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Contents

I. Editorial

Early Detection of a Kidney Disease – Where do we Stand Today?
Irena Kostovska ……...……..…..……...……... 1

II. Original Articles

Hypertension or Something More? Rethinking Hypertensive Kidney Disease in ESRD Populations
Biljana Gerasimovska …….……...…..……. 4

Pregnancy in patients with end-stage kidney disease
Matea Ivanda and Nikolina Basic-Jukic …….…….……... 8

Deceased Donor Transplantation in Albania: Integrating Public Opinion with ICU-Based Feasibility
Marsida Kasa, Nereida Spahia, Brunilda Elezi, Alma Idrizi, Arjana Strakosha and Merita Rroji ...…. 14

Abstract Book of the 20th Congress of the Balkan Association of Nephrology, Dialysis, Transplantation and Artificial Organs (BANTAO)
Timisoara, Romania, 13-15 November 2025 ….……...…..……. 21

BANTAO Journal 2025; 23(1): 1-3

BJ

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Editorial

Early Detection of a Kidney Disease – Where do we Stand Today?

Irena Kostovska

Department of Medical and Experimental Biochemistry, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, Republic of North Macedonia

Abstract

Chronic kidney disease (CKD) represents a major global health burden, with early detection of glomerular injury remaining a persistent clinical challenge. The urinary albumin-to-creatinine ratio (UACR), although widely accepted as a diagnostic and prognostic marker, primarily reflects established structural damage. Urinary nephrin, a podocyte-specific transmembrane protein integral to the slit diaphragm, has emerged as a sensitive and mechanistically precise indicator of early podocyte injury. Detection of nephrinuria precedes the onset of albuminuria and correlates with disease activity across diabetic nephropathy, preeclampsia, and immune-mediated glomerulopathies. Comparative evaluation suggests that nephrinuria provides superior temporal and pathophysiological insight into glomerular injury. Incorporation of urinary nephrin into clinical practice, alongside UACR, holds potential to refine early CKD diagnostics and to facilitate a transition toward precision-based renal risk assessment and timely therapeutic intervention.

Keywords: chronic kidney disease, urinary albumin-to-creatinine ratio, urinary nephrin

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Chronic kidney disease (CKD) affects more than 800 million individuals worldwide and continues to rise in prevalence and mortality [1]. Despite major advances in therapeutics and disease management, early detection of glomerular injury remains suboptimal. For decades, the urinary albumin-to-creatinine ratio (UACR) has been the cornerstone for the noninvasive detection of kidney injury, particularly in diabetic kidney disease (DKD). Yet, UACR elevation represents a relatively late event in the course of glomerular pathology, typically reflecting established damage rather than its incipient stages [2]. In the evolving landscape of renal biomarkers, urinary nephrin, a podocyte-specific protein, has emerged as a promising early indicator of glomerular injury. Its detection in urine (nephrinuria) provides direct evidence of podocyte stress or detachment, offering a mechanistically grounded complement, and potentially, a precursor to traditional albuminuria-based diagnostics.

The podocyte and the glomerular filtration barrier

The glomerular filtration barrier (GFB) is a tri-layered structure composed of fenestrated endothelium, the glomerular basement membrane (GBM), and the podocyte slit diaphragm. Its function relies on the structural and molecular integrity of podocytes, highly differentiated epithelial cells that maintain filtration selectivity through their interdigitating foot processes. Podocytes are dynamic cells with specialized junctional complexes, where nephrin, a transmembrane protein encoded by *NPHS1*, serves as both, a structural scaffold and a signaling molecule regulating cytoskeletal organization and cell survival. Experimental models demonstrate that nephrin loss leads to effacement of foot processes, disruption of slit diaphragm continuity, and consequent proteinuria. Damage to podocytes, whether mechanical, metabolic, or inflammatory, represents an early and irreversible event in the progression of glomerular disease. The shedding or leakage of nephrin into the urine thus provides a direct molecular signature of podocyte injury, preceding the onset of albuminuria and measurable renal function decline [3,4].

Urinary Nephrin: The sentinel biomarker of glomerular injury

Under physiological conditions, nephrin is retained within the slit diaphragm and absent from urine. Its appearance in urine indicates podocyte injury or detachment. Detection methods include enzyme-linked immunosorbent assays (ELISA), Western blotting, and, more recently, high-sensitivity chemiluminescent immunoassays [4]. Several clinical studies have established the role of urinary nephrin in diverse kidney disorders. In both type 1 and type 2 diabetes mellitus, nephrinuria occurs in normoalbuminuric patients, preceding microalbuminuria by months or years [5]. Similar findings have been reported in preeclampsia, where po-

Correspondence to: Irena Kostovska, Department of Medical and Experimental Biochemistry, Faculty of Medicine, Ss Cyril and Methodius University, Skopje, Republic of North Macedonia; E-mail: irenakostovska22@yahoo.com

docyte injury drives proteinuria and in immune-mediated glomerulopathies such as lupus nephritis, minimal change disease, and focal segmental glomerulosclerosis (FSGS) and hypertensive nephropathy [3,6,7]. Notably, nephrin levels often correlate with the disease activity and histological indices of glomerular damage, underscoring its potential for monitoring treatment response and disease remission. In this context, urinary nephrin is more than a marker, i.e. it's a window into podocyte biology, capturing early events that precede irreversible structural loss.

UACR: The established but imperfect standard

In the meanwhile, UACR remains a practical and clinically validated tool for detecting glomerular injury. It is simple, reproducible, and cost-effective, correlating strongly with long-term renal and cardiovascular outcomes. However, albuminuria reflects the net effect of multiple pathological processes endothelial dysfunction, GBM thickening, and podocyte injury, without distinguishing among them [8]. Furthermore, UACR is influenced by numerous nonpathological factors, including physical activity, posture, infection, fever, blood pressure, and glycemic fluctuations. This variability limits its precision for detecting subclinical or transient glomerular injury. In early diabetic nephropathy, for instance, significant podocyte loss and nephrin downregulation can occur despite normal UACR values [9, 10]. Thus, while UACR remains the clinical "gold standard", it may be more accurate to regard it as a lagging indicator, one that detects damage only after the glomerular barrier has already been structurally compromised.

Comparative evaluation: urinary nephrin vs. UACR

For better overview urinary nephrin and UACR characteristics have been presented in table 1.

Table 1. Comparative characteristics of urinary nephrin and UACR in glomerular injury detection

Table Feature	Urinary Nephrin	UACR
Source	Podocyte-specific slit diaphragm protein	Plasma protein filtered across the GFB
Pathophysiological insight	Direct marker of podocyte injury	Indirect marker of barrier dysfunction
Temporal appearance	Appears before albuminuria	Elevated in established injury
Specificity	High for podocyte damage	Nonspecific for the cause of injury
Measurement	Immunoassay (ELISA, Western blot)	Routine immunoturbidimetric methods
Clinical use	Research and emerging biomarker	Established diagnostic and prognostic tool

Clinical and research perspectives

Integrating urinary nephrin into clinical workflows could reshape CKD risk assessment and therapeutic monitoring. Its podocyte specificity provides an avenue for assessing early responses to nephroprotective interventions, particularly sodium-glucose cotransporter 2 (SGLT2) inhibitors, renin–angiotensin system blockers, and emerging podocyte-targeted therapies [10,11]. However, challenges remain on how nephrin could be transitioned from a research biomarker towards a routine diagnostic tool. These include the need for assay harmonization, standardized reference ranges across populations, cost-effectiveness analysis, and clarification of biological variability. Expectedly, large-scale longitudinal studies are essential to validate nephrin's predictive performance for CKD onset and progression. Moreover, combining nephrin with UACR or other podocyte-derived biomarkers such as podocalyxin, synaptopodin, or urinary exosomal mRNA could yield composite indices with superior sensitivity and specificity. Such multimarker strategies align with the emerging precision medicine paradigm, where molecular profiles guide individualized risk stratification and early intervention.

In conclusion, urinary nephrin represents a mechanistically specific and temporally early biomarker of podocyte injury, capturing glomerular pathology at a stage when intervention may still be reversible. While UACR continues to serve as a cornerstone of CKD screening and prognosis, it is ultimately a downstream marker reflecting established injury. The complementary use of both biomarkers, nephrin for detection and UACR for monitoring, may offer a more complete picture of glomerular health. As nephrology moves toward earlier and more personalized intervention, urinary nephrin holds promise not merely as a diagnostic innovation but as a redefinition of how clinicians conceptualize kidney disease progression from a reactive detection to a proactive preservation of renal integrity. Future research should focus on standardization of the nephrin measurement, establishing normative data, and exploring its predictive capacity for therapeutic response. The ability to identify glomerular injury before an incipient albuminuria could fundamentally alter the trajectory of CKD management, shifting the paradigm from a late recognition to the genuine prevention.

Conflict of interest statement. None declared.

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Original article

Hypertension or Something More? Rethinking Hypertensive Kidney Disease in ESRD Populations

Biljana Gerasimovska

University Clinic for Nephrology, Medical Faculty, Ss Cyril and Methodius University, Skopje

Abstract

Introduction. Hypertension is a significant contributor to end-stage renal disease (ESRD) in Macedonia, representing 25.8% of incident cases requiring renal replacement therapy (RRT). This study aimed to investigate the association between uncontrolled hypertension and hypertensive kidney disease, as well as the presence of nephroarteriosclerosis on renal biopsies.
Methods. This study utilized two data sources from the University Clinic of Nephrology in Skopje. Firstly, we conducted a record analysis linking data from a prior study on hypertension risk factors with patient records for hypertensive chronic kidney disease (CKD) at the Clinic over the past eight years. Secondly, we analyzed histopathological data from renal biopsies performed at the same Clinic.
Results. The analysis of hypertension risk factors revealed that 74% of patients in the study of risk factors had uncontrolled hypertension. Of these, only 1.7% had consulted the University Clinic of Nephrology for hypertensive kidney disease within the last eight years. In the analysis of renal biopsies (2017-2024) from 478 cases, nephroarteriosclerosis was confirmed in 2.5% of samples. Furthermore, clinical criteria for hypertensive kidney disease (Shlesinger criteria) were met by 17% of patients, with a similar proportion (17%) exhibiting uncontrolled hypertension.
Conclusion. By combining more precise diagnostic criteria, better clinical and pathological characterization, and improved data collection and registry management, the reliability of hypertensive nephrosclerosis statistics will meaningfully improve.

Keywords: end stage renal disease, hypertensive kidney disease, nephroarteriosclerosis, renal biopsy, renal replacement therapy, uncontrolled hypertension

Introduction

Hypertension is one of the leading causes of end-stage renal disease (ESRD) in Macedonia, accounting for around 25.8% of incident ESRD patients requiring renal replacement therapy (RRT) depending on the year and dataset [1]. There is a growing belief that the term "hypertensive nephropathy" (HN) should be abandoned, in favor of "hypertensive kidney disease" (HKD) [2]. This perspective is supported by the evidence that nephroarteriosclerosis, a key morphological feature, is not exclusive for hypertension and can be observed in various chronic nephropathies [3]. Furthermore, research indicates that hypertension may contribute to CKD progression rather than being the primary cause in many instances. The precise prevalence of HKD remains a subject of debate, compounded by diagnostic challenges arising from non-uniform criteria and infrequent biopsy confirmation [4].
The diagnosis of HKD should rely on clinical and morphological criteria [2]. Clinical, Schlesinger criteria involve family history of hypertension, evidence of longstanding arterial hypertension predating CKD and proteinuria <1g/d, typically elevated blood pressure (systolic BP >155 mm Hg based on newer optimized criteria), age >75 years, absence of diabetes mellitus and signs of hypertensive end-organ damage (hypertensive retinopathy, left ventricular hypertrophy and ultrasonographically small kidneys).
The sensitivity and specificity of the clinical criteria are suboptimal, underscoring the need for renal biopsy confirmation. Histopathologically, hallmarks of hypertensive nephrosclerosis involve changes in medium and small renal arteries, afferent/efferent glomerular arterioles, accompanied by medial hypertrophy of arterioles, duplication of internal elastic lamina, glomerular lesions like generalized sclerosis and focal segmental glomerulosclerosis, and interstitial fibrosis, tubular atrophy, and inflammatory cell infiltrates [5]. Kidney biopsy remains crucial for definitive diagnosis, especially in atypical cases or when proteinuria is significant. Unfortunately, renal biopsies are rarely performed in patients with hypertension and thus the diagnosis of HKD leading to CKD and RRT may not be accurate. There is a growing concern among nephrologists that hypertensive nephrosclerosis diagnosis often reflect incomplete diagnostic workups, where other ca-

Correspondence to: Biljana Gerasimovska, University Clinic for Nephrology, Medical Faculty, Ss Cyril and Methodius University, Skopje, R. N. Macedonia; E-mail: bgerasimovska@yahoo.com

uses of CKD, including genetic kidney diseases, primary glomerular diseases, renovascular disease, or other nephropathies, are not excluded [6].
Despite these challenges, hypertension is acknowledged as a significant factor in the pathogenesis of CKD. The kidneys themselves play a crucial role in regulating blood pressure through hormonal mechanisms, and conversely, high blood pressure impacts the kidneys [7]. The understanding of the mechanisms of kidney damage in hypertension involves the loss of autoregulatory properties of renal microcirculation, leading to increased intraglomerular pressure, and adaptive reactions like arteriolar hypertrophy [8]. Genetic factors, such as variations in the MYH9 and APOL1 genes, are also being investigated for their role in predisposing individuals to kidney damage from hypertension, particularly in populations of African descent [9].

Material and methods

This study involved analysis of two types of data, available from the University clinic of Nephrology in Skopje.
The first type of data is record based analysis. Data from a 2003 study on hypertension risk factors in 2,367 patients from Macedonia with normal renal function, who were controlled in primary healthcare settings, were linked with clinical records from the "Moj Termin" system at the University Clinic of Nephrology over the last eight years. Patients were categorized based on their hypertension control status as Group 1 (controlled hypertension) and Group 2 (uncontrolled hypertension), among those undergoing antihypertensive treatment. This analysis included office blood pressure measurements, age, sex, and evidence of target organ damage as potential risk factors for uncontrolled hypertension. Patients with comorbidities or pre-existing CKD were excluded from this linkage.
For the second component of the study, we analyzed the histopathology of renal biopsies obtained at the University Clinic of Nephrology. This analysis aimed to determine the prevalence of nephroarteriosclerosis as a marker of HKD and to review the corresponding clinical characteristics of these patients.
Data were analyzed using SPSS version 26.0. Numerical variables were expressed as mean ± standard deviation (SD) and compared using Student's t-test. Categorical variables were analyzed with the chi-square test. The frequency of nephroarteriosclerosis on histopathological findings in renal biopsies was presented as percentages, and a risk ratio was calculated to evaluate associations.

Results

In a 2003 study investigating risk factors for hypertension, 74% of participants were found to have uncontrolled hypertension (Table 1). This subgroup was predominantly female (63%) with a mean age of 64.1±10 years. The average systolic blood pressure among patients with uncontrolled hypertension (N=1.749) was 166±15 mmHg, and the average diastolic pressure was 94±10 mmHg.

Table 1. Average blood pressure values, age and gender in the groups with controlled and uncontrolled blood pressure

N=2367	Controlled HT 618 pts (26%)	Uncontrolled HT 1749 (74%)	P
Women	357 (58%)	1111 (63%)	0.000
Mean age (years)	61 12	64 10	0.000
Average systolic blood pressure (SBP) in mmHg	1328	166 15	0.000
Average diastolic blood pressure (DBP) in mmHg	83 8	94 10	0.000

Among patients with uncontrolled hypertension, 1.7% sought consultation at the University Clinic of Nephrology over the last eight years for HKD and CKD (Table 2). There was no statistically significant difference compared to controls, with a risk ratio of 1.5. The analysis was limited by the absence of data on patients who died or migrated.

Table 2. The risk for check ups for hypertensive kidney disease and CKD

N=2367	Controlled HT- 618 pts (26%)	Uncontrolled HT -1749 (74%)	P	Risk ratio for future check ups for CKD among uncontrolled HT
Patients with future check ups for CKD	15/618(2.4%)	30/1749(1.7%)	0.17	1.5(95% CI 0.8-2.8)

The second dataset comprised an analysis of renal biopsies performed at the Clinic between 2017 and 2024. Among 478 biopsies, histopathological findings confirmed nephroarteriosclerosis in 2.5% of cases (Table 3). Of the patients diagnosed with nephroarteriosclerosis, 17% met clinical (Shlesinger) criteria for

HKD and had a history of uncontrolled hypertension. Proteinuria exceeding 1 g/day was observed in 58% of these patients. In 17% of cases, further evaluation-including review of medical history and genetic analysis -led to a confirmed diagnosis of Alport syndrome. Hemodialysis was initiated immediately following biopsy in 17% of patients and within four years in an additional 8.5%.

Table 3. Findings of nephroarteriosclerosis on renal biopsies and frequency of clinical characteristics

Nr. of renal biopsies (2017-2024)	N=478
Nephroarteriosclerosis (NAS)	12/478(2.5%)
Uncontrolled HT in pts with NAS	2/12(17%)
Schlesinger criteria for hypertensive kidney disease in NAS	2/12(17%)
Proteinuria above 1 g/dU in NAS	7/12(58%)
GFR<60 ml/min in NAS	7/12(58%)
Further analysis showed Alport syndrome in NAS	2/12(17%)
Started HD immediately after biopsy (NAS)	2/12(17%)
Started HD after 4 years (NA	1/12(8,5%)

Discussion

The findings of this study demonstrate that among the high proportion of patients with uncontrolled hypertension identified in the 2003 cohort, only 1.7% subsequently presented to the University Clinic of Nephrology for evaluation of hypertensive CKD. The calculated risk ratio for developing hypertensive CKD was 1.5. A smaller proportion of uncontrolled HT patients had follow-ups compared to the controlled HT group (1.7% vs. 2.4%), which could suggest underreferral or lack of CKD awareness in patients with uncontrolled HT. The study design did not include continuous follow-up and did not account for patients who died, potentially underestimating the true burden of CKD in this population.

Few studies have quantified the risk of incident CKD attributable to hypertension. A meta-analysis by Weldegeorgis *et al*. reported that the relative risk (RR) of incident CKD or ESRD in individuals with hypertension, compared to those with optimal blood pressure, was 1.56 in women and 2.06 in men [10], indicating a notably higher risk in men.

A graded association between time-varying blood pressure and the development of CKD has been demonstrated, with increased CKD risk observed at systolic blood pressures (SBP) ≥130 mmHg and diastolic blood pressures (DBP) ≥90 mmHg [11-13]. Earlier studies have similarly shown a continuous, graded relationship between elevated blood pressure and the onset of kidney disease [14,15].

Uncontrolled hypertension is expected to exert long-term detrimental effects on renal function, and nephroarteriosclerosis is frequently identified in kidney biopsies performed in this context. In our cohort, nephroarteriosclerosis was confirmed in 2.5% of all renal biopsies, a finding consistent with previously published data [16,17]. These results support the argument for expanding the indications for renal biopsy to improve diagnostic accuracy.

A significant clinicopathological discordance was observed in cases of biopsy-confirmed nephrosclerosis. In approximately 50% of these cases, concomitant glomerular disease was identified [18]. Similarly, our findings revealed that only 17% of patients with nephroarteriosclerosis had uncontrolled hypertension and fulfilled the clinical criteria for hypertensive nephropathy. In contrast, a substantial proportion (58%) exhibited significant proteinuria (>1 g/day) and severely reduced renal function (eGFR <30 mL/min/1.73 m²).

Furthermore, in 17% of patients initially diagnosed with nephroarteriosclerosis, Alport syndrome was confirmed following further clinical evaluation. A significant number of these patients required initiation of hemodialysis shortly after the biopsy.

In summary, the current limitations in diagnostic precision-including the absence of specific diagnostic criteria, the predominance of exclusion-based approaches, the limited specificity of renal biopsy findings, and incomplete data capture in national registries-render existing statistics on hypertensive nephrosclerosis unreliable and not fully reflective of the true prevalence or disease burden. To improve diagnostic accuracy and epidemiological reporting, the development and implementation of more comprehensive diagnostic criteria and standardized biopsy protocols are strongly recommended.

Conclusion

By combining more precise diagnostic criteria, better clinical and pathological characterization, and improved data collection and registry management, the reliability of hypertensive nephrosclerosis statistics will meaningfully improve.

Conflict of interest statement. None declared.

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Original article

Pregnancy in Patients with End-Stage Kidney Disease

Matea Ivanda and Nikolina Basic-Jukic

School of medicine, University of Zagreb and Clinical hospital centre Zagreb, Zagreb, Croatia

Abstract

Introduction. Pregnancy in patients with end-stage renal disease (ESRD) is rare but possible. Fertility may be affected by both hormonal and non-hormonal factors. However, after kidney transplantation, reproductive function often improves, and many women resume regular menstrual cycles. Despite the potential for complications, successful pregnancies can occur in these patients with careful, multidisciplinary management.

Methods. A study conducted at the University Hospital Centre Zagreb from 1988 to 2024 analysed 15 pregnancies among 12 women aged 25 to 43 years. Of these pregnancies, two occurred while the patients were on hemodialysis, one during continuous ambulatory peritoneal dialysis, and 12 after kidney transplantation. Transplant recipients were treated with immunosuppressive medications such as cyclosporine combined with azathioprine and prednisone, or tacrolimus combined with azathioprine and prednisone.

Results. Eleven pregnancies resulted in deliveries via cesarean section, while four were delivered vaginally. There were four miscarriages. Five pregnancies were preterm, with deliveries occurring between 31 and 36 weeks of gestation. Six children were born with low birth weight (less than 2500 grams), although only three of these were preterm.

Obstetric complications included umbilical cord issues in four deliveries. Three newborns experienced complications: one had a Bochdalek hernia, another was suspected of having necrotizing enterocolitis, and one suffered from asphyxia and sepsis, requiring successful resuscitation. Maternal complications were rare, with one patient experiencing elevated blood pressure and another suffering from a urinary tract infection.

Conclusion. In conclusion, while pregnancy in patients with ESRD on dialysis or after kidney transplantation carries significant risks, it is not impossible. Advances in dialysis and immunosuppressive therapy have improved outcomes for both mothers and their children. A multidisciplinary approach is essential to provide the best possible care and outcomes for these high-risk pregnancies.

Keywords: pregnancy, dialysis, kidney transplantation, chronic kidney disease

Introduction

Fertility in women with chronic kidney disease (CKD) is generally reduced, although the exact cause is not fully understood. Studies show that several factors may be responsible for this condition, including dysfunction at the hypothalamic-pituitary-ovarian axis, sexual dysfunction, oxidative stress, and effects of certain medications [1]. One of the key indicators of fertility in women with CKD is a lower level of Anti-Müllerian Hormone (AMH), regardless of the stage of the disease, which indicates a reduced ovarian reserve [2]. In addition to the decreased AMH levels, these patients also have a reduced number of antral follicles, as determined by transvaginal ultrasound. Although they have elevated estradiol levels, FSH levels and ovarian volume are similar to those in women without CKD [3]. As glomerular filtration rate (GFR) decreases, the frequency of oligomenorrhea increases, and at GFR values below 4 ml/min, amenorrhea may occur [4]. Elevated prolactin levels, common in women with CKD, may affect the pulsatile secretion of hypothalamic gonadotropins, leading to anovulation and irregular menstrual cycles [5]. Hyperprolactinemia is caused by decreased prolactin clearance and increased secretion from the pituitary due to insufficient dopaminergic inhibition [6]. When evaluating female sexual function indices, which assess sexual desire, arousal, lubrication, orgasm, and pain/discomfort, women with CKD scored lower than controls, indicating sexual dysfunction [7]. Sexual dysfunction even worsens when patients begin dialysis [4].

Fertility in women with CKD who are on hemodialysis may be influenced by several factors. In women with CKD on hemodialysis who have regular menstrual cycles, Anti-Müllerian Hormone levels are not significantly different from those of women without CKD who also have regular menstrual cycles [8]. However, AMH levels are significantly lower in CKD patients on hemodialysis who have irregular menstrual cycles [8]. Overall, there is no significant difference in AMH le-

Correspondence to: Nikolina Basic-Jukic, Department of nephrology, arterial hypertension, dialysis and transplantation, Clinical hospital centre Zagreb, Kispaticeva 12, 10000 Zagreb, Croatia; E-mail: nina_basic@net.hr

vels between women on hemodialysis and those without CKD. When examining hormone levels in premenopausal women on hemodialysis, they are mostly similar to those in healthy women, except for elevated LH. Although normal estradiol levels are described during the follicular phase of the menstrual cycle, these levels do not reach the peak necessary for ovulation, and thus the LH surge does not occur, causing anovulation. Also, patients on hemodialysis with amenorrhea have lower estradiol levels, which further indicates ovarian dysfunction. If a woman had oligomenorrhea or amenorrhea before starting dialysis, it is very likely that these problems will persist after dialysis begins [4]. Elevated prolactin levels are common in women with CKD on hemodialysis. Although prolactin is significantly higher than in healthy women, no clear correlation has been found between prolactin levels and gonadotropins [9]. One reason for elevated prolactin is the decreased prolactin clearance [10].

Kidney transplantation can have a significant impact on the fertility in women. Although prolactin levels usually normalize after transplantation, the same does not fully apply to sex hormones. Estrogen and FSH levels are higher in transplanted women than in healthy women [11]. Conversely, some studies report no significant differences in estradiol and FSH levels in women before and after transplantation, with values comparable to those in healthy women [12]. Unlike estrogen and FSH concentrations, progesterone and LH levels are lower in transplanted women. The differences in hormone concentrations even after transplantation suggest that there is no complete recovery of the menstrual cycle [11]. This is also influenced by the fact that women after kidney transplantation have been found to have reduced AMH levels compared to the healthy population [8]. In more than half of the women who had dysfunctional menstrual cycles, the cycle stabilized after transplantation [4,13]. Although pregnancy in women with a transplanted kidney is four times more common than in those on dialysis, it is still ten times less frequent than in the healthy women [6]. This cluster of hormonal changes and cycle alterations indicates that kidney transplantation may have a positive effect on fertility, but ovarian function may still differ from that of healthy women.

Material and methods

This retrospective study was conducted as part of the project "Complications after Kidney Transplantation and Immunosuppressive Therapy". The study was approved by the Ethics Committee under number 02/21 AG. Data were collected by searching the database of the Department of Nephrology, Arterial Hypertension, Dialysis, and Transplantation at the Clinical Hospital Center Zagreb for the period from 1988 to 2024.

The main objective was to examine the course and outcomes of pregnancies in patients with CKD who are on dialysis or have undergone transplantation, and to assess the frequency and types of complications in mothers and newborns.

Initially, 14 patients with CKD who had documented pregnancies during this period, either while on dialysis treatment or after kidney transplantation, were included. Two patients were excluded from the analysis due to insufficient data following death (it was recorded that one of them had two deliveries after transplantation, and the other had one delivery during hemodialysis treatment), resulting in a final analysis cohort of 12 patients.

The following data were collected: underlying kidney disease, duration and type of dialysis (hemodialysis or peritoneal dialysis), time of kidney transplantation and type of donor (cadaveric or living), immunosuppressive therapy used, number of pregnancies per patient, pregnancy outcomes (delivery or miscarriage), patient age at delivery, gestational age at delivery, mode of delivery (vaginal or cesarean section), APGAR score, newborn's birth weight and length, obstetric complications, neonatal complications, and maternal complications during or after pregnancy. Renal function of the patients was also monitored during and after the pregnancy. In all subjects, renal function remained stable throughout and after pregnancy, without significant deterioration in GFR or increase in proteinuria.

Results

This study included 12 patients treated at the Clinical Hospital Center Zagreb from 1988 to 2024.

Out of a total of 15 analysed pregnancies, 12 occurred after kidney transplantation, while 3 were recorded during dialysis treatment (2 on hemodialysis and 1 on peritoneal dialysis). This aligns with findings from previous studies that show a higher frequency and better pregnancy outcomes after transplantation, which is attributed to the stabilization of hormonal status and the recovery of the ovulatory cycle following kidney transplantation.

All pregnant women with transplanted kidneys were on immunosuppressive therapy. The most commonly used combinations were cyclosporine + azathioprine + corticosteroids, and tacrolimus + azathioprine + prednisone. One patient used tacrolimus and everolimus. Despite the known teratogenic potential of some of these drugs, no increase in the number of congenital malformations related to the therapy was observed in this sample. One case of diaphragmatic hernia was recorded, but it cannot be directly associated or considered as a consequence of the therapy.

Out of 15 pregnancies, 11 were delivered by cesarean section, while 4 births were vaginal.

Five pregnancies were preterm (between the 31st and 36th week), confirming the presence of a high risk for premature birth.
Six newborns had low birth weight (<2500g) but only three of them were born prematurely, indicating that low birth weight is not necessarily related to the gestational age but also to the specifics of kidney disease and therapy.
Most newborns had satisfactory APGAR scores and a favourable postnatal course. The most serious neonatal complications included asphyxia, sepsis, and congenital diaphragmatic hernia, but all were successfully medically managed. Four deliveries were complicated by the umbilical cord being wrapped around the newborn's neck, but without lasting consequences.

Patient 1
Born in 1965, she suffered from mesangioproliferative glomerulonephritis. In 1990, she started hemodialysis treatment lasting 10 months, after which she was transplanted in 1991. The kidney donor was her mother. The patient had two pregnancies, both after the transplantation. The first delivery occurred at age 30, and the second at age 40. Both deliveries were vaginal. The first delivery was at 40 weeks gestation. The male newborn weighed 3110 grams, measured 51 cm, with an APGAR score of 10. Pregnancy and delivery were without complications. The second pregnancy ended at 39 weeks with an induced vaginal delivery. The female newborn weighed 1910 grams, measured 48 cm, with an APGAR score of 7. The infant was classified as having low birth weight and was diagnosed with congenital diaphragmatic hernia, which was surgically treated the following day. Postoperative recovery was uneventful, and further development was without complications. During both pregnancies, the patient was on standard triple immunosuppressive therapy including cyclosporine, azathioprine, and methylprednisolone.

Patient 2
Born in 1965, she suffered from chronic glomerulonephritis with symptoms appearing at age 16. From 2003, she was treated with continuous ambulatory peritoneal dialysis for ten years until kidney transplantation in 2013 from a deceased donor. She had three pregnancies. The first two deliveries occurred before dialysis and transplantation and were excluded from analysis. The third delivery occurred in 2008 during peritoneal dialysis. The pregnancy was completed vaginally at 41 weeks gestation. The female newborn weighed 2200 grams, measured 46 cm, with an APGAR score of 10. Although classified as having low birth weight, no other complications were noted. Since the patient was not transplanted at the time, she was not on immunosuppressive therapy.

Patient 3
Born in 1975, she had chronic glomerulonephritis. She was on hemodialysis for three years (2001-2004) before receiving a kidney from a deceased donor. She had one pregnancy at age 34. Due to pathological cardiotocography, delivery was performed by emergency cesarean section at 35 weeks gestation. The female newborn weighed 2470 grams, measured 47 cm, and had an APGAR score of 10. The infant was classified as having low birth weight and was diagnosed with necrotizing enterocolitis but without further complications. The patient received immunosuppressive therapy including cyclosporine, azathioprine, and prednisone during pregnancy.

Patient 4
Born in 1975, she had Goodpasture's syndrome at age 13, subsequently developing CKD. She was on hemodialysis from 1998 to 2003, with one failed transplant attempt in 2002, followed by successful transplantation in 2003. She had two pregnancies, both completed by cesarean section. The first pregnancy ended in 2010 at 37 weeks gestation. The male newborn weighed 3260 grams, measured 47 cm, with an APGAR score of 5 at first minute. Asphyxia and sepsis were noted, requiring resuscitation which was successful. The second pregnancy ended in 2012 at 36 weeks. The female newborn weighed 3130 grams, measured 49 cm, with an APGAR score of 10 and no complications. Immunosuppressive therapy during both pregnancies included tacrolimus, azathioprine, and prednisone.

Patient 5
Born in 1977, she was on hemodialysis from 2001 to 2006, when transplantation was performed. She had three pregnancies; the first two occurred before dialysis and transplantation and were excluded from analysis. The third pregnancy occurred during hemodialysis in 2002. Delivery was by cesarean section at 34 weeks gestation. The male newborn weighed 2100 grams, measured 41 cm, with an APGAR score of 8. Other than low birth weight, no additional complications were noted. The patient was not on immunosuppressive therapy during the pregnancy.

Patient 6
Born in 1979, she suffered from chronic pyelonephritis. She was on hemodialysis from 2003 to 2009, when she received a kidney from a deceased donor. She had three pregnancies-two ended in spontaneous miscarriages, and one was delivered by cesarean section at 31 weeks during hemodialysis at age 29. The female newborn weighed 1980 grams and was classified as having a low birth weight. The umbilical cord was wrapped around the newborn's neck. No other compli-

cations were noted. The patient was not on immunosuppressive therapy at the time of pregnancy.

Patient 7
Born in 1981, she was on hemodialysis for two years before receiving a kidney from a deceased donor in 2002. She had one pregnancy, completed by cesarean section at 39 weeks gestation at age 37. The male newborn weighed 3450 grams, measured 48 cm, with an APGAR score of 10. The patient developed an urinary tract infection after delivery. Immunosuppressive therapy included cyclosporine, azathioprine, and prednisone.

Patient 8
Born in 1982, she suffered from lupus nephritis. She was on peritoneal dialysis for two and a half years before receiving a kidney from a deceased donor in 2007. She had one pregnancy completed by cesarean section at 38 weeks gestation in 2013. The male newborn weighed 2470 grams, measured 46 cm, with an APGAR score of 10. The infant was classified as having a low birth weight without additional complications. Immunosuppressive therapy included cyclosporine, azathioprine, and prednisone.

Patient 9
Born in 1989, she had fibrotic kidney changes and was on hemodialysis from 2016 for one and a half years. Kidney transplantation from a deceased donor was performed in 2017. She had one pregnancy, delivered vaginally at 35 weeks gestation at age 30. The female newborn weighed 2520 grams, measured 46 cm, with an APGAR score of 10. At delivery, the umbilical cord was wrapped around the baby's neck. No other complications were observed. Immunosuppressive therapy during pregnancy included tacrolimus, azathioprine, and prednisone.

Patient 10
Born in 1990, she suffered from juvenile nephronophthisis. She was not on dialysis before transplantation, which was performed in 2016 with a kidney from a deceased donor. She had two pregnancies. The first delivery occurred at 30 years of age at 37 weeks gestation. The delivery began vaginally but was completed by cesarean section due to a pathological cardiotocography. The female newborn weighed 3530 grams, measured 51 cm, and had an APGAR score of 7 at the first minute. The umbilical cord was wrapped around the newborn's neck and oxygen support was required immediately after birth. The second delivery occurred at 39 weeks gestation at age 32, also completed by cesarean section. The female newborn weighed 3200 grams, measured 50 cm, with an APGAR score of 10. Umbilical cord wrapped around the neck was again noted without other complications. The patient received immunosuppressive therapy (tacrolimus, azathioprine, prednisone) during both pregnancies.

Patient 11
Born in 1990, she was on peritoneal dialysis for two years before kidney transplantation from a deceased donor in 2017. She had three pregnancies-two ended in spontaneous miscarriages, and one resulted in delivery by cesarean section at 37 weeks gestation at age 30. The female newborn weighed 2500 grams, measured 48 cm, with an APGAR score of 10. No complications were recorded in the mother or child. Immunosuppressive therapy included tacrolimus, azathioprine, and prednisone.

Patient 12
Born in 1993, she was on hemodialysis for one year before transplantation in 2015 with a kidney from a deceased donor. She had one pregnancy completed by cesarean section at 39 weeks gestation at age 29. The female newborn weighed 2800 grams, measured 47 cm, with an APGAR score of 10. Pregnancy and delivery were uneventful. Immunosuppressive therapy during pregnancy included tacrolimus and everolimus.

Discussion

Pregnancy in women with CKD, especially those on dialysis or after kidney transplantation, represents a significant clinical challenge due to numerous associated complications for both, the mother and child.
This study analysed pregnancies in women with CKD, divided into two groups: those who were on dialysis during pregnancy and those who conceived after kidney transplantation. The results were compared with data from the available literature.
In the transplanted patient group, 14 pregnancies were recorded, of which two (14.3%) ended in spontaneous miscarriage. This frequency is very similar to other studies reporting a miscarriage rate of 12.5%. The average maternal age at delivery was 32.9 years, slightly higher compared to the literature average of 30.3 years [14]. The average time from transplantation to conception was 6.9 years, somewhat longer than the previously reported 5.6 years.
Cesarean section was the most common mode of delivery, performed in 75% of cases, consistent with previous studies reporting a cesarean rate of 68.7%. The average birth weight of newborns in our sample was 2862.5 grams, with an average gestational age of 37.6 weeks, which is considerably more favourable than other studies reporting lower averages, weight 2387.7 g and gestational age 34.3 weeks. Furthermore, preterm deliveries in our sample accounted for 25% of all births, significantly lower than 45.3% reported in previous analyses [14].

Regarding maternal complications, a single case of hypertension (8.3%) was recorded in our group, whereas literature reports such complications in 24.3% of pregnancies. No cases of preeclampsia or gestational diabetes were observed, unlike previous data indicating their prevalence at 20.9% and 5.1%, respectively [14].
In the group of patients who conceived during dialysis treatment, a total of five pregnancies were recorded, of which two (40%) ended in spontaneous miscarriage. This frequency falls within previously reported ranges of 16.9% to 51.7% [15-17]. The average maternal age at delivery was 32.3 years, consistent with earlier studies reporting ages of 34.6 [16]and 35.4 [15] years. Duration of dialysis before pregnancy in our sample was 3.7 years, a way shorter compared to the average of 6 to 8.4 years reported in other studies [15,16].
Of all deliveries, 66.7% were completed by cesarean section, aligning with literature data showing rates between 71.4% and 73.1%. The average birth weight in our study was 2093 grams, slightly higher than those recorded in previous studies (1853 g and 1966 g) [15,16]. All three newborns had low birth weight, accounting for 100%, whereas previous studies reported low birth weight in 78.6% of cases [16].
The average gestational age at delivery in our sample was 35.3 weeks, higher than the averages reported in previous studies (32-33.7 weeks) [15,16]. The proportion of preterm births (66.7%) was lower compared to earlier research where preterm births accounted for 82.8% [17].
In our study, no maternal complications were recorded during pregnancy or postpartum in the dialysis group. In contrast, previous studies reported preeclampsia in 11.9% of cases, gestational hypertension in 7.7%, and anemia in 3.9% of pregnant women treated with dialysis [17].

Conclusion

This study confirms that pregnancy in women with CKD, including those on dialysis and after kidney transplantation, although rare and with a high-risk, can result in favourable outcomes with appropriate medical supervision.
The results showed that the most common complications included preterm birth and low birth weight; however, most infants had satisfactory APGAR scores and good postnatal outcomes. Despite the use of immunosuppressive therapy, a low number of congenital malformations were observed, indicating that safe pregnancy under such therapy is possible with an appropriate drug selection.
Kidney function remained stable in all transplanted patients during and after pregnancy, confirming that carefully planned and monitored pregnancy does not necessarily negatively affect the graft function. At the same time, although less common, successful pregnancies were also recorded in women on dialysis, highlighting the importance of an individualized and multidisciplinary approach to treatment.
In conclusion, with careful planning, adequate therapy adjustment, and continuous collaboration among nephrologists, gynecologists, and neonatologists, pregnancy in women with CKD-whether on dialysis or post-transplantation-is not only possible, but can also have a favourable outcome for both mother and child.

Conflict of interest statement. None declared.

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Original article

Deceased Donor Transplantation in Albania: Integrating Public Opinion with ICU-Based Feasibility

Marsida Kasa[1], Nereida Spahia[2,3], Brunilda Elezi[4], Alma Idrizi[2,3], Arjana Strakosha[2,3] and Merita Rroji[2,3]

[1]Department of Internal Medicine, University Hospital of Trauma, Tirana, [2]Department of Nephrology, University Hospital Center "Mother Tereza, Tirana, [3]University of Medicine, Tirana, [4]Faculty of Medical Technical Sciences, University Aleksander Xhuvani, Elbasan, Albania

Abstract

Introduction. Albania currently lacks a deceased donor kidney transplant program, mainly due to the legal, institutional, and cultural barriers. To assess the feasibility of starting such a program, we performed a dual-faceted investigation that integrated clinical observations in intensive care settings with an analysis of public attitudes toward organ donation.

Methods. A prospective observational study was undertaken involving 150 trauma patients admitted to the Intensive Care Unit (ICU) at the University Hospital of Trauma. The primary objective was to evaluate renal viability at the time of death. Concurrently, a nationwide, self-administered online survey was distributed to assess public perceptions, gathering responses from 1,457 adult participants across Albania.

Results. Among the 102 ICU deaths, 35.3% of patients maintained viable kidney function at the time of death. Notably, among those who died within the first 72 hours, 66.7% had transplantable kidneys, highlighting a missed opportunity for a deceased donation in early ICU mortality cases. The survey revealed encouraging public support for deceased organ donation in Albania. Nearly three-quarters (74.8%) believe it's time to establish a national deceased donor program, and 58.6% gave the highest possible score (10/10) when asked about registering as a potential deceased donor to help a family member. Even when it comes to donating to a stranger after death, 72% of respondents expressed moderate to strong willingness, with 36% giving the maximum score - highlighting a remarkable level of altruism.

In a separate question, an overwhelming 90.2% of participants stated they would be willing to donate a kidney to a family member while alive, reflecting strong support for living donation as well. Factors positively associated with willingness to donate included older age and personal familiarity with individuals undergoing dialysis. Significant barriers identified were partial trust in the healthcare system and perceived cultural or religious concerns.

Conclusion. The findings indicate both clinical and societal readiness to establish a deceased donor kidney transplantation program in Albania. Implementation will need a comprehensive legal, ethical, and institutional reforms, alongside targeted public education and strengthening of the healthcare system to promote trust and support informed consent.

Keywords: deceased donor kidney transplantation, feasibility study, trauma-related acute kidney injury, chronic kidney disease

Introduction

Organ transplantation is one of the most effective treatments for patients living with end-stage renal disease (ESRD). While living donor kidney transplantation is currently performed in Albania, a formal system for deceased donor transplantation is still lacking due to the absence of legal frameworks, clear clinical guidelines, and dedicated institutional infrastructure. In contrast, many European countries have well-established deceased donor programs that reduce dialysis dependence and improve long-term patient outcomes. Albania remains one of the few countries in the region without such a system. Understanding how the public views this issue is critical not just from an ethical standpoint, but also to inform practical and culturally sensitive policy planning. The aim of this nationwide survey, believed to be the first of its kind in Albania, was to assess public awareness, attitudes, and willingness toward organ donation in Albania, in order to evaluate societal readiness for establishing a national deceased donor kidney transplantation program. This survey aimed to identify key motivators and barriers impacting donation decisions, including trust in the healthcare system, cultural or religious beliefs, and

Correspondence to: Merita Rroji, Department of Nephrology, University Hospital Center "Mother Tereza, Tirana, University of Medicine, Tirana, Albania; E-mail: meritarroji@yahoo.com

personal experiences with kidney disease, thereby informing future policy, legal frameworks, and educational strategies.

Material and methods

We conducted a two-part investigation. First, 150 trauma patients admitted to the University Hospital Trauma ICU (2023-2024) with a normal baseline renal function were observed for 14 days to assess renal viability at the time of death. AKI was diagnosed and staged according to the Kidney Disease: Improving Global Outcomes (KDIGO) criteria. Inclusion criteria were age ≥18 years and baseline glomerular filtration rate (GFR) >90 mL/min, excluding preexisting chronic kidney disease. Patients with direct renal trauma were excluded.

Second, we conducted a nationwide online survey using Google Forms, which was distributed via WhatsApp over one week, and collected responses from 1,457 adult participants. Our questionnaire was based in part on previously published and validated instruments, including the 61-item survey by Zampieron *et al*. (2010) [1] and the European Commission's Special Eurobarometer [2] on organ donation and transplantation (2009). Selected items from both surveys were culturally adapted and translated to reflect the Albanian context and healthcare system, while maintaining their core thematic structure. The survey was anonymous, voluntary, and did not collect personally identifying data. By local regulations, formal ethics approval was not required.

Results

The ICU-based study of the 150 trauma patients with normal kidney function revealed that 102 (68%) died during their ICU stay. Of these, 36 (35.3%) maintained viable renal function at the time of death. Notably, among patients who died within the first 72 hours, two-thirds (66.7%) still had transplantable kidneys. A younger age was associated with a higher likelihood of maintaining kidney function at the time of death. Among early ICU deaths (within 72 hours), the average age of those with viable kidneys was 49 years±11.2 years, compared to 63.1±15.39 years among later deaths. This difference underlines the donor potential in younger trauma patients who die shortly after admission. Key risk factors for acute kidney injury (AKI) included nephrotoxic drug exposure, hypotension, and metabolic derangements. Despite these risks, early deaths often occurred before significant renal deterioration, identifying a window of donor eligibility that is currently missed due to a lack of policy and protocols. Figure 1, shows a comprehensive view of the ICU Study Data.

The survey data were collected over a one-week period using a self-administered online questionnaire created via Google Forms. The survey link was distributed through WhatsApp to enable a broad and efficient reach among the target population.

A total of 1,457 individuals participated in the survey. The majority of respondents were between 18 and 30 years old (41.3%), followed by those aged 31 to 45 years (37.8%) and 46 to 60 years (17.4%). Participants over the age of 60 accounted for the remaining portion.

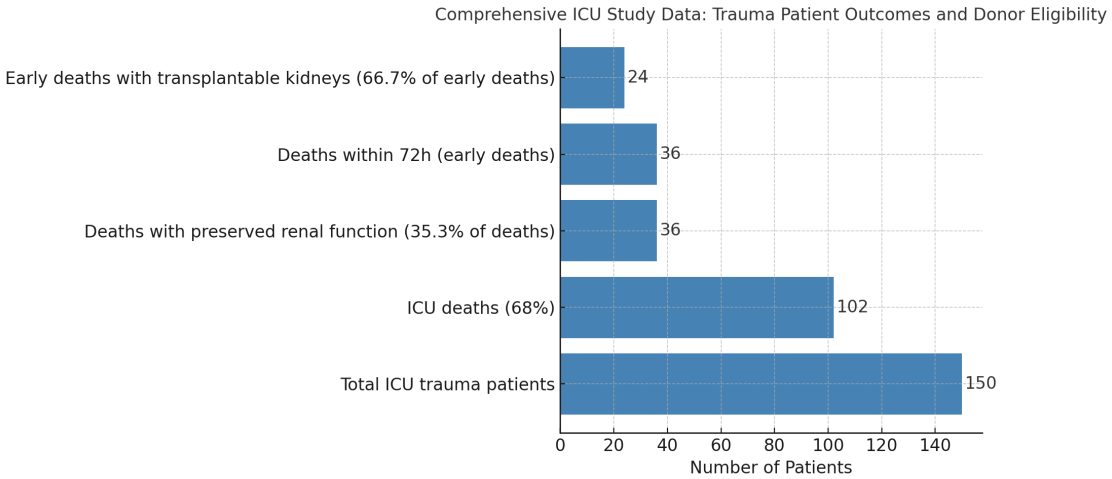

Fig. 1. Comprehensive ICU Study Data: Trauma Patient Outcomes and Donor Eligibility. From a total of 150 trauma patients admitted to the ICU, 68% died during their stay. Among the deceased, 35.3% preserved renal function, and 36 died within 72 hours. Of these early deaths, 66.7% had transplantable kidneys, representing a potential organ donation opportunity.

In terms of a gender distribution, 75.5% of respondents were identified as female, 23.7% as male, and the remaining 0.8% did not disclose their gender. Regarding the place of residence, 81.2% of respondents lived in urban areas, while 18.7% resided in rural areas. Figure 2 presents epidemiological data of participants on the survey.

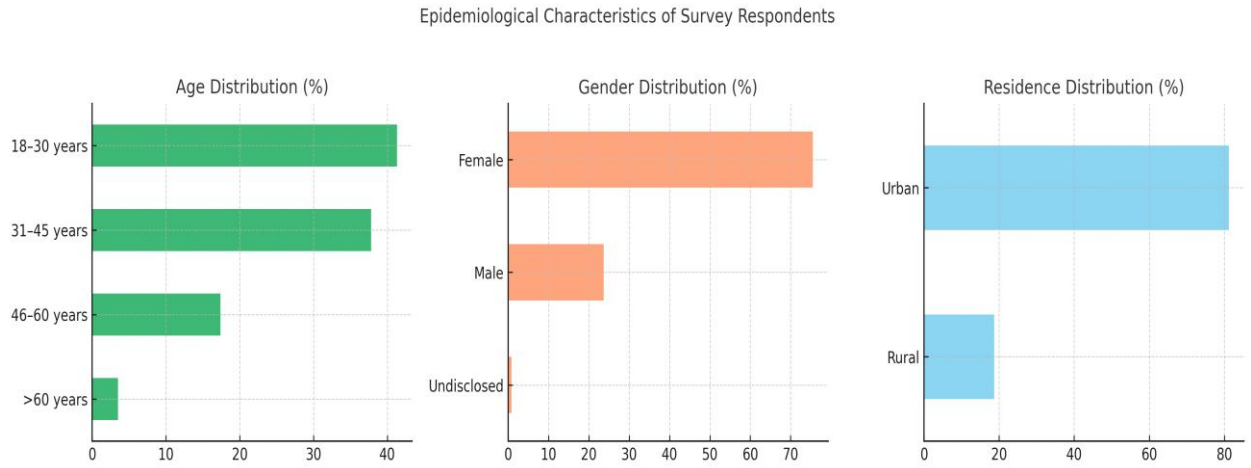

Fig. 2. Visualize the epidemiological characteristics of the survey respondents, including age distribution, gender distribution, and place of residence

The survey revealed several notable trends. In a very high proportion of both urban and rural respondents expressed complete willingness to donate (59.3% and 55.1% selected the highest score (10/10) in urban and rural, respectively). The percentage of respondents who were completely unwilling (score 0) was 6.8% and 8.1% in urban and rural, respectively. Out of 604 respondents who indicated they work in the medical field, 337 (or approximately 55.8%) gave the maximum score of 10/10 when asked about their willingness to join a potential deceased donor registry to help a family member. Among the 851 respondents who do not work in the medical field, 515 (or 60.5%) gave the maximum score of 10/10 when asked about their willingness to join a potential deceased donor registry to help a family member. Around 66.2% of respondents said they would agree to a kidney transplant to come from a brain-dead donor if a family member or friend needed it, but only 54.9% said they would agree to have this transplant performed in Albania. While alive, 90.2% were willing to donate a kidney to a family member. Majority, 74.8% agreed that the time has come for Albania to introduce a deceased donor transplant program. When asked about joining a donor registry if a family member was in need of a transplant, 86.3% rated their willingness between 5 and 10, with 58.6% giving the highest possible score (10/10). In addition, 36% were equally willing to donate to a stranger, highlighting significant altruism. Conversely, 14% completely rejected the idea (score 0), while another 30% were cautiously supportive (scores 5-9), forming a "grey zone" of hesitant but potentially reachable individuals.

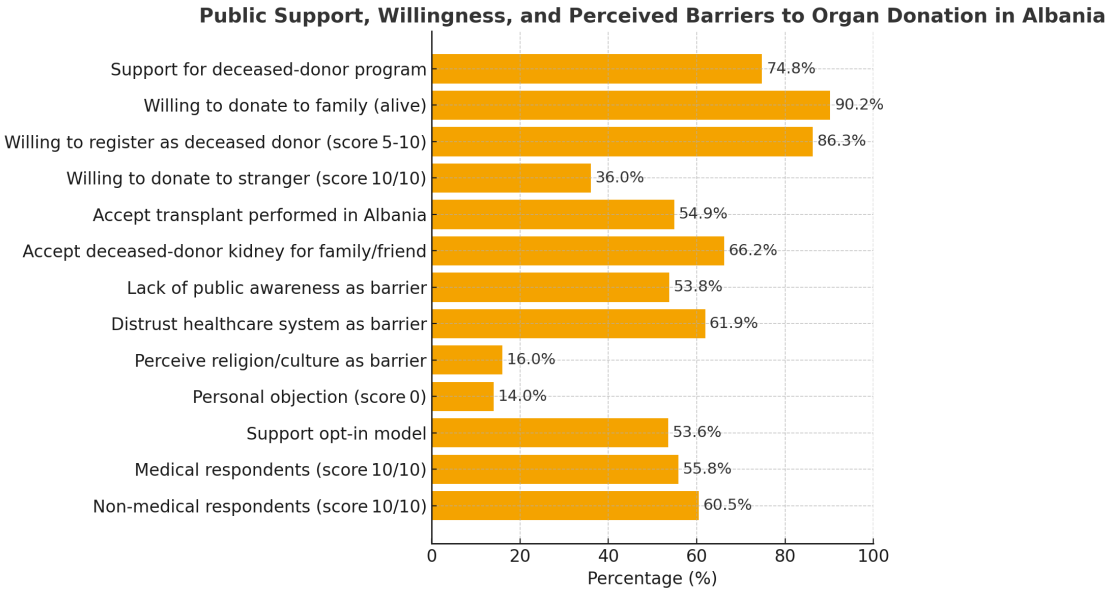

Fig. 3. Public Support, Willingness, and Perceived Barriers to Organ Donation in Albania: Results from a Nationwide Survey (n = 1,457). Data illustrate high willingness to donate to family members, moderate support for deceased donation, and key barriers including perceived religious and cultural objections and partial trust in the healthcare system. Responses reflect both medical and non-medical participants and inform public readiness for a deceased donor program.

Of those who scored 10/10 for donating to a stranger (57.4%), personally, they knew someone on dialysis. This association is supported by a statistically significant, albeit weak, positive correlation ($r=0.10$, $p<0.001$). In a multiple-choice question about perceived barriers to organ donation, 61.9% of respondents cited distrust in the healthcare system, followed by a lack of public awareness (53.8%) and cultural or religious beliefs (16%). Both urban and rural respondents identifieddistrust in the healthcare system as the leading concern, although it was slightly more common in urban areas (62.4% vs. 58.8%). A lack of public awareness was similarly reported in both groups, with rural participants showing a slightly higher percentage (54.8% vs. 53.3%). Rural respondents more frequently cited cultural or religious beliefs than urban ones, although overall, they remained the least cited barrier in both groups (12.9% vs. 9%). One thousand two hundred eighty-four participants (88.1%) reported having an university-level of education, 148 (10.2%) had completed secondary education, and 22 (1.5%) had finished eight-year schooling. Across all three educational levels, partial trust in the Albanian healthcare system is the most frequently reported response. More than a half (53.6%) believed that a person's wishes before death should be the final word in donation decisions an endorsement of an opt-in consent model. Only 25% of respondents fully trusted the healthcare system, with 50% reporting partial trust and 25% expressing none at all. Figure 3 presents Public Support, Willingness, and Perceived Barriers to Organ Donation in Albania.

Discussion

Kidney transplantation remains the preferred treatment for patients with kidney failure who are suitable transplant candidates. It has been shown to significantly reduce both cardiovascular [3] and overall mortality [4,5], while also offering improved quality of life and greater cost-effectiveness in the majority of cases [6]. Even kidneys of lower quality have been shown to offer better outcomes and cost-effectiveness than remaining on dialysis. Prioritizing their use-especially by matching lower-quality kidneys with older recipients-can significantly reduce organ waste and improve transplant efficiency [7]. According to the WHO Global Observatory on Donation and Transplantation, most Western European countries report over 20 deceased donors per million population annually [8,9]. At the same time, Albania remains one of the few without a formal deceased donor program. This regional gap underscores the need for strategic investment and public engagement in transplant policy.

A substantial 58.6% of respondents gave the maximum score (10/10) for registering as a deceased donor to help a relative, indicating strong family-centered motivation. Moreover, 36% expressed an equal willingness to donate to a stranger, suggesting a meaningful degree of altruism beyond kinship. While 14% of participants completely rejected the idea of organ donation, an additional 30% fell within a moderate range of support (scores 5-9), forming a “gray zone” of individuals who are not opposed to donation but may require targeted education, reassurance, or further engagement to shift toward full support.

When compared to the 2009 Eurobarometer data [2], in which 55% of EU citizens expressed willingness to donate their organs after death, Albania’s data shows comparable or even slightly greater support, particularly among the most willing ones. However, while the EU survey also highlighted significant hesitation tied to a distrust into the system and fear of body manipulation, these barriers were echoed in the Albanian context as well-most notably, with nearly 61.9% of Albanian respondents citing distrust in the healthcare system as a significant obstacle.

Doubt in the healthcare system emerged as the most frequently cited concern (61.9%), reflecting a broader skepticism that may hinder participation in deceased donor programs. This aligns with prior European data from Eurobarometer 2009[2], which also identified systemic distrust as one of the main reasons for refusal to donate organs either personally or on behalf of family members.

When stratified by residence, both urban and rural populations cited distrust as their top concern, though it was slightly more prevalent among urban respondents (62.4%) compared to rural (58.8%). This finding may suggest that an increased interaction with the health system in urban areas leads to a greater scrutiny and perceived risks, rather than a greater reassurance.

Lack of public awareness was the second most common barrier overall (53.8%), with a marginally higher ratio in rural participants (54.8%) compared to the urban residents (53.3%). This difference, although modest, reflects the well-documented challenge of accessing information and healthcare education in non-urban settings. Similar patterns have been noted in EU countries where public education campaigns have been unevenly allocated, particularly in Eastern Europe.

Cultural and religious beliefs, although the least cited obstacle in Albania (16%), were mentioned more frequently by rural respondents (12.9%) than by their urban counterparts (9%). These figures are notably lower than in other regional contexts. For instance, in Romania, 17% of respondents in the 2010 Eurobarometer explicitly cited religious reasons as a barrier. In Greece, fear and guilt correlated to the concept of organ removal were reported by over 55% of respondents, suggesting underlying religious or cultural discomfort [10].

All together, these findings underline the importance of targeted public health strategies. To build trust and

improve donation rates, campaigns should address misinformation, promote transparency in the healthcare system, and clarify the compatibility of organ donation with cultural and religious values, particularly in rural areas where such concerns are more noticeable.

There is only a slight difference in willingness to donate a kidney to a family member between urban and rural populations. Both groups demonstrate strong support for organ donation in brain death situations, with 59.3% of urban and 55.1% of rural respondents giving the highest score (10 out of 10). This difference was not statistically significant (χ^2=1.43, p=0.231). Similarly, the percentage of those completely unwilling to donate (score 0) is also close to 6.8% in urban areas and 8.1% in rural areas, without statistical difference (p=0.556). Overall, the level of commitment appears comparable across both groups, with only minor, non-significant variations.

When stratified by age and gender, willingness to donate organs revealed meaningful trends. Older individuals, especially those over 60, had the highest average willingness scores, suggesting that life experience and medical exposure may play a role in shaping altruistic attitudes. Men reported a slightly higher willingness to donate compared to women, while a professional background appeared to have a minimal overall influence. These findings underline the importance of tailoring public awareness campaigns not only demographically but also around shared human values and lived experiences.

Although individuals working in the medical field made up a substantial portion of the surveyed population (approximately 42%), their professional background did not appear to influence their decision significantly, as 55.8% gave the maximum score of 10/10 when asked about joining a potential deceased donor registry to help a family member, compared to 60.5% among non-medical respondents. This finding suggests that altruistic readiness for family-directed donation is widely shared across various professional groups, emphasizing strong societal support that grows beyond medical circles.

When considered together with our ICU-based study, where a significant number of patients maintained transplantable kidney function at the time of death, it becomes clear that both clinical opportunity and public readiness exist in parallel.

These findings paint a promising picture of a population that is mainly open to the idea of deceased donor transplantation. Many Albanians have adopted a thoughtful and compassionate stance on organ donation, especially when it involves helping a family member. However, even among those willing to donate to strangers, personal exposure, such as knowing someone on dialysis, seemed to play a motivating role.

An opt-in model appears to resonate strongly with the public, particularly because it respects individual autonomy and can help families avoid the emotional burden of making difficult decisions during moments of crisis. However, translating public support into policy and practice will require thoughtful, systematic reforms. The "grey zone" population, comprising those who are neither firmly opposed nor certain, represents an important target for education and outreach campaigns.

The alignment between public perception and ICU-based feasibility presents a unique opportunity for Albania to initiate a deceased donor kidney transplant program. Clinical evidence shows that many patients die with preserved organ function, particularly within the first days of ICU admission, highlighting a clear donor potential. The survey confirms public readiness and ethical alignment with an opt-in model, wherein individuals' choices are respected and families are spared from making difficult decisions under emotional duress.

Several limitations of the survey must also be acknowledged. The survey did not specifically target individuals with direct ICU experience or the next of kin of critically ill patients, which may limit insight into the perspectives most relevant during end-of-life decision-making. While respondents expressed high theoretical willingness to donate, these findings may not fully translate into consent behavior during real clinical scenarios.

Policy and Clinical Recommendations

Healthcare System Trust: Build a transparent and ethically grounded transplant infrastructure to foster public confidence. This includes regular audits, patient satisfaction monitoring, and public reporting mechanisms.

Definition of a Brain Death: Establish a clear, legal, and universally accepted definition of brain death, applicable across all ICUs. This clarity will support ethical decision-making by reanimators and anesthesiologists.

Legal Reform: Pass legislation that allows the withdrawal of life support in confirmed brain death cases, regardless of whether the patient is a potential donor. This is crucial for both ethical clarity and responsible management of ICU resources.

Workforce Training: Develop multidisciplinary transplant teams that include: ICU physicians trained in early donor identification, transplant surgeons and logistical coordinators, nurses, psychologists, or trained communicators skilled in guiding families through end-of-life donation conversations.

Public education: Broaden and intensify outreach to the “grey-zone” segment. Initiatives should be evidence-based, culturally sensitive, and incorporated into both formal curricula and community-level health programs.

Conclusion

Albania is well-positioned to move forward with a deceased donor transplantation program. Public support is strong, and clinical feasibility exists. What is needed now is a coordinated national effort grounded in legislation, supported by healthcare infrastructure, and shaped by respectful, informed dialogue. By adopting a culturally sensitive and patient-centered approach, Albania can build a sustainable program of self-sufficiency that saves lives while honoring individual and societal values.

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Oral presentations

OP-01 Kinetic glomerular filtration rate as a predictor of acute kidney disease

Chisavu L[1], Chisavu F[1], Mihaescu A[1], Marc L[1], Bob F[1], Schiller A[1]

[1]Centre for Molecular Research in Nephrology and Vascular Disease, Faculty of Medicine 'Victor Babes', Timisoara, Romania.

Introduction. Acute kidney injury (AKI) remains an important factor for mortality and morbidity among the adult population. Several biomarkers are being used to evaluate AKI, AKI duration, and AKI outcomes. The kinetic estimated glomerular filtration rate (KeGFR) formula developed by Chen is a valuable tool used in predicting AKI occurrence in patients admitted to intensive care units. The aim of our study focuses of the utility of the KeGFR formula to estimate AKI duration and mortality when applied in the first 24 hours of AKI diagnosis.

Methods. We performed a retrospective observational cohort study on 103 patients diagnosed with AKI, admitted to the Nephrology Department of "Pius Brinzeu" Emergency County Hospital from Timisoara during January-February 2024. The inclusion criteria was the recording of at least two serum creatinine values within 24 hours of AKI diagnosis. We recorded age, gender, and associated diseases. We identified several factors associated with acute kidney disease (AKD) development. We evaluated the impact of KeGFR on AKI duration and mortality.

Results. 65 patients developed a prolonged AKI episode and were diagnosed with AKD. Patients with AKD presented similar age (71 years), sex distribution (39.8% males), arterial hypertension (91.3%), diabetes mellitus (43.77%), neoplasia (11.7%) and sepsis (40.8%), but presented higher incidence of CKD (76% vs 52%, p=0.023) and heart failure (63.1% vs 42.1% p=0.039). Regarding biological parameters, AKD patients presented lower haemoglobin levels (10.96 vs 12.11 g/dl p=0.008), higher phosphate (4.4 vs 3.5 mmol/l p=0.0129), and higher parathormone levels (131.2 vs 93.95 pg/ml p=0.021). AKD patients had higher baseline serum creatinine levels (1.5 vs 1.15 mg/dl p=0.028), translated into lower baseline eGFR (35 vs 51.5 ml/min/1.72sm p=0.041). AKD patients presented lower levels of KeGFR (16.19 vs 32.71 ml/min/1.73sm, p=0.001), longer hospital stay (12.4 vs 6.7 days, p<0.001), and similar mortality compared to non-AKD patients (18.4%). Independently, each unit decrease in KeGFR translated into a 4% higher chance (OR=0.96, 95%CI=0.93-0.98, p=0.0039) of a patient developing AKD.

Conclusion. KeGFR evaluation on the first day of AKI could become a useful tool in predicting AKI duration, regardless of comorbidities or AKI cause. The impact of this simple equation can lead to better and earlier AKI management, especially in the intensive care units.

OP-02 Dynamic clinical and biochemical predictors of acute kidney injury in trauma ICU Patients: Insights from preliminary results of a cohort

Kasa M[1], Spahia N[2], Caushi X[2], Ibrahimi A[2], Kuci S[3], Sula H[3], Rroji M[3]

[1]Department of Internal Medicine, University Hospital of Trauma, Tirana, Albania; [2]Department of Nephrology, University of Medicine of Tirana, Albania; [3]Department of Intensive Care, University of Medicine of Tirana, Tirana, Albania;

Introduction. Acute kidney injury (AKI) is a frequent and severe complication in trauma intensive care unit (ICU) patients, substantially worsening survival. While contributors such as hemodynamic instability, nephrotoxic exposure, and illness severity are recognized, early predictive tools remain scarce. Classical markers, such as serum creatinine, rise only after significant renal damage. This study investigates risk factors and early detection markers of AKI in trauma ICU patients at the University Hospital of Trauma, Albania.

Methods. We conducted a prospective observational study of 153 adult trauma ICU patients (May 2024–August 2025). Clinical characteristics, exposures, and dynamic laboratory values were collected over a 14-day period. KDIGO criteria staged AKI. Logistic regression and ROC analyses were used to assess predictors of AKI and associated mortality. This report reflects interim data; enrollment will continue until December 2025 to refine biomarker validation.

Results. AKI developed in 53.6% of patients (Stage I: 31, Stage II: 23, Stage III: 28). Mortality increased with severity: 31% in no AKI, 68% in Stage I, 52% in Stage II, and 100% in Stage III. AKI conferred a >5-fold mortality risk (74% vs 34%; OR, 5.5; p < 0.000001). Independent predictors included inotrope use within 24h (OR 9.6, p=0.005), NSAID exposure (OR 3.0, p=0.003), transfusion burden (FFP OR 1.15/unit, p=0.022; RBC OR 1.15/unit, p=0.029), elevated lactate (OR 1.77, p=0.012), and reduced diuresis (OR 0.15, p=0.002). Mannitol amplified AKI risk in elderly or highly catabolic patients (CK ≥5000 U/L). SOFA scores correlated with AKI (max SOFA ≥9: specificity 84%, AUC 0.71), while SOFA

amplitude showed excellent predictive value (AUC 0.87). Urinary sodium <40 mmol/L predicted AKI onset (PPV 63%, NPV 85%) and distinguished persistent from transient AKI (40.5 vs 88.7 mmol/L, p=0.011). NLR amplitude was an independent predictor (OR 1.04, p=0.044). Fractional excretion of potassium (FEK >30–40%) showed exploratory promise as a marker of tubular stress.

Conclusion. In this Albanian trauma ICU cohort, AKI was common and carried an extreme mortality burden, with Stage III universally fatal. High-risk patients include those receiving inotropes, NSAIDs, and transfusions. Urinary sodium and FEK show potential as early stratification markers. Importantly, sequencing of dynamic data of NaU trends, SOFA evolution, and inflammatory amplitudes, offers more significant predictive accuracy than static values, supporting continuous monitoring for improved AKI prediction.

OP-03 Risk factors and incidence of contrast-induced nephropathy in patients undergoing elective endovascular procedures. A retrospective cohort study

Olariu N[1,2], Mihaescu A[1,2], Bob F[1,2], Maralescu F[1,2], Marc L[1,2], Chisavu L[1,2], Rată A[3], Barac S[3]

[1]Department of Internal Medicine II—Nephrology University Clinic, "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania; [2]Centre for Molecular Research in Nephrology and Vascular Disease, Faculty of Medicine, "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania; [3]Department of Vascular Surgery, Research Centre for Vascular and Endovascular Surgery, "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania;

Introduction. Contrast-induced nephropathy (CIN) has become a significant complication linked to the use of iodinated contrast media in diagnostic and therapeutic procedures. With the increasing global prevalence of chronic kidney disease (CKD), understanding the risks associated with contrast media exposure is essential. This study aimed to evaluate the incidence of CIN and identify its associated risk factors among patients undergoing endovascular interventions at a vascular surgery clinic in a tertiary hospital in Eastern Europe (Timisoara, Romania).

Methods. This retrospective cohort study analysed data from patients treated between January 1, 2018, and December 31, 2023. The study included adult patients who underwent scheduled endovascular procedures for peripheral arterial disease (percutaneous angioplasty with or without stent insertion or diagnostic peripheral arteriopathy) and had serum creatinine levels measured before and within 48h after the intervention. Patients were diagnosed with CIN if there was an increase in serum creatinine of at least 0,3 mg/dl within 48h after the administration of contrast media for the endovascular procedure, as per AKIN Group definition of AKI. The contrast media used was either iopromid or iodixanol within the 50-150 ml ranging in quantity, infused intra-arterial. We excluded patients with elevated inflammatory marker values, sepsis, hemodynamically unstable, missing key data, severe renal dysfunction (acute kidney injury at presentation or CKD stage 5 with eGFR<15 ml/min at presentation) or those who did not have complete follow-up.

Results. A total of 331 patients were included in the analysis, of whom 71.42% were male, with a mean age of 66.79±9.86 years. Among these, 9.22% had CKD, and 23.8% developed CIN. Multivariate logistic regression revealed that higher hemoglobin levels were associated with reduced odds of CIN (OR = 0.79, 95% CI: 0.659–0.952, p = 0.01), highlighting anemia as a significant risk factor. Additionally, CKD increased the odds of CIN by 85.8% (OR = 1.858, 95% CI: 1.105–3.125, p = 0.0023), confirming CKD as a critical predictor.

Conclusion. Anemia and CKD were identified as key predictors of CIN in patients undergoing elective endovascular procedures. Correcting anemia and ensuring stable baseline creatinine levels may be effective strategies for reducing CIN risk. Further research involving larger, more diverse populations is needed to validate these findings and explore additional risk factors.

OP-04 The role of serum potassium in uremic peripheral neuropathy: A comparative study between CKD stage 3-4 and stage 5

Cule E[1], Rroji M[2]

[1]Department of Nephrology, Hygeia Hospital, Tirana, Albania; [2]Department of Nephrology, University Hospital Center "Mother Teresa", Tirana, Albania

Introduction. Uremic peripheral neuropathy (UPN) is a frequent and disabling complication of chronic kidney disease (CKD), particularly in its advanced stages. The condition arises through multiple mechanisms, including accumulation of uremic toxins, oxidative stress, and metabolic derangements. However, the contribution of electrolyte imbalances, especially disturbances in serum potassium, has received comparatively little attention. Hyperkalemia is common in CKD, and experimental data suggest that elevated extracellular potassium may depolarize axons and exacerbate neuropathic dysfunction. This study aimed to explore the relationship between serum potassium levels and neuropathy severity in patients with moderate-to-advanced CKD.

Methods. We performed a cross-sectional analysis of 63 non-diabetic adults with confirmed CKD, of whom 57% were in stages 3–4 and 33% in stage 5 (non-dialysis). Peripheral neuropathy was defined according to established literature as an MNSI score greater than

seven and/or abnormal findings on nerve **conduction** studies (NCS)**,** consistent with diagnostic thresholds used in prior epidemiological and clinical studies of CKD-related neuropathy. Neuropathy assessment was conducted within 24 hours of serum potassium measurement. Descriptive statistics, group comparisons, correlation testing, and multivariate regression analyses were applied.

Results. The mean age of participants was 65.1 years; 33% females. UPN was more prevalent and severe in stage 5 patients, with 63% recording an MNSI score >7 compared with 27% of those in stages 3–4 ($p<0.001$). Serum potassium levels were significantly higher in stage 5 patients compared with those in stages 3–4 (5.1 ± 0.6 vs. 4.75 ± 0.5 mmol/L, $p = 0.026$). A moderate positive correlation was found between serum potassium levels and MNSI scores ($r = 0.48$, $p < 0.03$). Multivariate regression analysis demonstrated that both potassium ($\beta = +0.87$, $p = 0.013$) and eGFR ($\beta = -0.02$, $p = 0.049$) were independent predictors of neuropathy severity, together accounting for 32% of the observed variance ($R^2 = 0.32$).

Conclusion. Elevated serum potassium is independently associated with increased severity of UPN in CKD, especially in stage 5 disease. The observed relationship supports experimental evidence connecting hyperkalemia to axonal depolarization and indicates that potassium imbalance may accelerate neuropathic changes even in earlier CKD stages. These findings highlight the importance of vigilant potassium monitoring and early correction of abnormalities as potentially modifiable strategies to slow neuropathy progression and enhance patient quality of life.

OP-05 Hyperuricemia in chronic kidney disease: A hidden catalyst of heart failure and valvular disease

Hoxha E[1], Kuka S[1], Collaku L[1], Pojani P[1], Habilaj X[1], Gjata M[1]

[1]University Hospital Center "Mother Theresa", Internal Medicine, Tirana, Albania

Introduction. Uric acid has long been considered a secondary by-product of impaired renal clearance, but growing evidence suggests it plays an active role in the cardio–renal continuum. Through mechanisms including endothelial dysfunction, oxidative stress, systemic inflammation, and stimulation of the renin–angiotensin system, hyperuricemia has been implicated in vascular remodeling, left ventricular hypertrophy, and valvular calcification. However, its prognostic significance in patients with chronic kidney disease (CKD) remains controversial. The present study aimed to determine the prevalence of hyperuricemia in a CKD cohort and to evaluate its associations with cardiac structural abnormalities and biomarkers of cardiovascular stress.

Methods. We performed a cross-sectional study in 100 patients with CKD stages II–V, including 21 on hemodialysis. Clinical data, comorbidities, and biochemical parameters were collected. Hyperuricemia was defined as serum uric acid >7 mg/dL in men and >6 mg/dL in women. Echocardiographic evaluation included left ventricular ejection fraction (LVEF), left ventricular hypertrophy (LVH), diastolic function, and valvular calcifications. NT-proBNP was measured as a marker of myocardial stress. Associations between uric acid levels and cardiovascular features were analyzed using correlation tests and multivariate logistic regression.

Results. Hyperuricemia was present in 58% of patients and was more frequent in advanced CKD stages (72% in stages IV–V vs. 46% in stages II–III, $p<0.05$). Patients with hyperuricemia had significantly higher rates of LVH (60% vs. 35%, p=0.02) and valvular calcifications (51% vs. 28%, p=0.03). Uric acid levels correlated positively with NT-proBNP (r=0.30, p=0.01) and inversely with LVEF (r=-0.28, p=0.02). In logistic regression, hyperuricemia was confirmed as an independent predictor of LVH (OR 1.9, 95% CI 1.05–3.6, p=0.04), even after adjustment for age, diabetes, and hypertension.

Conclusion. Hyperuricemia is common in CKD and is independently linked to adverse cardiac remodeling and calcific valvular disease. Far from being a passive marker of reduced renal function, uric acid emerges as an active metabolic and inflammatory risk factor. Its routine evaluation may improve cardiovascular risk stratification in CKD, and future interventional trials are needed to clarify whether urate-lowering therapy can modify outcomes.

OP-06 Integrated Screening of MASLD and CKD in Type 2 Diabetes: A Prospective Cohort Study

Marc L[1,2], Chisavu L[1,2], Mihaescu A[1,2], Olariu N[1,2], Bende F[3], Avram V[4], Schiller O[5], Schiller A[1,2]

[1]Department of Internal Medicine II—Division of Nephrology, "Victor Babeș" University of Medicine and Pharmacy, Timisoara, Romania; [2]Center for Molecular Research in Nephrology and Vascular Disease, Faculty of Medicine, "Victor Babeș" University of Medicine and Pharmacy, Timișoara, Romania; [3]Department of Internal Medicine II—Division of Gastroenterology and Hepatology, "Victor Babeș" University of Medicine and Pharmacy, Timisoara, Romania; [4]Department of Internal Medicine II—Division of Diabetes, Nutrition and Metabolic Diseases, "Victor Babeș" University of Medicine and Pharmacy, 300041 Timisoara, Romania; [5]Avitum Hemodialysis Center Timisoara

Introduction. Chronic kidney disease (CKD) is routinely screened in diabetes [1], while metabolic

dysfunction–associated steatotic liver disease (MASLD) has only recently been recognized as a frequent comorbidity. The latest American Diabetes Association (ADA) Consensus Report highlighted its high prevalence and recommends systematic screening and early intervention in type 2 diabetes mellitus (T2DM) patients [2]. Given their shared mechanisms—insulin resistance, inflammation, and metabolic dysregulation—combined assessment of CKD and MASLD may improve risk stratification. This study prospectively examined their relationship in T2DM, focusing on metabolic and therapeutic profiles.

Methods. We enrolled 91 patients with T2DM and MASLD (from 105 screened) from County Emergency Hospital "Pius Brinzeu", Timișoara (Jan–Dec 2023). CKD was staged by KDIGO 2024 criteria (eGFR, UACR), while MASLD was assessed using FibroScan® (CAP, LSM). Laboratory work-up included renal, hepatic, and metabolic biomarkers. Clinical characteristics and antidiabetic therapy were recorded.

Results. CKD was identified in 60.4% of patients, most frequently in stages G2–G3. More than half of the cohort was obese (BMI >30 kg/m² in 56%), while 70.3% had hypertension. Patients with CKD exhibited poorer metabolic control (fasting glucose 201.2 ± 55.4 vs. 173.5 ± 56.7 mg/dL, p=0.002), higher CRP (15.9 ± 8.7 vs. 6.9 ± 6.1 mg/L, p=0.03), and as expected markedly elevated UACR (1525.6 ± 347.1 vs. 17.3 ± 6.3 mg/dL, p=0.02). When analyzed by therapy, insulin-treated patients had a longer diabetes duration (18.3 ± 15.1 vs. 13.7 ± 4.9 years, p=0.043), higher BMI (36.1 ± 7.7 vs. 30.3 ± 5.2 kg/m², p=0.0005), poorer glycemic control (HbA1c 9.8 ± 1.05% vs. 8.4 ± 1.6%, p=0.002), higher CRP (15.9 ± 8.7 vs. 6.9 ± 6.06 mg/L, p=0.03), and more advanced CKD (eGFR 57.1 ± 30.3 vs. 74.2 ± 19.9 ml/min/1.73m², p=0.002). In contrast, patients on oral agents exhibited a lower degree of hepatic fibrosis (LSM 8.4 ± 6.4 vs. 12.8 ± 6.4 kPa, p=0.004). No significant differences were observed in steatosis between CKD and non-CKD groups (CAP 321.6 ± 50.9 vs. 321.2 ± 46.2 dB/m, p=0.97). A positive correlation between eGFR and CAP (r=0.751, p=0.03) suggested a link between renal hyperfiltration and hepatic fat accumulation.

Conclusions. This cohort illustrates the dual burden of CKD and MASLD in T2DM and the role of obesity, poor glycemic control, systemic inflammation, and insulin therapy in accelerating organ damage. In line with the ADA 2025 Consensus Report, integrated screening for MASLD and CKD should become routine in diabetes care.

OP-07 Venous thromboembolism as a chronic kidney disease complication or early symptom

Koleva N[1], Nikolova M[1]
[1]University Hospital "St. Ivan Rilski" Sofia, Bulgaria

Introduction. Patients with chronic kidney diseases have significantly increased risk of venous thromboembolism (VTE). It includes deep VTE, usually in the lower limbs and pulmonary embolism (PE)**.** All severities of kidney disease appear to increase the risk of venous thromboembolism. In the general population the risk associated with mild to moderate kidney disease is increased 1.3 to 2 time the average rate. Risk increases after kidney transplant and with nephrotic syndrome as well. The connection depends on what causes chronic kidney disease and the stage of the kidney damage. The risk for venous thrombosis is more often seen in people with nephrotic syndrome and systemic diseases compared to patients without nephrotic syndrome. Those with nephrotic syndrome have a 39% increase in risk of DVT and a 72% increased risk of PE. Dyslipidemia and underlying atherosclerosis lead to further endothelial dysfunction. Chronic renal diseases can lead to prothrombotic state via different mechanisms, including antiphospholipid antibodies, changes in vascular wall and/or platelets, urinary loss of anticoagulant factors in nephrotic syndrome and paraneoplastic thromboses. The combination of increased creatinine and urea levels or urinary abnormalities must focus the search for underlying chronic nephropathy. The aim of our study is to evaluate the causes of DVT in patients in whom the thrombosis leads to the diagnosis of underlying chronic nephropathy.

Methods. 21 patients (15 males and 6 females, aged 31-78 years), admitted in the Clinic of Nephrology, University Hospital St. Iv. Rilski in whom deep venous thrombosis was the initial symptom that led the discovery of the underlying renal disease.

Results. 7 patients presented with PE, 14 patients presented with peripheral venous thrombosis. Out of the 21-patients group, 5 had systematic lupus (SLE), 5 had chronic glomerulonephritis, 2 had amyloidosis, 3 had cancer, 6 had advanced chronic kidney disease. 7 patients presented with nephrotic syndrome. The patients that had pulmonary embolism were diagnosed via SPECT/Computer tomography of lungs. Peripheral thrombosis was proven via Doppler sonography. Five patients were tested for thrombophilia.

Conclusion. VTE has a high incidence in patients with CKD. In some cases VTE can be described as an early symptom for CKD, while in its last stage the number of complications of VTE are increased. Anticoagulation therapy is recommended for an early start. Sustained anticoagulation therapy in patients with CKD limits VTE complications. Rates of kidney disease are increasing rapidly in the population and kidney disease is a risk factor for VTE.

OP-08 Hyperkalemia in chronic kidney disease: risk factors, outcomes, and the impact of acute kidney injury

Gostian A[1], Olariu N[1,2,3], Chisavu L[1,2,3], Marc L[1,2,3], Dragota-Pascota R[2,3,4], Mihaescu A[1,2,3]

[1]Nephrology Department, County Emergency Hospital "Pius Branzeu" Timisoara, Romania; [2]Department of Internal Medicine II—Division of Nephrology, "Victor Babeș" University of Medicine and Pharmacy, 300041 Timisoara, Romania; [3]Center for Molecular Research in Nephrology and Vascular Disease, Faculty of Medicine, "Victor Babeș" University of Medicine and Pharmacy, 300041 Timișoara, Romania; [4]Dialysis Department, Municipal Hospital "Alexandru Simionescu", Hunedoara, Romania

Introduction. Hyperkalemia is a frequent and potentially life-threatening electrolyte disorder in CKD patients, often aggravated by AKI and the use of renin–angiotensin–aldosterone system (RAAS) inhibitors. We aimed to assess the prevalence, risk factors, and outcomes of hyperkalemia in patients admitted to a tertiary nephrology clinic.

Methods. We performed a retrospective cross-sectional study of 117 CKD patients admitted with hyperkalemia (serum K^+ >5 mmol/L) to the Nephrology Department of the County Emergency Hospital "Pius Brânzeu" Timișoara in 2018. Demographic, clinical, and laboratory data (comorbidities, CKD and AKI stage, serum creatinine, urea, albumin, CRP, medication, dialysis requirement, length of stay, readmissions, and mortality) were collected from medical records. CKD and AKI were defined and staged according to KDIGO guidelines. Statistical processing was performed using GraphPad Prism v.8.

Results. A total of 117 CKD patients were included (mean age 64.8 ± 14 years; 51.3% male). Heart failure was present in 78.6% and diabetes mellitus in 42.7%, while urinary tract infections and sepsis were documented in 23% and 20.5% of cases, respectively. CKD was predominantly advanced: stage 1–2, 8.8%; stage 3, 22.1%; stage 4, 23.8%; stage 5, 33.6%; and stage 5D, 11.1%. Superimposed AKI occurred in 47.8% of patients, most frequently stage 3 (69.6%), with prerenal etiology predominating (83.9%). Prior to admission, 26.4% of patients were treated with ACEI/ARBs, 11.9% with spironolactone, and 7.7% with both. Hyperkalemia correlated positively with age (p=0.008), AKI (p=0.002), prerenal AKI (p<0.0001), and spironolactone use (p<0.0001). Compared with AKI-negative patients, those with AKI were older (70.7 vs. 59.3 years, p<0.0001), had higher CRP (47 vs. 22 mg/L, p=0.02) and admission potassium (6.3 vs. 5.8 mmol/L, p=0.002), longer hospitalization (10.7 vs. 7.5 days, p=0.03), and higher in-hospital mortality (5.1% vs. 0.8%, p=0.03). Spironolactone (10.2% vs. 1.7%, p=0.002) and combined ACEI/ARB + spironolactone therapy (6.8% vs. 0.8%, p=0.01) were more frequent in the AKI group. Interestingly, hemodialysis was required more often in AKI-negative patients (20.5% vs. 8.5%, p=0.01), and readmissions for hyperkalemia were also more frequent (21.3% vs. 5.9%, p=0.0006). Overall, in-hospital mortality was 6%, readmission rate was 27.3%, and hemodialysis was required in 28.8% of cases.

Conclusion. Hyperkalemia in CKD is associated with advanced disease, RAAS inhibitor use, and superimposed prerenal AKI. It carries substantial risks of recurrence, dialysis, and mortality, underscoring the need for careful monitoring and individualized management.

OP-09 Liquid-Phase Separation and Mass Spectrometry for Ganglioside Analysis in Renal Pathology

Suteanu A[1,2,3], Zamfir AD[4,6], Gadalean F[1,2,3], Bob F[1,2,3], Milas O[1,2,3], Glavan M[1,2,3], Marcu L[1,2,3], Ienciu S[1,3], Sarbu M[4], Ica R[4,5], Petrica L[1,2,3]

[1]Department of Internal Medicine II, Division of Nephrology, "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania; [2]Department of Nephrology, County Emergency Hospital, Timisoara, Romania; [3]Centre for Molecular Research in Nephrology and Vascular Disease, Faculty of Medicine, "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania; [4]Department of Condensed Matter, National Institute for Research and Development in Electrochemistry and Condensed Matter, Timisoara, Romania; [5]Department of Physics, West University of Timisoara, Timisoara, Romania; [6]Department of Technical and Natural Sciences, "Aurel Vlaicu" University of Arad, Arad, Romania

Introduction. Gangliosides, sialylated glycosphingolipids with amphiphilic properties, are critical regulators of cellular recognition, signaling, and apoptosis. While predominantly studied in the nervous system, increasing evidence highlights their importance in kidney physiology and pathology. Altered ganglioside expression has been implicated in podocyte injury, diabetic nephropathy, and renal involvement in systemic metabolic and inflammatory diseases. Despite their low abundance in biological fluids such as plasma, urine, and cerebrospinal fluid, changes in ganglioside composition may serve as sensitive biomarkers of renal dysfunction. The aim of this review is to summarize advances in liquid-phase separation techniques coupled to high-resolution mass spectrometry (MS) for the analysis of gangliosides in body fluids, with a particular focus on their renal relevance.

Methods. Recent literature on liquid chromatography (LC), hydrophilic interaction chromatography (HILIC), ultrahigh-performance LC (UHPLC), ion

mobility separation (IMS), and electrophoretic methods coupled to MS/MS was reviewed. Emphasis was placed on methodological improvements enabling detection of low-abundance gangliosides, structural elucidation of ceramide and glycan portions, and application to renal-related conditions.

Results. MS-based gangliosidomics has enabled detailed mapping of gangliosides in serum, plasma, urine, and kidney tissue extracts. In diabetic nephropathy, altered GM3 and GD3 profiles correlate with glomerular injury, insulin resistance, and podocyte apoptosis. Studies have shown that loss of specific gangliosides from podocyte membranes exacerbates proteinuria and accelerates progression of chronic kidney disease. In systemic metabolic diseases such as type 2 diabetes mellitus, circulating ganglioside patterns reflect renal involvement and disease severity. Furthermore, changes in ganglioside species detected in serum and urine have been associated with immune-mediated renal injury, suggesting their role as biomarkers in lupus nephritis and transplant rejection. Advances in UHPLC–MS/MS and IMS–MS techniques now allow quantitative and structural analysis from minimal sample volumes, offering noninvasive opportunities to monitor renal pathology.

Conclusion. Liquid-phase separation techniques coupled with high-resolution MS provide unprecedented sensitivity and specificity for ganglioside analysis in biological fluids. These advances offer new perspectives for nephrology, where altered ganglioside metabolism contributes to diabetic nephropathy, chronic kidney disease, and immune-mediated renal disorders. Ganglioside profiling in serum and urine has the potential to become a powerful noninvasive biomarker platform for early detection, risk stratification, and therapeutic monitoring in renal diseases. Future efforts should focus on standardizing analytical protocols, integrating gangliosidomic data with clinical nephrology, and validating findings in large patient cohorts to establish clinical applicability.

OP-10 Current perspectives on gut-derived biomarkers in early diabetic kidney disease and their interconnection to the renal–cerebral axis. Implications for clinical practice and future research

Marcu L[1,2], Socaciu C[2,3], Socaciu A[4], Vlad A[2,5], Gadalean F[1,2], Bob F[1,2], Milas O[1,2], Suteanu A[1,2], Glavan M[1,2], Ienciu S[1,2], Ursoniu S[2,6,7], Jianu DC[2,6,8], Petrica L[1,2,6]

[1]Department of Internal Medicine II – Division of Nephrology "Victor Babeș" Univeristy of Medicine and Pharmacy, County Emergency Hospital, Timișoara, Romania; [2]Centre for Molecular Research in Nephrology and Vascular Disease, Faculty of Medicine "Victor Babeș Univeristy of Medicine and Pharmacy", Timișoara, Romania; [3]Research Center of Applied Biotechnology and Molecular Therapy BIODIATECH, SC Proplanta, Cluj-Napoca, Romania; [4]Department of Occupational Health, University of Medicine and Pharmacy "Iuliu Hațieganu", Cluj-Napoca, Romania; [5]Department of Internal Medicine II – Division of Diabetes and Metabolic Diseases, "Victor Babeș" Univeristy of Medicine and Pharmacy, County Emergency Hospital, Timișoara, Romania; [6]Centre for Cognitive Research in Neuropsychiatric Pathology (Neuropsy-Cog), Faculty of Medicine, "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania; [7]Department of Functional Sciences III, Division of Public Health and History of Medicine, "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania, [8]Department of Neurosciences—Division of Neurology, "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania.

Introduction. Type 2 diabetes mellitus (T2DM) impairs patients' quality of life and imposes an economic burden, primarily via renal and neurological complications. Gut dysbiosis, driven by obesity and insulin resistance, plays an important role in the development of T2DM complications. The blood–brain barrier and glomerular basement membrane share structural features that render them highly vulnerable to hyperglycemia induced stress and inflammation, these changes often preceding the clinical diagnosis of diabetic kidney disease (DKD) and cerebrovascular microangiopathy (CMA). As a result, these complications are usually detected at advanced stages. The growing incidence of DKD underscores the limitations of our traditional biomarkers and drives research towards early indicators of renal and cerebrovascular damage.

Methods. Blood and urine samples of DKD patients, in different stages of albuminuria, were analyzed using ultra-high performance liquid chromatography coupled with electrospray-ionization quadroupole time-of-flight mass spectrometry (UHPLC-QTOF-ESI$^+$-MS) in order to acquire the gut-derived metabolites in an untargeted and targeted manner. The markers of podocyte [podocalyxin (PDX)], proximal tubule [kidney injury molecule 1 (KIM-1)] and endothelial damage [(intercellular adhesion molecule 1 (ICAM-1)], were assesed by ELISA technique and the cerebrovascular indices [intima-media thickness (IMT), breath-holding index (BHI)] were determined by neurosonography. The association between the detected gut-derived metabolites, specific to the normoalbuminuric subgroup, and markers of renal and cerebral damage was studied by univariable and multivariable linear regression analyses.

Results. The study provided a subset of metabolites, specific for the normoalbuminuric DKD, that may

determine renal and cerebral damage. Low levels of serum arginine were inversely associated with IMT and ICAM-1. Serum levels of butenoylcarnitine positively correlated with IMT and ICAM-1, whereas urine butenoylcarnitine correlated with KIM-1 and PDX. Serum sorbitol was negatively correlated with BHI. Serum indoxyl sulfate correlated with ICAM-1 and p-cresyl sulfate was associated with KIM-1, being considered biomarkers of endothelial dysfunction and proximal tubular dysfunction.

Conclusion. Our research revealed a subset of gut-derived metabolites with a potential role in early diagnosis and therapeutical target development in order to prevent DKD and CMA onset. Arginine levels may predict common carotid atherosclerosis and renal endothelial dysfunction thus arginine supplementation may reduce the incidence of stroke, renal hyperfiltration and proteinuria. Butenoylcrnitine may represent a future therapeutical target for drug develpoment related to podocyte and proximal tubule dysfunction in DKD, whereas sorbitol may represent a new therapeutical target for CMA prevention. Prebiotics, probiotics and symbiotics administration may have positive effects on delaying DKD development.

OP-11 Quantitative and Targeted Analysis of Serum and Urinary Metabolites Uncovers Novel Biomarkers for Early Chronic Kidney Disease

Glavan MR[1], Socaciu C[2], Socaciu AI[3], Gadalean F[1], Vlad A[4], Muntean DM[5], Bob F[1], Milas O[1], Suteanu A[1], Jianu D-C[6], Balint L[1], Petrica L[1]

[1]Dept.of Internal Medicine II – Nephrology, "Victor Babeș" University of Medicine and Pharmacy Timisoara, Romania; [2]Research Center for Applied Biotechnology and Molecular Therapy BIODIATECH, Cluj-Napoca, Romania; [3]Department of Occupational Health, University of Medicine and Pharmacy "Iuliu Haţieganu", Cluj-Napoca, Romania; [4]Dept. of Functional Sciences – Pathophysiology, Faculty of Medicine, "Victor Babeș" University of Medicine and Pharmacy, Timișoara, Romania; [5]Dept. of Neurosciences – Neurology, "Victor Babeș" University of Medicine and Pharmacy Timișoara, Romania;

Introduction. Traditional diagnostic methods of chronic kidney disease, based on albuminuria and estimated glomerular filtration rate, are limited in their ability to detect early disease stages or predict progression. The aim of the present study was to perform targeted metabolomic analysis of serum and urine from patients with chronic kidney disease in order to validate candidate metabolites previously identified through untargeted approaches and to assess their diagnostic and prognostic potential.

Methods. A total of one hundred individuals were included, consisting of eighty patients with chronic kidney disease at various stages, without diabetes, and twenty age- and sex-matched healthy controls. Serum and urine samples were collected, processed by protein precipitation, and analysed using ultra-high-performance liquid chromatography coupled with electrospray ionization quadrupole time-of-flight mass spectrometry. The targeted metabolomic panel included amino acids, acylcarnitines, creatinine, arginine, asymmetric dimethylarginine, and kynurenic acid. Data analysis comprised multivariate and univariate statistics, principal component analysis, partial least square discriminant analysis, and receiver operating characteristic curve evaluation. Quantitative performance was ensured by calibration with pure standards, validation of linearity, precision, accuracy, and determination of detection and quantification limits.

Results. The targeted profiling identified significant differences between patients with early-stage chronic kidney disease and healthy controls. In serum, asymmetric dimethylarginine, methionine, and kynurenic acid showed marked increases, while acetylcarnitine and propenoylcarnitine displayed significant variations. In urine, phenylalanine, arginine, and methionine were consistently modified in early disease compared to controls. These results indicate that metabolic disturbances can be detected before overt renal dysfunction becomes clinically evident, suggesting that the identified metabolites may serve as early diagnostic biomarkers.

Conclusion: This study demonstrates that targeted metabolomic analysis can identify and validate a panel of serum and urinary metabolites with diagnostic and prognostic relevance in chronic kidney disease. The integration of alterations in arginine metabolism, acylcarnitine pathways, and the kynurenine axis highlights their involvement in the pathophysiology of early renal injury. These findings provide a strong rationale for the development of biomarker-based strategies aimed at earlier detection, improved risk stratification, and potential therapeutic monitoring in chronic kidney disease.

OP-12 Early arteriovenous fistula outcomes under the shadow of anemia and inflammation

Gjana G[1], Zenelaj A[1], Xhaferaj M[1]

[1]University Trauma Hospital, Tirana, Albania

Introduction. Arteriovenous fistula (AVF) remains the preferred vascular access for hemodialysis due to superior long-term patency compared with grafts or catheters [1]. However, early AVF failure is common and limits its clinical utility [2]. Previous studies have highlighted the role of anemia, inflammation, and vascular characteristics in determining AVF maturation [3–5]. This pilot analysis reports the first three-month results of an ongoing three-year prospective study in our center.

Methods. We prospectively studied 24 patients (16 men, 8 women; mean age 55 years) who underwent AVF creation at our center and were followed for three months. AVFs were classified as functional or failed at 90 days. Functional AVFs were usually cannulated in weeks 6–8, while most failures occurred around week 2. Hemoglobin (Hb), ferritin, and C-reactive protein (CRP) levels were analyzed as predictors of AVF outcome. Kaplan–Meier curves, log-rank tests, and Cox regression were applied.
Results. At three months, 14 AVFs were functional and 10 had failed. Failures occurred between days 3 and 60, mostly in the second week. Kaplan–Meier analysis showed significantly poorer survival in patients with Hb <8 g/dL and 8–10 g/dL compared with Hb >10 g/dL (log-rank p<0.001). Patients with high CRP (>5 mg/L) had a 75% failure rate versus 29% in those with low CRP. In Cox regression, CRP was an independent predictor of failure, while higher Hb was protective. Fistula site showed a non-significant trend toward better outcomes for brachiocephalic access.
Conclusion. This pilot study demonstrates that severe anemia and elevated CRP are major determinants of early AVF failure. These findings are consistent with previous reports [3–5] and suggest that preoperative correction of anemia and control of inflammation may improve AVF maturation and survival. Although limited by sample size, the study underlines the importance of systematic monitoring and provides a basis for the ongoing three-year prospective analysis, which aims to generate stronger evidence for risk-stratified vascular access management.

OP-13 CRRT and PIRRT in dialysis-dependent patients

Strazmester-Majstorovic G[1], Djurovic V[1,2], Markovic M[1], Azasevac T[1,2], Milak J[1], Zivkovic S[1,2], Medin D[1,2], Golubovic S[1,2], Knezevic V[1,2]
[1]University Clinical Center of Vojvodina, Serbia; [2]Medical Faculty, University of Novi Sad, Serbia

Introduction. Dialysis-dependent patients often require continuous renal replacement therapy (CRRT) or prolonged intermittent renal replacement therapy (PIRRT) during hospitalization. The aim of this study was to evaluate the impact of CRRT/PIRRT parameters on 90-day mortality in dialysis-dependent patients.
Methods. The retrospective, observational study included 139 CRRT/PIRRT procedures performed on 53 dialysis-dependent patients. PIRRT procedures were done using CRRT machines. Procedures were performed with (heparin or regional citrate anticoagulation), or without anticoagulation. Vascular access was achieved using arteriovenous fistulas, temporary or permanent central venous catheters (CVCs). Procedure-related data, information on comorbidities and current medical status, and baseline laboratory findings, were collected. Variables were compared with respect to 90-day mortality using appropriate statistical tests. The influence of various factors on mortality, including variable models, was assessed using logistic regression.
Results. Data related RRT procedures, clinical status and comorbidities are presented in Table 1. Patients were divided into two groups based on 90-day mortality. Better survivor was observed in patients with a higher prescribed RRT dose (p=0.001) and in those with temporary CVCs (p<0.001). A borderline significance was found for procedures done without anticoagulation compared to those with its use (p=0.056). Male patients had better survival (p<0.001). Clinical conditions that influenced survival included residual diuresis (p=0.016), the need for vasoactive support (p=0.005), and mechanical ventilation (p<0.001). Higher mortality was associated with non-surgical causes of hospitalisation (p<0.001) and diabetes (p<0.001). Survivors had lower CRP (p=0.009), aPTT (p=0.049) and PT (p<0.001), but higher creatinine (p<0.001), urea (p<0.001), and albumin levels (p=0.023). Logistic regression analysis identified significant predictors of 90-day mortality: total RRT dose (p<0.001), RRT dose/body weight (BW) (p=0.030), vascular access (p<0.001), gender (p<0.001), previous surgery (p<0.001), diabetes (p<0.001), residual diuresis (p<0.001), and the need for vasoactive support (p=0.003) or mechanical ventilation (p<0.001). The influence of filter choice (p=0.080) and anticoagulation (p=0.066) was not significant. A predictive model for 90-day survivor was built using procedure-related variables with p values less than 0.1 in logistic regression. The model demonstrated strong predicting performance, with an accuracy of 0.863 and an AUC of 0.890. Sensitivity was high (0.924), while specificity was moderate (0.676) (Graph 1).

Table 1 – Data regarding RRT, clinical status, and comorbidities

variable	**median**	**IQR**
length of RRT	530 min	480 min
total UF	2454 ml	1900 ml
UF/h	225 ml/hr	164.58 ml/hr
prescribed RRT dose	2500 ml/hr	900 ml/hr
prescribed RRT dose/BW	31.11 ml/kg/hr	3.33 ml/kg/hr
age	69 years	9 years
survivor after RRT	10 days	16 days
variable		**N (%)**
90-day mortality	**died**	105 (75.54%)
	alive	34 (24.46%)
RRT modalities	**CVVHD**	48 (34.53%)

	CVVHDF	91 (65.47%)
f**ilters**	**Emic2**	48 (34.53%)
	Kit8/1000	28 (20.14%)
	Oxiris	18 (12.95%)
	ST150	45 (32.37%)
a**nticoagulation**	**heparin**	73 (52.52%)
	RCA	27 (19.42%)
	without	39 (28.06%)
v**ascular access**	**AVF**	46 (33.09%)
	temporary CVC	73 (52.52%)
	permanent CVC	20 (14.39%)
s**urgery prior to RRT**	**yes**	57 (41.01%)
	no	82 (58.99%)
n**eed for vasoactive support**	**yes**	48 (34.53%)
	no	91 (65.47%)
n**eed for** mechanical ventilation	**yes**	86 (61.87%)
	no	53 (38.13%)
diabetes	**yes**	76 (54.68%)
	no	63 (45.32%)

Legend: RRT – Renal replacement therapy; UF – ultrafiltration; BW – body weight; RCA – regional citrate anticoagulation; AVF – arteriovenous fistula; CVC – central venous catheter

Conclusion. Among RRT-related parameters, only the total prescribed RRT dose, RRT dose/BW, and vascular access significantly influenced 90-day mortality in hospitalised dialysis-dependent patients. Filter and anticoagulation choice had only a moderate impact. The model including these variables demonstrated excellent discrimination in predicting 90-day mortality.

OP-14 Cognitive impairment across renal replacement therapies in chronic kidney disease: prevalence and predictors in a cross-sectional study

Cadri V[1], Strakosha A[1], Pasko N[1], Rista E[2]
[1] Department of Nephrology, University Hospital Center "Mother Teresa", Tirana, Albania; [2] Department of Nephrology, American Hospital Tirana, Tirana, Albania

Introduction. Cognitive impairment is increasingly recognised in people with chronic kidney disease, yet comparative data across the main renal replacement therapies remain limited. We sought to estimate its prevalence across haemodialysis, peritoneal dialysis and kidney transplantation and to identify domain-specific predictors using a validated bedside screening tool.

Methods. In a cross-sectional study conducted at the University Hospital "Mother Teresa" (Tirana) from November 2023 to November 2024, 319 adults completed the Montreal Cognitive Assessment. We analysed 193 participants with chronic kidney disease [haemodialysis = 96; peritoneal dialysis = 22; kidney transplantation = 75] and 126 non-kidney controls. Independent t-tests and analysis of variance compared mean scores. Multivariable logistic regression (n = 193 complete cases) modelled cognitive impairment (mild to severe). Discrimination was quantified with the area under the receiver operating characteristic curve.

Results. Participants with chronic kidney disease scored lower than controls (23.1 ± 3.1 versus 24.4 ± 2.6; $p < 0.001$). Severe or moderate impairment occurred in 9% of patients versus 2% of controls. In adjusted models, lower executive/visuospatial ($\beta = -2.00$; $p < 0.001$), attention ($\beta = -1.96$; $p < 0.001$) and memory scores ($\beta = -1.73$; $p = 0.003$) independently predicted impairment. Treatment modality carried differential risk: peritoneal dialysis (odds ratio = 0.30; $p = 0.018$) and kidney transplantation (odds ratio = 0.14; $p = 0.043$) were protective, whereas haemodialysis was not. Age, systolic and diastolic blood pressure, and blood glucose were not significant. The model showed strong discrimination (area under the curve 0.842; 95% confidence interval 0.773–0.911) with 95% sensitivity and 72% specificity at the Youden index of 0.573.

Conclusions. Cognitive impairment is common in chronic kidney disease and predominantly involves executive, attentional and memory domains. Peritoneal dialysis and kidney transplantation appear to confer relative neuroprotection compared with haemodialysis. A simple multivariable screen derived from Montreal Cognitive Assessment domains achieved high sensitivity and can help nephrology services triage candidates for comprehensive neuropsychological testing and incorporate cognitive health into shared decisions about renal replacement therapy.

OP-15 Dietary Antioxidants and Their Relationship with Oxidative Stress in Hemodialysis Patients

Bodea M[1,2], Sircuta A[1,2], Grosu I[1,2], Schiller A[1,2], Petrica L[1,2], Schiller O[3], Bob F[1,2]
[1]Dept.of Internal Medicine II – Nephrology University Clinic, "Victor Babeș" University of Medicine and Pharmacy Timisoara, Romania; County Emergency Hospital Timisoara, Romania; [2]Centre for Molecular Research in Nephrology and Vascular Disease, Faculty of Medicine, "Victor Babeș" University of Medicine and Pharmacy, Timișoara, Romania [3]BBraun Avitum Dialysis Center Timisoara, Romania

Introduction. We know that chronic kidney disease (CKD) is linked to oxidative stress due to ongoing inflammation and a reduced intake or availability of dietary antioxidants. The relationship between lifestyle, oxidative stress, and CKD in patients on hemodialysis is complex and interconnected. In this study, we analysed the relationship between an oxidative damage marker (malondialdehyde-MDA) on one hand and plasma antioxidant status (glutathione peroxidase-GPx) on the other, as well as the complications associated with chronic kidney disease (anemia, CKD-MBD).

Methods. We conducted a single-center cross-sectional study that included 58 CKD G5D patients (mean age 60.39 +/- 11.73 years; 33 male, 25 female; mean hemodialysis vintage of 6.43 +/- 4.89 years). All patients were evaluated for their dialysis status based on medical history. Blood samples were collected prior to the dialysis session for analysis, including standard biochemical parameters, complete blood count, and measurements of GSSG and MDA using high-performance liquid chromatography. In all patients the monthly intake of antioxidant nutrients has been performed using a semi-quantitative food frequency questionnaire.

Results. Malondialdehyde showed no significant correlation with: Gender (r = -0.008, *p = 0.95*); Trans-β-carotene intake (r = -0.081, *p = 0.547*); Vitamin E-alpha intake (r = -0.127, *p = 0.3419*); Vitamin E-beta intake (r = -0.143, *p = 0.2828*); Vitamin E-gamma intake (r = -0.035, *p = 0.7971*); Vitamin E-delta intake (r = -0.113, *p = 0.3985*). A significant negative correlation was found between malondialdehyde and vitamin C intake (r = -0.321, *p = 0.014*).; MDA was also negatively correlated with echocardiographic atheroma grade A0 (r = -0.234, *p = 0.1641*), though not significantly. There was a negative correlation between glutathione peroxidase levels and sleep duration (r = -0.354, *p = 0.063*), approaching statistical significance. Between Vitamin E Isoforms intake and sleep duration no significant correlations were found: Vitamin E-alpha (r = -0.083, *p = 0.5336*); Vitamin E-beta (r = -0.075, *p = 0.5742*); Vitamin E-gamma (r = -0.085, *p = 0.5268*). In patients with hyperkalemia, no significant correlations were observed between: Vitamin E-delta (r = -0.087, *p = 0.5176*); Vitamin E-gamma (r = -0.114, *p = 0.3933*). Blood selenium levels showed no statistically significant correlation with: Glutathione peroxidase (r = -0.17, *p = 0.201*); Hemoglobin (r = -0.015, *p = 0.9082*); BMI (r = -0.074, *p = 0.5784*). No significant correlations were found between selenium and any of the measured amounts of antioxidant intakes.

Conclusion. Overall, while certain antioxidants like vitamin C may play a role in modulating oxidative stress, further studies with larger sample sizes and controlled designs are necessary to clarify these relationships and their clinical relevance in hemodialysis populations.

OP-16 Our experience of vascular access for hemodialysis. Evolution, challenges and future perspectives

Dejanov P[1], Gjorgjievski N[1], Pushevski V[1], Janevski Z[1]

[1]Vascular Access Unit, Clinic of Nephrology, Clinical Center Skopje, Skopje, N. Macedonia

Introduction. Over the past 50 years, vascular access (VA) has played a critical role in the success of hemodialysis (HD). Since the introduction of the arterio-venous fistula (AVF), significant improvements were made in access techniques, materials, and management strategies. Despite these developments, VA complications remain a major challenge, impacting patient outcomes and healthcare resources. This study provides an overview of our 50 year experience in VA for HD, highlighting key advancement, clinical challenges, and future directions.

Methods. A retrospective analysis of experience, patient outcomes, and technological advancements in VA was conducted. Literature reviews and registry data were also examined to contextualize our findings within broader clinical trends.

Results. Our 50 year experience reflects significant progress in surgical techniques, access surveillance, and complication management. The shift from central venous catheters (CVC) to AVF and arterio-venous grafts (AVG) has improved long term outcomes, while innovations such as endovascular procedures and bioengineered grafts offer promising alternatives. In the beginning we started with AV shunts, then continue with CVC (femoral, subclavian, and jugular), and AVF, AVG and tunneled catheters as permanent VA. However, access failure due to stenosis, thrombosis, and infection remains a persistent challenge. Advances in imaging, vascular biology, and precision medicine are paving the way for improved access longevity and functionality.

Conclusion. Reflecting on 5 decades of VA experience, we recognize both, the achievements and ongoing challenges in HD access. Future efforts should focus on optimizing patient selection, enhancing surveillance strategies, and integrating novel technologies to improve VA outcomes.

OP-17 Impact of SGLT2i on mortality and outcomes in advanced kidney disease and dialysis utilising a global real-world clinical data platform, TriNetX

Mitra V[1], Mitra S[2,3,4,5], Hartemink J[2,5]

[1]East Cheshire NHS Trust; [2]Manchester University Hospitals NHS Trust; [3]Manchester Academy of Health Sciences Centre (MAHSC); [4]NIHR Health Technologies Centre in Long-term Conditions; [5]University of Manchester, UK

Introduction. Chronic kidney disease (CKD) is the third fastest-growing cause of death worldwide, with an increasing burden of end-stage renal disease (ESKD). SGLT2-inhibitor (SGLT2i) trials demonstrate overwhelming benefit in heart failure, diabetes and CKD. Patients with advanced-CKD (adCKD) and dialysis, however, have been systematically excluded from major SGLT2i trials, restricting use. Preclinical studies suggest off-target effects which may benefit these populations. This study aims to leverage real-world data to address gaps in evidence regarding the effects of SGLT2i on renal outcomes and mortality in adCKD and dialysis patients.

Methods. TriNetX, a global health collaborative clinical research platform collecting real-time

electronic data, was used to identify anonymised cohorts of adults with adCKD (eGFR<25ml/min), and those on dialysis, treated with or without SGLT2i. In the adCKD cohort, the primary outcome was a composite measure of progression to ESKD and all-cause mortality. In the dialysis cohort, the outcome measures include all-cause mortality and hospitalisations. In addition, sub-cohort analyses were undertaken in two groups: i) stable adCKD (eGFR<25ml/min, excluding a fall in eGFR<20ml/min within 1 year) and ii) eGFR<10ml/min. Cohorts were adjusted for baseline co-morbidities with propensity score matching, survival analysis and log-rank test performed. Hazard ratios (HR; 95% CI) and Kaplan-Meier survival analysis was used to compare outcomes.

Results. Among 3,795,402 patients identified with adCKD, propensity matching yielded a cohort of 15,276. In this matched cohort, SGLT2i use was associated with significantly reduced composite renal outcome (HR 0.542; 0.521-0.563), progression to CKD5 (HR 0.844; 0.814-0.876), mortality (HR 0.325; 0.305-0.346) and hospitalisations (HR 0.526; 0.507-0.546). In a subgroup analysis, the stable adCKD cohort showed sustained benefit, with reduced composite renal outcome (HR 0.722; 0.675-0.772), mortality (HR 0.598; 0.541-0.661) and hospitalisations (HR 0.729; 0.687-0.773). Furthermore, in a matched cohort of 4,557 patients with eGFR<10, reduced mortality (HR 0.281; 0.252-0.314) and hospitalisations (HR 0.613; 0.573-0.656) was demonstrated. Among 97,253 patients undergoing dialysis, propensity matching identified 701 patients for comparative analysis. The benefit of SGLT2i persisted in dialysis, with reduced mortality (HR 0.765; 0.626-0.936) and reduced hospitalisations (HR 0.784; 0.694-0.885).

Conclusions. In this global cohort, SGLT2i use was associated with improved renal outcomes and all-cause mortality in both patients with adCKD and on dialysis, despite current regulatory exclusion. Our study can inform future randomised trials investigating SGLT2i use in adCKD to reduce progression and improve survival in dialysis-dependent patients. These findings support evidence of the benefit of SGLT2i in improving mortality and burden of adCKD and dialysis.

OP-18 Arteriovenous fistula calcifications – innocent bystanders?

Grosu ID[1,2], Stirbu O[3,4], Schiller A[1,2], Bob F[1,2]

[1]Department of Internal Medicine II –Nephrology University Clinic, "Victor Babeș" University of Medicine and Pharmacy Timisoara, Romania, County Emergency Hospital Timisoara, Romania; [2]Centre for Molecular Research in Nephrology and Vascular Disease, Faculty of Medicine, "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania; [3]B Braun Avitum Dialysis Centre Timisoara, Romania; [4]Department of Nephrology and Dialysis, Arad County Hospital, Arad, Romania

Introduction. Arteriovenous fistulas (AVFs) are considered the gold standard for vascular access (VA) in patients undergoing maintenance hemodialysis (HD). Although HD patients are at increased risk for extraosseous calcifications, AVF calcifications remain a relatively underexplored VA-related complication. This study aimed to determine the prevalence and risk factors of AVF calcifications and to evaluate their 5-year impact on AVF function and overall mortality.

Methods. We conducted a 5-year prospective study involving 161 patients receiving maintenance HD. Baseline data included VA history, comorbidities, demographic information, subjective global assessment (SGA) scores, and biochemical parameters. All participants underwent comprehensive AVF ultrasonography to assess AVF blood flow and identify calcifications, stenoses, and aneurysms.

Results. AVF calcifications were present in 39% of patients. Univariate analysis showed that AVF calcifications were associated with other VA complications (stenoses and aneurysms), longer AVF and HD duration, and elevated serum calcium and parathyroid hormone (PTH) levels. Multivariate analysis identified longer HD vintage and higher calcium levels as independent predictors of AVF calcifications. However, the presence of AVF calcifications did not significantly influence 5-year fistula patency or overall mortality.

Conclusion. AVF calcifications were a common finding in this cohort, but their presence did not adversely affect 5-year AVF patency or survival outcomes.

OP-19 Can the VEINES-QoL/Sym Questionnaire be adapted to the arm for use in hemodialysis patients with arteriovenous fistulas? Impact of AVF care education on quality of life and symptom burden

Taran F[1], Taban VB[2]

[1]Turkish Ministry of Health, Sirnak State Hospital, Department of Nephrology, Sirnak, Türkiye; [2]Turkish Ministry of Health, Sirnak State Hospital, Department of Cardiovascular Surgery, Sirnak, Türkiye

Introduction. Similar to the venous congestion in chronic venous disease of the lower extremities, arteriovenous fistula (AVF) in hemodialysis (HD) patients inherently increases venous pressure in the upper extremity, leading to congestion and reduced quality of life (QoL). However, there is currently no objective tool to assess or quantify this QoL impairment. No validated questionnaire exists to evaluate symptoms related to upper extremity venous

congestion and hypertension, nor to measure the impact of patient education on these outcomes. This study aimed to adapt the VEINES-QOL/Sym questionnaire—originally developed for lower extremities—into an upper extremity-specific version for HD patients with AVF, assess its validity and reliability, and evaluate whether structured AVF care education improves symptoms and QoL.

Methods. A prospective study was conducted between 01.07.2025 and 31.07.2025 in five HD centers, including 100 patients (50% female, mean age 57.33±14.75 years). Participants were assigned to an education group (n=80) receiving structured AVF care training with both verbal and written materials by a nephrovascular team (nephrologist, cardiovascular surgeon, dialysis nurse) or a control group (n=20). The VEINES-QOL/Sym was modified for the upper limb and administered pre- and post-intervention alongside the SF-36. Content validity was evaluated using CVR and CVI; internal consistency by Cronbach's alpha; and construct validity by confirmatory factor analysis (CFA).

Results. The adapted questionnaire showed excellent content validity (CVR=0.99, CVI=1.00) and good internal consistency (Cronbach's alpha: VEINES-Sym=0.894, VEINES-QOL=0.695). CFA demonstrated good model fit (RMSEA=0.043, CFI=0.954, GFI=0.977). Baseline VEINES-Sym scores were higher in the education group (31.13±7.19) vs. control (26.55±6.97, p=0.009). Post-intervention, the education group had greater improvements in VEINES-Sym (+5.03±7.83 vs. +3.55±7.8, p=0.037), VEINES-QOL (+6.78±8.73 vs. +3.20±7.82, p=0.019), and total VEINES scores (+11.8±13.69 vs. +6.75±12.77, p=0.036). In SF-36, the education group showed significant improvement in mental component scores (p=0.006).

Conclusion. The first upper extremity adaptation of the VEINES-QOL/Sym questionnaire is a valid and reliable tool for assessing AVF-related symptoms and QoL in HD patients. Structured AVF care education, delivered verbally and in writing by a multidisciplinary nephrovascular team, significantly reduces symptoms and improves QoL. This approach fills the gap of lacking objective tools for upper extremity venous congestion and demonstrates that targeted patient education can lead to measurable clinical and patient-reported benefits.

OP-20 Inflammatory Cytokines and Cardiac Remodeling in Hemodialysis: IL-6 Outperforms TNF-α

Sircuța AF[1,2,3], Grosu ID[1,2,3]*, Schiller A[1,2], Petrica L [1,2,3], Ivan V[3,4], Schiller O[5], Palamar M[1,2], Mircea MN[6], Nișulescu D[6,7], Goleț[8], Bob F[1,2,3]

[1] Department of Internal Medicine II—Nephrology University Clinic, "Victor Babes" University of Medicine and Pharmacy, Timișoara, Romania;
[2] Centre for Molecular Research in Nephrology and Vascular Disease, Faculty of Medicine, "Victor Babes" University of Medicine and Pharmacy, Timișoara, Romania
[3] County Emergency Hospital, Timișoara, Romania;
[4] Department of Internal Medicine II—Cardiology University Clinic, "Victor Babes" University of Medicine and Pharmacy, Timișoara, Romania
[5] B Braun Avitum Dialysis Centre, Timișoara, Romania;
[6] Institute of Cardiovascular Diseases Timișoara, Timisoara, Romania
[7] Research Center of the Institute of Cardiovascular Diseases Timisoara, Timisoara, Romania
[8] Department of Management, Faculty of Economics and Business Administration, University of the West, Timișoara, Romania;

Introduction. Cardiovascular disease is the main cause of death in end-stage renal disease (ESRD), with chronic inflammation contributing to myocardial remodeling. IL-6 and TNF-α are central cytokines, but their relative clinical significance in hemodialysis (HD) remains uncertain.

Methods. We studied 58 maintenance HD patients (mean age 60.4 ± 11.7 years, 55% male). Pre-dialysis serum IL-6, TNF-α, IL-1β, C-reactive protein (CRP), albumin, and hemoglobin were measured. Standard echocardiography assessed left ventricular mass (LVM), global longitudinal strain (GLS), interventricular septum thickness (IVS), left ventricular end-diastolic diameter (LVEDD), and right ventricular diameter (RVD). Spearman correlations and multivariate regression explored associations between cytokines and echocardiographic remodeling.

Results. Median IL-6 was 7.36 pg/mL (IQR 4.52–11.03) and TNF-α 9.35 pg/mL (IQR 7.9–12.57). IL-6 strongly correlated with LVM ($\rho = 0.63$, $p < 0.001$), RVD ($\rho = 0.53$, $p < 0.001$), and CRP ($\rho = 0.52$, $p < 0.001$). In contrast, TNF-α showed an inverse association with LVM ($\rho = –0.36$, $p = 0.006$). Multivariate regression identified LVM ($p = 0.019$) and RVD ($p = 0.042$) as independent predictors of IL-6, whereas TNF-α was predicted by age ($p < 0.001$), CRP ($p = 0.038$), and albumin ($p = 0.012$).

Conclusions. IL-6 was more consistently associated with echocardiographic hypertrophy and right-sided dilation than TNF-α, suggesting it may serve as a more informative biomarker of subclinical cardiac remodeling in HD patients. These findings support prioritizing IL-6 in future studies evaluating inflammation-driven cardiovascular risk in ESRD.

OP-21 Experience of using medium cut-off membranes in Multiple myeloma- related acute kidney injury: A case series presentation

Markovska Z[1], Bushljetikj IR[1], Severova G[1], Nikolov I[1], Trajcevska L[1], Karanfilovski V[1], Usprcov J[1], Stojanovska A[1], Spasovski G[1], Gjorgjievski N[1]
[1]University Clinic of Nephrology, Faculty of Medicine, University Ss. Cyril and Methodius, Skopje, R. of North Macedonia

Introduction. Acute kidney injury (AKI) in Multiple myeloma (MM) patients is frequently precipitated by excessive free light chains (FLC) deposition, leading to tubular obstruction and inflammation. Standard hemodialysis (HD) is ineffective in removing these large molecules, whereas high cut- off (HCO) membranes have shown promise but with limitations such as albumin loss. Medium cut- off (MCO) membranes, designed for enhanced middle-molecule clearance up to 45 kDa with minimal albumin leakage, may offer a novel therapeutic approach.

Case report. We report on five cases with MM who developed AKI and were treated with MCO-HD and specific chemotherapy with Bortezomib on our clinic. Initially, 4 hours sessions were conducted using a 1.7/2.0 m^2 MCO filter, followed by 6 hours sessions, every other day.

Outcome. Four of our patients were male and the mean age of our cases was 70,2 (65- 77) years. The mean Reduction Ratio (mRR) of lambda (λ-FLC) was: 40% in the first patient, 33%, of the second and 42% of the third, mRR of kappa (k-FLC) was 75% of the fourth patient and 69% for the fifth patient, respectively, without a significant reduction in the plasma albumin levels. Tree out of five patients recovered renal function becoming independent of HD.

The mean eGFR of the three patients who recovered kidney function after treatment with specific chemotherapy and MCO-HD increased from 15 ml/min/1.73m^2 at the end of MCO-HD sessions to 61 ml/min/1.73m^2 (range 48-75 ml/ min/1.73m^2) three months afterwards.

Conclusion. The combined and early initiated treatments of chemotherapy plus MCO-HD sessions are effective in reducing the levels of both FLC and sufficient recover of renal function, allowing significant savings, better quality of life and longer life span.

OP-22 Peritoneal dialysis-related infections in a national network: a 30-month multicenter study from Romania

Gemene EM[1], Havasi N[1]
[1]Diaverum Romania

Introduction. Peritoneal dialysis (PD) remains underutilized in Eastern Europe, where infectious complications represent a major barrier to technique survival. The most frequent infections are peritonitis and exit-site infections (ESI), both targeted by ISPD quality indicators (<0.5 and <0.4 episodes/patient-year, respectively). Reliable multicenter data from national programs in the region are scarce. This study aimed to evaluate the incidence, microbiological profile, antimicrobial resistance, and clinical outcomes of PD-related infections in a Romanian national dialysis network.

Methods. We retrospectively analyzed all confirmed peritonitis and ESI episodes between January 2023 and June 2025 in 14 dialysis centers, including 75 patients on PD. Data collected included infection type, microbiological etiology (Gram-positive, Gram-negative, fungal), antimicrobial resistance, and outcomes (catheter retention/removal, transfer to hemodialysis, infection-related mortality). Incidence rates were calculated per patient-year at risk.

Results. A total of 57 PD-related infections were recorded during the 30-month observation period: 46 ESIs and 11 peritonitis episodes. Exit-site infections: Gram-positive organisms predominated (Staphylococcus aureus MSSA/MRSA, S. epidermidis), while Gram-negative isolates were rare and no fungal pathogens were identified. Three multidrug-resistant organisms (MDROs) were documented overall. No catheter removals were required and no episodes progressed to peritonitis. The cumulative ESI incidence was 0.27 episodes/patient-year, below the ISPD benchmark of 0.4.

Peritonitis: Eleven episodes were identified, with Gram-negative bacteria being most frequent (6/11, mainly Escherichia coli), followed by Gram-positive organisms (4/11, including MRSA) and one fungal infection (Candida spp.). One MDRO case was recorded. All patients responded to targeted therapy, with no infection-related deaths. The overall peritonitis incidence was 0.18 episodes/patient-year, meeting ISPD targets (<0.5).

Conclusion. This is the first 30-month multicenter analysis of PD-related infections performed in a Romanian national dialysis network. Our findings demonstrate that ISPD-based preventive protocols—exit-site care, MRSA screening and decolonization, structured patient and caregiver education, and culture-guided antimicrobial therapy—can achieve and sustain benchmark infection rates in a multicenter setting. Importantly, no catheter losses and no infection-related mortality occurred. These results provide a benchmark for PD programs in Eastern Europe and support the expansion of PD as a sustainable dialysis modality when standardized infection control strategies are systematically applied.

OP-23 Viral infections and co-infections rates of Cytomegalovirus, Epstein-Barr virus and BK

polyomavirus in kidney transplant patients a single center study.

Sulejman S[1], Severova G[1], Sterjova Markovska Z[1], Trajcheska L[1], Rambabova-Bushljetik I[1], Hamamdzieva I[1], Nikolov IG[1], Spasovski G[1]

[1]University Clinic for Nephrology, Faculty of Medicine, Saints Cyril and Methodius University in Skopje, North Macedonia.

Introduction. Viral infections are among the most common and serious complications after kidney transplantation, contributing to morbidity and graft loss. The most significant viral pathogens are Cytomegalovirus, Epstein-Barr virus, and BK polyomavirus, which may occur as isolated infections or as coinfections. Data on their frequency and clinical significance among kidney transplant population in North Macedonia is limited. Our aim was to determine the frequency of viral infections and rates of coinfection among kidney transplant recipients as well as their impact on graft function and clinical outcomes.

Methods. We conducted a prospective interventional study of 43 kidney transplant recipients at the University Clinic of Nephrology, Skopje, between January 2023 and December 2024. Data were analyzed from the electronic medical records of the transplant department, including routine follow-up visits and consultations for symptoms. All received induction therapy (Anti-thymocyte globulin or Basiliximab) followed by triple immunosuppressive therapy, steroids, mycophenolic acid and calcineurin inhibitors (tacrolimus or cyclosporin A). Biochemical analyses and virological monitoring with Polymerase Chain Reaction for Cytomegalovirus, Epstein-Barr virus, and BK polyoma virus were performed. In cases with Cytomegalovirus with copies > 300 copies/mL and symptoms Vangancyclovir was used as a treatment, while in Epstein-Barr virus and BK polyomavirus positivity, immunosuppressive therapy was modified. The association with renal function, hospitalization and graft survival was also assessed.

Results. Mean age of patients was 41.7±12.9 years, 72.1% were male and 27.9% female. Among the 43 transplant recipients, Cytomegalovirus infection was detected in 20.9% of patients with >300 copies/mL, EBV was not detected in any patient, and BK polyomavirus was detected in 9.3% with >300 copies/mL. Coinfection with at least two viruses was observed in 2.33% of patients, that being Cytomegalovirus + BK virus. Only 16.7 % of patients with detectable Cytomegalovirus were asymptomatic and were not treated, rest had impaired graft function and were treated with oral Valganciclovir. Graft function improved in all treated patients except in one patient with Cytomegalovirus+BKvirus coinfection, who experienced irreversible graft loss and remained on hemodialysis treatment. Three patients died, in two of them beside Cytomegalovirus, bacterial and fungal coinfections were present.

Conclusion. Our study concluded that Cytomegalovirus and BK virus infections are frequent complications after kidney transplantation, Cytomegalovirus being the most frequent. Patients with coinfections had significantly more severe graft dysfunction, higher hospitalization rates and worse clinical outcomes. Regular protocol-based monitoring and individualized adjustment of immunosuppressive therapy are essential for early detection and treatment, aiming to improve graft and patient survival.

OP-24 The implantable artificial kidney

Pîtea I.V[1], Știrbu O[1]

[1]Hemodialysis Center, County Clinical Emergency Hospital, Arad, Romania

Introduction. The Implantable Artificial Kidney (IAK) is an impressive example of biomedical engineering (bionics) and nanotechnology, combining mechanical filtration and biological functions into a miniaturized device which can function inside the human body without requiring an external energy source or daily maintenance, as is the case for haemodialysis. This article aims to analyze the major components of the implantable artificial kidney.

Methods. This study analyzed the nanotechnology-based mechanical filter (a detailed analysis of silica membranes with controlled porosity) and the cellular bioreactor - composed of living cells which perform complex biological functions (absorption, secretion, hormone regulation), as well as its connection to transhumanism (the replacement of biological functions with advanced technological systems), which require in this case the following: overcoming the natural limits of a functioning biological organ, integrating within the body a mechanical device which then becomes a part of human anatomy and physiology, and its autonomy, in the sense that it does not require an energy source. The article also analyzes the current stage, in 2025, of preclinical development of the implantable artificial kidney (the results of animal testing and studies), as well as the perspective of starting clinical trials.

Results. The implantable artificial kidney is an applied example of medical transhumanism, in which human biology is supplemented or replaced with advanced technology, not only for the purpose of treating a disease, but also to change the way in which we understand the limits of the human body.

Conclusion. The implantable artificial kidney is a bridge between classic medicine and the future of the augmented man, which may require improving basal medicine education by supplementing with elements of artificial intelligence, bionics and quantum physics.

OP-25 Typical vs. atypical hemolytic uremic syndrome in children

Steflea R[1,2], Stroescu R[1,2], Doros G[1,2], Gafencu M[1,2]
[1]"Victor Babes" University of Medicine and Pharmacy Timisoara; [2]"Louis Turcanu" Emergency Hospital for Children, Timisoara

Introduction. Typical hemolytic uremic syndrome (HUS) and atypical Hemolytic Uremic Syndrome (aHUS) are part of the thrombotic microangiopathies (TMA). They are characterized by thrombocytopenia, hemolytic anemia, acute kidney injury, cerebral involvement. HUS occurs frequently after a diarrheal disease, especially from E. coli that produces Shiga toxin (STEC). For aHUS the underlying cause is the uncontrolled activation of the complement system. The aim of our study was to determine the main characteristics of these diseases in children and how to promptly diagnose them for proper treatment.

Methods. A retrospective observational analysis was performed at the "Louis Turcanu" Emergency Hospital for Children in Timisoara, Romania, during a 10-year period. Data were collected from the electronic medical records of the patients.

Results. We identified 37 patients: 25 diagnosed with HUS, from which 68% were STEC-HUS, 36% of them required Renal Replacement Therapy (RRT), 3 deaths occurred in this lot due to severe neurological involvement. In May 2025, 2 patients tested positive for STEC-serogroup O26, and were part of the HUS outbreak in Romania. All survivors recovered renal function, the average hospitalization duration was 20.72 days (ranging from 2 to 64 days). Two of the 12 aHUS patients presented infectious prodrome, 67% of them required RRT, no deaths were recorded, 2 underwent kidney transplant, 1 progressed to chronic kidney disease. Mean length of hospitalization was 25.66 days (range 5 to 60 days). In the past two years, Eculizumab was given as fast as 24 hours after admission, reducing red blood cell transfusions, RRT, and hospitalization days (median lowered from 19.5 days to 12 days). We did not perform plasmapheresis on any patients; studies have not demonstrated any benefit for the pediatric population. To confirm the diagnosis, Semmelweis Immunology Institute Budapest evaluated all aHUS patients for complement dysregulation. One had a pathogenic mutation, medium risk group, necessitating Eculizumab continuation.

Conclusion. Rapid identification of HUS and aHUS drastically reduces mortality and increases the chance of renal function recovery. In case of aHUS, it is important to administer the targeted therapy in the first days after the onset. A quick referral to the pediatric nephrologist in case of suspected HUS/aHUS can improve the child's outcome.

OP-26 Clinical significance of serum VEGF and TGF- β1 levels in urinary tract infections in infants and young children

Bocearova L[1,2]
[1]Pediatrics Department, State University of Medicine and Pharmacy "Nicolae Testemițanu", Chișinău, Republic of Moldova; [2]IMSP "Valentin Ignatenco" Municipal Clinical Children's Hospital, Chișinău, Republic of Moldova.

Introduction. Urinary tract infections (UTIs) are among the most common pediatric conditions, with the potential to progress to permanent kydney damage, especially in young children. Early identification of biomarkers such as *Vascular Endothelial Growth Factor,* (VEGF) and *Transforming Growth Factor Beta 1* (TGF-β1) plays an important role in inflammatory processes and tissue remodeling, which can significantly improve diagnostic and therapeutic strategies. To evaluate serum levels of VEGF and TGF-β1 in children with UTI in order to identify their role as biomarkers of renal impairment and inflammatory and fibrotic processes.

Methods. This prospective study included 180 children, divided into three groups: children aged 3 months–1 year and 1–3 years diagnosed with UTI, and a control group of healthy children. Serum levels of VEGF and TGF-β1 were measured using the ELISA method.

Results. The study results showed a significant decrease in VEGF levels in children with UTI compared to the control group. Thus, the mean serum VEGF values were 526.50 ± 29.36 pg/ml in children aged 3–12 months with UTI, and 568.15 ± 48.50 pg/ml in the 1–3 years group, compared to 708.11 ± 65.50 pg/ml in the control group. The reduction in VEGF levels indicates impairment of vascular regeneration and angiogenesis, which may contribute to the persistence of kidney inflammation and delayed healing. Serum TGF-β1 values were similar between the control group and children under 1 year of age (22.81 ± 1.44 pg/ml vs. 22.78 ± 1.02 pg/ml), but in the 1–3 years group a significant increase was recorded (58.44 ± 8.35 pg/ml). Changes in TGF-β1 may indicate the initiation of an early, potentially reversible kidney fibrotic process if appropriate therapeutic intervention is applied. TGF-β1 is known as a key mediator of fibrogenesis and epithelial-mesenchymal transition, being involved in renal remodeling and scarring.

Conclusion. Serum levels of VEGF and TGF-β1 change specifically in UTI, providing valuable information about the inflammatory status and risk of renal injury. VEGF may reflect vascular status and the degree of renal hypoxia, while TGF-β1 may serve as an early marker of renal fibrogenesis initiation. Incorporating these biomarkers into diagnostic algorithms contributes to risk stratification of kidney

damage and optimization of treatment according to severity. The use of these biomarkers can improve clinical assessment and prognosis in children with UTI.

Oral case presentations

<u>OC-1</u> Renal biopsy in children – element of surprise

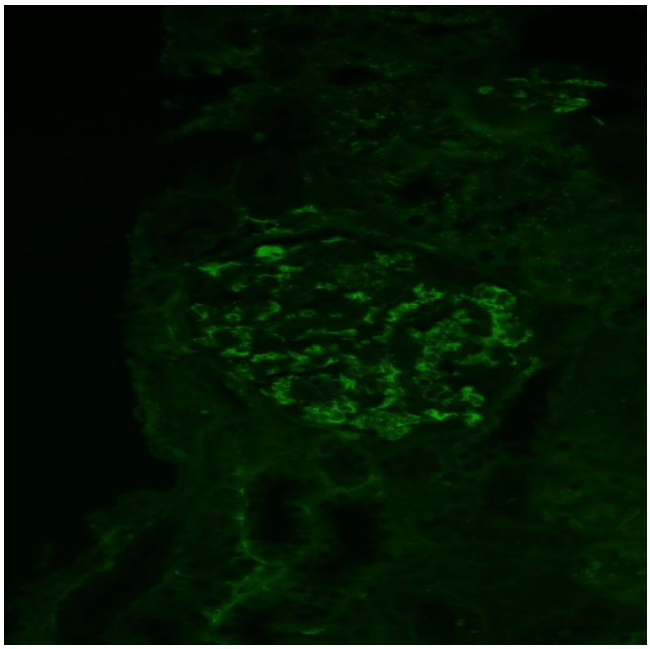
Cuceu E[1,2], Hanu D[1,2], Anghel D[1,2], Cojocaru AR[1,2], Steflea R[1,2], Stroescu RF[1,2], Gafencu M[1,2]

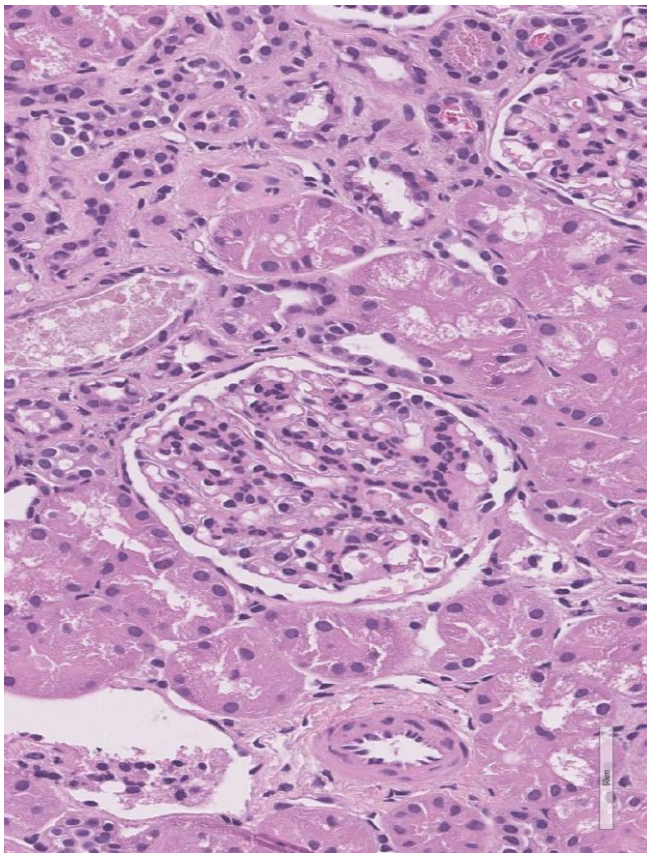
[1]Emergency Clinical Hospital for Children 'LOUIS TURCANU" Timisoara; [2]Medicine and Pharmacy University "Victor Babes" Timisoara

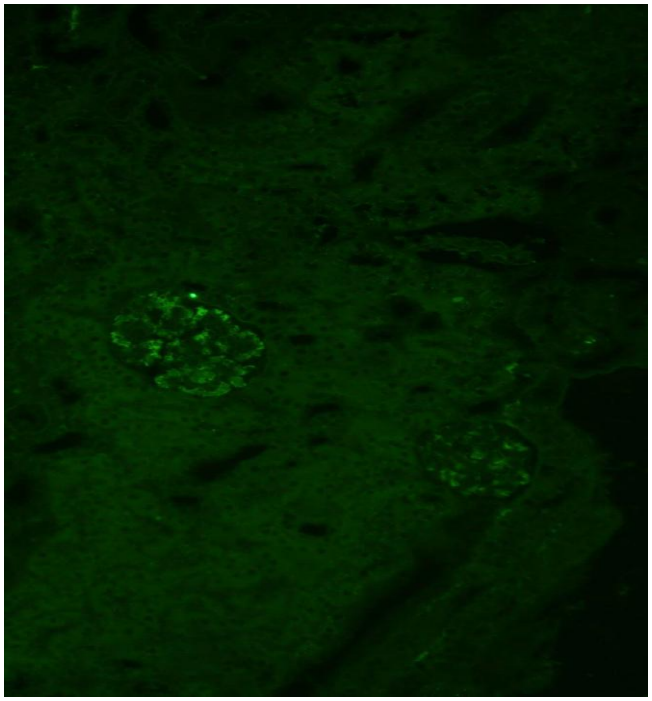
Introduction. Full-house glomerulonephritis (FHN) is a biopsy finding where all types of immunoglobulins (IgA, IgG, IgM) and complement components (C1q, C3) are deposited in the glomeruli, mimicking the pattern seen in lupus nephritis (LN). It can occur without systemic lupus erythematosus (SLE) or positive autoantibodies (non-lupus FHN) and it can present as nephrotic syndrome or a rapidly progressive glomerulonephritis. Treatment is challenging, but may involve immunosuppressants such as steroids, cyclophosphamide, or calcineurin inhibitors.

Methods. The patient aged 3 years and 6 months, known to have Nephrotic Syndrome since February 2025, treated with Prednisone (35 mg/day), was admitted on 15.04.25 to a local hospital with headache, eyelid edema, diplopia and vomiting. Subsequently, the patient developed convergent strabismus and complained of frontal headache, which is why an ophthalmological consultation was recommended, which revealed papillary edema and a cerebral angiography-CT was performed, where a thrombus was suspected in the superior sagittal sinus. During the hospitalization, in the Pediatrics department of the local hospital, the patient received pulse therapy with Methylprednisolone. The patient had been taking daily treatment with Prednisone since the onset of Nephrotic Syndrome and an emergency transfer to the Nephrology department was decided, presenting edema, cushingoid face, hypertension.

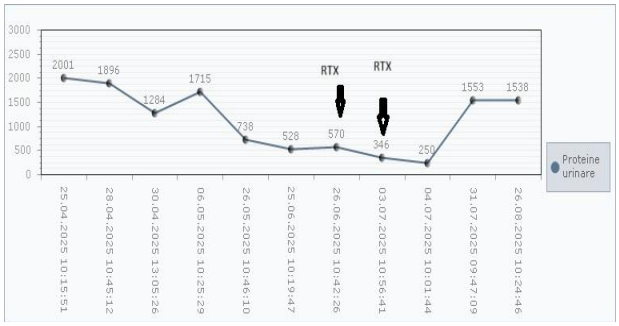
Results. Considering the duration of corticosteroid treatment without response on proteinuria, it is classified as a corticosteroid-resistant nephrotic syndrome and treatment with cyclosporine is initiated and corticosteroid tapering is started according to the IPNA 2023 guideline. The antibodies for AAN where negative and a renal biopsy is performed, which directs the diagnosis to a non-lupus "full-house" nephropathy.







Anticoagulant treatment is also initiated in therapeutic doses, with good evolution, antihypertensive treatment with ACE inhibitors. In the dynamics, the persistence of nephrotic-range proteinuria and microscopic hematuria is noted, which is why treatment with Rituximab is initiated and the tapering of Cyclosporine. The range-nephrotic proteinuria persisted, so it was associated Mycofenolate Mofetil in the therapeutic plan.



Conclusions. Diagnosing nephrotic syndrome is not difficult, but it is also necessary to detect the underlying disease. Kidney biopsy is the gold standard in establishing the ethiology of cortico resistant nephrotic syndrome and adapting an appropriate treatment.

OC-2 An Unusual Scenario of 'Three Sisters': Exploring Alport's Syndrome in Women“ A Case Series

Maulti S[1], Alexandru A[1,2], Ciciu E[1,2], Gafar N[2], Pana C[1,2], Stanigut AM[1,2], Tuta LA[1,2]
[1]Nephrology Department, Constanta County Emergency Hospital, Constanta, Romania; [2]Faculty of Medicine, Ovidius University, Constanta, Romania

Introduction. Alport Syndrome is a genetic disorder caused by mutations in type IV collagen genes, essential for the structural integrity of the glomerular basement membrane, inner ear, and eyes. The X-linked form, due to *COL4A5* mutations on chromosome Xq22, accounts for about 85% of cases and is typically more severe in males. Females, often labeled as asymptomatic "carriers," may still experience significant renal impairment. Less commonly, autosomal recessive or dominant forms linked to *COL4A3* or *COL4A4* mutations (on chromosome 2q36) can also cause progressive disease in females. Diagnosis relies on genetic testing and, when needed, kidney biopsy showing glomerulosclerosis and interstitial fibrosis. This presentation aims to emphasize the importance of recognizing Alport Syndrome in females and the role of genetic and clinical evaluation, even when family history or extrarenal signs are absent.

Case report. In this case series, we present three female patients diagnosed with Alport Syndrome, symbolically referred to as the “Three Sisters” due to their shared diagnostic and clinical challenges.

Case 1: A 54-year-old woman with no known renal history presented with elevated creatinine (2.59 mg/dL), hyperuricemia, hematuria, and proteinuria (3.5 g/24h). Imaging showed nephrocalcinosis and poor corticomedullary differentiation. Over two years, creatinine rose to 5.67 mg/dL. A *COL4A4* mutation was identified, confirming Alport Syndrome. She progressed to end-stage kidney disease and is on dialysis.

Case 2: A 53-year-old woman with chronic kidney disease and microscopic hematuria had renal cortical cysts. Initially suspected of medullary sponge kidney, genetic testing revealed a *COL4A3* mutation. Renal function remains stable (creatinine 1.62 mg/dL; proteinuria 198 mg/24h).

Case 3: A 23-year-old pregnant woman (36 weeks) presented with hypertension and heavy proteinuria (13 g/24h), suspected of preeclampsia. After a premature cesarean section, nephritic-range proteinuria persisted. Biopsy and genetic testing confirmed Alport Syndrome. Under treatment (ACE inhibitors, statins, SGLT2 inhibitors), her kidney function is stable (eGFR >75 ml/min/1.73 m²; UACR <200 mg/g).

Conclusion. Alport Syndrome should be suspected in females with hematuria and/or proteinuria, regardless of family history or extrarenal signs. Autosomal forms may affect women significantly. Early diagnosis through genetic testing and biopsy is

essential for guiding management and preserving renal function.

OC-3 C1q nephropathy in a patient with relapsed multiple myeloma after autologous stem cell transplantation

Radunovic D[1], Radunovic I[1], Prelevic V[1], Tomovic F[1]
[1]Clinic for Nephrology, Clinical Center of Montenegro, Montenegro

Introduction: C1q nephropathy is a pattern of glomerulonephritis characterized by predominant mesangial C1q deposition but with other histological features resembling lupus nephritis, although no extrarenal disease. C1q nephropathy is a poorly understood and controversial entity with distinctive immunopathologic features: dominant or co-dominant immunofluorescence staining for C1q, mesangial electron dense deposits. The prevalence of C1qN has been estimated from 0.2% to 16%. Clinical presentations vary from asymptomatic urinary anomalies and macroscopic hematuria to nephritic syndrome and nephrotic syndrome.

Case report. Female patient, 44 years old, presented with peripheral edema, arterial hypertension and diabetes mellitus and nephrotic syndrome with proteinuria range 10 grams in 24 h urine sample with preserved renal function. Five years previously she was diagnosed with multiple myeloma. Initially treated according to the CTD protocol, and then according to the VTD protocol. After that, she was treated with autologous stem cell transplantation. The disease was in remission with lenalidomide in maintenance therapy. During the treatment of multiple myeloma, DM type 2 was diagnosed and insulin therapy was introduced. Clinical analysis of the etiology of nephrotic syndrome did not reveal pathological lymphadenopathy or solid tumors. Tumor markers were normal, as were viral markers. In the findings of serology, a positive liver profile was obtained, which was laboratory compatible with PBC (primary biliary cirrhosis) of the liver. A liver biopsy was performed, but PBC was ruled out pathohistologically. Lupus serology was negative. A kidney biopsy was then performed and a pathohistological finding of C1q nephropathy was obtained. On light microscopy there was focal mesangial cell proliferation in some glomeruli. In the immunofluorescence, granular accumulation of C1q 4+ was found, while kappa, lambda, IgG, IgM, IgA and C3 were negative. There was no any other significant finding in the kidney biopsy. In the finding of electrophoresis of serum proteins by immunofixation, an M peak was obtained in the gamma region. The finding of flow cytofluorometry of the bone marrow aspirate was not indicative of lymphoproliferative hematological diseases. Pathohistological findings of bone biopsy with immunohistochemical tests proved relapse of multiple myeloma.

Outcome. She was treated with corticosteroids and daratumumab. Clinical and laboratory partial remission of nephrotic syndrome was achieved.

Conclusion: The association between nephrotic syndrome and multiple myeloma has been reported in various glomerulopathies, but not with C1q nephropathy in literature.

OC-4 Metastatic neuroendocrine carcinoma of unknown primary site in inguinal lymph nodes complicated with membranous nephropathy: a case report (oral case)

Cretan AE[1], Marcu L[1,2,3], Petrica L[1,2,3], Bob F[1,2,3], Vaduva A[4,5], Szilagyi D[4], Rosca C[1], Iova I[1], Milas O[1,2,3], Suteanu A[1,2,3], Glavan M[1,2,3], Gadalean FN[1,2,3]
[1]County Emergency Hospital, Department of Nephrology, Timisoara, Romania; [2]Department of Internal Medicine II – Division of Nephrology, "Victor Babeș" University of Medicine and Pharmacy, County Emergency Hospital, Timișoara, Romania; [3]Centre for Molecular Research in Nephrology and Vascular Disease; Faculty of Medicine "Victor Babeș Univeristy of Medicine and Pharmacy", Timișoara, Romania; [4]County Emergency Hospital, Department of Pathology, Timisoara, Romania; [5]Department of Microscopic Morphology - Discipline of Morphopathology, "Victor Babeș" University of Medicine and Pharmacy, Timișoara, Romania

Introduction. Membranous nephropathy (MN) is one of the most common causes of nephrotic syndrome in adults, with 80% of MN cases being primary and 20% secondary. Primary MN involves the presence of anti-phospholipase A2 receptor antibody (PLA2R) in 70-80% of cases, whereas secondary MN is commonly a result of malignancy, infection or drugs. Neuroendocrine neoplasms (NENs) are uncommon malignant tumors distinguished by fluctuating global incidence rates, exhibiting a general trend of rising frequency. The gastrointestinal tract and lungs are themost common primary sites for NENs, the liver being the most common location for metastases. However, up to 22% of NENs present without an identifiable primary site. Nevertheless, metastasis to the inguinal lymph nodes is rare. Tumor-associated nephropathies can occur in association with both solid tumors and hematologic malignancies. MN is the most prevalent

pathological variant of tumor-associated nephropathies in individuals with solid tumors, but its incidence in patients with neuroendocrine carcinoma is exceedingly uncommon.

Case presentation. We report the case of a 46-year-old man admitted to the hospital with nephrotic syndrome (proteinuria at admission = 10.4 g/24h) and normal renal function (eGFR = 90.8 ml/min/1.73m2). He had no extrarenal symptoms indicative of infection, connective tissue disease, or malignancy. He had been previously healthy and was not receiving treatment with any drugs. Kidney biopsy revealed a MN pattern. Serum anti-PLA2R antibodies were negative. A comprehensive evaluation of secondary causes was conducted. The computed tomography of the abdomen and pelvis showed multiple enlarged left inguinal lymph nodes measuring between 15 mm and 40 mm. A lymph node biopsy was performed and histologic examination showed metastases of a small cell neuroendocrine carcinoma. Despite extensive examination, the primary tumor site could not be detected.

Outcome. The patient was referred to the Oncology Department, where he began a systemic chemotherapy regimen consisting of Carboplatin and Etoposide, administered intravenously, for three consecutive days, every 3 weeks. To date, he has completed four cycles of chemotherapy, resulting in a significant decrease in proteinuria (proteinuria = 4.6 g/24h), with stable renal function.

Conclusion. NEN association with MN is rare, and when present, combined chemotherapy (Carboplatin and Etoposide) represents an effective treatment modality, with positive results on renal function and protein loss.

OC-5 Focal segmental glomerulosclerosis presenting as nephrotic syndrome and acute kidney injury in late pregnancy: a case report (oral case)

Pascu CM[1], Constantin R[1]
[1]Department of Nephrology, University Emergency Hospital Bucharest, Bucharest, Romania

Introduction. Nephrotic syndrome, occurring in 0.012% to 0.025% of pregnancies, is characterized by peripheral edema, severe proteinuria, hypoalbuminemia and often hyperlipidemia. Focal segmental glomerulosclerosis is a common etiology of nephrotic syndrome in the general population.

Case report. We present the case of a 31-year-old female with no significant medical history, who is 29 weeks into an unmonitored pregnancy and was admitted for recent onset of oliguria and anasarca. The patient underwent an uncomplicated urgent cesarean section for imminent preterm labor. Clinical examination revealed normotension, pale skin, alopecia, massive bilateral leg edema and diminished breath sounds in the lung bases. Laboratory findings indicated moderate anemia, azotemia, hyperkalemia, severe nephrotic-range proteinuria, hypoalbuminemia, hyperlipidemia. Imaging studies showed moderate pleural effusion and ascites. We considered the following differential diagnoses for the etiology of nephrotic syndrome: preeclampsia, systemic lupus erythematosus, focal segmental glomerulosclerosis, minimal change disease, membranous nephropathy, ANCA-associated vasculitis and Goodpasture syndrome. Specific diagnostic tests showed negative results for autoimmune antibodies (ANA, anti-dsDNA, p/cANCA, anti-GBM, anti-PLA2R), normal C3, C4 levels, and no viral infections. Renal biopsy sample (Figure. 1) contained a single glomerulus, which showed normal cellularity, a glomerular basement membrane of normal structure and thickness, with no immune deposits and podocytopathy. The suggested histopathological diagnosis was focal segmental glomerulosclerosis.

Outcome. Initial supportive therapy (albumin, electrolytes, loop diuretic) was ineffective. Due to persistent fluid overload and worsening renal function (creatinine 6.25 mg/dL), renal replacement therapy was initiated via six hemodiafiltration sessions. Pulse therapy with methylprednisolone and cyclophosphamide was started for severe nephrotic syndrome, but the response was inadequate after two cycles. We noted infectious complications (urinary tract infection and bacteremia with MDR *Klebsiella)* related to the nephrotic syndrome and immunosuppressive therapy. The patient remained on immunosuppressive corticosteroids until biopsy confirmed focal segmental glomerulosclerosis. Given the steroid-resistant profile, second-line treatment with cyclosporine was initiated and then tapered gradually. Renal function improved progressively, with significant reduction in proteinuria and normalization of creatinine (0.55 mg/dL) after nine months, accompanied by scalp and body hair regrowth.

Conclusion. This case underscores the complexities of diagnosing nephrotic syndrome in pregnancy, particularly in the setting of acute kidney injury, and highlights the importance of a thorough differential diagnosis [3,4]. Notable aspects of this case include the rare occurrence of focal segmental glomerulosclerosis-induced nephrotic syndrome with acute kidney injury during pregnancy necessitating

aggressive treatment, and reversible alopecia universalis following restoration of renal function.

OC-6 Hidden in plain sight: infectious spondylodiscitis as an underrecognized complication of Hemodialysis

Saliaj K[1], Rista E[2], Gjecka E[1], Idrizi A[1], Strakosha A[1]
[1]Department of Nephrology, Dialysis and Transplantation, University Hospital Center "Mother Teresa" Tirana, Albania; [2]Hygeia International Hospital, Tirana, Albania

Introduction. Infectious spondylodiscitis is defined as an infection of the intervertebral disc and adjacent vertebral bodies. It is an uncommon, but potentially fatal complication among patients on maintenance hemodialysis, that already carry a heightened risk of infection due to immune dysfunction associated with the uremic milieu, pre-existing comorbidities such as diabetes mellitus and vascular disease, as well as repeated vascular access procedures. Recurrent bacteremia episodes mainly due to cannulation of the vascular access or the presence of a central venous catheter (CVC), represent the primary pathologic mechanism, often leading to metastatic infections. The most frequent culprits are gram-positive bacteria, principally Staphylococcus aureus, although gram-negative organisms and polymicrobial infections have also been reported. Clinical presentation is often insidious and nonspecific, with persistent back pain as the hallmark symptom, contributing often to a delayed recognition and underdiagnosis. If left untreated, the infection can progress to paraspinal or epidural abscess formation, vertebral collapse and permanent neurological impairments.

Case report. Case 1: A 45-year-old man with end-stage kidney disease and hypertension, recently started on hemodialysis via a temporary femoral central venous catheter (CVC), presented with one week history of severe lumbar pain refractory to analgesics and limited mobility. Initially, acute abdominal emergencies were ruled out. Neurological examination revealed a bilateral, positive Lasegue sign, but no sensory deficits were noted. MRI revealed spondylodiscitis at the L3–L4 level with paravertebral involvement. Neurosurgical consultation recommended conservative treatment. Empiric antibiotic therapy was initiated, the CVC was removed and hemodialysis continued via a functioning AVF. Cardiac ultrasound ruled out concurrent infectious endocarditis. Blood cultures were positive for *Enterococcus faecalis,* and subsequently antibiotics were tailored to sensitivity testing. The patient improved clinically and made a full recovery without neurological sequelae.

Case 2: A 61-year-old man on maintenance hemodialysis for 12 years, with a history of kidney transplant failure and hypertension, presented with a 7-day history of severe back pain and fever following his dialysis sessions. He had longstanding vascular access problems and was dialyzing via a tunneled left internal jugular CVC for the past 3 years. Blood cultures were obtained, empiric antibiotics started, and echocardiography ruled out endocarditis. MRI revealed spondylodiscitis of T9–T10 with a pathological fracture of T9. Cultures grew *Staphylococcus aureus*. Due to a history of multiple vascular access failures and no alternative access options, immediate removal of the CVC was considered unfeasible, and an attempt at access salvage was made. Therapy was adjusted accordingly, alongside the administration of an antibiotic lock. Neurosurgical evaluation recommended conservative treatment. The patient's fever resolved, pain improved, and mobility partially recovered. He continues on antibiotics and is scheduled for a delayed catheter exchange.

Case 3: A 60-year-old woman on chronic hemodialysis for 5 years, with diabetes mellitus, hypertension, multiple prior vascular access failures and recurrent catheter-related bloodstream infections (CRBIs), was using a tunneled right subclavian CVC for 2 years. She presented with a new CRBI and was initiated on empiric antibiotic therapy, awaiting culture and sensitivity results. Subsequently, she developed severe lumbar pain radiating to the upper abdomen, refractory to analgesics. After ruling out acute abdominal emergencies, an MRI confirmed spondylodiscitis and echocardiography revealed tricuspid valve endocarditis. Her CVC was removed and broad-spectrum empiric antibiotic therapy continued, however her condition rapidly deteriorated and she succumbed to septic shock.

Conclusion: Infectious spondylodiscitis is a rare, but serious complication in patients on chronic hemodialysis. Recurrent bacteremia due to their vascular access remains the main risk factor in this population. Early recognition requires a high index of suspicion, and spinal imaging should be promptly pursued in dialysis patients presenting with persistent back pain, even in the absence of fever or other overt signs of infection, to prevent irreversible neurological sequelae.

OC-7 Managing dabigatran overload with intermittent hemodialysis and idarucizumab: case report (oral case)

Trbojevic-Stankovic J[1] (oral case)
[1]Affiliation Faculty of Medicine, University of Belgrade

Introduction. Dabigatran is a predominantly renally cleared direct thrombin inhibitor with a highly renal-dependent pharmacokinetic profile. Standardised tests for monitoring its activity are lacking, and the sole reversal agent is idarucizumab, but financial

constraints and limited effectiveness in acute kidney injury (AKI) hamper its clinical use. Removal by hemodialysis (HD) may sometimes be the sole reversal strategy. This report presents a case of dabigatran overload associated with AKI.

Case presentation. A 71-year-old man was admitted to the Surgical Intensive Care Unit for urgent surgery due to acute cholangitis and cholecystitis. His physical findings included altered mental status, icterus, hypotension, tachyarrhythmia, dyspnoea, low oxygen saturation, dehydration, prolonged bleeding from puncture sites and oliguria. Clinical history included atrial fibrillation (CHA2DS2-VASc=4), chronic heart failure, hypertension, abdominal aortic aneurysm, hypothyroidism, hyperlipidemia, prostatic hyperplasia, untreated chronic renal disease and previous STEMI with triple aorto-coronary bypass. Chronic treatment included dabigatran 150mg bid, trimetazidine, an ACE inhibitor, beta-blocker, torasemide, statin, levothyroxine, tamsulosin, solifenacin, and diosmin/hesperidin. Ultrasound revealed gallstones in the common bile duct and the gallbladder, aerobillia, and signs of incipient pancreatitis, while the kidneys appeared normal. Bloodwork on admission confirmed stage 3 AKI with mild acidosis, anaemia and thrombocytopenia, no electrolyte imbalance, severe systemic inflammation, signs of hepatic and pancreatic injury and anticoagulation. He was immediately treated with adequate conservative therapy. Cardiologic exam excluded worsening cardiac failure. Dabigatran was promptly discontinued and low-molecular-weight heparin (LMWH) introduced, along with 10mg of vitamin K, tranexamic acid, plasma and human prothrombin complex, but with limited effect on anticoagulation parameters. On day 4, idarucizumab was administered, but the ecarin clotting time (ECT) still suggested a rebound in dabigatran activity. Despite improved hemodynamic status and recovered diuresis, azotemia aggravated, necessitating urgent dialysis. A temporary dialysis catheter was placed in the femoral vein immediately after idarucizumab infusion. On days 5 and 6, two consecutive intermittent predilution hemodiafiltration treatments were performed. ECT between and after dialyses indicated a gradual decline in dabigatran activity. Surgical treatment was postponed. He remained on LMWH at discharge. Dabigatran was reintroduced by the cardiologist two weeks post-discharge. Three months later, the patient underwent a laparoscopic cholecystectomy without complications.

Outcome. HD contributed to dabigatran activity mitigation, even with short, intermittent sessions, as mandated by the anticipated urgent surgery.

Conclusion. HD remains an important option for managing dabigatran overload, even with the availability of idarucizumab. Clearer protocols are needed for cost-effective and safe treatment of dabigatran-associated coagulopathy.

OC-8 ANCA vasculitis and IgA nephropathy in patient with Grave's disease (oral case)

Radunovic D[1], Radunovic I[1], Prelevic V[1], Tomovic F[1]
[1]Clinic for Nephrology, Clinical Center of Montenegro, Montenegro

Introduction. Antineutrophil cytoplasmic autoantibodies (ANCA) are commonly associated with a necrotizing and crescentic glomerulonephritis (GN) that is pauci-immune, with few or no glomerular immune complex deposits. Immunoglobulin A (IgA) nephropathy may also be manifest as a crescentic GN, but it is characterized by mesangial immune complex deposits containing IgA and is rarely associated with myeloperoxidase (MPO)- or proteinase 3 (PR3)-specific ANCA. Graves' disease (GD) is a common autoimmune cause of hyperthyroidism, which is eventually related to the generation of IgG antibodies stimulating the thyrotropin receptor. Clinical manifestations of the disease reflect hyperstimulation of the gland, causing thyrocyte hyperplasia (goiter) and excessive thyroid hormone synthesis (hyperthyroidism). There is no clear association between Grave's disease and immunoglobulin A nephropathy.

Case report. Male patient, 38 years old, who was diagnosed with Grave's disease 4 years ago with hyperthyroidism and the development of atrial fibrillation. At first, he was treated with thiamazol, which was discontinued due to myelotoxicity, and then with propylthiouracil therapy, regulation of the thyroid hormone status was achieved. In the follow-up, erythrocyturia and hematuria were verified in the patient's urine. In the 24-hour urine tests, proteinuria of the range of 2.0 gr/24h was verified, predominantly albuminuria. An investigation into the etiology of proteinuria was conducted. During hospital monitoring, serum creatinine values increased from 100 to 263 μmol within a week. In the immunological findings, a high titer of MPO antibodies was obtained. Other secondary causes of proteinuria have been excluded. Clinically, extrarenal manifestations of MPO vasculitis were not verified by examination. A kidney biopsy was performed. Pathohistological findings revealed IgA nephropathy, Oxford classification M1E0S1T0C0 with global and segmental sclerosis in glomeruli with mild hyalinosis of arterioles. The immunofluorescence test verified IgA 4+ granular mesangial accumulation.

Outcome. The patient was treated with 6 cycles of pulse therapy with methylprednisolone and cyclophosphamide, with continued therapy with oral corticosteroids, ACE inhibitors, SGLT2 inhibitors, hypolipemic drugs and propylthiouracil. The indicated therapy resulted in a regression of the proteinuria level to 0.3 gr/24h with an improvement in renal function (serum creatinine 190 μmol, GFR 40 ml/min/1.73m2) without other complication. In the control findings of immunology, there was a drop in the MPO antibody

titer. During follow-up, the patient did not develop extrarenal manifestations of MPO vasculitis.
Conclusion: Patients with Graves' disease may develop ANCA-associated vasculitis with the pathohistological presentation of IgA nephropathy. Propylthiouracil use has been associated with ANCA positive pauci-immune glomerulonephritis, but not with IgA nephropathy. Searching the literature, we did not come across a similar described case.

OC-9 Cardio-renal syndrome: what's more important, the heart or the kidneys? (oral case)

Meche VA
[1]Institute of Cardiovascular Diseases, Timisoara, Romania

Introduction. Cardio-renal syndrome is a clinical entity that entails a simultaneous disorder of the cardiovascular and renal system, with one system affecting the other. Due to complex underlying mechanisms, high mortality rates and a multi-faceted treatment, it is important to recognize and treat accordingly.
Case report. We present a 75-year-old female patient, smoker, obese, with 2nd-degree HT, dyslipidemia, type 2 diabetes, HFpEF, LBBB, CKD KDIGO G2A1, COPD GOLD III, presenting with fatigue, discrete ankle swelling and chronic diarrhea. The ECG shows Afib with RVR. Lab reports revealed occult hemorrhage, AKI AKIN III, nephrotic range proteinuria, negative urine culture, positive pANCA, and moderate anemia. During the albumin administration patient developed severe cardiogenic APE and cardiac arrest (asystole). Post-resuscitation, she is admitted to ICU (intubated). On cardiac echo EF was 30%, a globally hypokinetic heart, with severe MR and TR. The renal function was on decline. Lung Rx revealed an OTI-associated bronchopneumonia (but without sepsis). The patient frequently develops severe HT crises, entered Afib with RVR, and then cardiogenic APE.
Outcome. Given her worsening kidney function, the medical team decided to initiate emergency hemodialysis. After that, her general state shows slow, gradual improvement in all systems. Her state was stationary for 8 months, until chronic dialysis could no longer be postponed. At present, she is hemodynamically stable, with EF=50%, mild MR, and TR.
Conclusion. A type III cardio-renal syndrome (acute kidney failure gives acute heart failure) with associated lung damage reportedly has a very high mortality rate. A multidisciplinary approach is necessary, as a low eGFR, immune compromise and mechanisms such as diuretic resistance can complicate an already elaborated issue. Emergency dialysis can represent a last resort for these patients, but a close and careful follow-up is mandatory to ensure optimal long-term results.

Poster presentations

PP-01 Clinical outcomes of acute kidney injury: a recent cohort from a tertiary nephrology service

Spahia N[1], Rroji M[1], Kasa M[2], Gjongecaj J[3], Strakosha A[1]

[1]University Hospital Center "Nënë Tereza", Tirana, Albania; [2]University Hospital of Trauma, Tirana, Albania; [3]University of Medicine Tirana

Introduction. Acute kidney injury (AKI) is a major global health problem, associated with high morbidity, mortality, and healthcare costs. However, data from Albania remains limited. We aimed to represent the epidemiology, clinical features, and outcomes of AKI in a tertiary nephrology center.

Methods. We retrospectively analyzed 116 adult patients hospitalized with AKI in the Nephrology Service, University Hospital Center "Mother Teresa", Tirana, between September 2024 and May 2025. Patients included de novo AKI (61.2%) and AKI on pre-existing CKD stage 1–3 (38.8%). Demographic, clinical, etiological, and laboratory characteristics, comorbidities, and management were recorded. Outcomes included recovery, mortality, dialysis requirement, ICU admission, and hospital stay.

Results. The mean age was 70.6 ± 14.9 years; 66.4% were male. AKI was predominantly prerenal (50%), followed by intrinsic (37.1%) and postrenal (12.9%). By KDIGO criteria, 42% were stage 1, 30% were stage 2, and 28% were stage 3, with the latter accounting for the majority of dialysis starts. Hyperkalemia (K+ > 6.0 mmol/L) occurred in 18.9% of patients and was a strong predictor of the need for dialysis ($p < 0.01$). Oliguria/anuria was present in 14% and showed a trend toward higher mortality and incomplete recovery. Elevated inflammatory markers (CRP and neutrophil-to-lymphocyte ratio) and anemia were more frequent in patients with poor outcomes; however, these associations did not reach statistical significance. Within intrinsic AKI, 55.8% remained of undetermined cause as no renal biopsies were performed. Overall, dialysis was required in 20.7% of cases, and ICU admission occurred in 9.5% of cases. Recovery occurred in 89.7%, mortality in 5.2%, and persistent dysfunction in 5.2%. Hospital stays correlated negatively with age ($r = –0.26$, $p = 0.006$) and positively with creatinine ($r = 0.19$, $p = 0.046$).

Conclusion. In this recent Albanian cohort, AKI was most often prerenal, while advanced stages, hyperkalemia, and oliguria pointed to greater severity and risk. Although inflammatory markers and anemia showed only non-significant trends toward poorer outcomes, they remain clinically intriguing signals warranting closer study. Taken together, these findings provide a focused snapshot of AKI outcomes in a tertiary nephrology service, highlighting both the encouraging recovery rates and the gaps in diagnostic precision. They highlight the need for systematic AKI registries, earlier risk stratification, and broader use of diagnostic tools—steps that could transform care delivery and diminish the burden of AKI in nephrology service.

PP-02 Low dose furosemide reduces acute kidney injury in hip fracture patients post-blood transfusion perioperatively

Leka S[1], Kasa M[2]

[1]Anesthesiologist-Intensivist at University Trauma Hospital, Tirana, Albania, [2]Nephrologist at University Trauma Hospital, Tirana, Albania

Introduction. Hip fractures in frail elderly patients are a significant cause of morbidity and mortality, requiring immediate surgery (optimally within the first 72 hours post fracture). These patients frequently suffer from chronic illnesses such as hypertension, cardiac disease, diabetes, osteoporosis, anemia, preexisting renal impairment, dehydration etc.

Blood transfusions during surgical repair of hip fractures are among the most frequent intervention and are associated with the risk of acute kidney injury (AKI). AKI is defined as an abrupt decline in renal filtration rate, marked by a rise in serum creatinine (SCr) or azotemia in laboratory findings. Every day evidence from the operating room, suggests that the use of low dose furosemid, such as 10 mg, may prevent the risk of AKI by promoting diuresis and improving renal perfusion.

Methods. This is a retrospective cohort study, where 143 frail hip fracture patients (aged 70- 96) over a period of 12 months, received perioperative blood transfusion. Their baseline serum creatinine ranged from 0.5-1.2 mg/dL and they received a single dose of 10 mg of IV furosemide, post transfusion, intraoperatively. The outcome was SCr measured at 48 hours post surgery. AKI was staged using KDIGO criteria based on SCr: Stage 1: SCr 1.5 - 1.9 * baseline or ≥ 0.3 mg/ dLincrease; Stage 2: SCr 2.0-2.9 * baseline; Stage 3: SCr ≥ 3.0 * baseline.

Results. The overall AKI incidence was 23/143 or 16.1 % of the total cohort. The results showed that SCr level was ≥1.3 mg/dl and ranged from 1.3 to 3.9 mg/dl. Our study displayed the following: **Stage 1** - 17 patients or 73.9 % of AKI cases, or 11.9 % of total cohort; **Stage 2** - 6 patients or 26.1 % of AKI cases, or

4.2 % of the total cohort; **Stage 3** - 1 patient or 4.3 % of AKI cases , or 0.7 % of the total cohort. No severe furosemide-related adverse events, such as significant hypotension or hypokalemia (K <3.0 mEq/L) were observed.

Conclusion. Prophylactic administration of 10 mg of Furosemide was associated with a moderate AKI incidence as 16.1% and as seen by results predominantly mild stage 1 cases. These findings support further trials to validate its renoprotective role after blood transfusion in hip fracture surgery.

PP-03 Acute kidney injury induced by hypercalcemia: a rare but significant complication of primary hyperparathyroidism

Dumitanoiu RS[1], Istodor IM[1], Maria DT[1,2]
[1]Nephrology Department, County Emergency Hospital of Craiova; [2]University of Medicine and Pharmacy Craiova

Introduction. Primary hyperparathyroidism is an endocrine disorder characterized by excessive autonomous secretion of parathyroid hormone (PTH), independent of serum calcium levels (absent hypocalcemia), which leads to hypercalcemia by activating bone resorption mechanisms, renal calcium reabsorption and intestinal absorption stimulated by calcitriol.

Case presentation. We present the case of a hypertensive patient, without prior renal impairment, with recently diagnosed digestive pathology (gastritis), who presents with significant joint and bone pain, with the impossibility of maintaining orthostaticity, fatigue, nausea, vomiting, abdominal pain and bradycardia. For osteo-articular symptoms he undergone electro-physiotherapy procedures and received a contrast-enhanced computer tomography to serch the ethiology of gastrointestinal disorder, when slightly increased nitrogen retention values were detected (creatinine=1.7mg/dL, urea=80mg/dL). Upon presentation to the Nephrology service, a rapid increase in nitrogen retention (creatinine=3.8mg/dl, urea=150mg/dl) was detected over the last 2 weeks, also severe hypercalcemia (serum calcium=16mg/dl) and hyperuricemia (uric acid=13.7mg/dl), without significant electrolyte changes. Considering the clinical symptomatology of bone pain correlated with the laboratory test values, the suspicion of multiple myeloma is raised, but serum protein electrophoresis with immunofixation and skull x-ray refuted the diagnosis.

Outcome. The particularity of the case appears when the serum parathyroid hormone (PTH) value is determined. Thus, PTH=983pg/mL guides the diagnosis to primary hyperparathyroidism, secondary to an ultrasound-detected parathyroid adenoma, which is why hypocalcemic treatment with zoledronic acid is initiated, reducing the risk of associated complications (cardiac rhythm disorders, osteoporosis, coma), with improvement in digestive symptoms. After partial hydro-electrolyte balancing and significant reduction of symptoms, the patient is transferred to a specialized medical institution for curative treatment.

Conclusions. Acute kidney injury induced by severe hypercalcemia is a serious and frequently underdiagnosed complication of primary hyperparathyroidism, with significant implications on the clinical evolution of patients. Rapid recognition of signs of hypercalcemia and possible renal effects is crucial to reduce the risks of progression to chronic kidney disease. The therapeutic approach should be comprehensive, including measures to reduce serum calcium (adequate hydration, diuretics, bisphosphonates) and surgery to eliminate the primary cause (usually a parathyroid adenoma).

PP-04 Acute kidney injury secondary to SARS COV2 infection in a patient with major comorbidities

Istodor IM[1], Dumitanoiu RS[1], Maria DT[1,2], Firu SG[1]
[1]Nephrology Department, County Emergency Hospital of Craiova; [2]University of Medicine and Pharmacy Craiova

Introduction. SARS COV2 infection does not only affect the respiratory system, but has important systemic consequences, the kidney being one of the organs frequently involved both directly and indirectly.

Case report. We present the case of a patient known to have multiple cardiovascular pathologies (CTI ablation for typical atrial flutter in 2015, severe valvular diseases, chronic heart failure NYHA class III with reduced ejection fraction, nonischemic dilated cardiomyopathy, carrier of a biotronik biventricular pacemaker for cardiac resynchronization therapy, atrial fibrillation with rapid ventricular allura), diabetic, with mild renal impairment stage G3A for several years, who presents to the emergency department, with fatigue, nausea, vomiting, diarrhea, occurring in the context of non-compliance with the diet, prolonged exposure to the sun and urban agglomeration. Clinically, he presents with hypotension, dyspnea, pale skin. Biological evaluation reveals a significant nitrogen retention syndrome (creatinine=11mg/dL, urea=305mg/dL), severe hyperkalemia=7.1mmol/l and severe metabolic acidosis (pH=6.9, HCO3=8.5mEq/L), with anuria of over 12h. He denies the association with febrile syndrome, considering it a severe dehydration syndrome and a possible context of infectious or infectious-contagious disease. The primary emergency is represented by hyperkalemia, acidosis and anuria so admission to the intensive care unit is decided, with renal replacement therapy through hemodialysis.

Outcome. He performs 2 hemodialysis sessions, with partial resumption of renal function, complete remission of digestive symptoms and apparent improvement of vital functions 48 hours after admission. But in the next 10 hours the general condition is getting worse, severe respiratory depression occurs requiring positive pressure ventilation, and surprisingly severe hepatic cytolysis appears without signs of sustained hypovolemic shock. Over 72 hours after admission, fever develops and it is decided to perform a SARS-COV2 test, with a positive result. The particularity of the case is the appearance of a significant hepatic cytolysis syndrome that is not found at admission (GPT=2251U/L, GPT=2710U/L) and rhabdomyolysis (CK=1071U/L, CKMB=60U/L), concomitant with fever 4 days after admission.

Conclusion. SARS COV2 infection can cause severe acute kidney injury in a patient with major comorbidities, such as cardiovascular disease and diabetes mellitus, being the most serious complication requiring immediate treatment. The subsequent evolution, with the appearance of a syndrome of massive hepatic cytolysis and rhabdomyolysis, confirms the systemic and complex nature of the damage caused by the COVID-19 virus.

PP-05 Association of FGF23 with markers of macrovascular complications, lipid profile, and inflammation in patients with type 2 diabetes mellitus and early-stage chronic kidney disease

Minova NN, Spasovski G, Kostovska I, Baloski M, Ilievska CV, Velkovska V, Ilievska DB, Hristov G
[1]University Clinic of Nephrology, Faculty of Medicine, University Ss. Cyril and Methodius, Skopje, R. of North Macedonia

Introduction. Fibroblast Growth Factor 23 (FGF23) is a phosphaturic hormone with a key role in phosphate metabolism and the pathophysiology of chronic kidney disease (CKD). Growing evidence suggests that elevated FGF23 levels are associated with increased cardiovascular risk, vascular calcification, and inflammation. The aim of this study was to evaluate the association between serum FGF23 levels and markers of macrovascular complications, lipid status, and inflammation (CRP) in patients with type 2 diabetes mellitus (T2DM) and early-stage CKD.

Methods. A total of 106 patients (52 females, 54 males) with T2DM and early CKD, aged 38–80 years (mean age 67.4 ± 7.6), were included in the study. Serum FGF23, C-reactive protein (CRP), lipid profile, estimated glomerular filtration rate (eGFR), body mass index (BMI), and demographic characteristics were analyzed. Doppler ultrasonography was performed to assess extracranial carotid and peripheral arterial disease. Statistical analyses included Student's t-test, ANOVA, and Pearson/Spearman correlation tests.

Results. The mean serum FGF23 level was 118.67 ± 32.3 pg/ml. There were no statistically significant differences in FGF23 according to sex, age, smoking status, or diabetes duration. FGF23 showed a strong negative correlation with eGFR ($r = –0.9283$, $p<0.0001$) and a significant positive correlation with CRP ($r = 0.2062$, $p=0.034$). A weak but statistically significant positive correlation was observed with total cholesterol ($r = 0.1924$, $p=0.048$), while associations with LDL, HDL, and triglycerides were not significant. FGF23 levels were higher in patients with vitamin D deficiency ($p=0.045$). Patients with established carotid or peripheral atherosclerosis had higher mean FGF23 values, although without statistical significance.

Conclusion. FGF23 shows a trend toward association with inflammatory and lipid parameters, as well as vascular changes in patients with T2DM and early CKD. The strong negative relationship with eGFR confirms its potential role as an early biomarker of impaired renal function and increased cardiovascular risk.

PP-06 Effect of combined sodium glucose cotransporter inhibition and renin angiotensin aldosterone system blockade on kidney function in patients with cardio renal metabolic syndrome: A real world study

Văcăroiu IA[1,2], Șerban Feier LF[1,2], Rădulescu D[1,2], Popescu P[2], Turcu FL[1,2], Stepan E[1,2], Cuiban E[1,2], Spătaru D[2], Isvoranu I[2], Dragomirescu RIF[2]
[1]Department of Nephrology, Carol Davila University of Medicine and Pharmacy, Bucharest, Romania; [2]Department of Nephrology, Sf. Ioan Clinical Emergency Hospital, Bucharest, Romania

Introduction. Cardiovascular disease, chronic kidney disease and type 2 diabetes frequently coexist, forming the cardio renal metabolic syndrome. These conditions share overlapping mechanisms that promote disease progression. Therapeutic strategies that inhibit the renin angiotensin aldosterone system and reduce glucose reabsorption have demonstrated individual benefits in delaying renal and cardiovascular deterioration. However, limited evidence exists regarding the combined impact of these interventions in real world settings. The present study aimed to investigate the effects of dual therapy on renal outcomes in patients with established chronic kidney disease.

Methods. This retrospective observational analysis was conducted in a single Nephrology Center and included sixty four patients with chronic kidney disease. Patients were categorized according to exposure to renin angiotensin aldosterone system inhibitors, sodium glucose cotransporter inhibitors, or the combination of both. Clinical and biochemical variables were collected at two time points, including

serum creatinine, urea, estimated glomerular filtration rate, albumin, proteinuria and hemoglobin. Statistical analysis employed appropriate paired tests based on distribution, with significance defined as $p < 0.05$.

Results. Treatment with sodium glucose cotransporter inhibitors was associated with a significant reduction in serum creatinine, together with a trend towards reduced urea levels. Monotherapy with renin angiotensin aldosterone system blockade alone did not achieve significant improvements. In contrast, patients not exposed to renin angiotensin aldosterone system inhibitors showed a significant decline in serum albumin. The combination of sodium glucose cotransporter inhibitors and renin angiotensin aldosterone system blockade demonstrated favorable, though not statistically significant, changes in renal function, while also preventing the progression of proteinuria. Proteinuria increased significantly in patients not receiving the combination therapy.

Conclusion. In this real world cohort, sodium glucose cotransporter inhibition was independently associated with improved renal function, while combination therapy with renin angiotensin aldosterone system blockade provided additive benefit by stabilizing proteinuria and supporting renal preservation. These results highlight the importance of integrated therapeutic approaches in patients with cardio renal metabolic syndrome and justify further evaluation in larger prospective studies.

PP-07 Kidney Health Awareness and Risk Factors in Albania: Findings from the ISN "Are My Kidneys Healthy?" Questionnaire

Rista S[1,2], Çizmja S[2], Saliaj K[2], Cadri V[3], Hoxha E[4], Dervishi D[2], Strakosha A[3]
[1] Department of Nephrology, Hygeia Hospital, Tirana, Albania; [2]Department of Nursing and Physiotherapy, European University of Tirana, Tirana, Albania; [3]Department of Nephrology, University Hospital Center "Mother Teresa", Tirana, Albania; [4]Department of Internal Medicine, University Hospital Center "Mother Teresa", Tirana, Albania

Introduction. Chronic kidney disease (CKD) affects more than 10% of the global adult population, yet awareness and preventive action remain low. This study aimed to evaluate knowledge and exposure to CKD risk factors in the Albanian population using the ISN questionnaire "Are My Kidneys Healthy?".

Methods. A cross-sectional survey was conducted between January–June 2025. The validated ISN questionnaire was translated into Albanian and administered to 501 adults (≥18 years) without prior known kidney disease. Data were analyzed with descriptive statistics, chi-square tests, and correlation analysis.

Results. The study included 501 participants. Mean age 38.4 ± 14.7 years; 54% women. Knowledge levels were: 40.1% had high knowledge of CKD risk factors, 28.7% moderate, and 31.1% low. Risk factor exposure: NSAID use (regular and occasional users) was the most common exposure (56.3%), followed by daily salt intake >5 g (52.1%) and hypertension (34.7%). Diabetes was reported in 11.7%, and obesity (BMI>30kg/m^2) in 19.6%. Multiple exposures: 60% of participants were exposed to two or more risk factors, with prevalence rising significantly after age 40 ($p < 0.05$). Gender differences: Women reported higher NSAID consumption, while men showed higher rates of hypertension and obesity. Knowledge–exposure link: A negative correlation was observed between knowledge and number of risk factors ($r = –0.131$, $p = 0.003$), higher knowledge was associated with fewer risk factors.

Conclusion. This first nationwide application of the ISN CKD questionnaire in Albania shows that one-third of adults have low awareness of kidney health risks, while most are exposed to multiple modifiable factors. Public health interventions should prioritize people over 40 years, targeting NSAID overuse, high salt intake, and poor control of hypertension and diabetes, with primary care and nephrology services playing a central role in prevention and early detection.

PP-08 Hyperhomocysteinemia in chronic kidney disease: from biomarker to silent driver of cardiac remodeling and calcification

Hoxha E[1], Kuka S[1], Collaku L[1], Pojani P[1], Habilaj X[1], Gjata M[1]
[1]University Hospital Center "Mother Theresa", Internal Medicine, Tirana, Albania

Introduction. Chronic kidney disease (CKD) is strongly associated with increased cardiovascular morbidity and mortality. While traditional risk factors such as hypertension and diabetes play an important role, non-traditional factors linked to uremia and impaired metabolism are increasingly recognized. Among these, hyperhomocysteinemia has emerged as a relevant marker of endothelial dysfunction, vascular injury, and accelerated atherosclerosis. Elevated plasma homocysteine levels are frequently reported in patients with CKD, but their clinical significance in relation to cardiac remodeling and vascular calcification remains under debate. This study aimed to assess the prevalence of hyperhomocysteinemia in a CKD cohort and to explore its associations with echocardiographic findings and biochemical markers of cardiovascular risk.

Methods. We conducted a cross-sectional observational study in 100 patients with CKD stages II–V, including 21 on maintenance hemodialysis. Demographic data, comorbidities, and laboratory parameters were collected. Plasma homocysteine levels were measured in all patients.

Hyperhomocysteinemia was defined according to established cut-off values (>15 μmol/L). Echocardiographic evaluation included left ventricular ejection fraction (LVEF), left ventricular hypertrophy (LVH), diastolic function, and the presence of valvular calcifications. Associations were explored using correlation analysis and logistic regression models.

Results. Hyperhomocysteinemia was detected in 64% of patients, with a higher prevalence in advanced CKD stages (78% in stage IV–V vs. 52% in stage II–III, $p<0.05$). Patients with hyperhomocysteinemia had significantly higher rates of LVH (62% vs. 38%, $p=0.02$) and valvular calcifications (54% vs. 29%, $p=0.03$). Mean homocysteine levels correlated positively with NT-proBNP ($r=0.36$, $p=0.01$) and inversely with LVEF ($r=-0.32$, $p=0.02$). Logistic regression confirmed hyperhomocysteinemia as an independent predictor of valvular calcifications (OR 2.1, 95% CI 1.1–4.2, $p=0.04$), even after adjusting for age, diabetes, and hypertension.

Conclusion. Hyperhomocysteinemia is highly prevalent in CKD and independently associated with cardiac remodeling and valvular calcification. Beyond being a biochemical abnormality, it emerges as a true cardiovascular risk factor that mirrors the hidden vascular and myocardial damage in this population. Its routine assessment could refine cardiovascular risk stratification in CKD, and future interventional studies are needed to determine whether lowering homocysteine translates into improved outcomes.

PP-09 Epidemiology, comorbidities, and chronic kidney disease progression in autosomal dominant polycystic kidney disease: data from the Republican Clinical Hospital "Timofei Moșneaga," Chișinău (2024)

Guțu B[1], Rotaru L[1], Ceban E[2], Groppa L[1]

[1] Discipline of rheumatology and nephrology, Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova; [2] Department of urology and surgical nephrology, Nicolae Testemitanu State University of Medicine and Pharmacy of the Republic of Moldova

Methods. Medical records of patients admitted in 2024 were retrospectively reviewed. Out of 1681 hospitalizations, 55 cases of ADPKD were identified, representing 3.3% of the cohort. Variables analyzed included demographic characteristics (age and sex), family history, clinical manifestations at onset, disease duration, CKD stage according to KDIGO classification, ultrasonographic findings, comorbidities, and the need for hemodialysis.

Results. The mean age of patients was 52.7 years, with a median of 54 years (range 19–76). Women accounted for 65.5% of cases and men for 34.5%. The most frequent age of presentation was between 50–60 years in women and 40–50 years in men. A positive family history was documented in 58.3% of patients, with maternal transmission in 28%, paternal in 22%, and involvement of siblings in 8.3%. The most common presenting manifestations were lumbar pain (72.9%), followed by recurrent urinary tract infections (39.6%) and episodes of hypertension (37.5%). The mean disease duration was 17 years, with a median of 16 years (range 1–40). Subgroup analysis showed an evolution ≤10 years in 27.3% of patients, 11–20 years in 34.5%, and >20 years in 38.2%. CKD staging revealed: G1 – 9.1%, G2 – 23.6%, G3a – 9.1%, G3b – 29.1%, G4 – 12.7%, and G5 – 16.4%, with intermediate and advanced stages (G3b–G5) comprising 58.2% of cases. Ultrasonography confirmed renal cysts in all patients, while hepatic cysts were present in 34.5%.Cardiovascular comorbidities were highly prevalent: hypertension was observed in 91.7%, cardiopathy (ischemic, hypertensive, dismetabolic, or mixed) in 62.5%, and heart failure in 58.3%, of whom 81.2% were in NYHA stage II. Type 2 diabetes was diagnosed in 10.4% of patients, and anemia in 25%. Hemodialysis was required in 9.1% of patients, with a mean treatment duration of 3 years, a median of 2 years, and a range between 1 and 7 years. In the absence of widely available genetic testing, diagnosis continued to rely primarily on clinical manifestations and imaging, particularly ultrasonography.

Conclusions. ADPKD accounted for 3.3% of hospitalized patients in 2024, confirming the burden of this hereditary condition in the local setting. Most patients presented with advanced CKD stages (G3b–G5), underscoring the need for earlier diagnosis. The data highlight the clinical and genetic heterogeneity of ADPKD and support the development of dedicated screening programs and a national registry. Improved accessibility to genetic testing would enable earlier identification of familial cases and facilitate optimized management in line with KDIGO guidelines.

PP-10 The impact of comorbidities on quality of life in patients with chronic kidney disease

Groza C, Rotaru L, Ceban E, Razlog T, Groppa L

Discipline of rheumatology and nephrology "Nicolae Testemitanu" State University

Introduction. Chronic kidney disease (CKD) is, in most cases, associated with other chronic conditions and rarely occurs as an isolated entity. Comorbidities can accelerate CKD progression and significantly affect overall health, negatively impacting patients' quality of life. The study aims to investigate the relationship between comorbidities associated with CKD and patients' quality of life, as well as how these coexisting conditions influence overall health and well-being.

Methods. A cross-sectional study was conducted on a cohort of 989 CKD patients in stages I–V, prior to

initiating hemodialysis, admitted over one year to the Nephrology Department of IMSP SCR "Timofei Moșneaga." Quality of life was assessed using the KDQOL-SF™ 1.3 questionnaire, a validated instrument specifically designed for CKD patients.

Results. Among the included patients, 64.5% were female and 35.5% male, with a mean age of 57.7 ± 13.1 years. The distribution across CKD stages was: stage I – 31.0%, stage II – 26.1%, stage III – 19.7%, stage IV – 15.3%, and stage V – 7.9%. The majority of patients (86.7%) had at least one comorbidity, while approximately 13% had no associated conditions. The most common comorbidities were hypertension (79.3%), dyslipidemia (43.7%), diabetes mellitus (28.3%), obesity (19.0%), ischemic heart disease (8.4%), and peripheral artery disease (3.0%).

Conclusions. Comorbidities have a significant impact on CKD progression and patients' quality of life. These findings underscore the need for an integrated, multidisciplinary management approach, addressing not only CKD treatment but also effective control of associated conditions, to improve overall health and patient well-being.

PP-11 Nephroprotection in real life CKD - are we doing enough?

Stan AA
[1]Medlife Titan Hospital, Department of Nephrology, Bucharest, Romania

Introduction. According to the 2024 KDIGO Guideline for CKD (Chronic Kidney Disease) management, several standard-of-care therapies can be used, especially in patients with increased albuminuria: RAS (renin-angiotensin-system) inhibitors, SGLT (sodium-glucose cotransporter 2) inhibitors, MRA (mineralocorticoid receptor agonists) and GLP-1 RA (glucagon-like peptide-1 receptor agonists) for diabetic patients. **Aim:** To assess the implementation of these therapies in a group of diabetic and non-diabetic CKD patients from an ambulatory nephrology practice.

Methods. A group of 46 patients (23 male and 23 female) was analyzed and distributed according to age, presence of diabetes, GFR and ACR (albumin-to-creatinine ratio) staging, as well as their therapies and combinations thereof.

Results. Age: 1 (40-50), 4 (51-60), 14 (61-70), 16 (71-80), 9 (81-90), 2 (>90) KDIGO CKD and ACR stages: 1 G1, 9 G2, 14 G3a, 14 G3b, 8 G4; 23 A1, 4 A2, 4 A3, 16 Ax (not staged)**;** Diabetes: 11 yes, 35 no**;** Nephroprotective therapy: 6 with no therapy, 37 on RAS, 14 on MRA-Spironolactone, 20 on SGLT2i, 4 on GLP-1 RA; Number of therapies: 13 on single drug, 21 on double therapy, 5 on triple therapy, 1 on quadruple therapy; Therapy vs KDIGO stage: G1-double therapy; G2-no, mono or double therapy; G3-4 with no therapy, 5 with monotherapy, 15 with double, 3 with triple and one with quadruple therapy; G4-4 with single drug, 2 with double and 2 with triple therapy; A1-4 with no therapy, 7 with single, 10 with double and 2 with triple therapy; A2-all 4 with double therapy; A3- all 4 with double therapy.

Conclusion. Unfortunately, in real life CKD patients are undertreated. Some of them, especially those with high albuminuria, receive double nephroprotection, but we should aim to start more intensive treatment in incipient stages. Thus, preventing future complications and slowing progression to end stage kidney disease.

PP-12 Post-COVID trajectory and outcomes of chronic kidney disease

Răzlog T[1], Russu E[12], Ceban E[3], Groza C[1], Groppa L[2]
[1]Timofei Moșneaga Republican Clinical Hospital, Chisinau, Republic of Moldova; [2]Department of rheumatology and nephrology, Nicolae Testemiţanu State University of Medicine and Pharmacy, Chisinau, Republic of Moldova; [3]Department of Urology and Surgical Nephrology, Nicolae Testemiţanu State University of Medicine and Pharmacy, Chisinau, Republic of Moldova

Introduction. COVID-19 is recognized as a multisystem disease with a wide range of manifestations, including renal involvement. Acute COVID-19 can precipitate acute kidney injury and exacerbate underlying kidney disease, making progression of chronic kidney disease (CKD) a common complication in survivors. We aimed to evaluate the evolution and prognosis of CKD in patients after COVID-19, identifying key risk factors associated with CKD progression and poor outcomes in this population.

Methods. We conducted an observational study of 1000 patients hospitalized with COVID-19 at the "Timofei Moșneaga" Republican Clinical Hospital between 2020 and 2022. Patients had various comorbidities, including pre-existing CKD. Clinical and biochemical blood analyses were performed to assess inflammatory, renal, and hepatic parameters in the acute phase. Statistical analysis was carried out using StatSoft STATISTICA 9.0 to compare patients with and without CKD progression and to evaluate predictors of adverse outcomes.

Results. Patients who progressed to more advanced CKD were significantly older (median 71 vs 62 years, $p<0.001$). Key risk factors for CKD progression included hypertension (present in 74% of progressors vs 62% of non-progressors, $p<0.01$), type 2 diabetes mellitus (27% vs 21%, $p=0.017$), and cardiovascular disease (31% vs 23%, $p<0.05$). Comorbidity burden was also higher in the progression group, with median Charlson Comorbidity Index of 5 vs 3 points ($p<0.0001$). Notably, patients with pre-existing CKD during acute COVID-19 had over a 2.5-fold higher

risk of mortality and of further CKD worsening compared to those without CKD in the acute phase.
Conclusion. COVID-19 illness was associated with accelerated CKD progression, particularly in older patients and those with significant comorbidities. Independent negative prognostic factors for post-COVID CKD evolution include advanced age, hypertension, cardiovascular disease, poorly controlled type 2 diabetes (often with obesity), and Charlson index >4. COVID-19 survivors with these risk factors require close nephrological follow-up, as pre-existing or acute-phase kidney involvement markedly increases the risk of death and long-term CKD progression.

PP-13 A modest experience in the treatment of membranous nephropathy with classical and alternative medications

Alexandrova S[1], Borisov B[1]
[1]Department of Nephrology, Medical University, Pleven, Bulgaria

Introduction. Membranous nephropathy (MN) is the most common morphological finding encountered in cases of nephrotic syndrome in adults. Etiologically, MN is divided into primary (PMN) and secondary (SMN). Treatment of patients with MN is carried out with corticosteroids, immunosuppressants, monoclonal antibodies and others, depending on the determined degree of risk in the respective patients.
Methods. We describe two cases, from practice, with biopsy established MN, such as PMN, in which we carried out treatment with intermittent "pulses" of glucocorticoids and/or cyclophosphamide with simultaneous administration of medications with nephroprotective and/or anti-inflammatory effects - SGLT2 inhibitors and finerenon.
Results. Active observation of the patients lasted for six months. During this period, remission of the main manifestations of the disease was achieved without deterioration of renal function. Subsequent observation and non-pathogenetic treatment in the next six months also showed no disease activity.
Conclusion. The good results we have reported in these patients, in our opinion, are evidence that the individual approach to treatment does not contradict the accepted rules of good clinical practice, but often complements them well under the appropriate conditions.

PP-14 Nutritional therapy in chronic kidney disease - influence on intestinal microbiota

Gârneață L[2,3], Paul R[2,3], Mocanu CA[2,3], Teodora MD[1], Moraru SM[1]
[1]Department of Internal Medicine-Nephrology, Faculty of Medicine, University of Medicine and Pharmacy of Craiova, 2 Petru Rareș, 200349 Craiova, Romania; [2]Department of Internal Medicine and Nephrology, "Carol Davila" University of Medicine and Pharmacy, 050474 Bucharest, Romania; [3]Department of Nephrology, "Dr. Carol Davila" Teaching Hospital of Nephrology, 010731 Bucharest, Romania

Introduction. The gut microbiota has a significant impact on various aspects of health, including digestion, metabolism, and immune system functions. There is rising interest worldwide on the relationship between the complex abnormalities in chronic kidney disease (CKD) and the gut microbiota. Limited research investigates the link between alterations in gastrointestinal microbiota and CKD. Nutritional therapy—ranging from low/very-low protein diets (LPD/VLPD) supplemented with ketoanalogues to fermentable fiber, resistant starch, and synbiotic approaches—may remodel the microbiota and attenuate toxin burden. We aimed to synthesize the evidence of nutritional therapy on intestinal microbiota composition/function and downstream metabolic and vascular endpoints in CKD.
Methods. We performed a focused narrative review of CKD stage 3–5 (non-dialysis and dialysis) interventions highlighted in the presentation, prioritizing studies reporting microbiome profiles (16S rRNA), short-chain fatty acids (SCFAs), gut-derived uremic toxins (indoxyl sulfate [IS], p-cresyl sulfate [PCS], TMAO), intestinal permeability (e.g., zonulin), endothelial function (flow-mediated dilation -FMD), and safety/nutritional status. Exemplar datasets included crossover trials (MEDIKA/MEDIKA2: Mediterranean diet [MD]±ketoanalogues; VLPD+ketoanalogues) and a 6-month LPD+ketoanalogues study, contextualized by mechanistic data on dysbiosis in CKD/ESR
Results. All studies showed CKD/ESKD to expand urease-positive/proteolytic taxa and depletion of saccharolytic, barrier-supporting bacteria, aligning with higher IS/PCS and endotoxemia; uremia itself appears sufficient to induce dysbiosis. VLPD plus ketoanalogues consistently lowered total/free IS and PCS and reduced zonulin, suggesting improved barrier integrity and a shift away from proteolytic metabolism—effects plausibly mediated by decreased luminal urea and proteolytic substrate. Mediterranean diet plus ketoanalogues increased SCFA-producing taxa (e.g., Roseburia, Faecalibacterium, Lachnospiraceae), consistent with enhanced saccharolytic fermentation.
Conclusion. Nutritional medical therapy in CKD can beneficially modulate the intestinal microbiota and reduce gut-derived uremic toxins, with VLPD+ketoanalogues showing the strongest toxin-lowering and permeability signals, and MD+ketoanalogues enhancing SCFA-linked taxa. These data support integrating precision nutrition alongside guideline-based CKD care and justify larger,

longer randomized trials powered for microbiome-metabolite endpoints and clinical outcomes.

PP-15 Association of interleukin 6 levels with antihypertensive regimens in hemodialysis patients

Dedej A[1], Kakariqi Pepa L[2], Simaku A[3]
[1]Department of Nephrology, American Hospital, Tirane, Albania; [2]Department of Pharmacology, Faculty of Medicine, University of Medicine, Tirane, Albania; [3]Institute of Public Health, Tirane, Albania

Introduction. Chronic inflammation is a key factor in the morbidity and mortality of patients undergoing hemodialysis (HD), with interleukin-6 (IL-6) serving as a pivotal biomarker. Antihypertensive agents such as beta-blockers and calcium channel blockers (CCBs) may influence inflammatory processes. This study evaluates IL-6 levels in HD patients according to the antihypertensive regimen used.

Methods. A retrospective analysis was conducted on 83 HD patients in American Hospital in Tirana, Albania in 2024. IL-6 serum levels (pg/mL) were recorded alongside detailed pharmacological therapy. Patients were stratified into four groups based on the use of beta-blockers, calcium channel blockers, both, or neither. Mean IL-6 levels were compared across groups, and standard deviation (SD) was calculated.

Results. Based on pharmacological therapy, 18 patients (21.7%) were on beta-blockers alone, 15 (18.1%) on calcium channel blockers (CCBs) alone, 8 (9.6%) on a combination of both, and 42 (50.6%) on neither class of drugs. The mean IL-6 levels were significantly different among the groups ($p < 0.001$). The no-treatment group exhibited the highest mean IL-6 concentration (33.6 ± 77.6 pg/mL). Patients treated with beta-blockers alone had moderately lower IL-6 levels (17.8 ± 18.8 pg/mL), while those on CCBs alone demonstrated slightly reduced levels (15.5 ± 12.1 pg/mL). The lowest IL-6 values were observed in patients receiving both beta-blockers and CCBs (13.2 ± 4.7 pg/mL), with notably reduced variability.

Conclusion. Among hemodialysis patients, those not receiving antihypertensive therapy exhibited the highest IL-6 levels, while patients on combined beta-blocker and calcium channel blocker therapy showed the lowest and most stable IL-6 values. The observed trend suggests that combined therapy may exert a more effective anti-inflammatory effect than monotherapy or no therapy. These findings support the hypothesis of a synergistic modulation of inflammatory pathways by dual antihypertensive regimens.

PP-16 Shadows of the Pandemic: Mortality Predictors in Hemodialysis Patients During and After Covid-19

Ratiu IA[1,2,5], Marc L[3,4], Olariu N[3,4], Mihaescu A[3,4], Baidog A[5,6], Havasi N[5], Hocopan O[6], Bako GC[1,2]
[1] Faculty of Medicine and Pharmacy, University of Oradea, 1st December Square 10, 410073 Oradea, Romania; [2] Nephrology Department, Emergency Clinical Hospital Bihor County, Oradea , Romania; [3] Department of Internal Medicine II—Division of Nephrology, "Victor Babeș" University of Medicine and Pharmacy, 300041 Timisoara, Romania; [4] Center for Molecular Research in Nephrology and Vascular Disease, Faculty of Medicine, "Victor Babeș" University of Medicine and Pharmacy, 300041 Timișoara, Romania; [5] Diaverum Hemodialysis Center Oradea, Romania; [6] Emergency Clinical Hospital Bihor County, Oradea, Romania

Introduction. The COVID-19 pandemic represented a major challenge for hemodialysis (HD) patients, a population already burdened by frailty and multiple comorbidities. This study aimed to describe their in-hospital outcomes during acute infection and their long-term post-pandemic evolution.

Methods. We retrospectively analyzed 186 HD patients monitored between 2020 and 2024. Patients were classified into four groups: G(I) – SARS-CoV-2–positive, hospitalized, deceased during admission; G(II) – SARS-CoV-2–positive, hospitalized and discharged; G(III) – SARS-CoV-2–positive, non-hospitalized; and G(IV) – SARS-CoV-2–negative. Demographic characteristics, comorbidities, laboratory parameters, and mortality were compared across groups during hospitalization and at long-term follow-up.

Results. Baseline demographics were similar across groups; however, patients in G(I) had a shorter dialysis vintage, and none were vaccinated. In this group, INR ($p = 0.0017$), AST ($p = 0.0002$), ALT ($p = 0.058$), and CRP ($p < 0.00001$) were significantly elevated, while Kt/V was reduced ($p = 0.050$). Independent predictors of in-hospital mortality included female sex, CRP ($p = 0.033$), procalcitonin ($p = 0.0015$), and D-dimer ($p = 0.033$). Severe COVID-19 occurred more frequently in overweight patients, reflected by higher BMI and BSA ($p = 0.030$ and $p = 0.031$), and in those with diabetes ($p = 0.0187$) or malignancy ($p = 0.0368$). Severe cases also showed hypoalbuminemia ($p = 0.017$), hypocalcemia ($p = 0.020$), and intense systemic inflammation (CRP, $p < 0.00001$; procalcitonin, $p = 0.0154$). Higher iPTH levels were observed in patients with mild/moderate forms ($p = 0.078$). Most severe cases died from COVID-19 itself ($p = 0.00001$), despite antiviral therapy, while mild/moderate cases died mainly from cardiovascular disease ($p = 0.018$). Patients who refused immunization were significantly younger (57.9 vs. 63.8 years, $p = 0.022$), had lower dialysis adequacy (Kt/V 1.51 vs. 1.66, $p = 0.0013$), stronger inflammatory activity, and a higher prevalence of malignancy ($p = 0.023$). Regression analysis comparing COVID-positive and COVID-negative deaths showed that diabetes mellitus ($p =$

0.029) and elevated CRP (p = 0.019) were significantly associated with mortality in the COVID-positive group.

Conclusions. HD patients remain a highly vulnerable population with persistently high mortality during and after the COVID-19 pandemic. Mortality was strongly linked to systemic inflammation and comorbidities, particularly diabetes mellitus and cardiovascular disease. These findings highlight the need for close monitoring and integrated risk management to improve survival in HD patients, especially in the context of future health crises.

PP-17 Improving Dialysis Care: A Single-Center Comparison of Post-Dilution Hemodiafiltration and Standard Hemodialysis

Mitrova E[1], Ivanova D[1], Misovska N[2]
[1]Center for haemodialysis DIAVERUM-Strumica, N.Macedonia**;** [2]Diaverum N.Macedonia, Skopje, N.Macedonia

Introduction. Chronic kidney disease causes retention of small and middle molecules, leading to inflammation and cardiovascular risks. While standard hemodialysis (HD) clears small solutes, it poorly removes middle molecules. Post-dilution hemodiafiltration (HDF), combining diffusion and convection, may enhance solute clearance and outcomes. This analysis compares post-dilution HDF and standard HD regarding biochemical control, clinical tolerance, and mortality in patients receiving chronic dialysis.

Methods. This study included 20 patients (10% of the dialysis population) who transitioned to HDF between 2021 and 2025 at the DIAVERUM Dialysis Center in Strumica. We analyzed eKt/V, serum phosphorus, hemoglobin, and erythropoietin dose over three months before and after HDF initiation. Criteria included blood flow ≥300 mL/min, dialyzer surface ≥1.7 m², session ≥240 min, older age, and diabetes.

Results. After transitioning to post-dilution HDF, changes were observed in dialysis adequacy, biochemical parameters, and clinical tolerance. Dialysis adequacy, measured by eKt/V, improved in 35% of patients, remained unchanged in 25%, and declined in 40%. Substitution volumes ranged between 23-39 liters per session. The group with increased eKt/V had an average substitutional volume (SV) of 33l, compared to 28.5l in the stable group and 27l in those with declined adequacy. Phosphorus control improved in 45% of patients, remained stable in 20%, and worsened in 35%. Patients with decreased or stable phosphorus had SV levels averaged 30.2l, while those with rising levels averaged 28.7l. Hemoglobin levels increased in 50% of patients, remained unchanged in 25%, and decreased in 25%. Erythropoietin dosing was reduced in 40% of patients, increased in 30%, and unchanged in the rest. One death was recorded during the observation period. Clinically, patients experienced fewer hypotensive episodes, less post-dialysis fatigue, and reduced symptoms such as nausea and headaches. Inflammatory markers declined in patients with previously elevated levels. Vascular access complications were minimal, with AV fistula thrombosis noted in two cases.

Conclusion. Post-dilution HDF offers potential benefits in biochemical control, clinical tolerance, and cardiovascular stability. Though not yet standard therapy, our single-center experience suggests reduced mortality, improved inflammation, and fewer vascular access issues, along with enhanced patient comfort and treatment consistency. Worsening of clinical and biochemical parameters was linked to lower substitutional volumes, highlighting the importance of achieving higher convection volumes. Dialysis modality should be individualized, considering age, comorbidities, vascular access quality, treatment tolerance, and overall patient goals. Further multicenter studies are needed to confirm HDF's broader applicability, long-term value, and potential to improve outcomes across dialysis populations.

PP-18 The resolution of AVF stenosis - techniques

Cucu M[1], Costache VS[1]
[1]Sanador Clinical Hospital, Bucharest, Romania

Introduction. AVF is the first line vascular access for patients with CKD in dialysis. Due to hemodynamic changes in the vascular wall - mostly the venous segment, this leads to stenosis in different parts of this segment, the major cause of AVF thrombosis. In this presentation we highlight techniques used by the presenting author for maintaining AVF patent and optimising its flow by surgical or endovascular means.

Methods. This is a retrospective, multicentric five-year study, single surgeon experience on correcting the stenosis of AVF on different levels of the venous and arterial segments, either by balloon angioplasty or by surgical means. The study included 175 patients with indication on correcting the stenosis according to ESVS-VAS criteria (2018). The goal was to achieve optimal dialysis flow, either pre or post AVF thrombosis, by stenosis correction with minimal local and systemic complications, with catheter insertion avoidance by all means. The surgical techniques used in one group were: patch angioplasty (ePTFE, venous, bovine pericardium), graft interposition either with or without thrombectomy, re-routing to collateral or profound venous system, techniques used according to ESVS guidelines. The other group was treated endovascular with ultrasound guided balloon angioplasty - either plain old balloon angioplasty (POBA), high pressure balloon (HPB) and drug coated balloon (DCB).

Results. The techniques used had an over 90% success rate, with a high primary patency at one year, without restenosis in the surgical group. We found a residual stenosis in the endovascular treated group ranging from 10 to 30%, observed at one and a half months follow-up.
Conclusion. We found the techniques used to be highly efficient on achieving optimal dialysis flow, keeping the AVF patent or, late after total occlusion declotting, with minor local complications, that have later passed.

PP-19 Techniques on overcoming the stenosis of AVF

Cucu M[1], Costache VS[1]
[1]Sanador Clinical Hospital, Bucharest, Romania

Introduction. AVF is the first line vascular access for patients with CKD in dialysis. Due to hemodynamic changes in the vascular wall - mostly the venous segment, this leads to stenosis in different parts of this segment, the major cause of AVF thrombosis.
Methods. This is a retrospective, multicentric five-year study, single surgeon experience on correcting the stenosis of AVF on different levels of the venous and arterial segments, either by balloon angioplasty or by surgical means. The goal was to achieve optimal dialysis flow, either pre or post AVF thrombosis, by stenosis correction with minimal local and systemic complications, with catheter insertion avoidance by all means. The surgical techniques used in the study were: patch angioplasty (ePTFE, venous, bovine pericardium), graft interposition either with or without thrombectomy, re-routing to collateral or profound venous system, techniques used according to ESVS guidelines.
Conclusions. The techniques used had an over 90% success rate, with a high primary patency at one year, without restenosis.

PP-20 Vascular access for hemodialysis treatment in problem groups of patients

Aleksandrova S[1], Borisov B[1]
[1]Department of Nephrology, Medical University, Pleven, Bulgaria

Introduction. End stage renal disease (ESRD) is increasingly common worldwide. ESRD is estimated to account for 9,1% (from 8,5 to 9,8%) of the total number of patients with CKD, amounting to 700 million people in 2017. Hemodialysis is the preferred treatment for ESRD. In terms of vascular access, tunneled catheter preferences range from 1% in Japan, 18% in USA, 42% in Belgium to 44% in Canada, respectively. In South Africa the relative share of native fistulas among patients on hemodialysis treatment was 51% during 2017, in Argentina was 70% during 2018 and in Vietnam was more than 95%. *The purpose* of our review is to present the features of vascular access in the three most problematic groups: diabetics, overweight- and elderly patients.
Methods. Based on the review of more than 250 literature sources, we share our over 15 years of experience in the field of vascular access for hemodialysis, with over a thousand primary and reconstructive arteriovenous anastomoses constructed, and more than two thousand temporary and tunneled catheters inserted for dialysis treatment of patients from the predominant part of Northern Bulgaria.
Results. Literature data shows that the relative share of central venous catheters as vascular access continues to be high. The number of patients, especially the elderly, who refuse attempts at native fistula construction is increasing. The proportion of primary cubital anastomoses and those requiring subsequent surgical interventions to reach optimal functionality and maturity is increasing.
Conclusion. Vascular access in problematic patient groups should be decided individually after clarifying the patient's condition. The main goal is to provide vascular access that is as trouble-free as possible for each patient.

PP-21 Cost Analysis of Hospital Treatment for Peritoneal Dialysis-Associated Peritonitis

Stojadinovic M[1], Zivkovic Zaric R[2,3], Petrovic D[4,5], Kezic A[1,6], Radovic M[1,6], Jovicic Pavlovic S[1], Mrdja I[1], Hadzi Tanovic L[1], Knezevic V[7,8], Pilcevic D[9,10], Jemcov T[6,11], Karapandzic M[11], Jankovic S[2,3]
[1] Department of Nephrology, University Clinical Center Serbia, Belgrade, Serbia; [2] Department of Pharmacology and Toxicology, Faculty of Medical Sciences, University of Kragujevac, Kragujevac, Serbia; [3] Department of Clinical Pharmacology, University Clinical Center Kragujevac, Kragujevac, Serbia; [4] Department of Nephrology, University Clinical Center Kragujevac, Kragujevac, Serbia; [5] Department of Internal Medicine, Faculty of Medical Sciences, University of Kragujevac, Kragujevac, Serbia; [6] Department of Internal Medicine, Medical Faculty, University of Belgrade, Belgrade, Serbia; [7] Department of Nephrology, University Clinical Center Vojvodina, Novi Sad, Serbia; [8] Department of Internal Medicine, Medical Faculty, University of Novi Sad, Novi Sad, Serbia; [9] Department of Nephrology, Medical Military Academy, Belgrade, Serbia; [10] Department of Internal Medicine, Medical Faculty of the Military Medical Academy, University of Defense in Belgrade, Belgrade, Serbia; [11] Department of Nephrology, General Hospital Zemun, Belgrade, Serbia

Introduction. Increasing healthcare spending is a significant issue, with the aging population contributing to a rise in patients needing renal replacement therapy. The cost of peritoneal dialysis (PD) is substantial, particularly in upper-middle-

income countries like Serbia. This study aims to identify the direct costs and influencing factors of treating PD-associated peritonitis in Serbia.

Methods. A retrospective observational study was conducted on consecutive patients admitted due to PD-associated peritonitis in five tertiary care hospitals across Serbia in period of four years. The primary outcome was total cost of hospitalization. Potential predictors were determined using generalized linear model with a gamma probability distribution and a log link function.

Results. The study included a total of 122 patients. The results showed that the average total cost per patient was 1131.90±1538.67 USD, with the cost of hospitalization (348.17 ± 361.52 USD) and antibiotics (294.94±465.88 USD) being the most significant. The length of hospitalization ($p<0.001$) and treatment outcome ($p<0.001$) were found to be significant predictors of the total cost.

Conclusion. The costs of treating peritonitis in Serbia are substantial, with each additional day of hospitalization significantly increasing the cost. The importance of patient and doctor education about infection prevention is underscored by the health consequences and the lengthy, expensive treatment when an infection occurs.

PP-22 Plasma Exchange: A Single-Center Experience (2024-2025)

Iancu OC[1], Iancu Moteli DA[3], Chisavu L[2], Marc L[2], Maralescu F[2], Mihaescu A[2], Bedreag O[2], Olariu N[2]

[1]Emergency County Hospital "Pius Brinzeu" Timisoara; [2]University of Medicine and Pharmacy "Victor Babes" Timisoara; [3]Fresenius Medical Care

Introduction. Plasma exchange (PEX) is an extracorporeal technique widely used in autoimmune, neurological, hematological, and renal disease [1,2]. By removing autoantibodies, immune complexes, and other circulating pathogenic factors, PEX can lead to rapid clinical improvement, particularly in acute neurological emergencies [3]. Although international data supports its efficacy, systematic reports from Romania remain limited, justifying the analysis of local experience. Our aim was to identify adverse events, complications as well as patient outcome with PEX.

Methods. This retrospective study included 31 patients admitted between January 2024 to August 2025 who were treated with PEX in a single center emergency hospital. Recommendations used for performing PEX were defined by the American Society for Apheresis (ASFA) Guidelines 2023. PEX sessions were performed using InfomedHF440 and Fresenius MultiFiltrate systems either in the Intensive Care Unit (ICU) or Dialysis Unit. Data collected from medical records included: admitting department, diagnosis, number and duration of sessions, type of replacement fluid, procedure-related complications and patient discharge status. A descriptive statistical analysis was performed.

Results. For the total of 31 patients included, the mean age was 52,2 years, 52.5% were male patients, and distribution by hospital ward was: Neurology 70.9%, Nephrology 22.5% and 6.45% Gastroenterology. Total number of plasmapheresis sessions was 129, most common pathology treated were Acute Polyradiculoneuropathy 22.58%, ANCA positive Vasculitis 19.35%, Myelitis 16.1%. Replacement fluids used: 1492 units of fresh frozen plasma and 335 units of human albumin. Mean session duration was 184,03 minutes. Anaphylaxis was reported in 1.55% of cases, syncope:1.55%, hypotension:1.55%, mild allergic reactions:16.27%. Patient status at hospital discharge was defined as improved in most cases (87.09%).

Conclusion. Our findings confirm that PEX is a valuable therapeutic option, especially in neurological disorders. The predominance of FFP use reflects local practice, although guidelines recommend tailoring the choice of replacement fluid to both indication and patient risk. Allergic complications (including anaphylaxis) highlight the higher immunological risk associated with FFP compared to albumin. The overall incidence of complications (≈14%) is consistent with international reports, which range between 10–20%. The main limitations are the small study group size and absence of a control group. Nevertheless, these data support the need for standardized national protocols and careful patient monitoring.

PP-23 Kidney transplantation policy in the Western Balkans: from isolated national efforts to a coordinated regional strategy

Rista E[1,2], Strakosha A[3], Cadri V[3], Idrizi A[3]

[1] Department of Nephrology, Hygeia Hospital, Tirana, Albania; [2]Department of Medical Sciences, European University of Tirana, Tirana, Albania; [3]Department of Nephrology, University Hospital Center "Mother Teresa", Tirana, Albania

Introduction. Despite almost five decades of kidney transplantation in the region, most programs in the Western Balkans remain small, and unable to adequately address patient needs. Many patients continue to depend on dialysis, while limited resources and variable practices compromise graft survival and long-term kidney health. This study aimed to generate a regional policy overview and to define priorities that can be implemented through coordinated action.

Methods. In 2024, the European Society for Organ Transplantation and its Kidney Transplantation Section initiated a regional needs assessment. An online survey was sent to kidney transplant centers in Albania, Bosnia & Herzegovina, Croatia, Kosovo, Montenegro, North Macedonia and Serbia. The survey

covered clinical practice, infrastructure, legislation and workforce capacity. Findings were consolidated and discussed at a regional workshop in Tirana (May 2025), organized with support of the Albanian Ministry of Health, bringing together transplant professionals, policy makers and international experts to validate results and agree on shared priorities.

Results. Survey responses confirmed low and uneven activity across the region. Albania, Bosnia & Herzegovina, North Macedonia and Montenegro reported limited volumes, mainly from living donation, with very few or no deceased donor transplants. Kosovo lacks a national program and procedures are performed abroad. Common gaps included persistently low deceased donation, absence of paired kidney donation, limited immunology laboratories and rejection diagnostics, restricted access to modern immunosuppressive therapies, and shortages of trained surgeons, coordinators and immunologists. Strengthening legal frameworks and building comprehensive national registries were identified as essential enablers. At the Tirana workshop, stakeholders prioritized harmonized clinical protocols, expanded training and certification, modernization of legislation, stronger regional collaboration and public awareness. A stepwise approach was endorsed: introduce national paired kidney donation programs as a foundation, followed by a Western Balkans regional paired donation program, alongside registry improvement and engagement with religious leaders and communities.

Conclusions. Large unmet needs and wide gaps with European standards persist in the Western Balkans. Progress requires targeted investment in training, legislation and infrastructure, coupled with the roll-out of paired kidney donation at national and regional levels. Participants agreed that supporting transplantation in the Western Balkans should remain a strategic priority, with sustained professional and institutional partnerships to expand equitable access and improve outcomes.

PP-24 Living donor genetic testing practices in kidney transplantation - The Living Donor Genetic Registry (LDGen)

Radunovic D[1], Radunovic I[1], Prelevic V[1], Tomovic F[1], Caliskan Y[2]

[1]Clinic for Nephrology, Clinical Center of Montenegro, Montenegro; [2]Saint Louis University, USA

Introduction. The growing availability of genetic testing has prompted its increased use in the evaluation of living donor (LD) candidates and recipients. Guidance on the use and interpretation of these novel tests are limited. However, genetic testing on asymptomatic living kidney donors remains fraught with many challenges and uncertainties. Not all transplant practitioners are aware of the limitations of genetic testing, are comfortable with selecting testing methods, comprehending test results, or providing counsel, and many do not have access to a renal genetic counselor or a clinical geneticist.

Methods. A cross-sectional, electronic REDCap registry was developed to collect information on LD candidates and their genetic test results. Participating transplant staff register LD candidates who either: 1) underwent genetic testing, and/or 2) had a family history of genetic kidney disease, or 3) are looking to donate to a related recipient with kidney disease of unknown etiology.. Data reported here were collected between June, 2023 and May, 2024.

Results: Data on 1004 LD evaluations were obtained [mean age 46.6±12.2 years, 54.5% women, 78% related to intended recipient] representing 12 U.S. and 9 international centers. 39% (n=305) of intended recipients had possible genetic kidney disease. Of these the most common recipient diagnoses were Alport Syndrome (22%), followed by autosomal dominant polycystic kidney disease (19%), focal segmental glomerulosclerosis (12%) and atypical hemolytic uremic syndrome (12%). Genetic testing was performed in 17% (n=168) of LD evaluations. Testing in recipient candidate was performed before the LD candidate in 12% of cases (n=122) while it was performed only in the donor candidate in 5% (n=46) of evaluations (Fig. 1A). 125 LD candidates underwent genetic testing and 81% of these donors received formal pre-test genetic counseling. Single gene/limited gene panel (42%) and broad kidney disease gene panel (29%) were the most common methods; however, in 20% of the cases, the specific genetic test used in donor evaluation was unknown. 33% (n=41) of the LD candidates who underwent genetic testing during evaluation were not accepted, of which 51% (n=21) of declinations were due to the genetic testing result [Pathogenic/Likely pathogenic variant (n=9), renal risk variants (n=2), variant of uncertain significance (n=10)].

Conclusion: Our initial experience supports the feasibility of international collaboration in creating a registry of genetic kidney disease testing practices among LD candidates. With more data, the findings of the LDGen registry will provide value information on global LD evaluation practice patterns, clarify how family history and genetic test results could impact donor selection and provide early follow-up data in those approved to donate.

PP-25 Living donor genetic testing practices in kidney transplantation - The Living Donor Genetic Registry (LDGen)

Radunovic D[1], Radunovic I[1], Prelevic V[1], Tomovic F[1]

[1]Clinic for Nephrology, Clinical Center of Montenegro, Montenegro

Mitochondrial diseases can be related to mutations in either the nuclear or mitochondrial genome. Childhood presentations are commonly associated with renal tubular dysfunction, but renal involvement is less commonly reported outside of this age-group. Mitochondrial diseases are notable for the significant variability in their clinical presentation and the broad spectrum of genes implicated in their etiology. These features contribute to the challenges of establishing a definitive diagnosis and understanding the pathogenetic mechanisms leading to kidney involvement in these diseases.

Mitochondrial diseases are a clinically and genetically heterogeneous group of disorders. The underlying dysfunction of the mitochondrial electron transport chain and oxidative phosphorylation is caused by variants of genes encoding mitochondrial proteins. Whilst each of these variants is individually rare, the estimated prevalence of all mitochondrial diseases is approximately 1:8500 (95% C.I.),1 making up quite a frequent group within rare diseases.

Mitochondrial diseases are a phenotype and genotype heterogeneous group of disorders that typically have a multisystemic involvement. The m.3243A>G pathogenic variant is the most frequent mitochondrial DNA defect, and it causes several different clinical syndromes, such as mitochondrial encephalopathy, lactic acidosis and stroke-like episodes (MELAS), and the maternally inherited diabetes and deafness (MIDD) syndromes.

Kidney involvement in these diseases is uncommon but may be higher than current estimates since many cases are not properly diagnosed. Noteworthy, renal disease when present may significantly increase patient morbidity. renal involvement in these diseases is probably underestimated, yet it increases morbidity. It generally manifests as subnephrotic proteinuria and progressive deterioration of kidney function. Adult presentation of mitochondrial diseases is hard to recognize, especially in oligosymptomatic patients or those with exclusive kidney involvement. However, suspicion should always arise when family history, particularly on the maternal side, and multisystemic symptoms, most often of the central nervous system and skeletal muscles, are present.

The contribution of mitochondria dysfunction in the pathogenesis of multiple types of kidney disease is well recognized. This includes not only kidney disease secondary to mitochondrial genetic defects, but also acute kidney disease, CKD, renal tumors, aging, and transplant nephropathy. Genetic counseling is an important component of patient management.

PP-26 From Awareness to Action: Public Readiness and Clinical Potential for Deceased Donor Kidney Transplantation in Albania

Kasa M[1], Spahia N[2,3], Idrizi A[2,3], Strakosha A[2,3], Rroji M[2,3]*

[1]Department of Internal Medicine, University Hospital of Trauma, Tirana, Albania; [2]Department of Nephrology, University Hospital Center "Mother Tereza", Tirana, Albania; [3]University of Medicine, Tirana, Albania

Introduction. Albania currently lacks a deceased donor kidney transplantation program, mainly due to institutional, legal, and cultural barriers. To assess feasibility, we conducted a dual investigation combining intensive care unit (ICU) observations of trauma patients with a nationwide survey of public attitudes toward organ donation.

Methods. A prospective observational study was undertaken involving 150 trauma patients admitted to the ICU at the University Hospital of Trauma. The primary objective was to evaluate renal viability at the time of death. Concurrently, a nationwide, self-administered online survey was distributed via Google Forms to assess public perceptions, collecting responses from 1,457 adult participants across Albania.

Results. Of 150 ICU patients with normal baseline kidney function, 102 (68%) died during their ICU stay. Among these, 36 (35.3%) maintained viable renal function at the time of death. Donor potential was highest among early deaths (≤72 hours), where two-thirds (66.7%) retained transplantable kidneys. Younger patients were more likely to preserve kidney viability, with an average age of 49 years in early deaths compared to 63.1 years in later deaths. Despite risks such as nephrotoxic drug exposure, hypotension, and metabolic derangements, early ICU deaths often occurred before significant renal deterioration, identifying a missed window for donor eligibility. The survey revealed strong societal support for donation. Nearly three-quarters (74.8%) agreed it is time to establish a national deceased donor program. When asked about registering to donate for a family member, 86.3% expressed moderate-to-high willingness (scores 5–10), with 58.6% selecting the maximum score. Altruism extended beyond kinship: 72% were willing to donate to a stranger after death, and 36% gave the highest score. Living donation was widely accepted, with 90.2% of individuals willing to donate to a family member while they were alive. Willingness to donate was positively associated with older age and knowing someone on dialysis ($r = 0.10$, $p < 0.001$). Significant barriers included doubt in the healthcare system (61.9%), lack of awareness (53.8%), and cultural or religious concerns (16%).

Conclusion. These findings reveal both significant donor potential in Albanian ICUs and a good public readiness for organ donation. Establishing a deceased donor transplantation program is medically and socially feasible, but success will depend on policy

action and rebuilding public trust in the healthcare system.

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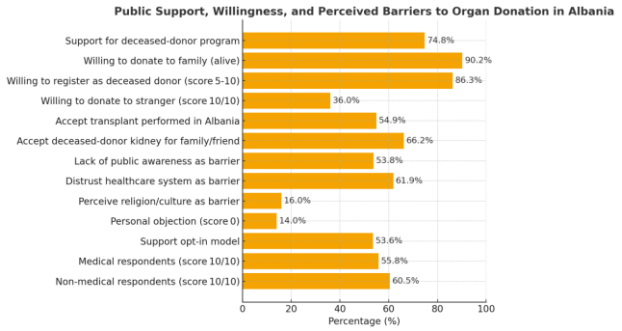

Figure1. Public Support, Willingness, and Perceived Barriers to Organ Donation in Albania: Results from a Nationwide Survey (n = 1,457). Data illustrate high willingness to donate to family members, moderate support for deceased donation, and key barriers including perceived religious and cultural objections and partial trust in the healthcare system. Responses reflect both medical and non-medical participants and inform public readiness for a deceased donor program.

PP-27 Kidney transplantation in a patient with tubulocystic carcinoma of native kidney (oral case)

Radunovic D[1], Radunovic I[1], Prelevic V[1], Tomovic F[1]
[1]Clinic for Nephrology, Clinical Center of Montenegro, Montenegro

Introduction. Tubulocystic renal cell carcinoma of the kidney is a rare entity with less than one hundred cases reported so far. It is now a well-established entity in renal neoplastic pathology and has been recognized as a distinct entity in the 2012 Vancouver classification of renal tumors. Current guidelines on listing patients for renal transplantation suggest that no delay is required for subjects with small or incidentally discovered RCC (renal cell carcinoma), while the recommendations for patients who have been treated for other types of renal cell carcinomas are conflicting.

Case report. Male patient, 43 years old, diagnosed with IgA nephropathy at the age of 10, with progression to CKD. He was on a chronic hemodialysis program for 3 years. Among the comorbidities, he had arterial hypertension. Two years ago, he developed severe aortic stenosis, for which he was treated with replacement of the aortic valve with a mechanical valve, and was on chronic anticoagulant therapy. In the patient, a tumor mass of the native left kidney was verified 3 years ago. His father was evaluated and examined as a potential kidney donor with compatible blood group and no contraindications were found. Radical left nephrectomy was performed. Pathohistological finding revealed renal tubulocystic carcinoma, 3 cm in diameter, without necrosis, Fuhrman nuclear grade III, without lymphatic or venous invasion, without invasion in renal vein, hilus and perinephritic adipose tissue, Gerota's fascia or ureter. Lymph node and hilus adipose tissue had normal histology, without metastasis.

Outcome. After 3 years he was reconsidered for kidney transplantation treatment. Clinical examinations did not verify the presence of malignancy or pathological lymphadenopathy. Transplantation was performed with basiliximab in induction therapy, and with a standard immunosuppressive protocol (TAC + MMF + steroid), without complications. Graft function and patient are stable in follow up period.

Conclusions: Patients with tubulocystic renal carcinoma should be considered for treatment with a kidney transplantation with an individual assessment of the overall risk and benefit. Searching the literature, we did not come across a described case of kidney transplantation in a patient with a history of this type of native kidney cancer.

PP-28 Kidney transplantation in a patient with CML - chronic myeloid leukemia (oral case)

Radunovic D[1], Radunovic I[1], Prelevic V[1], Tomovic F[1]
[1]Clinic for Nephrology, Clinical Center of Montenegro, Montenegro

Introduction. Myeloid neoplasms with PDGFRB rearrangements are genotypically and phenotypically diverse, typically presenting as myeloproliferative neoplasm (MPN) with eosinophilia. Common morphologic diagnosis is chronic myelomonocytic leukemia with eosinophilia, associated with t (5;12) (q33; p13), resulting an ETV6-PDGFRB fusion gene (formerly TEL-PDGFRB). Patients bearing PDGFRB fusion genes achieve durable long-term remissions with imatinib. Consensus regarding kidney transplantation feasibility in patients with chronic myeloid leukemia (CML) well controlled by tyrosine kinase inhibitors has not yet been achieved.

Case report. Female patient, 42 years old, had arterial hypertension and diabetes mellitus type 2 for seven years and CKD. After total hysterectomy and adnexectomy, due to uterine fibroids, developed acute respiratory distress syndrome, acutisation of CKD, threatened by pancytopenia. After the stabilization of the condition, a diagnosis of myeloproliferative neoplasm was made after pathohistological analysis of bone marrow biopsies PDGFRB (TIER3).

Outcome. After imatinib introduction, the condition stabilized. Patient achieved molecular response in treatment after a year, but developed ESRD (end stage renal disease) and was on chronic hemodialysis program. Her mother was examined as a potential

kidney donor and no contraindications for kidney donation were found. Patient underwent clinical examination according to the protocol for examining the suitability of treatment with the method of kidney transplantation. Clinical and hematological bone marrow molecular examinations suggested CML molecular remission. Transplantation was performed with basiliximab in induction therapy, and with a standard immunosuppressive protocol (TAC + MMF + steroid), without complications. Imatinib adjustment with immunosuppressive drugs was required. Graft function and patient are stable in follow up period.

Conclusions: Patients with low-risk chronic phase CML in good disease control and ESRD may be considered for a treatment with kidney transplantation.

PP-29 Congenital abnormalities of the kidney and urinary tract - Shadow in adults. Protecting kidney function through Medical Nutritional Therapy: a case presentation (oral case)

Moraru SM[1], Teodora MD[1], Paul R[2,3], Mocanu CA[2,3], Gârneață L[2,3]

[1]Department of Internal Medicine-Nephrology, Faculty of Medicine, University of Medicine and Pharmacy of Craiova, Craiova, Romania; [2]Department of Internal Medicine and Nephrology, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania; [3]Department of Nephrology, "Dr. Carol Davila" Teaching Hospital of Nephrology, Bucharest, Romania

Introduction. Congenital upper urinary tract abnormalities with secondary nephrolithiasis determine chronic kidney disease (CKD) via recurrent obstruction, infections, and hyperfiltration.

Case report. We report the case of a 30-year-old woman with chronic pyelonephritis. She was diagnosed with urinary tract abnormalities, with multiple urological intervention in childhood, who developed then malformation, highlighting risk stratification (KDIGO G1A3) and the design of a tailored nutritional strategy to support kidney preservation and stone prevention. We documented medical history (multiple childhood UTIs; pelvic/calyceal stones; in April 2009 pyelolithotomy; in September 2009 uretero-calyceal anastomosis/nephrolithotomy; in August 2010 ESWL unsuccessful), urinalysis/biochemistry (microalbuminuria 332 mg/24 h in 11/2009. Important proteinuria was revealed, up to 1.8 g/24 h in 08/2013), and functional studies (renal scintigraphy split function 17% left/83% right; global eGFR 93 mL/min/1.73 m²). A multifactorial nutritional plan was initiated: moderated protein intake (~0.6–0.8 g/kg/day, high-quality sources), ketoanalogue supplementation (1 tb/10 kg-day), phosphorus caution, adolescent-adapted counseling (food diary, shared decision-making), physical-activity encouragement, and close monitoring of growth and nutritional status. At risk stratification, CKD was G1A3 with persistent hematuria/proteinuria (RBC ~250/µL; proteinuria up to 1.8 g/24 h) and preserved global filtration driven by compensatory right kidney function (83%). The left kidney was shrunken, with delayed excretion. Nutritional counseling and adherence support were implemented without compromising growth objectives. Renal function at assessment was 93 mL/min/1.73 m²; the rate of decline in kidney function was much slower than was expected to, while proteinuria remained high above target.

Conclusion. The particularity of the case leads in early occurrence of CKD, due to chronic pyelonephritis (urinary tract abnormalities, secondary lithiasis), accompanied by high proteinuria during adolescence. Medical nutritional therapy, in terms of supplemented, personalization of protein, sodium and phosphorus intake provides a practical framework for delaying the dialysis and allows awaiting for kidney transplantation.

PP-30 Outcomes of patients with acute kidney injury: a single center results from Türkiye

Keskin AH[1], Kaynar K[2], Beyhun NE[3], Özen N[3], Keskin HV[4], Güvercin B[2], Ulusoy Ş[2]

[1] Karadeniz Technical University, Faculty of Medicine, Department of Internal Medicine, Trabzon, Türkiye; [2] Karadeniz Technical University, Faculty of Medicine, Department of Nephrology, Trabzon, Türkiye; [3] Karadeniz Technical University, Faculty of Medicine, Department of Public Health, Trabzon, Türkiye; [4] Karadeniz Technical University, Faculty of Medicine, Department of Chest Diseases, Trabzon, Türkiye

Introduction. We aimed to analyze the demographic, etiological, clinical and biochemical findings and outcomes of patients who were hospitalized and treated with diagnosis of acute kidney injury in this observational and prospective study which was performed in a single center (Trabzon/ Türkiye).

Methods. Twenty eight patients (Female/Male: 7/21) with acute kidney injury whom were diagnosed based on the KDIGO recommendations were recruited into this study. The etiology of acute kidney injury, sociodemographic, clinical and laboratory data were recorded for all of the patients. Volume evaluations were carefully performed in every and each of the patients. The need for dialysis, appearence of complications such as chronicity and mortality of the patients, clinical course and outcome of patients were evaluated.

Results. AKI stage 1 (n:5), stage 2 (n:3), and stage 3 (n:20) were diagnosed in 17.9, 10.7, and 71.4% of the patients respectively, based on the KDIGO

recommendations. The major comorbidity was chronic kidney disease which was found in 64.2% of all the patients. The main complaint of the patients was nausea which was present in 46.4% of all the participants. Second most common complaint was anorexia which was present in 28.6% of all the patients. Third most common complaint was vomiting which was present in 25% of patients. At admission, the usage of nonsteroidal anti-inflammatory drugs (NSAID) and acetaminophen (paracetamol) were present in 46 % and 17.8% of the patients respectively. Hypovolemia was diagnosed in 82.2% of all the patients while, hypervolemia was present in 14.2%, and euvolemia was found in 3.6% of the patients. Urinary infection was significantly more in patients with stage 1 AKI (80%) than those with stage 2 and 3 AKI (26.1%). The main electrolyte disturbances of the patients were hyponatremia and hyperkalemia. During hospitalization, Half of the patients recovered without sequelae. In all, 25% of patients needed chronic hemodialysis.

Conclusion. At the time of diagnosis, unfortunately, most of the patients had severe AKI (stage 3). Most of the cases were due to usage of nephrotoxic drugs such as NSAID and paracetamol. Hypovolemia was the most common examination finding. As a result, half of the patients recovered without sequelae. Half of the patients needed acute hemodialysis and 25% of all patients needed chronic hemodialysis. In all, 14.2% of patients died during follow up. Multiple myeloma was found to be significantly associated with mortality. Hypomagnesemia during hospitalization was detected statistically more in patients who died.

PP-31 Purple urine bag syndrome: a curious presentation of infection

Petrov P[1], Sabri S[1], Dimieva-Dineva Y[1], Petrov A[1], Benkova-Petrova M[1], Shaleva R[1], Harizanova N[1], Marcheva Ts[1], Danailova S[1], Staykova S[1]

[1]Clinic of Nephrology, University Hospital "St. Marina" – Varna, Bulgaria; Medical University "Prof. Dr. Paraskev Stoyanov" – Varna, Bulgaria

Introduction. Purple urine bag syndrome (PUBS) is an uncommon clinical entity most frequently observed in patients with long-term indwelling urinary catheters and associated with urinary tract infections caused by urease-producing microorganisms. While the condition is generally considered benign, it represents an important diagnostic sign that warrants clinical attention.

Case report. We report the case of an 81-year-old male with end-stage chronic kidney disease on maintenance hemodialysis and multiple comorbidities, managed with an indwelling urethral catheter. The patient was admitted with febrile episodes up to 38°C and striking purple discoloration of the urine collection bag. Laboratory investigations demonstrated elevated C-reactive protein (92.6 mg/L), leukocytosis (15×10^9/L), alkaline urine (pH 8.5), and active urinary sediment. Urine culture yielded *Escherichia coli* (>10^5CFU/mL).

Intravenouspiperacillin/tazobactam therapy combined with catheter replacement resulted in clinical improvement. The pathogenesis of PUBS is attributed to bacterial degradation of indoxyl sulfate, which in an alkaline urinary environment is converted into indigo and indirubin pigments, leading to the characteristic purple discoloration. Although infrequent, PUBS has relevant clinical implications as it often signals an underlying urinary tract infection.

Conclusion. PUBS should be recognized as a valuable clinical marker of urinary tract infection in chronically catheterized patients with substantial comorbid burden. Prompt recognition allows for early diagnosis and the institution of appropriate therapeutic measures.

PP-32 Urinary disorders and quality of life in prostate cancer patients

Gjyzari A[1], Bara R[2], Spahiu O[2]

[1]University Hospital Center Nene Tereza, Nephrology, Tirana, Albania; [2]University Hospital Center Nene Tereza, Radiotherapy, Tirana, Albania

Introduction. Among frequent men malignancies, prostate cancer (PC) is the second most common. Early diagnosis and improved treatment contribute to better survival, but the burden of the quality of life (QoL) remains important. We aimed to evaluate the frequency of urinary disorders and QoL of PC patients.

Methods. In this cross-sectional study we included 40 men, diagnosed with PC and treated in an oncological service of a tertiary university hospital during January 2023 - July 2025. Patients were treated with radical prostatectomy (RP), transurethral resection of the prostate (TURP), androgen deprivation therapy, and radiotherapy (RT). We used the EORTC QLQ-C30 version 3 questionnaire for assessing the quality of life during the last week, and the complementary EORTC QLQ-PR25 questionnaire. The following data were recorded: age, comorbidities as chronic kidney disease (CKD) and diabetes mellitus (DM), PSA levels ng/mL (before treatment), Gleason Score (GS), radiation therapy dosage in Centigray (cGY).

Results. The mean age of enrolled patients was 71±6.6 years. 10 % were in working condition at the time of the diagnosis. Comorbidities were: CKD in 5%, and DM in 7.5% of patients. The initial median and interquartile range (IQR) of PSA levels was 24.7 (10.4-107), and prostate volume was 50 (46-85.5) cc. The mean radiation therapy dosage was 6805±865 cGY. Before starting the RT, 17.5% had RP with a median IQR time in months 4 (2-9). 70.3 % patients reported frequent urination during the night, 67.6 % patients during the day, 32.4 % reported frequent

emergencies of urination. Involuntary urination was reported as occasionally in 51.4%, and frequently in 5.4% patients. Painful urination was reported as occasionally in 51.4%, and frequently in 10.8 % patients. Hematuria was reported in 32.4% patients. 13.5 % patients reported to frequently have trouble carrying out normal daily activities. 29.7.2% reported to be frequently anxious, and 45.9% reported difficult to get a good night's sleep. The average rating of quality of life on the last week was 3.7±1.0. We found a statistically significant association between frequent urination and emergencies of urination and difficulties to get a good night's sleep with p=0.02; p=0.042 respectively, and between frequent urination and the overall worse QoL p=0.014. The lack of involuntary urination was associated with a good QoL p<0.001.

Conclusion. Urinary disorders are frequent between PC patients and they significantly affect their QoL.

PP-33 Relationship between prostate-specific antigen and other diagnostic parameters for prostate cancer patients

Gjyzari A[1], Bara R[2], Spahiu O[2], Gjyzari A[3], Strakosha A[1]

[1]University Hospital Center "Nene Tereza", Nephrology, Tirana, Albania; [2]University Hospital Center "Nene Tereza", Radiotherapy, Tirana, Albania; [3]Lady of Good Counsel University, Tirana, Albania

Introduction. To assess the relation of prostate-specific antigen (PSA) with other conventionally used diagnostic parameters, specifically extra capsular extension, Gleason Score, and metastasis.

Methods. A prospective observational analysis of diagnostic data was performed and included 54 men, between the ages of 53 and 80 years, during January 2023 to December 2024, at a tertiary care oncology hospital. Patients were treated with radical prostatectomy, androgen deprivation therapy, and radiotherapy. The following data were recorded: age, PSA levels on ng/mL (before and after treatment), prostate volume, Gleason Score (GS), extra capsular extension (ECE), and presence of metastasis.

Results. Study participants had a mean age 70.4±5.8 years, and an initial median and interquartile range (IQR) of PSA levels 19 (11.3-45.2), and mean prostate volume 43.8±18.6 cc. GS according stages was: 13% stage I, 48.1% stage II, 16.7% stage III, 11.1% stage IV and 11.1% stage V. ECE was present in 24.1% of patients. Kruskal-Wallis test didn't show any statistically significant relation between PSA level at diagnosis and GS stage (P=0.761). We found a statistically significant relation between PSA level at diagnosis and ECE presence {14.9(9.7-39) vs 41(18.6-97.7); p=0.010}.

Conclusion. Based on the data collected and their subsequent analysis, a clear and optimal categorization of the PSA levels in relation to the grades of the Gleason score cannot be established. Appropriate biomarkers are need in decisions according to early diagnosis.

PP-34 The role of inflammatory biomarkers in children with chronic kidney disease

Lozovan V[1], Băluțel T[1], Ciuntu A[1]

[1]Department of Pediatrics, State University of Medicine and Pharmacy "Nicolae Testemitanu", Chișinău, Republic of Moldova

Introduction. Chronic kidney disease (CKD) in children affects approximately 74.4 cases/1 million pediatric population worldwide. Chronic inflammation plays a central role in the pathogenesis of systemic complications, negatively influencing the growth hormone axis and nutritional status. According to the *North American Pediatric Trials and Collaborative Studies,* approximately 37% of children with CKD present with growth disorders.

Aims. Evaluation of the relevance of inflammatory biomarkers in children with CKD and their association with growth disorder.

Methods. Narrative synthesis of the specialized literature available in the last five years, using PubMed, Scopus and Web of Science databases.

Results. Interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α) contribute to growth retardation in children with CKD by inducing growth hormone resistance, reducing insulin-like growth factor 1 (IGF-1) synthesis and bioavailability, inhibiting growth plate function, and aggravating malnutrition, making chronic inflammation a central determinant of stature deficit. Recent studies report increased levels of proinflammatory cytokines, such as IL-6, TNF-α, and TNF receptors R1/R2, in children with CKD, being correlated with accelerated disease progression. Other studies have shown that plasma TNFR1 and TNFR2 levels are independent predictors of CKD progression in pediatric and adult CKD cohorts. The CKiD study, in a cohort of 651 children who were followed for more than 6 years, reported that double growth of plasma TNFR1 and TNFR2 levels was associated with CKD progression, with an adjusted HR (aHR) of 1.94 (95% CI: 1.56–2.40) and 1.85 (95% CI: 1.37–2.51), respectively. Elevated serum soluble urokinase plasminogen activator receptors (suPAR) were associated with a quick decline in renal function in European cohorts of 898 children. The CKiD study reports that double growth of urinary monocyte chemoattractant protein-1 (MCP-1) was associated with CKD progression, with an aHR of 1.29 (95% CI: 1.20–1.39) in the fully adjusted model. Chronic inflammation also negatively influences the GH–IGF1 axis and contributes to malnutrition and decreased appetite, which aggravates height loss. About 30% of children with CKD present a stature delay (below −1.88 SDS). Recent studies demonstrate elevations of

TNF-α and sCD14 correlated with intestinal barrier dysfunction and endotoxemia, accentuating systemic inflammation.

Conclusion. Inflammatory biomarkers represent promising indicators for risk assessment and personalized management of children with CKD, particularly regarding the consequences on linear growth. Integrating these biomarkers into monitoring protocols allows early intervention and prevention of stature deficiency in children with CKD.

PP-35 Advanced glycosylation end-products in the progression of chronic kidney disease in children

Băluțel T[1], Ciuntu A[1, 2]
[1]Department of Paediatrics, Nicolae Testemitanu State University of Medicine and Pharmacy; [2]IMSP Institute of Mother and Child, Chisinau, Republic of Moldova

Introduction. Advanced glycosylation end-products (AGEs) are covalently modified proteins formed by glycation and non-enzymatic oxidation. Pentosidine and verperlysine are fluorescent AGEs obtained by cross-linking arginine and lysine residues with a ribose. Recent studies have demonstrated that dysregulation of AGE homeostasis contributes to the progression of chronic kidney disease (CKD), leading to the generation of reactive oxygen species, proinflammatory transcription factors, and irreversible damage to kidney structures. Aim of the study: Determination of serum levels of pentosidine, verperlysine, and carbonyl groups in children with CKD.

Methods. A prospective study was conducted on a group of 72 children aged 1-16 years, diagnosed with CKD stages II-V, to determine serum levels of pentosidine, verperlysine, and carbonyl groups. The results were compared with those of a control group.

Results. The serum levels of pentosidine, verperlysine and carbonyl groups in the study group were (1918,218 ± 412,799 μM/L, $p < 0.001$; 3827,78 ± 661,407 μM/L, $p < 0.001$; 271,835 ± 84,393 nM/gprotein, $p < 0.001$) compared to the control group (1823,083 ± 868,921 μM/L, $p < 0.001$; 1628,777 ± 898,123 μM/L, $p < 0.001$; 233,005 ± 79,416 nM/gprotein, $p < 0.001$). The Mann-Whitney U test demonstrated a significant difference in verperlysine μM/L levels between the study and control group ($U = 706$, $n1 = 61$, $n2 = 55$, $p < 0.001$). Numerous other studies have reported the impact of increased levels of AGEs on the decline in renal function, which is also reflected in current study, according to the Spearman test, wich showed a high positive correlation between serum levels of verperlysine and creatinine ($r(59) = 0.527$, $p = <0.001$) and between verperlysine and catalase ($r(59) = 0.377$, $p = 0.003$).

Conclusions. Determination of serum AGE levels is a valuable method for assessing prooxidant status and is a crucial marker of CKD progression in children with kidney disease.

PP-36 The effects of antibiotic therapy on neonatal acute kidney injury

Chisavu F[1,2], Chisavu L[1], Schiller A[1], Hanu D[2], Steflea R[2,3], Gafencu M[2,3], Stroescu R[2,3]
[1]Centre for Molecular Research in Nephrology and Vascular Disease, Faculty of Medicine 'Victor Babes', Timisoara, Romania; [2]"Louis Turcanu" Emergency County Hospital for Children, Timisoara, Romania; [3]University of Medicine and Pharmacy 'Victor Babes', 300041 Timisoara, Romania.

Introduction. Neonatal acute kidney injury (AKI) continues to be one of the most common and often overlooked complications in newborns. As a high-risk population that is particularly susceptible to infections, the use of prophylactic antibiotics is frequently emphasized in clinical practice. Few studies have addressed the impact of antibiotic therapy on the immature kidney function. Our study aimed to underline the effects of the increasing use of antimicrobial classes in the management of neonates with AKI.

Methods. We performed an observational cohort study on 877 newborns admitted during 2014 – 2023 to the "Louis Turcanu" Clinical Emergency Hospital for Children from Timisoara, Romania, who were diagnosed with AKI according to the KDIGO criteria. We evaluated the impact of the most used antibiotic classes on AKI duration and mortality during hospitalization according to gestational age, form extremely premature to term neonates.

Results. The cohort consisted of 877 newborns diagnosed with AKI, with 521 males (58.4%) and 539 (60.7%) from an urban area. 350 (39.9%) newborns progressed to acute kidney disease (AKD), and 143 (16.3%) died during hospitalization. AKD presence doubled the hospitalization period (31 vs 16 days, $p<0.0001$). 94.3% of the patients received at least one class of antibiotics per admission. All the prescribed antibiotic classes presented higher incidences in patients with AKD when compared to non-AKD ones: beta lactams 75.1% vs 62.6%, $p=0.0001$, aminoglycosides 70.6% vs 59.9% $p=0.0011$, carbapenems 74.3% vs 52.9% $p<0.0001$, polymyxins 32% vs 10.4% $p<0.0001$, fluoroquinolones 22.6% vs 5.7% $p<0.0001$, glycopeptides 19.4% vs 10.2% $p=0.0001$, and lincosamides 6.9% vs 0.6% $p<0.0001$. In the univariate and multivariate analyses (adjusted for C-reactive protein, procalcitonin, gestational age category, total serum proteins, and thrombocytes), all prescribed antibiotic classes increased the risk of a prolonged AKI episode, but did not affect mortality. Antibiotic stewardship, as measured by the cumulative dose-effective index and drug class efficacy in newborns, increased the risk of AKD development by

80% (OR=1.81, 95% CI=1.61-2.04, p<0.0001). On the other hand, AKD patients received antibiotic therapy longer period of time compared to non-AKD ones (12 vs 9 days for beta-lactams, 9 vs 8 days for aminoglycosides, 13 vs 10 days for carbapenems, p<0.0001).

Conclusion. Antibiotic use in the presence of AKI independently increases the risk of AKD, and hospital stay but without any impact on mortality. The use of antibiotics is extremely high in neonates, and it seems that 3 out of 4 hospitalised neonates require more than two antibiotic classes.

PP-37 Mental Health, Quality of Life and Sleep Among Patients with Glomerulonephritis

Güvercin B[1], Kaynar K[1], Arslan FC[2], Manzak Saka I[2], Ulusoy Ş[1], Mungan S[3], Cansız M[1], Beyhun NE[4], Huseynova S[5]

[1]Karadeniz Technical University, Faculty of Medicine, Department of Nephrology, Trabzon, Türkiye
[2]Karadeniz Technical University, Faculty of Medicine, Department of Psychiatry, Trabzon, Türkiye
[3]Karadeniz Technical University, Faculty of Medicine, Department of Pathology, Trabzon, Türkiye
[4]Karadeniz Technical University, Faculty of Medicine, Department of Public Health, Trabzon, Türkiye
[5]Karadeniz Technical University, Faculty of Medicine

Introduction. The aim of this study was to investigate the effects of glomerulonephritis, which has a heterogeneous and unpredictable clinical course with remissions and relapses and can be emotionally and physically burdensome for patients due to both the disease and its treatments, on mental health, quality of life, and sleep.

Methods. A total of 40 participants (healthy control: 10, Glomerulonephritis: 30) were included in the study. The healthy control group had no proteinuria and a mean serum creatinine level of 0.7±0.1 mg/dL. The glomerulonephritis group, confirmed by renal biopsy, had proteinuria of 5.9±5.5 g/day and a mean serum creatinine level of 1.7±1.6 mg/dL. The Short Form-36, Pittsburgh Sleep Quality Index, and General Health Questionnaire-12 were administered to all groups. The Kidney Disease Quality of Life-36 form was administered only to the glomerulonephritis group. All participants were evaluated by a clinical psychiatrist. The correlation between the biochemical data of the groups and the scores on these forms was analyzed.

Results. The groups were similar in terms of smoking status, marital status, occupation, education, residence, hemoglobin, and blood pressure. Nephrotic syndrome was present in 43.3% of the glomerulonephritis group, 26.7% had acute kidney injury, 13.3% had nephrotic-range proteinuria, 10% had chronicity, and 6.7% had nephritic syndrome. The physical functioning and role-physical functioning scores of glomerulonephritis group were statistically significantly lower than those of healthy control group. Age exhibited a significantly negative correlation with vitality subscale of The Kidney Disease Quality of Life-36 scale and proteinuria was significantly negatively correlated with role-physical subscale of The Kidney Disease Quality of Life-36 survey. Hemoglobin levels were found to be significantly positively correlated with physical functioning, role-physical functioning, and emotional-role functioning subscales of The Short Form-36. There were also significant positive correlations between serum albumin levels and physical functioning, role-physical functioning subscales of The Short Form-36 survey. Linear association between estimated glomerular filtration rate of glomerulonephritis patients and role-physical domain of The Short Form-36 scale was found. Control group had significantly lower scores in Pittsburgh Sleep Quality Index than those of glomerulonephritis patients. Significantly lower sleep quality was found in the glomerulonephritis group compared to the control group (p<0.05).

Conclusion. Proteinuria, age, hemoglobin and albumin levels were found to have an impact on quality of life in glomerulonephritis patients, particularly in the subscales of physical function, vitality, role-physical and emotional. Sleep quality was also found to be poorer in glomerulonephritis patients.

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