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Erratum

1822 Correction

 eJournal club provides a timely and interactive electronic journal club experience by offering a forum in which CJASN readers have the opportunity to converse with the featured study authors. Visit ejc.cjasn.org to learn more.

On the Cover

What's the diagnosis? A 65-year-old woman with a history of hypertension, CAD, left renal artery stenosis, GERD, autoimmune hepatitis, and hypothyroidism developed acute kidney injury following unremarkable transvaginal hysterectomy, bilateral oophorectomy and pelvic floor reconstruction. Oliguria and rising serum creatinine developed 48 hours in the post-operative course and continued despite intravenous fluids. Exam was notable for basilar lung crackles, no rash or edema was present. Non-contrast CT scan revealed mild pelvocaliectasis and moderate left kidney atrophy. Ureteroscopy excluded obstruction and kidney function continued to decline with serum creatinine increasing to 4.6 mg/dl (baseline 0.9 mg/dl). Urine microscopy revealed numerous WBCs, RBCs, waxy casts, and both WBC and renal tubular epithelial cell casts. Laboratory data revealed increased LDH (673 U/L), and depressed haptoglobin (<10 mg/dl) and serum complement (C3 58 mg/dl and C4 <10 mg/dl). Urine spot protein:creatinine ratio was 13.1. CBC revealed anemia and thrombocytopenia, but no schistocytes or spherocytes on peripheral blood smear. Kidney biopsy was performed. In the left upper panel, light microscopy reveals a glomerulus with intracapillary thrombi and segmental capillary hypercellularity with necrosis. The right upper panel demonstrates positive IgM staining of the intracapillary thrombi and of the deposits along the subendothelial space by immunohistochemistry. The left lower panel reveals large intracapillary thrombi and subendothelial deposits by electron microscopy. The right lower panel shows higher magnification of one of the intracapillary thrombi showing its organized substructure. These findings are consistent with cryoglobulinemic glomerulonephritis. Work-up revealed type-1 cryoglobulinemia with monoclonal IgM kappa.

Cryoglobulins are immunoglobulins that precipitate in the cold. Cryoglobulinemia consists of 3 types based on the immunoglobulin (Ig) components. Type I is comprised of a single monoclonal Ig, type II with a polyclonal and monoclonal Ig, and type III with 2 polyclonal Ig. Type I is primarily seen in monoclonal diseases like multiple myeloma or Waldenstrom's macroglobulinemia, type II is caused by viral infections, with hepatitis C the most common, and type III is often associated with chronic inflammatory and autoimmune diseases. Renal manifestations include hematuria with low-grade or nephrotic range proteinuria, acute or chronic kidney injury, and hypertension. Other manifestations include purpura, arthralgias/arthritis, and peripheral neuropathy. Kidney biopsy may show a membranoproliferative pattern. However, as seen in our case, intraluminal thrombi composed of precipitated cryoglobulins, IgM positivity in thrombi and deposits, and "curvilinear" substructure of deposits and thrombi seen by electron microscopy are the diagnostic hallmark of lesions of cryoglobulinemic GN. We believe that hypothermia associated with the operative procedure initiated the cold-induced cryoglobulin precipitation and chain of events. (Images and text provided by Gilbert Moeckel, MD and Mark A. Perazella, MD, Yale University School of Medicine, New Haven, CT)