INCIDENCE AND SPECTRUM OF BIOPSY-PROVEN DYSPROTEINEMIC KIDNEY DISEASES: A SINGLE-CENTRE EXPERIENCE

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BACKGROUND AND AIMS: We aimed to evaluate the incidence and clinical features of patients with biopsy-proven dysproteinemic kidney diseases (group 1), as well as spectrum of biopsy-proven kidney diseases of patients with monoclonal gammopathy (MG) or abnormal free light chain (FLC) ratio (group 2) at our institution.

METHOD: This was a single-centre retrospective study of all patients who had native kidney biopsies at the Singapore General Hospital between October 2015 and December 2021. Demographic, clinical, laboratory and histological data were retrieved from electronic medical records to identify patients with biopsy-proven dysproteinemic kidney diseases (group 1) and patients with positive MG and/or abnormal FLC (κ to λ) ratio who underwent kidney biopsy (group 2). Patients were considered to have MG if they tested positive on any of the following tests: serum protein electrophoresis, serum immunofixation, urine protein electrophoresis or urine immunofixation. Abnormal FLC ratio is defined as a ratio outside the range of 0.27–1.65 in patients with eGFR >60 mL/min/m² or 0.37–3.10 in patients with eGFR <60 mL/min/m².

RESULTS: Out of 1066 patients who underwent kidney biopsy between October 2015 and December 2021, 25 (2.3%) patients were diagnosed with dysproteinemic kidney diseases (group 1). The median age of the patients at diagnosis was 65.6 years (IQR 58.6, 68.2), and majority was male (17/25; 68.0%). Haematological diagnoses present in this cohort include multiple myeloma (5/25; 20.0%), chronic lymphocytic leukaemia (2/25; 8.0%), Waldenstrom’s macroglobulinaemia (2/25; 8.0%) and mantle cell lymphoma (1/25; 4.0%).

Two-thirds of the patients had acute kidney injury (AKI) at time of biopsy (17/25; 68.0%). All patients presented with proteinuria, and nephrotic syndrome was noted in approximately half of the patients (15/25; 60.0%). Hypocomplementemia was present in a third (7/21; 33.3%) of the patients who had complement levels performed prior to biopsy, with low C3 and low C3/C4 observed in 5 and 2 patients, respectively. The most common histological lesion is immunoglobulin-related amyloidosis (8/25; 32.0%), followed by proliferative glomerulonephritis with monoclonal immune deposits (PGNMD) (6/25; 24.0%) and light-chain cast nephropathy (4/25; 16.0%).

Sixteen (64%) patients fulfilled criteria for monoclonal gammopathy of renal significance (MGRS). All patients with PGNMD had undetectable MG and normal FLC ratio at diagnosis. Among these 1066 patients who underwent kidney biopsy, 396 patients had FL electrophoresis, serum immunofixation, urine protein electrophoresis or urine immunofixation and/or FLC performed prior to biopsy. A total of 44 (11.1%) patients with detectable MG and/or abnormal FLC ratio were identified (group 2), 5 of whom had previously known haematological conditions. Dysproteinemic kidney diseases were diagnosed in 14 (31.8%) patients. Amongst patients with non-dysproteinemic diagnosis, diabetic/hypertensive nephropathy was the most frequent (15/36; 50.0%). Majority of the remaining patients had a history of proliferative glomerulonephritis and renal vasculitis (10/30; 33.3%), or tubulointerstitial diseases (2/30; 6.7%). In univariate analysis, non-diabetic status, presence of AKI and abnormal FLC ratio (P = 0.032) and abnormal FLC ratio (P = 0.005) increased the likelihood of diagnosing dysproteinemic kidney disease in this group of patients.

CONCLUSION: AKI and proteinuria are common in dysproteinemia kidney diseases. Non-diabetic status, presence of AKI and abnormal FLC ratio increased the likelihood of diagnosing dysproteinemic kidney disease.

CARDIORENAL UNITS AS MANAGEMENT STRATEGY TO IMPROVE OUTCOMES IN CARDIORENAL SYNDROME

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BACKGROUND AND AIMS: Cardiorenal syndrome (CRS) is defined as the spectrum of disorders that acutely or chronically affect both heart and kidney function, is often a challenging condition with paucity of evidence-based therapy. The increasing burden of this entity has prompted the creation of cardiorenal units (CRU) as integrating programs intended to provide a combined multidisciplinary approach to maximize all chances for organ and patient recovery. Here we describe the early results of the creation of one CRU in a high complexity university hospital.

METHOD: This observational study included all patients diagnosed with CRS, who have been seen in the cardiorenal day care unit, formed by specific trained nephrologist, cardiologist and nurses. Assessment of cardiorenal function and volume status was performed by conventional cardiac ultrasound plus V-Scan, GFR estimation by CKD-EPI, NT-proBNP determination and bioelectrical impedance when indicated.

RESULTS: Cardiorenal Unit of Puerta de Hierro University Hospital was created in January 2015. A total of 68 patients have been evaluated with a mean follow-up of 4 months (SD 3.2). Most frequent cardiologic diagnoses were 63.9% heart failure with reduced function (HFrEF) and 37.1% heart failure with preserved ejection fraction (HFpEF) and the presence on pulmonary hypertension or tricuspid regurgitation was 29.4% and 50.9%. 51.6% patients showed diuretic resistance.

Most frequent renal diagnosis were pure CRS 36.9%, and 27.7% and 24.6% CRS associated to diabetic kidney disease or nephroangioesclerosis, respectively. Mean FGe rate when patients were initially evaluated was 31.5 mL/min/1.73 m² (SD 11.0) with demonstration of albuminuria in 48.5% of patients.

The integrated cardiorenal management of these patients included initiation or adjustment of specific cardio-neuroprotective drugs (SGLT2 inhibitors (46.8%), ARNI (25.8%), aldosterone receptor antagonists (4.8%)) or diuretic regime adjustment including iv administration (54.8%). Percutaneous dialysis was indicated in three patients and haemodialysis in one patient. Approximately 13.3% patients suffer new episodes of heart failure that needed hospitalization or unexpected medical attention at the day-care clinic. One patient died during follow-up (1.5%).

CONCLUSION: We conclude that this coordinated cardioneuro approach of CRS was useful to optimize drug therapy aimed to mid-long term goals of cardiorenal protection and to implement advanced therapies for fluid management in patients with diuretic resistance.

VITAMIN C NEPHROTOXICITY IN A COVID-19 PATIENT: A CASE REPORT

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BACKGROUND AND AIMS: During the time of the COVID-19 pandemic, multiple treatment options have been investigated, even though their efficacy and secondary effects remain insufficiently known.

We report the case of a vitamin C induced oxalate nephropathy in a COVID-19 patient with preexisting chronic kidney disease (CKD) resulting in irreversible acute renal failure.

Vitamin C, also known as ascorbic acid, has been used as an anti-inflammatory therapy for COVID-19, but review of the literature shows similar cases of acute kidney injury (AKI), raising concern.

METHOD: We report the case of a 73-year-old Caucasian woman admitted for hyperthermia and digestive disorders. She had recently started a first-line chemotherapy for multiple myeloma with partial response. She also displayed preexisting stage 4 CKD (eGFR 18.50 mL/min/1.73 m² using CKD-EPI) of unknown aetiology.

She was tested positive for SARS-CoV2 by nasopharyngeal swab and soon transferred to the intensive care unit. She received intravenous corticosteroids using dexamethasone 6 g/24 h for 10 days and a piperacillin + tazobactam probabilistic antibiotherapy. She also received high doses (15 g/24 h) of vitamin C for three consecutive days. No monoclonal antibodies were prescribed due to a previous vaccination with a positive serology upon admission.

Although the patient recovered from respiratory tract infection, her kidney function progressively deteriorated with serum creatinine levels rising up to 8.06 g/dL, leading to her admission in our nephrology department. The patient was initially treated with high doses of diuretics for anasarca and an abdominal CT excluded urinary tract obstruction with normal kidney size and aspect. Urinary analysis showed protein to creatinine (p/c) ratio of 1348 g/g, and presence of urinary light chains. Her monoclonal spike was measured at 2.3 g/L and her kappa/lambda fraction was 1.74.

Intermittent haemodialysis was initiated, and a kidney biopsy was performed.

RESULTS: Histology revealed hundreds of intratubular calcium oxalate crystals, with severe and diffuse acute tubular necrosis and interstitial edema. There was no amyloidosis, no sign of active glomerular disease and no interstitial fibrosis. Immunofluorescence (IgA, IgG, IgM, C1Q, C3, kappa and lambda) was negative.

We concluded to oxalate nephropathy.

After a 2-month follow-up, the patient remains dialysis dependent. Vitamin C is a precursor of oxalate and has been shown to cause secondary oxaluria, particularly with high-dose regimens in patients with altered renal function. Given the histological findings evocative of acute oxalate nephropathy, the accountability of high doses of vitamin C should be considered.
No other cause of hyperoxaluria was identified in our patient beside broad spectrum antibiotic use, which could decrease intestinal bacterial oxalate degradation. In particular, there was no malabsorption.

The limitation of our report is the unknown cause of preexisting CKD; therefore, we cannot rule out preexisting hyperoxaluria. Also, no dosage of serum vitamin C and oxalate levels were performed during follow-up. Finally, our patient had other possible causes AKI, such as recent SARS-CoV2 infection, or linked to multiple myeloma, but these were considered unlikely given the proper haematological response to treatment and non-evocative biopsy.

The rationale for vitamin C use in COVID-19 is based on in vitro studies showing its antioxidant, anti-inflammatory, anticoagulant and immune modulatory properties. There lack large clinical studies, and the literature shows conflicting results. Multiple cases of acute oxalate nephropathy were described.

**CONCLUSION:** Vitamin C is an anti-inflammatory treatment used in COVID-19 that can lead to secondary hyperoxaluria with significant and irreversible AKI. Due to the severity of AKI in patients with preexisting CKD, we believe renal function should be considered before using high doses of vitamin C. Larger controlled trials are needed both to establish the clinical benefit of vitamin C and further describe its potential nephrotoxicity.

**FIGURE 1:** Cox’s regression survival curve for dialysis and non-dialysis groups. Patterns: 1 = Age at diagnosis, 2 = consanguinity.

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**PREDICTIVE FACTORS FOR RENAL IMPAIRMENT SECONDARY TO FAMILIAL MEDITERRANEAN FEVER IN AN ALGERIAN POPULATION**

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**BACKGROUND AND AIMS:** The aim of this study was to assess predictors of renal involvement and other factors secondary to FMF in renal and overall survival.

**METHOD:** We prospectively studied 57 Algerian patients admitted to our nephrology department from January 2012 to January 2021. The diagnosis of nephropathy was suspected clinically and biologically and confirmed histologically. The search for mutations in the MEFV gene was carried out in all our patients. The patients were divided into two groups according to their evolution: G1 (patients on dialysis) and G2 (patients not on dialysis).

**RESULTS:** G1 presents compared to G2 a presence of patients with more men with \((P = 1015 \times 10^{-7})\) but the difference is not significant, consanguinity \((P = 4998 \times 10^{-3})\), later age of onset of FMF \((P = 1116 \times 10^{-3})\), triggers for renal damage \((P = 3907 \times 10^{-2})\), age of onset of nephropathy \((P = 4199 \times 10^{-2})\), higher C-reactive protein \((P = 2561 \times 10^{-2})\), AA amyloidosis \((P = 11.0 \times 10^{-2})\), higher percentage of sclerosis glomeruli \(>50\% (P = 2052 \times 10^{-2})\), rapidly progressive glomerulonephritis \((P = 1.0 \times 10^{-2})\), higher proteinuria \((P = 1.0 \times 10^{-2})\), higher serum creatinine \((P < 0.15 \times 10^{-3})\), higher homozygous and/or compound heterozygous at the different gene mutations \((P = 3.815 \times 10^{-6})\) and a higher number of deaths \((P = 3.394 \times 10^{-3})\). The renal and overall survival analysis of the Kaplan-Meier survival analysis curve was significantly different in multivariate analysis (log rank, \(P < .0001\)).

**CONCLUSION:** There are predictive factors specific to renal injury and FMF that predict renal and overall survival in these patients.

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**A STUDY ON RENAL INVOLVEMENT IN COVID-19 PATIENTS WITH OR WITHOUT PREEXISTING KIDNEY DISEASE AND OUTCOME: A SINGLE-CENTRE RETROSPECTIVE STUDY**

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**BACKGROUND AND AIMS:** Chronic kidney disease (CKD) patients and renal allograft recipients (RARs) are at increased risk for severe coronavirus disease 2019 (COVID-19). Acute kidney injury (AKI) can develop in a patient with COVID-19 infection. Data regarding the outcome of COVID-19 patients with renal disease are scarce, especially from northeastern part of India.

**METHOD:** We conducted a single-centre, retrospective, observational study, involving hospitalized COVID-19 affected patients with renal disease in Guwahati Medical College, Guwahati between 1 July 2020 and 30 June 2021. Patients with various forms of kidney disease including AKI, CKD, RAR and glomerulonephritis were included.

The main aim of the study was to describe the outcome (in-hospital mortality) in this group of patients.

**RESULTS:** The study included a total of 384 patients with most patients in the elderly age group (73.7% above 45 years). Most of the patients were male (n = 288, 75%). Those with renal disease were grouped under AKI, CKD, RAR, systemic lupus erythematosus with lupus nephritis (LN) and rapidly progressive GN (RPGN) (20.3%, 75%, 3.4%, 1% and 0.3%, respectively). The mean duration of stay at the hospital was 8.1 days with maximum duration for RAR patients with a mean of 11.2 days. A total of 199 patients (51.8%) died. Mortality data were not available for 19 patients who got transferred to various other departments after recovering from COVID-19. Mortality rates for AKI, CKD, RAR and LN were 37.2%, 55.2%, 53.8% and 75%, respectively.

One patient with RPGN also died.

**CONCLUSION:** COVID-19 affects patients of all age and sex. CKD patients and those on immunosuppressive agents are at higher risk for mortality.