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Large Brown Tumor as a Complication of Hyperparathyroidism in a Young Adult

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Topic: Pediatric Nephrology
Keyword(s): hemodialysis, hyperparathyroidism, tumor, dwarfism

Background: Hyperparathyroidism is a near-universal sequela of end stage kidney disease (ESKD), particularly in patients receiving chronic hemodialysis. Brown tumors are less common, affecting 1.5-13% of those with hyperparathyroidism. These tumors are clinically important in that they may cause disfigurement and difficulties with eating and/or breathing. Here we report a case of a very large mandibular brown tumor in a patient treated in our pediatric dialysis unit.

Methods: A 22-year-old man with dwarfism (weight 16kg) and ESKD due to renal hypo/dysplasia on hemodialysis presented to our institution for management of a large mandibular mass which was first noted about 1 year prior to presentation and had grown in size, measuring 7.1 × 8.6 × 6.0 cm. PTH was 1530 pg/mL.

He had received hemodialysis for the last 10 years and had been on cinacalcet for the last 5 years. In addition to the maxillary and mandibular lesions seen on CT (Figure 1), he also had multiple lytic lesions in the bilateral humeri and multiple vertebral bodies. Despite the size of his tumor, he was still able to eat and drink. He was treated with thrice weekly hemodialysis, IV calcitriol, oral calcium, and cinacalcet over a 6-month period. PTH responded well to medical therapy, however, the tumor was unchanged in size, and he underwent a total parathyroidectomy with reimplantation in the sternocleidomastoid.

Conclusions: Brown tumors are non-neoplastic bone lesions which are the end-product of uncontrolled hyperparathyroidism. Increased osteoclastic activity results in decreased trabecular bone, which is then replaced by fibrovascular tissue. Microfractures and hemorrhages lead to macrophage infiltration and deposition of fibrous tissue. Treatment usually involves a stepwise approach, including medical therapy with vitamin D analogs and calcimimetics, although most published reports of large brown tumors were treated with parathyroidectomy. Many lesions will regress after parathyroidectomy or kidney transplant, although surgical resection of the tumor is still required in severe cases. In our case, his family elected not to have his tumors resected but instead to monitor tumor size post-parathyroidectomy and pursue kidney transplant in his home country.

Fig. 1. CT scan image with coronal and sagittal views of the skull depicting large maxillary (2.2 × 3.1 × 2.3 cm) and mandibular (7.1 × 8.6 × 6.0 cm) brown tumors. (Abstract: [1] Poster/Control Number: 5)
Hemodialysis for Methanol Intoxication in a Pediatric Patient

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Topic: Hemodialysis
Keyword(s): Methanol Intoxication, Hemodialysis

Background: Methanol intoxication is relatively rare, but an important poisoning because it is associated with high morbidity and mortality. Given its nonspecific clinical symptoms and inconsistency of serum osmolality and anion gap, there needs to be a high index of suspicion to prompt methanol-specific tests. We describe a case of methanol intoxication where hemodialysis (HD) was warranted with an overview of the cost analysis.

Methods: A 12-year-old boy with asthma presented to the emergency department after an intentional ingestion of a bathroom cleaning solution. He presented with stable vital signs and labs demonstrating an elevated creatinine, anion-gap metabolic acidosis, and an elevated serum osmolality gap (59). On exam, he was somnolent, but improved after a normal saline bolus. He underwent an extensive toxicology work-up including a send-out methanol level that resulted in 24 hours. Given his lab findings, he was started on a bicarbonate infusion, folic acid, and fomepizole due to concern for methanol ingestion.

The methanol level was elevated at 193 mg/dL. Based on consensus statement, HD is recommended (in addition to fomepizole) if serum methanol concentration is above 70 mg/dL or if patient has signs of severe poisoning (new vision deficit, refractory metabolic acidosis). In the setting of an elevated initial level, he was started on HD with a total of 2 treatments. The estimated duration of dialysis required to eliminate methanol to a safe range (&lt;20 mg/dL) was ~8.5 hours based on the equation by Hirsch et al (see below). He received a total of 7 hours of HD with undetectable levels after his second treatment. To note, the half-life of methanol on fomepizole therapy is ~52 hours and is eliminated in a first-order kinetic model. It would have taken ~200 hours/9 days of fomepizole treatment for the level to enter a safe range. Our patient was discharged on day 5.

Conclusions: This case report reviews the value of hemodialysis and the cost-effectiveness in the setting of methanol intoxication in a pediatric patient. Based on the half-life of methanol and slow elimination during alcohol dehydrogenase inhibition, the cost associated with exclusive fomepizole therapy is higher than early HD treatment.

Equation 1.

\[
\text{Estimated HD Time} = \frac{\text{Total Body Water (L)} \times \ln \left( \frac{5}{A \text{ (initial toxin level)}} \right)}{0.06 \times k \text{ (ml/min - based on filter & blood flow rate)}} - \frac{44L \times \ln \left( \frac{5}{60.24 \text{ mmol/L}} \right)}{0.06 \times 215 \text{ ml/min}} \approx -8.5 \text{ hours}
\]
Fatigue Prevalence and Associations with Non-diuretic Anti-hypertensive Medications in the Maintenance Hemodialysis Population

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Topic: Hemodialysis
Keyword(s): Fatigue, Hemodialysis, Blood Pressure

Background: It is well known that dialysis patients suffer from fatigue post dialysis. It is possible that fatigue is exacerbated by antihypertensive medications. We hypothesized that post-dialysis fatigue (PDF) was positively correlated with the number of antihypertensive medications.

Methods: We conducted cross sectional survey and 6-month retrospective medical record chart review at three privately owned dialysis clinics in Illinois. The survey consists of 50 questions related to fluid and blood pressure management, the validated Post-Dialysis Fatigue and Time to Recover from Dialysis Survey (PDFTIRSD), and the validated National Institute of Health Patient Reported Outcomes Measurement System (NIH PROMIS) fatigue short form. A random mixed effect model was created through a reverse stepwise or backwards elimination process to assess associations. Chi-squared analysis was performed with categorical symptom data.

Results: One hundred and two patients consented to the study, 96 had complete medical records with all research variables and survey values captured. The average number of dialysis sessions captured per patient was 50.0 +/- 19. The average time on maintenance hemodialysis was 5.06 +/- 4.93 years with a range of 0.2 to 28 years. Seventy six percent (73/96) of dialysis patients suffered from post-dialysis fatigue. Most patients 53/96 reported that their fatigue was the worst after dialysis. On average patients required 462.67 +/- 655.18 minutes (7.7 +/- 10.92 hours) to recover after dialysis. In our random mixed effect model, the time required to recover post-dialysis was positively correlated with the number of antihypertensive medications.

Conclusions: Post-dialysis fatigue is a pervasive problem in the dialysis population that has significant consequences on patients’ quality of life. While fatigue has several important contributing factors, the number of non-diuretic blood pressure medications appear to exacerbate patients’ fatigue. Further investigation on the survival and quality of life benefits, including fatigue, of patients maintained on antihypertensive medications versus volume control strategies is needed.

Severe Hypercalcemia in a Child on Peritoneal Dialysis

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Topic: Pediatric Nephrology
Keyword(s): Hypercalcemia, Peritoneal Dialysis

Background: Hypercalcemia is defined as a serum calcium greater than (&gt;): 10.6 mg/dL or an ionized calcium &gt;1.38mmol/L. It can present with symptoms such as muscle weakness, constipation, and altered mental status. Prolonged hypercalcemia can cause nephrolithiasis and can also result in a tubular concentrating defect and polyuria. Hypercalcemia has multiple etiologies including hyperparathyroidism, familial hypocalciuric hypercalcemia, immobilization, thyrotoxicosis, malignancy, hypervitaminosis A and D, and medications such as thiazide diuretics and lithium.

Methods: A 14-month-old, former 35-week gestational age, male on peritoneal dialysis (PD) with hypothyroidism and end-stage renal disease secondary to posterior urethral valves was noted to have hypercalcemia (serum calcium 17.6 mg/dL, ionized calcium 1.99mmol/L) at a routine clinic visit. He was achieving adequate dialysis with standard calcium dialysate bags, and his medications including vitamin B complex, calcitriol, and levothyroxine had no recent change in dosing. He had been started on growth hormone two weeks prior. His intact PTH was undetectable and his 25-OH and 1,25-(OH)2 vitamin D levels were normal. His TSH was 4.7mU/mL (normal range 0.67-5.97 mU/mL) with free T4 of 1.55ng/dL (0.93-1.45 ng/dL). His vitamin A level was significantly elevated at 175 mcg/dL (30-75 mcg/dL), and his PTHrP was negative. Physical examination revealed a palpable abdominal mass and an abdominal CT scan showed multiple conglomerate hepatic masses, confirmed later by biopsy as hepatoblastoma. He had a nuclear medicine scan that was negative for metastases. He received calcitonin, IV pamidronate and IV hydration with normal saline for his hypercalcemia. His PD treatment was also extended from 10 hours to 16 hours to improve clearance. Ten days later, his serum calcium level improved to 12.6 mg/dL (ionized Ca 1.4 mmol/L).

Conclusions: We report the case of a 14-month-old patient on PD who presented with severe hypercalcemia in the setting of multiple risk factors. His workup was ultimately negative except for a high vitamin A level. Hypervitaminosis A is an uncommon cause of hypercalcemia, though patients with impaired kidney function have been found to have elevated retinol levels without vitamin A supplementation. Hepatoblastoma, despite being a malignancy, is rarely associated with hypercalcemia. The pathways through which malignancy causes hypercalcemia, such as secretion of PTHrP and bone metastases were also not present. In patients with ESRD who present with hypercalcemia, multiple etiologies should be considered, including hypervitaminosis A.
Dent’s Disease
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Topic: Pediatric Nephrology
Keyword: Dent’s Disease, nephrocalcinosis, genetic, mutation
Background: Dent’s disease is a X-linked recessive genetic disorder involving mutations in a kidney-specific endosomal degradation cascade that manifests as a low molecular weight proteinuria, Fanconi syndrome and hypercalciuria leading to nephrolithiasis and nephrocalcinosis. Treating hypercalciuria with thiazide diuretics often leads to significant hypokalemia and/or hypovolemia. Many patients have significant decline in GFR leading to ESRD.

Methods: This patient began having UTIs and nephrolithiasis at the age of 5. Basic labs showed mild hypokalemia and a non-anion gap acidosis. Urine studies demonstrated hypercalciuria, hyperphosphaturia and proteinuria. Urine beta 2 microglobulin was elevated. Kidney US revealed nephrocalcinosis. As the disease progressed, patient developed a reduction in GFR and erythrocytosis. Attempts to treat hypercalciuria with thiazide diuretics lead to severe hypokalemia requiring hospitalization or significant hypovolemia and orthostasis when paired together with a K sparing diuretic. Patient tested negative for the 2 most common mutations namely CLCN5 and OCRL1. Approximately 10 years after initial presentation, the patient developed hypophosphatemia. This led to respiratory symptoms presumably from diaphragmatic paralysis requiring hospitalization. Patient is now on daily phosphorus repletion.

Conclusions: There are well established diagnostic criteria for Dent’s disease but there is also a broad range of other clinical manifestations. This patient, for example, had erythrocytosis presumably due to renal medullary hypoxia. He did not have aminoaciduria as part of a complete Fanconi syndrome. His hypophosphatemia presented later in his disease course. This patient was tested for urinary beta 2 microglobulin but the choice of which low molecular weight protein to test is lab specific. Others test for urinary retinol binding protein. Genetic testing did not reveal the cause of his syndrome as is the case in about 20% of patients suspected to have Dent’s disease. Although this patient never had a kidney biopsy, about 6% of patients with Dent’s disease have FSGS on pathology. Given the spectrum of clinical findings, prior authors have suggested considering Dent’s disease in patients found to have FSGS on biopsy especially if they have nephrocalcinosis on imaging. Many patients develop ESRD in mid-life. Transplant is considered curative because the affected genes code for proteins found almost exclusively in the kidneys.

White Colored Effluent in a 15-Year-Old Girl on Peritoneal Dialysis
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Topic: Peritoneal Dialysis
Keyword(s): Peritoneal dialysis, Turbidity
Background: Peritoneal dialysis effluent is normally transparent. A change in its clarity may be the first indication of an intra or extra peritoneal abnormality. The onset of cloudy dialysate fluid in a patient on peritoneal dialysis usually suggests infectious peritonitis. However, infection does not explain all cases of dialysate turbidity.

Methods: We report the case of a 15-year-old girl with a history of a failed kidney transplant on continuous cycling peritoneal dialysis for 1 year. She presented with asymptomatic milk like peritoneal dialysis effluent without pain or fever. On physical examination, the PD catheter exit-site was clean. There was no tenderness along the tunnel of the catheter and no erythema. An analysis of the peritoneal dialysate effluent one week prior to presentation showed no white blood cells. When the turbid effluent was analyzed, there were 30×10^6/L RBC and 37×10^6/L WBC, 86% of which were lymphocytes and 14% monocytes. Biochemical analysis was not done on the initial sample. She was loaded with intraperitoneal cefazolin and ceftazidime; the next morning the effluent was clear. Evaluation of the PD fluid the following day, after the effluent had cleared, showed a triglyceride content of 0.07 mmol/L, an LDH of 1 mmol/L, amylase <5 U/L, lipase 1 U/L, glucose 76.6 mmol/L, and protein 5g/L. The blood WBC was normal at 4.90×10^9/L and serum triglyceride level normal at 1.18 mmol/L. Abdominal ultrasound was normal, with no adenopathy. She was admitted to hospital and received intra peritoneal vancomycin and ceftazidime for 72 hours while awaiting the final culture results, which were negative.

Results: The differential diagnosis of cloudy PD effluent includes both infectious and non-infectious causes. Bacterial peritonitis is the most common cause of cloudy effluent. Therefore, it is recommended that patients presenting with cloudy PD effluent be treated with antibiotics until the diagnosis can be confirmed or excluded. Fungal peritonitis should also be considered. Non-infectious causes of cloudy PD effluent include leak of chyle into the peritoneal cavity, eosinophilic peritonitis, pancreatitis, Some drugs. Chyle leak into the peritoneum, characterized by high triglyceride in fluid (typically >2.26 mmol/L). In our case, the cause was thought most likely to be secondary to injury from the PD catheter. We presumed that the catheter ruptured a lymphatic vessel.

Conclusions: Milky effluent is a rare complication of PD, but it is important to be aware peritonitis is not the only etiology. It can be caused by injury from the PD catheter and several other causes. It is important to investigate all possibilities.
Time-course of Tissue Sodium Flux in Maintenance Hemodialysis Patients

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Topic: Hemodialysis
Keyword(s): Tissue sodium, Hemodialysis, Sodium-MRI

Background: Recent sodium magnetic resonance imaging (Na-MRI) studies show that sodium can be stored in tissues. Maintenance hemodialysis (MHD) patients have higher tissue sodium concentration ([Na+]t) than healthy individuals, yet tissue [Na+] can be partially reduced during hemodialysis (HD). This study sought to evaluate the magnitude of tissue [Na+] removed during HD and the time-course for its recalibration.

Methods: Seven MHD patients (57% male; 60±13 y; BMI: 36±10 kg/m2; average BFR: 406±67 mL/min; average DFR: 647±89 mL/min; spKt/V: 1.54±.32; UFR: 8.0±1.7 mL/kg/hr; thrice-weekly HD) had sequential Na-MRI scans (3T system) over 3 consecutive days, including 2 HD days and the non-HD day in between, at 4 time points: pre-first HD (T1), post-first HD (T2), 24 hours post-first HD (T3), and pre-second HD (T4). [Na+] of the medial (MG) and lateral (LG) gastrocnemius, soleus (Sol), tibialis anterior (TA), and the whole lower leg (WL, with and without skin) were quantified from MRI images. To account for changes in hydration status over time [Na+], the volume of total body water (TBW) was assessed by bioimpedance. Repeated measures ANOVA and its nonparametric equivalent were used to test the differences in tissue [Na+] over time.

Results: A significant time effect was found for the [Na+] in all tissue analyzed (all P<.01). Post-hoc comparison showed that tissue [Na+] reduced at the end of HD (T2) compared to baseline (T1) in the WL (with or without skin: both P=.006), MG (P=.043), LG (P=.006), Sol (P=.029), and TA (P=.006). For all tissues analyzed, tissue [Na+] at both T3 and T4 did not differ from baseline (all P>.05). These results were mostly consistent after adjusting for hydration status, despite the insignificance of the time effect on the [Na+] of TA (P=.074) and the T1-to-T2 difference in the [Na+] of MG (P=.08). These data indicate that tissue [Na+] deceased after HD but returned to the baseline within 24 hours after last HD.

Conclusions: We found that tissue [Na+] was immediately reduced by HD but returned to baseline levels within 24 hours and remained stable until next pre-HD. More studies are needed to determine the mechanisms for these shifts, and whether lifestyle or pharmaceutical interventions can inhibit tissue [Na+] deposition or enhance its removal.
Ultrafiltration Rate Limits Improve Hypertension in a Small Pediatric Hemodialysis Cohort

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Topic: Pediatric Nephrology
Keyword(s): Pediatric Nephrology, Hemodialysis, Ultrafiltration

Background: Previous studies in both adults and pediatrics have suggested multiple benefits to limiting ultrafiltration rates. These include reducing myocardial stunning, reducing interdialytic weight gain, and improving pre-dialysis systolic blood pressures and antihypertensive medication burden.

Methods: We implemented ultrafiltration limits of 13 mL/kg/h to three of our adolescent hemodialysis patients over the period of a year. We then assessed the percentage of dialysis treatments when pre-dialysis systolic blood pressure was below 90th percentile for height and age, percent fluid overload less than 4% pre-dialysis, percentage of post-dialysis weights within 0.5 kg of dry weight, and number of antihypertensive medications, and quality of life.

Results: One patient showed a 15% improvement in quality of life scores, while the other two had a 5% and 6% decrease. One patient showed improvement in percent of treatments with weight less than 4% above dry weight while the other two patients showed no change. All three patients showed improvement in the percentage of time pre-dialysis blood pressure was below 90th percentile for their height and age. All three patients had reductions in their antihypertensive regimens with two patients able to stop antihypertensive medication altogether.

Conclusions: Overall, our cohort would suggest that these limitations did provide benefit to our patients with improvement in their blood pressure and antihypertensive medication burden. This suggests improvement in their overall cardiovascular morbidity risk. Our data suggest improvement in the cardiovascular health and care of our patients with ultrafiltration limitations. Our data is however limited by a small number of analyzed dialysis treatments and a small patient population. More longitudinal studies are needed to show if these effects endure as many patients fluctuate with their medication and fluid restriction adherence.

Understanding Delays to Pediatric Kidney Transplant Wait-list Activation in Complex Cases: Providers and Family Members Weigh In

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Topic: Pediatric Nephrology
Keyword(s): Kidney allocation, kidney transplantation, socioeconomic disparities

Background: A goal of the Kidney Allocation System is to decrease the known disparities in access to kidney transplant for under-represented groups, yet racial disparities continue to persist in length of waiting time and access to preemptive kidney transplantation. Complex patients, particularly patients who are members of racial/ethnic communities who have socioeconomic disparities, developmental disabilities, mental health, or medical comorbidities can have the longest delays in waitlist activation (WA). While there is some guidance on addressing medical comorbidities and psychosocial assessment, a lack of robust and standardized tools may contribute to inequitable decision making in WA practices. Using a mixed methods study, we examined patient and clinician perspectives about factors influencing delays in WA. Our project assessed (i) how clinicians made WA decisions for patients in different complex situations and (ii) patient and clinician perceptions of delays in WA.

Methods: We conducted semi-structured phone interviews and surveys with 20 clinicians and 20 patients. Patients included peds 18-21yr and caregivers for peds 2-18yr seen in the last 2 years for transplant evaluation in 1 transplant center. Clinicians were nephrologists, surgeons, transplant coordinators and social workers from 17 different pediatric kidney transplant centers. Interviews were analyzed using thematic analysis.

Results: Preliminary analysis reveals 6 key factors in WA delays: Family instability; Changing expectations about WA; Concerns regarding failure of the first transplant; Mental readiness for transplant; Importance of trust between clinicians and peds; and Multidimensional concerns about organ scarcity. Interestingly clinicians admit to delaying WA over concerns of social instability, scrutinizing families because of the patients’ need for multiple organs in a lifetime. Patients and caregivers tend to agree with clinicians’ choices while expressing distress related to delays.

Conclusions: To avoid bias, greater consensus is needed about the kinds of factors and their influences on clinicians’ decision-making about WA for complex peds. Delays in complex peds cases are not unidimensional, related to non-adherence. Interventions to overcome these disparities for complex patients must target overlapping social factors and include a multidimensional discussion of organ scarcity.
Renal Replacement Therapy in an Adolescent with Hyperosmolar Hyperglycemic State

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**Topic:** Acute Kidney Injury

**Keyword(s):** Hyperosmolar hyperglycemic state, CVVH, AKI

**Background:** Hyperosmolar hyperglycemic state (HHS) is a life-threatening complication of diabetes mellitus. We present an adolescent with HHS, cerebral edema, and severe acute kidney injury (AKI), highlighting challenges of fluid and electrolyte management and renal replacement therapy (RRT) in HHS.

**Methods:** A 16-yr-old female presented with polyuria, polydipsia and altered mental status with Glasgow Coma Score 8. Initial labs notable for glucose 1808 mg/dL, Na 149mEq/L, HCO3 10 mEq/L, Cr 3.5mg/dL, anion gap 25, pH 7.1, serum osmolality (sOsm) 450mOsm/kg. Following HHS guidelines for fluid resuscitation and insulin therapy, sOsm fell from 450 to 350 mOsm/kg, and glucose fell to 300mg/dL in the first 24 hr. Declining mental status required intubation on hospital day (HD) 2 and computed tomography (CT) of the brain showed cerebral edema. Over several days AKI with oliguria and fluid overload worsened despite maximal diuretic therapy; peak BUN and Cr were 102mg/dL and 13.8mg/dL, Na 153mEq/L, sOsm 370mOsm/kg, with lab evidence of rhabdomyolysis (creatine phosphokinase 25K U/L). Continuous veno-venous hemofiltration (CVVH) was initiated on HD7, with custom replacement fluid using higher Na concentration of 150mEq/L. After improvement in sOsm, mental status and urine output, CVVH was stopped on HD9. She was extubated on HD10. Despite robust urine output, BUN and Cr continued to rise (peak 143mg/dL and 13 mg/dL); sOsm remained 350 mOsm/kg. To avoid dialysis disequilibrium CVVH was restarted on HD20, transitioned to CVVHDF until HD22. With this approach, Na normalized; BUN, Cr, and sOsm fell to 63mEq/L, 5.55mg/dL, and 321mOsm/kg. Renal function slowly improved with stable electrolytes. While neurocognitive testing will be needed to assess for lasting effects, mental status appears near baseline.

**Conclusions:** Children with HHS are at higher risk of cerebral edema than adults. Adept management of fluid, electrolytes and glucose is required to avoid overly rapid correction of hyperosmolality. Reports in adults with HHS describe both intermittent hemodialysis and CVVH as chosen RRT, but few pediatric reports exist. This patient developed cerebral edema and severe AKI likely secondary to profound dehydration and hyperosmolality. Despite similar levels of serum osmolality, the hyperosmolar state evolved from HHS to severe uremia. While these states may theoretically differ with respect to the formation and constituency of protective brain osmoles, each carries inherent risk of cerebral edema during correction, particularly when RRT is required.

Acute Peritoneal Dialysis: Are The Pros “Aging” And The Cons Growing?

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**Topic:** Peritoneal Dialysis

**Keyword(s):** Peritoneal dialysis, Renal Replacement Therapy, Acute Kidney Injury

**Background:** Acute kidney injury (AKI) is common in the pediatric intensive care unit (ICU). Peritoneal dialysis (PD) was the first modality of continuous renal replacement therapy (CRRT) for AKI in children, but continuous veno-venous hemofiltration (CVVH) and hemodialysis (HD) have become more routine even in young children. We describe a case of a 3-year-old with hyperlytic uremic syndrome (HUS) requiring RRT.

**Methods:** A 3-year-old previously well girl with 4-days of bloody diarrhea, abdominal pain and emesis was hypertensive to 110/70mmHg. Initial lab findings included creatinine 1.6mg/dL, Hb 7.6mg/dL and platelets 20K; rapid stool PCR assay was positive for E. Coli O157. In the ICU her renal function fell over several days to anuria. Without improvement during 72 hours of conservative management, PD was initiated. Evidence of severe colitis with possible ischemic patterns were visualized by fiber optics during catheter placement; initial therapy required “glue” to successfully stop leakage and allow increasing intensity. Fungal peritonitis 6 days into PD (despite antifungal prophylaxis) required catheter removal and change to HD via an internal jugular catheter. After nearly 4 weeks of complete hematologic but gradual renal improvement, the patient transitioned to outpatient care. No longer needing dialysis a month later, ongoing improvement in eGFR continues, though some degree of residual CKD is expected.

**Conclusions:** PD has historically been the modality of choice for chronic RRT in younger patients, particularly toddlers, with pros including continuous modality, less hemodynamic instability, no need for anticoagulation, lower cost, and less technological requirements. Despite this, its role in the acute setting has been reduced among centers, such as ours, with a full range of RRT options. Cons of acute PD include the potential for leakage and often, the potential need for a trip to the operating room versus bedside catheter placement. Despite the complications, we believe PD was an apt choice of RRT in this case, but that perception was not shared by all involved. Our experience leaves us to consider whether the field faces a progressive decline in experience in the subject by nephrologists and non-nephrologists alike in conjunction with increasing familiarity with the newer CRRT modalities. With lack of consensus and significant local variations in choice of RRT, we conjecture that QI and research into this topic is needed on an ongoing basis to define evolving best practices and to address perceived and real drawbacks of acute PD.
Abstracts

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Best abstract, 3rd Place
Predictors of Complications Associated with the Placement of a Percutaneous Tenckhoff Catheter by Nephrology Fellows at the Hospital General Regional 46

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Topic: Peritoneal Dialysis
Keyword(s): Catheter, Tenckhoff, Dialysis

Background: In Mexico, the increase in the incidence of Chronic Kidney Disease (CKD) and the need to offer renal support therapy, make the placement of the percutaneous Tenckhoff catheter an accessible option for most of our patients, given the benefits that confers peritoneal dialysis (PD) over hemodialysis (HD). That is why the development of skills to perform this procedure has become a necessity for the nephrologist.

Methods: Prospective, observational, single-center study. 301 patients undergoing percutaneous Tenckhoff catheter placement by Nephrology fellows were included during the period from July 2016 to July 2019, of which 80 (26.6%) were women and 221 (73.4%) were men. The median age was 45 years (QR 27 to 51 years) with a mean follow-up time of 19 months.

Results: During the investigation period, 71 (23.6%) complications occurred. The most frequent causes of dysfunction were mechanical, followed by leakage. Severe complications occurred in 9 (3%) patients (3 intestinal perforation and 6 hemoperitoneum). The median time in which complications appeared was 2 days (QR 0-4). Of the patients who presented some complication, 24 (8%) required removal and repositioning of the catheter, 7 (2.3%) required transfer to HD, and 39 (13%) were managed conservatively. The factors associated with complications were arterial hypertension (HTN) BP >140/90 mmHg (p = 0.017), the Body Mass Index (BMI) >25 kg/m2 (p = 0.003). In a multivariate analysis with logistic regression adjusted for age, gender, BMI, diabetes mellitus, HTN and previous surgeries, only HTN and BMI were statistically significant.

Conclusions: No laboratory parameters were found that were related to complications associated with the procedure. BMI and HTN were factors significantly related to adverse outcomes, catheter dysfunction was mainly due to mechanical failure and leakage of dialysis fluid.

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Temporary vs Permanent Hemodialysis Catheter Functionality in Low-resource Setting

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Topic: Hemodialysis
Keyword(s): Temporary, Permanent, Hemodialysis

Background: Vascular access (VA) is priority in hemodialysis (HD). Most of patients around the world start HD through a temporary catheter as VA. Extended use for a temporary catheter is not recommended and a permanent VA should be created in chronic HD patients. In our country, HD treatment must be paid by patients since there is no coverage for chronic kidney disease in the public health system. Majority of chronic HD patients are classified as low-economic resources and receive HD treatment trough a temporary catheter during prolonged time. The aim of this study was to analyze the functionality of long-term use temporary catheters (TC) compared to permanent catheters (PC).

Methods: A prospective, multicenter, cross sectional study was performed in 80 chronic HD patients in Morelia, Mexico.

Results: Eighty chronic HD patients were included (40 TC vs 40 PC), 61% male, mean age 44.1 ± 16.8 years. Hemodialysis vintage in TC group was 36.2 ± 31.1 months and 46.5 ± 42.3 months in PC group (p=0.22). The mean catheter vintage was 16.7 ± 1.93 months and 26.3 ± 2.5 months in TC and PC group respectively (p=0.062). The prescribed blood flow (PBF), effective blood flow (EBF), arterial line pressure (ALP) and venous line pressure (VLP) were measured at 60, 120 and 180 minutes during a conventional HD session.

Fig. 1. Arterial line pressure measurements at different time-points during a conventional HD. (Abstract [15]; Poster/Control Number: 26)
HD treatment and compared between groups. No differences in PBF, EBF, VLP were found at different time points between groups; while ALP was higher in PC group compared to TC group at 60 (-218.5 ± 39 vs -175 ± 44.7 mmHg, p<0.001), 120 (-220 ± 37.8 vs -180 ± 45.9 mmHg, p<0.001) and 180 minutes (-216.7 ± 38.4 vs -179.5 ± 30.1 mmHg, p<0.001) (Figure 1).

Conclusions: A very extended-time for TC use in our clinical low-resources setting were detected. We found worse functionality in PC group compared to long-term use TC group based on ALP measurements across a single conventional HD treatment. Comparison between groups in clinical and biochemical HD parameters would be the next step.

Nephrology, Hospital General Dr Miguel Silva, Morelia, MEXICO

Topic: Transplantation
Keyword(s): COVID-19, Kidney graft, biopsy
Background: A 47-year-old female, advanced chronic kidney disease secondary to urolithiasis. A deceased donor transplant was performed in 2011, without complications. During September 2020 she presented to the emergency room with fever, headache, chills and dry cough. Vital signs were BP 110/70 mmHg, HR: 90, RR: 22 arterial oxygen saturation 91% and a protocol for a patient with suspected COVID-19 was started. The radiograph shows abundant bilateral ground glass infiltrates. Inpatient biochemical results were, lactic dehydrogenase of 441 IU/L, ferritin 1855 ugr/l, D-dimer 0.72 ug/mL leukocytes of 11,700 total lymphocytes were 351, BUN 20.7 mg/dL, creatinine 1.1 mg/dl. Over a short period since admission, respiratory conditions changed. Finally, mechanical ventilation was prescribed. She suffered hemodynamic deterioration with a requirement for vasoactive amines. She had decreased urinary volumes, elevation of acute phase reactants. Finally, she died 3 days after mechanical ventilation prescription.

Methods: Kidney biopsy performed by nephrologist is the standard of care in our center, describing pathological changes in Covid-19 and kidney transplant.

Results: We found extensive subcortical necrosis, tubular necrosis with detachment of tubular cells, glomeruli with dilated capillary loops and coagulate necrosis, in addition to erythrocyte thrombi in glomerular capillaries and some loops with double contours, findings consistent with thrombotic microangiopathy. Figure 1. a, b, c.

Conclusions: To our knowledge, no histological findings of kidney graft have been reported in patients with COVID-19. The findings in our patient were consistent with thrombotic microangiopathy which has been poorly described in kidney biopsies of patients with covid-19. It is possible that our patient had an acute rejection associated with the suspension of immunosuppressant treatment or, failing that, it was a consequence of the thrombotic microangiopathy typical of coronavirus disease.

Fig. 1. Post-mortem kidney graft biopsy. a) A low magnification reveals extensive cortical necrosis (Hematoxylin and eosin, ×40). b) Tubular necrosis with detachment of tubular cells, presence of erythrocyte thrombi in peritubular capillaries (Methenamine silver ×100). c) Glomerular capillaries with erythrocytes segments and fibrin and presence of inflammatory infiltrates with areas of double contours (Methenamine silver ×200). (Abstract [16]; Poster/Control Number: 27)
**Coexisting Anti-GBM Glomerulonephritis and Membranous Glomerulonephritis with Different IgG Subclasses**

**A. Chiao**

University of Rochester, Rochester, NY

**Topic:** Acute Kidney Injury  
**Keyword(s):** Anti-GBM disease, acute renal failure, glomerulonephritis  

**Background:** Anti-GBM disease represents an infrequently diagnosed condition where circulating antibodies are directed against antigens to type IV collagen of the glomerular and alveolar basement membranes. The simultaneous presentation of anti-GBM glomerulonephritis and membranous glomerulonephritis remains rare but has been previously documented; however, immunofluorescence demonstrating different IgG subclasses associated with these two types of glomerular lesions appears to not have been previously described in the literature.

**Methods:** A 73-year-old female was evaluated due to acute renal failure with serum creatinine elevated at 3.68 mg/dL (with baseline creatinine at 1.02 mg/dL). She endorsed symptoms of rash, nausea, vomiting, and dizziness with physical examination significant for a diffuse faintly erythematous maculopapular rash as well as trace lower extremity edema. Her renal function worsened despite supportive measures, and examination of the urine sediment noted 50 red blood cells (<5% were dysmorphic), <5 white blood cells, 0-5 renal tubular epithelial cells, 0-3 pigmented granular casts, and no cellular casts. Studies to evaluate for potential glomerulonephritis were sent and noted elevated anti-GBM antibody levels. Renal biopsy findings showed necrotizing and crescentic glomerulonephritis with linear IgG1 fluorescence consistent with anti-GBM glomerulonephritis as well as membranous glomerulonephritis with IgG4 dominant immune deposits (with negative PLA2R staining). She received plasmapheresis treatments, high dose pulse intravenous steroids followed by a prednisone taper, and intravenous cyclophosphamide. She did not require hemodialysis during her hospital course, and her apheresis catheter was removed a month after hospital discharge. Her anti-GBM antibody titers decreased to normal levels, and she finished her taper of prednisone with her most recent serum creatinine improved at 1.60 mg/dL.

**Conclusions:** Coexisting anti-GBM disease and membranous glomerulonephritis remains rarely observed, but prior cases have been described (Troxell ML et. al. Clin Nephrol. 2006 Aug;66(2):120-7). Immunofluorescence findings showing different IgG subclasses associated with simultaneous anti-GBM disease and membranous glomerulonephritis have not previously been documented. Additional investigation could further understanding regarding prognosis and treatment for these infrequently seen presentations.

**Chronic Kidney Disease after Contrast Induced Nephropathy in Coronary Angiography Patients**

**R. Galindo, A. Avilés, M. A. Carmona, M. A. Sebastian**  
Nephrology, Pemex/UNAM, México City, Mexico

**Topic:** Chronic Kidney Disease  
**Keyword(s):** contrast, chronic kidney disease, acute kidney injury  

**Background:** Contrast Induced Acute Kidney Injury (CI-AKI) is a reversible AKI form presented 24 to 48 hours after iodine intravenous contrast use, from 1 to 6% in low-risk population, to 40-50% in those with high risk. It constitutes a risk factor for chronic kidney disease (CKD) in 26% of cases. The scores predict 30 days AKI risk, but there is limited information and lack of knowledge on progression to CKD in patients with previously preserved renal function. To determinate the number of patients who evolved to Chronic Kidney Disease after a Contrast Induced Acute Kidney Injury Event.

**Methods:** Observational and descriptive study of one center, at our institution in Mexico City over the period from June 1 to April 30, 2020. It included patients over 18 years old, with a basal serum creatinine treated with coronary angiography. Patients without at least one serum creatinine measured 3 months after exposure were excluded; additionally, patients with a recent AKI event or previous chronic kidney disease were not included in the study. Those patients with contrast induced nephropathy at 48 hours were registered. Subsequent serum creatinine was recorded. Glomerular filtration rate was estimated with CKD-EPI equation. Results were reported as mean or medians, interquartile ranges, U-Mann Whitney Test, and t test were used; p< 0.05 was considered statistically significant.

**Results:** After 1100 coronary angiography procedures, 194 patients presented Contrast Induced Nephropathy (17.6%), and 116 patients were followed. At three months from the AKI event, 18.1% developed Chronic Kidney Disease. Chronic Kidney Disease development was associated with contrast volume 171.87 ml (149.8 - 193.94 108.3) versus 151.9 ml (107.4 - 196.77 98.5) (p=0.03). At 6 and 12 months, most of the people with Chronic Kidney Disease after a Contrast Induced Acute Kidney Injury Event.

**Conclusions:** Chronic Kidney Disease development after Contrast Induced Nephropathy was associated with contrast volume use, many of those patients need a formal nephrological long term attention after the AKI event.
Urgent Onset of Peritoneal Dialysis in Patients Post Placement of a Percutaneous Tenckhoff Catheter by Nephrologists, Experience in a Center of Western Mexico


Nephrology, Hospital General Regional No 46 Instituto Mexicano del Seguro Social, Guadalajara, Mexico

Topic: Peritoneal Dialysis
Keyword(s): dialysis, urgent start

Introduction: In Mexico, the renal replacement therapy (RRT) mostly used as a treatment modality for end-stage renal disease (ESRD) is peritoneal dialysis (PD), which offers a wide range of advantages over hemodialysis (HD). The placement of the peritoneal access can be performed using different techniques and by different groups of specialists. Urgent-start PD refers to an approach that involves initiation of PD therapy earlier than 2 weeks after PD catheter insertion. The objective was to demonstrate that the urgent initiation of PD in patients after percutaneous Tenckhoff catheter placement by nephrologists, represents an effective alternative in RRT in patients with ESRD.

Methods: Prospective observational study. All patients treated with urgent onset of PD were included, defined as PD started within two weeks after catheter insertion, in the period from September 2016 to September 2019. The insertion of the PD catheter was performed percutaneously by nephrology residents. Dialysis was started during hospitalization with an average dose of 60 liters in rapid cycles of 1-1.5 liters.

Results: During the research period, percutaneous Tenckhoff catheters were placed in our center in 301 patients, of which 221 men (73.4%), who received urgent initiation of PD during the study. The follow-up was 19 months. Dialysis started in a median of 1 day (QR 0.6-2.0). The main indications were acidosis and uremic syndrome. The median hemoglobin was 8 g / dL (IQR 7-9.2), urea 214 mg / dl (QR 169-268), potassium 4.75 mmol / L (QR 4.2-5.3), pH 7.32 (QR 7.2-7.38) and HCO3 12.7 mEq / L (QR 9.4-165.5). Twenty-four patients (7.9%) developed mechanical complications and 23 patients had peri-catheter leak (7.6%); 24 patients required removal and reinsertion of the catheter and 7 (2.3%) patients required a change of modality to hemodialysis. Sixteen patients were treated conservatively.

Conclusion: The urgent initiation of PD was a viable and safe alternative for the initiation of renal support therapy in patients with ESRD, which was not associated with an increase in the number of complications.

Best abstract, 4th Place
A Comparative Study of Treatment Adherence Amongst In-center Hemodialysis Patients Based on Years on Dialysis and Demographic Factors

S. A. Varghese
Social Work, University of Central Florida, Orlando, FL

Topic: Hemodialysis
Keyword(s): Adherence, Hemodialysis, End-stage renal disease

Background: Adherence with renal replacement therapy is a significant factor for disease management in patients diagnosed with end-stage renal disease (ESRD). Shortening or missing dialysis treatments is directly associated with increased hospitalization and mortality rates among dialysis patients. The purpose of this study was to explore the differences in treatment adherence based on the number of years on dialysis and demographic factors such as age, annual income, living status and gender with the number of shortened dialysis treatments for 10 minutes or more and missed dialysis treatments amongst in-center hemodialysis patients.

Methods: This study used a quantitative and non-experimental descriptive research design to explore the differences in adherence. Data was collected from 412 in-center hemodialysis patients through patient surveys and from participant’s medical records.

Results: Dialysis patients who are 60 and older were found to be more adherent than those who are 18 to 59 with a statistically significant difference between the groups with a \( p \) value of 0.01 each for shortened and missed treatments. Patients whose annual income was above 200% of the federal poverty level were also found to be more adherent than the patients who reported less income, with a statistically significant difference between the groups with a \( p \) value of 0.01 each for shortened and missed treatments.

Conclusions: The results of this study highlighted the importance of interventions targeting specific populations of in-center hemodialysis dialysis patients in improving treatment adherence. Future studies may focus on addressing adherence by incorporating more adherence factors and with different modalities of treatments for ESRD.
To prove that resulting tissues in perfusion bioreactors and tubular endothelial and epithelial cells. We matured and tested absorption, or both. We seeded channel networks with glomerular scaffolds that recapitulated either glomerular filtration, tubular only by membrane. To emulate basic renal functions, we created removed the fugitive material to create channel systems separated embedded the resulting printed membrane in a hydrogel and terns of fugitive material on both sides of membranes. We able scaffolding system, we 3D printed mirrored branching pat- gelatin porogen mixture to a thickness of 5um. To build a perfus- 

Background: 

To generate biomimetic membranes, we deposited a gelatin porogen mixture to a thickness of 5um. To build a perfus- able scaffolding system, we 3D printed mirrored branching pat- terns of fugitive material on both sides of membranes. We embedded the resulting printed membrane in a hydrogel and removed the fugitive material to create channel systems separated only by membrane. To emulate basic renal functions, we created scaffolds that recapitulated either glomerular filtration, tubular absorption, or both. We seeded channel networks with glomerular and tubular endothelial and epithelial cells. We matured and tested the resulting tissues in perfusion bioreactors in vitro. To prove scalability, we created multilayer devices and implanted them in a large animal model.

Results: Scaffolds supported cell engraftment and barrier for- mation in vascular and epithelial channels, enabling filtration and reabsorption across the membrane. Acellular scaffold vascular perfusion at 30mmHg resulted in a flow rate of 5.82mL/min/cm2 (N=9), producing filtrate at 8.01µL/min/cm2 of membrane. Confluent glomerular grafts produced filtrate at a rate of 3.76µL/ min/cm2 (48h, N=3). At 1-week, mature tubular grafts retained 96.8% of Inulin-FITC in the tubular epithelium (N=3). At maturity, glucose was transported into the vascular channel at a 24-hour rate of 0.11mg/mL/cm2 (N=4). Implanted large-scale grafts anastomosed into heparinized porcine circulation produced filtrate for 20 minutes.

Conclusions: Biomimetic thin film scaffolds support forma- tion of perfusable 3D tissues and renal cell-based functions such as filtration and reabsorption in vitro. At scale, cellular constructs could enable fabrication of a fully biologic implantable renal replacement device.

Abstracts

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Methods: To generate biomimetic membranes, we deposited a gelatin porogen mixture to a thickness of 5um. To build a perfus- able scaffolding system, we 3D printed mirrored branching pat- terns of fugitive material on both sides of membranes. We embedded the resulting printed membrane in a hydrogel and removed the fugitive material to create channel systems separated only by membrane. To emulate basic renal functions, we created scaffolds that recapitulated either glomerular filtration, tubular absorption, or both. We seeded channel networks with glomerular and tubular endothelial and epithelial cells. We matured and tested the resulting tissues in perfusion bioreactors in vitro. To prove scalability, we created multilayer devices and implanted them in a large animal model.

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Conclusions: Biomimetic thin film scaffolds support forma- tion of perfusable 3D tissues and renal cell-based functions such as filtration and reabsorption in vitro. At scale, cellular constructs could enable fabrication of a fully biologic implantable renal replacement device.

Abstracts
A Case of Class IV Lupus Nephritis with Thrombotic Microangiopathy Treated with Success

N. Kulsum-Meccci
UICOMP, Peoria, IL

Topic: Glomerular and Tubulointerstitial Disorders
Keyword(s): Lupus, TMA, Glomerulonephritis
Background: Introduction: A 15-year-old female presented with low energy for several weeks with shortness of breath at rest. She noted outpatient clinic to have high blood pressure and weight gain and hypothyroidism. Labs in ED showed Low hemoglobin, thrombocytopenia with abnormal renal function. She was transferred to PICU. Noted to have hypertensive urgency with quick progression to oliguric renal failure in 24-48 hrs.

Methods: The patient has no significant past medical history. She was adopted from China. Her initial laboratory work showed very low complement level with evidence of schistocyte on a peripheral smear with profound thrombocytopenia. Primary diagnosis of microangiopathic hemolytic anemia (MAHA) with high LDH, undetectable Haptoglobin was made. Differential diagnosis of TTP, HUS and atypical HUS leading to rapidly progressive Glomerulonephritis was executed. A workup for ANCA, Anti GBM antibodies and Lupus was done. She developed posterior reversible encephalopathy syndrome (PRES). Patient was started on intermittent hemodialysis (IHD) and daily Therapeutic Plasma exchange (TPE). On day 1, pulse steroids were given. Blood work came positive for lupus. A renal biopsy showed Class IV crescentic proliferative lupus nephritis with renal thrombotic microangiopathy with full house pattern immune deposit. Pulse cyclophosphamide with Lupron (LHRH agonist) due to age of patient and increased risk for gonadal toxicity was considered. ADAMTS13 activity was normal. She was given vaccines for Pneumococcal, meningococcal and influenza prior to immunosuppression. Started on eculizumab (monoclonal antibody against complement C5). Deficiency of vitamin B 12 and homocysteinemia ruled out. Genetic work for aHUS showed no mutations. She needed 5 anti-hypertensive meds. Renal recovery noted in 3-4 weeks with increasing urine output with IHD needed until 3rd week and TPE by 4th week. Discharged to home on monthly cyclophosphamide infusion and every 2 weeks eculizumab. She completed 6 doses of cyclophosphamide and 9 months of eculizumab. Remains only on Mycophenolate Mofetil. Her nadir creatinine is 0.8.

Results: These are shown in the table.

Conclusions: This case highlights successful teamwork and timely management of our complicated patient with mild CKD stage 2 and well controlled hypertension.

Table 1. Laboratory results (Abstract [23]; Poster/Control Number: 34)

<table>
<thead>
<tr>
<th>Hematological</th>
<th>Immunological</th>
<th>Renal</th>
<th>Miscellaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hg 7.7 g/dl</td>
<td>C3 37</td>
<td>BUN 26 mg/dl</td>
<td>Vitamin B 12 WNL</td>
</tr>
<tr>
<td>Platelets 17 K</td>
<td>C4 &lt;4</td>
<td>Creatinine 1.26 mg/dl</td>
<td>Methylmalonic acid 0.16 low</td>
</tr>
<tr>
<td>1-2+ Schistocytes</td>
<td>ANA positive</td>
<td>Urine output&lt; 500 ml</td>
<td>Serum homocysteine was 13.3, slightly elevated</td>
</tr>
<tr>
<td>Haptoglobin &lt;8 g/dl</td>
<td>dsDNA &gt; 300 IU</td>
<td>BP&gt; 160/110 mm hg</td>
<td>aHUS showed mutation of unknown significant</td>
</tr>
<tr>
<td>LDH 1020</td>
<td>Antiphospholipid Neg</td>
<td>&gt; 20 lbs. weight gain</td>
<td>of heterozygous mutation of MMACHC</td>
</tr>
<tr>
<td>ADMATS13 &gt; 100%</td>
<td>ANCA Neg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: Hg, hemoglobin; C, complement; BUN, blood urea nitrogen; WNL, within normal limit; ANA, antinuclear antibody; ANCA, anti-neutrophil cytoplasmic antibodies; dsDNA, double stranded DNA; LDH, lactate dehydrogenase; BP, blood pressure; a-HUS, atypical-hemolytic uremic syndrome; ADMATS-13, a disintegrin and metalloproteinase known as von Willebrand factor; MMACHC, metabolism of cobalamin associated C gene.
Anemia Due to Mycophenolate Mofetil Toxicity in a Pediatric Patient with Lupus Nephritis and Atypical Hemolytic Uremic Syndrome on Hemodialysis

Y. Xie, B. Goilav, A. Zolotniskaya
Pediatric Nephrology, Children’s Hospital at Montefiore/Albert Einstein College of Medicine, Bronx, NY

**Topic:** Hemodialysis
**Keyword(s):** Mycophenolate mofetil, Anemia, ESRD

**Background:** Mycophenolate mofetil (MMF), a well-known bone marrow suppressant, is widely used for lupus nephritis. In patients with ESRD and underlying anemia, the toxicity of MMF must be considered. The aim of this abstract is to show importance of adjusting the dose of MMF in patients on maintenance hemodialysis (HD).

**Methods:** A 15-year-old AA male with SLE, lupus nephritis class IV, and ESRD secondary to SLE nephritis and atypical HUS with a homozygous deletion of CFHR3-CFHR1 has been receiving HD for three months. He initially presented with hemoglobin (Hb) 4 g/dl, AKI, and thrombocytopenia. HD was initiated for fluid overload. At the time of HD initiation, his 24-hour urine output was 600 ml. He was subsequently maintained on erythropoietin, IV iron, and Eculizumab with initial Hb improvement to 12.2g/dl. The results of his Hb, reticulocyte and mycophenolic acid (MPA) levels are shown in Tab.1. Over the next month Hb started to decrease. There was no significant weight loss, new onset rash, hair loss or joint pain.

**Results:** Physical exam was remarkable for pallor. Laboratory results were significant for high mycophenolic acid level and reticulocytopenia. Progress and outcome: After gradual reduction of MMF from 1gram BID to 250 mg BID, the patient’s anemia resolved. **Table 1.**

**Conclusions/Discussion:** In our patient, after ruling out recurrence of atypical HUS, lupus flare and iron deficiency, MMF toxicity is most likely etiology of anemia in the setting of normal WBC and platelet. Pure red cell aplasia has been reported in patients receiving MMF. Dose reduction of MMF usually reverses pure red cell aplasia. It is important to adjust the dose of MMF for ESRD patient on HD because most (87%) of MMF is excreted in the urine as mycophenolic acid glucuronide and minimally by HD. In our patient, trough MPA levels declined with the reduction of MMF dose, and his anemia was gradually corrected. Although MPA levels remained elevated, we did not attempt to further decrease MMF dose due to a concern for a lupus flare. This clinical case highlighted the importance of MMF dose adjustment for patients on HD who continues to receive MMF.

**Table 1.** Labs and Mycophenolate mofetil dose (Abstract [25]; Poster/Control Number: 36)

<table>
<thead>
<tr>
<th>Laboratory Date</th>
<th>06/2020</th>
<th>07/2020</th>
<th>08/2020</th>
<th>09/2020</th>
<th>10/2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb [10-12g/dl]</td>
<td>12.2</td>
<td>10.5</td>
<td>9.4</td>
<td>7.9</td>
<td>11.7</td>
</tr>
<tr>
<td>Reticulocyte [0.8-2.2%]</td>
<td>1.4</td>
<td><strong>0.3</strong></td>
<td>1.1</td>
<td>2.1</td>
<td>3.8</td>
</tr>
<tr>
<td>MPA level [1.0-3.5mcg/ml]</td>
<td>1.5</td>
<td><strong>12.4</strong></td>
<td>9.8</td>
<td>8.6</td>
<td>5.1</td>
</tr>
<tr>
<td>MMF dosage 1g BID</td>
<td><strong>0.5g BID</strong></td>
<td>0.5g daily, 0.25g nightly</td>
<td>0.25g BID</td>
<td>0.25g BID</td>
<td>0.25g BID</td>
</tr>
</tbody>
</table>

Abbreviations: Hb, hemoglobin; MPA, mycophenolic acid; MMF, Mycophenolate mofetil; BID, twice a day.
carriers of ALG8 mutations, 9 patients had an International Classification of Diseases (ICD) diagnosis code for cyst of kidney, acquired, 1 patient had an ICD diagnosis code for cystic kidney disease, unspecified, though no patients had an ICD diagnosis code for ADPKD or PLD, and no patient had end-stage kidney disease (ESKD).

Discussion: While mutations in PKD1, PKD2 genes encoding polycystin-1 and 2, respectively, cause the vast majority of ADPKD, heterozygous mutations in several genes involved in protein biogenesis pathway in the ER (e.g., ALG8, ALG9, GANAB, PKHD1, PRKCSH, SEC61B, SEC63) have been implicated in the spectrum of PKD and PLD. This variant has only been described in isolated PLD. While further research is needed on carriers of ALG8 mutations and other atypical ADPKD genes, these mutations are usually associated with a milder kidney phenotype than PKD1 or PKD2. This case also demonstrates the potential benefits of genetic testing, which enabled us to feel confident that his risk of progression to ESKD is likely low. Further studies are needed to determine how to incorporate findings of atypical ADPKD gene mutations into decision-making for future therapies to slow the progression of ADPKD.

Conclusion: We report a predicted loss of function mutation [c.1090C>T (p.Arg364Ter)] in a patient with ADPKD along with 76 carriers in a research cohort. The mutation appears to cause kidney and liver cysts though none of the 77 patients have progressed to ESKD.

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Dialytic Management of Life-threatening Toxic Ingestions
J. Moran
Nephrology, Baylor Scott & White, Temple, TX

Topic: Hemodialysis
Keyword(s): ethylene glycol, dialysis, lactic acidosis

Background: Ethylene glycol remains a common source of toxic ingestions in the United States. Its availability as a common household item likely contributes to the frequency with which it presents as an ingestion. Ethylene glycol toxicity is one of the most frequent indications for RRT in toxic ingestions in the US. Although there is data to support use of fomepizole and supportive care as primary management, in patients with acute kidney injury, electrolyte abnormalities, and refractory acidosis, RRT remains the mainstay of intervention.

Methods: 69-year-old male with past medical history significant for DM (on metformin), CAD, and depression presented to ED. He was unresponsive, hypothermic (core temp 95.5 F), hypertensive (89/50 mmHg) and acidic with venous pH 7.05. Lactic acid (LA) was initially elevated at 3.2 mmol/L and peaked at 13.6 mmol/L within 12 hours of presentation. Initial anion gap was 29, measured serum osmolality was 307, calculated was 285, with a gap of 22. Prolonged intermittent hemodialysis with F180 dialyzer (Qb 300, Qd 500 x 21 hours) was initiated due to concern for toxic ingestion (elevated osmolar gap) with concomitant intentional medication overdose (metformin and beta-blocker) and need for management of marked metabolic acidosis. Ethylene glycol measured prior to initiation of RRT resulted with level at 43 mg/ dl. During initial ICU care, patient developed severe bradycardia with resultant hypotension. A temporary transvenous pacemaker was placed with subsequent improvement in hemodynamics. AV node dysfunction resolved following several hours of dialysis, suggesting beta blocker toxicity. Post-treatment ethylene glycol levels were undetectable and lactic acidosis had significantly improved (post-treatment LA 2.2 mmol/L). Patient experienced acute kidney injury associated with hypotension, cardiogenic shock, severe lactic acidosis, and ethylene glycol toxicity. He required KRT for three weeks, ultimately recovering renal function, with return of serum creatinine to near baseline several months following his acute kidney injury.

Conclusions: In this patient, with clear evidence of ethylene glycol ingestion, and potential for concomitant intentional overdose of home medications including metformin with resulting life-threatening lactic acidosis, and suspected beta-blocker toxicity, initiation of RRT was critical to his survival.
patients were women (56%), and 11 were men (44%). At this time, the baseline measurement of all patients is available, the average weight being 34.1 kg, the lowest weight is 21 kg belonging to a 10-year-old patient, and two weights of 49 kg, belonging to 18-year-old patients. The average age is 14 years, with the smallest patient being 8 years old and the oldest patient being 18 years old. Regarding the phase angle, showed an average of 4.1, indicating that our patients were in malnutrition, since it is below 5. The lowest value being 3.9 and the highest 6.2. To evaluate the quality of life of the patient, a questionnaire has been used, which quantifies quality of life from 1 to 100, and whose average result was 73.92. The intake of vegetable proteins was increased to improve nutrition and a half-hour trans hemodialysis exercise plan was initiated.

Conclusions: Post intervention evaluations will be completed in the coming months.

Results: Thirty spent PD dialysate samples were collected from 11 COVID-19 positive patients from 10 dialysis centers. Each patient provided one to five samples at different time points. A total of 33 spent PD dialysate samples from 21 PD patients were collected as negative control. Our results showed that among 11 COVID-19 patients, only 7 patients had SARS-CoV-2 antibodies present in their spent dialysate. Among these 7 patients, 4 patients showed rapid decline of antibody level within first 3 months of infection.

Discussion: This is the first study reporting SARS-CoV-2 antibodies in spent PD dialysate. Four out of 11 PD patients with COVID-19 did not show SARS-CoV-2 antibodies in spent PD dialysate within 3 months of infection. It will be important to better understand the clinical correlates of these findings. Measurement of SARS-CoV-2 antibodies in spent PD dialysate potentially provides a new way to perform frequent serology tests for this high-risk group.

Acknowledgement
Apreciation to all Abstracts contributing authors who submitted their work to be presented at the 23rd International Conference on Dialysis, Advance in Kidney Disease 2021.

Statement of Ethics
The abstract submission is made on behalf of the authors who have been approved for abstract publication on the BPU special edition for the 2021 RRI Conference. Research Abstracts for the RRI Conference on Dialysis are expected to comply with the guidelines for human studies and conducted ethically in accordance with the World Medical Association Declaration of Helsinki.

Conflict of Interest
None to declare

Funding Sources
None

Author Contributions
The contribution of each author/abstract is noted

Corresponding author: highlighted in bold

Submission Statement
Attached

References:
None

Detection of SARS-CoV-2 Antibody in Spent Dialysate from Chronic Peritoneal Dialysis Patients with COVID-19
Xiaoling Wang, Amrish Patel, Xin Wang, Lela Tisdale, Zain Haq, Xiaoling Ye, Rachel Lasky, Priscila Preciado, Xia Tao, Gabriela Ferreira Dias, Joshua E. Chao, Mohamad Hakim, Maggie Han, Ohnmar Thwin, Jochen Raimann, Dinesh Chatoth, Peter Kotanko, Nadja Grobe
Renal Research Institute, New York, NY

Topic: Peritoneal dialysis
Keyword(s): SARS-CoV-2 antibody, chronic kidney disease, peritoneal dialysate

Background: To date, more than 55 million people worldwide have been infected by the coronavirus COVID-19, and over 1.3 million have died. Chronic kidney disease patients are particularly vulnerable as they are immunocompromised, rendering them at high risks of infection and impaired response to vaccines.

Since early 2020, Covid-19 serology test has been widely used for COVID diagnosis because it can provide infection and immune response information. Currently, most of serology tests are done using blood, plasma, or serum samples. We explore the feasibility of serology tests with spent dialysate from chronic peritoneal dialysis (PD) patients.

Methods: Spent PD dialysate samples from PD patients with and without COVID-19 were collected between March and September 2020. All samples were stored in -80°C. Serology tests for SARS-CoV-2 total antibodies were conducted with enzyme-linked immunosorbent assay (ELISA) against recombinant full-length SARS-CoV-2 nucleoprotein (N) and spike (S) proteins. The antibody titer of COVID-19 positive patient was calculated as a relative value to the mean of antibody levels of COVID-19 negative patients.