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ADRENAL HEMORRHAGE OCCURRING AFTER CATHFLOW (ALTEPLASE) USE

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CASE PRESENTATION

A 44-year-old diabetic man on hemodialysis presented with a one-day history of acute left flank pain that radiated to his anterior abdomen. Two months previously, he was diagnosed with renal failure and a vascular catheter was placed in the right internal jugular vein. At the time of dialysis, one day prior to admission, his vascular catheter was noted to have no flow, concerning for thrombosis. 0.9 cc of Cathflow (alteplase) was subsequently instilled into the catheter without return of flow. Several hours later, he underwent a fistulogram, which demonstrated that vascular flow had been restored and the catheter was patent. The next day while showering, he developed sudden, severe left flank pain and came to the emergency department. He denied fevers, chills, night sweats, recent infections and trauma. Other than 81 mg of aspirin daily and the administration of alteplase into the venous catheter, he reported no anticoagulant or anti-platelet agent use. Physical exam was significant for left-sided costovertebral angle tenderness, as well as epigastric and left upper quadrant tenderness. A CT scan of the abdomen and pelvis showed findings consistent with a left adrenal hemorrhage.

The patient was hospitalized and remained afebrile and normotensive. Sodium, potassium, cortisol, aldosterone, and renin values were normal. A cosyntropin stimulation test was also normal. He was discharged from the hospital. At the time of a clinic visit two weeks later his pain had resolved.

ADRENAL HEMORRHAGE

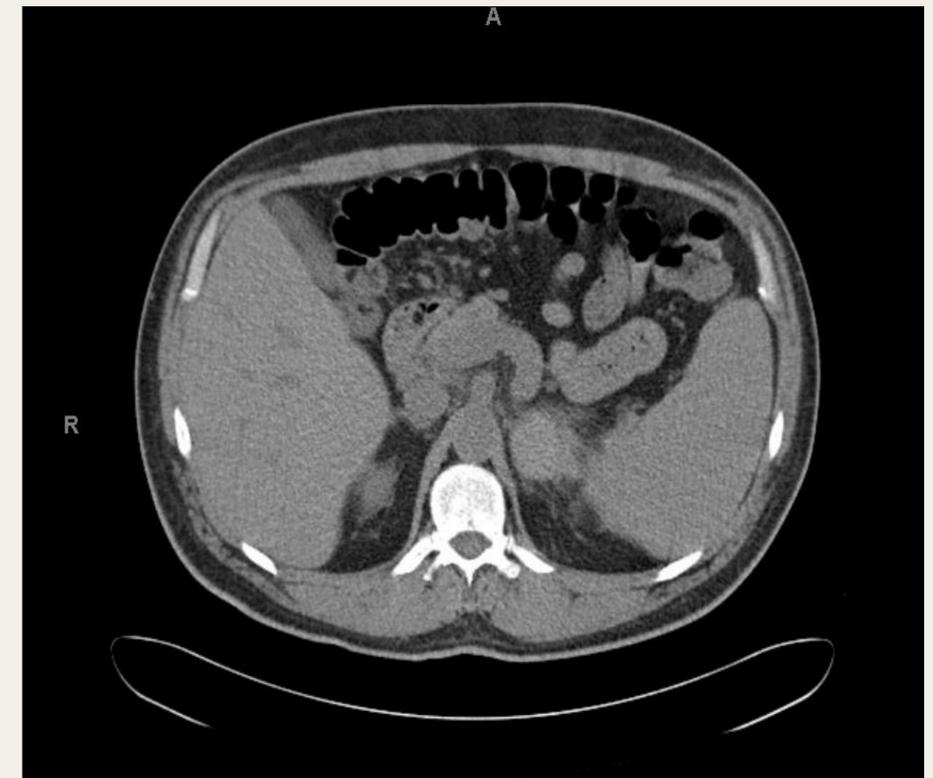
Background: Adrenal hemorrhage is an extremely rare condition that is typically unilateral in location and may occur secondary to blunt abdominal trauma, anticoagulation, coagulopathy, underlying tumor, or sepsis. In rare cases, it may be of idiopathic origin. Prior to the widespread use of cross-sectional imaging, adrenal hemorrhage was most commonly identified on autopsy. However, non-traumatic adrenal hemorrhage is now often discovered incidentally upon imaging workup for other medical conditions.

Pathophysiology: A unique vascular supply makes the adrenal glands vulnerable to hemorrhage. 50-60 small arterial branches of the suprarenal arteries supply each adrenal gland. These arteries feed into a subcapsular plexus located in the adrenal cortex before draining into the medullary sinusoids via venous channels. However, there is a disproportionate number of venous channels compared to sinusoids and a physiologic "vascular dam" is created. Additional venous drainage of each adrenal gland is provided by a single central vein. This vein is composed of thick muscle bundles that have the propensity to create further resistance to blood flow. If venous drainage is impaired by an increase in adrenal venous pressure or arterial perfusion, hemorrhage into the gland may result. Additionally, reperfusion injury following hypotension and anticoagulation use potentiates bleeding.

Clinical Presentation: Patients often present with vague, nonspecific symptoms including abdominal pain, flank pain, nausea, vomiting, hypotension, hypertension, a palpable flank mass, agitation, mental status change, and low grade fever. Laboratory studies may indicate decreased hematocrit, leukocytosis, and electrolyte abnormalities. Although more common with bilateral hemorrhage, adrenal insufficiency may occur when 90% of the adrenal cortex is destroyed. In this condition, patients may present with hyponatremia, hyperkalemia, hypoglycemia, azotemia and a variable degree of acidosis.

Diagnosis: Initial workup of a patient with adrenal hemorrhage in the acute setting should include plasma sodium, potassium, bicarbonate, and cortisol measurements. A cosyntropin stimulation test may also be indicated to assess for adrenal insufficiency. CT of the abdomen and pelvis is the most common imaging modality obtained in cases of adrenal hemorrhage and may show a round or oval mass in the location of the adrenal gland with periadrenal stranding. MRI may also be useful to identify adrenal hemorrhage as it produces a typical isointense or hypointense signal on T1-weighted images and markedly hypointense signal on T2-weighted images.

Treatment and Prognosis: Most cases of adrenal hemorrhage are unilateral and carry a benign course. If the patient is clinically stable, the patient should be managed nonoperatively. Nonoperative management of the patient includes supportive care, serial hematocrit measurements, and blood transfusions as indicated. Careful evaluation of adrenal function is imperative to evaluate for adrenal insufficiency. Follow-up imaging to assess for evolution of the hemorrhage is also indicated. If unstable, patients may require surgical resection or repair depending on the extent of injury, the viability or residual tissue, and status of the contralateral adrenal gland.



Sagittal CT view of the left adrenal hemorrhage



Coronal CT view of the left adrenal hemorrhage

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TEACHING POINTS

1. Unilateral adrenal hemorrhage is a rare condition that may occur secondary to blunt abdominal trauma, underlying tumors, or anticoagulation.
2. The clinical presentation of patients with adrenal hemorrhage is frequently vague, and imaging for another medical condition often incidentally identifies the condition.
3. Anticoagulation such as alteplase potentiates the risk for bleeding. According to the manufacturer's package insert, when alteplase is administered for restoration of function of central venous access devices, circulating plasma levels of alteplase are not usually expected to reach pharmacologic concentrations. However, patients with renal failure are at higher risk for bleeding

CONCLUSIONS

This case illustrates a rare cause of unilateral adrenal hemorrhage. Given the timing of alteplase administration and the onset of symptoms in our patient, it is suggestive that alteplase may have contributed to his adrenal hemorrhage. We report this case to alert others to the possibility of alteplase-induced adrenal hemorrhage.