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A Case Report: Acute Phosphate Nephropathy

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Case Study: Acute phosphate nephropathy (APN) is caused by the deposition of calcium phosphate crystals in tubular epithelial cells, causing reactive oxygen damage, resulting in tubular atrophy and interstitial fibrosis with loss of kidney function. We report a case of APN secondary to excessive dietary phosphate.
A 38-year-old male had five day history of epigastric pain. One day prior, he had decreased urine output. Patient has DM, history of alcoholic hepatitis and chronic pancreatitis. No intake of herbal supplements.
Examination revealed signs of volume overload. He had elevated creatinine (12.85mg/dL), potassium (6.7mmol/L), uric acid (8.3mg/dL) and phosphorus (11.2mg/dL); and low calcium (corrected 7.16mg/dL). Negative ANCA, FANA, and ASO; normal C3 and C4. His eGFR was 50.8 ml/min/1.73m^2 3 months prior. Kidneys were normal-sized, with increased cortical echogenecity. No focal lesions or signs of obstruction noted. Patient underwent emergency hemodialysis.
Kidney biopsy revealed normal to mildly enlarged glomeruli; marked focal atrophy, tubular cell injury with transparent crystal casts positive for Von Kossa staining, suggesting APN. There was marked focal interstitial fibrosis and focal infiltration of mononuclear cells and few eosinophils; and fibrointimal thickening of blood vessels.
Patient ate meatball pasta and carbonara for nine days prior to admission. Each meatball pasta serving contained 100gm mozzarella and cheddar cheese, while each carbonara serving had 100gm mozzarella and 125gm camembert cheese. Cheddar cheese has 936mg phosphorus/100gm, mozzarella has 656mg/100gm, and camembert has 347mg/100gm. Pasta has 58gm /100gm. Patient consumed more than twice the recommended phosphorous intake. His calcium-phosphate product, indicator of calcium phosphate precipitation risk, was 80 mg^2/dL$^{2.}$. Our patient also had risk factors for APN including DM, liver and renal impairment.
Our patient did not recover renal function and is now hemodialysis-dependent. Timely recognition of APN is imperative so that measures can be instituted to prevent progression to ESRD, including education on proper diet.

Figure 1. Hematoxylin and eosin stain.

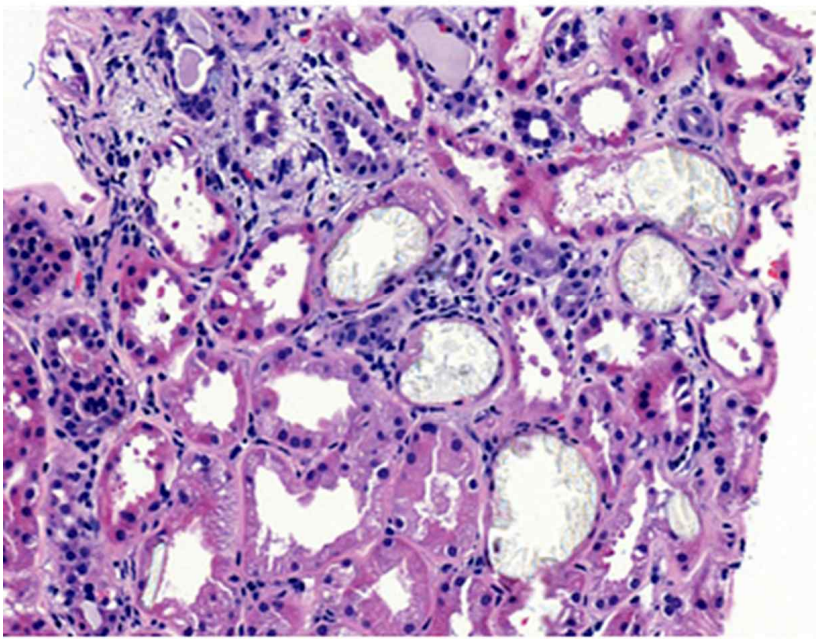

Figure 2. Von Kossa stain.