

## Fall

A 52-year-old man presented to the ED with complaints of left shoulder and left chest pain following a bicycle accident. The patient stated he had fallen from his bicycle and landed on his left side after he turned sharply to miss a speeding car. He denied head injury, loss of consciousness, or neck pain. The patient was ambulatory after the fall and had driven himself to the ED, and complained primarily of the left shoulder and left chest pain. He described the chest pain as sharp, worsening with movement and deep inspiration. The pain also was associated with mild shortness of breath. The patient denied headache, nausea, vomiting, abdominal pain, or back pain. He was otherwise in good health and on no medications.

The patient's vital signs on presentation were normal

murmurs, rubs, or gallops. The abdomen was soft and nontender, without guarding or rebound. The pelvis was stable, and the patient moved all four extremities with good strength. However, he did exhibit pain with movement of his left shoulder. Peripheral pulses were 2+ and symmetrical.

The emergency physician (EP) ordered an X-ray of the chest and left shoulder, as well as urinalysis. The X-rays revealed a small left pneumothorax, a minimally displaced left clavicular fracture, and fractures of the left fourth and fifth ribs. The urinalysis results were normal. The patient was administered intravenous (IV) morphine for pain and placed on 2 L/minute oxygen via nasal cannula, with 100% oxygen saturation on pulse oximetry.

The EP consulted a pulmonologist regarding management of the pneumothorax, who recommended a 4-hour observation period in the ED, followed by a repeat chest X-ray. During the observation period, the patient remained on oxygen and continued to deny any new complaints, including headache, dizziness, or abdominal pain. His vital signs remained normal throughout the entire observation period.

While in radiology services for a repeat chest X-ray, the patient fainted and struck his head on the floor. The EP immediately ordered a noncontrast computed tomography scan of the head, which demonstrated a large intracranial bleed. The patient was taken immediately to the operating room by neurosurgery. His recovery was uneventful, and he was discharged home without obvious sequelae.

The patient sued the EP and hospital for negligent care, claiming the EP underestimated the patient's injuries and that additional testing was warranted. The defendants argued the patient was properly evaluated based on the history and physical examination. A defense verdict was returned.

## Discussion

Though this is an unfortunate case, it is not one due to any negligence. There was absolutely no indication



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and his head was atraumatic. He exhibited no midline posterior cervical tenderness to palpation. The head, eyes, ears, nose, and throat (HEENT) and mouth examinations were unremarkable. The patient did have tenderness to palpation over the left clavicle and left anterior chest; there was no crepitus or subcutaneous emphysema appreciated. Breath sounds were normal, and the heart had a regular rate and rhythm without

that this patient was going to experience a syn-copal episode. The patient did not experience any head injury, had no evidence of external head trauma, and consistently denied headache, dizziness, or lightheadedness. He had remained completely stable for approximately 5 hours in the ED. While the patient had some real injuries from the bicycle accident, there was no reason to suspect that he was at risk for a fall.

One possible criticism of this case is the consulting of a pulmonologist for the traumatic pneumothorax rather than a trauma surgeon or general surgeon. It is unclear if these specialists were not available for consult. Nevertheless, the pulmonologist's advice to the EP was reasonable. Until just recently, it was dogma that all traumatic pneumothoraces required tube thoracostomy for management. This is still true for tension pneumothorax, hemothorax, moderate-to-large pneumothorax, symptomatic pneumothorax, or if mechanical ventilation is anticipated or needed.<sup>1</sup> For small pneumothoraces, several management options exist, including close observation, needle or catheter aspiration, or placement of a pig-tail catheter—in addition to the placement of a small (ie, 10-14 French) thoracostomy tube.<sup>2</sup>

Regardless, it does not appear the pneumothorax played a role in the patient's hospital fall. More likely, the patient experienced a vasovagal episode. Interestingly, he never required treatment for the pneumothorax, despite requiring mechanical ventilation.

## References

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## A Tragic Complication of Hemodialysis

**A** 58-year-old man presented to the ED with the chief complaint of bleeding from his dialysis fistula. The patient had end-stage renal disease and had been on hemodialysis (HD) for the past 3 years. He had an arteriovenous fistula (AVF) in his left arm for dialysis access, and



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received HD 3 days per week—every Tuesday, Thursday, and Saturday. He had completed a scheduled run of dialysis 5 hours prior to presentation, but had continued to bleed intermittently from the AVF site. The patient stated he had applied pressure multiple times to the site, but was unsuccessful in stopping the bleeding. His medical history was significant for hypertension and coronary artery disease. Regarding his social history, the patient admitted to smoking one pack of cigarettes per day and consuming alcohol on a regular basis.

The patient's vital signs at presentation were: heart rate, 98 beats/minute; blood pressure, 146/85 mm Hg; respiratory rate, 20 breaths/minute; and temperature, 98.6°F. Oxygen saturation was 96% on room air. The HEENT examination was unremarkable. Examination of the heart revealed a normal rate and regular rhythm with a grade of 1/6 systolic murmur, heard best at the left sternal border. The breath sounds were equal bilaterally and clear to auscultation; the abdominal examination was unremarkable. The patient had an AVF in his left forearm that was not actively bleeding. There was a palpable thrill and a bruit present on auscultation over the site; there was no increased warmth or drainage.

The EP ordered a complete blood count (CBC) on the patient. The hemoglobin and hematocrit levels were essentially unchanged from a previous CBC 1 month prior, and the platelet count was normal. After approximately 1 hour of observation in the ED, there was no rebleeding at the site, and the patient was discharged home.

Unfortunately, the bleeding resumed the following day. The patient went into cardiac arrest and died at home prior to arrival of emergency medical services.

The patient's family sued the EP and hospital for discharging the patient home without first obtaining a surgical consult. The EP and hospital settled the case with the family for \$2 million.

### Discussion

Emergency physicians frequently see and manage patients with complications associated with HD, such as missed dialysis, fluid overload, clotted or thrombosed AVFs or grafts, access-site infection, and vascular access hemorrhage. Several studies have demonstrated that approximately 30% of hospitalizations involving patients on HD are related to the construction or complications of vascular access.<sup>1</sup> Although bleeding is not encountered nearly as often as thrombosis, the complications of hemorrhage can be much more devastating and life-threatening. Bleeding can occur not only from the vascular access site, but can also present as epistaxis, gingival bleeding, gastrointestinal bleeding, hemoptysis, and even subdural hematoma. The incidence of bleeding complications in HD patients has been described as high as 24%.<sup>2</sup> One of the reasons HD patients are at greater risk for bleeding is the transient thrombocytopenia (from anticoagulation during dialysis), and the well-described platelet dysfunction observed in these patients. In addition to the above, vascular access sites can bleed due to aneurysm, pseudoaneurysm, or anastomosis rupture.

Many patients who present to the ED with bleeding from the vascular access site can be managed simply with direct pressure, typically for a minimum of 5 to 10 minutes. In more severe cases, the EP can apply direct pressure with an absorbable gelatin sponge (eg, Gelfoam). If the patient presents soon after comple-

tion of dialysis, the EP should consider heparin anticoagulation as the etiology. In such cases, the use of IV protamine should be considered. One milligram of protamine can reverse 100 units of heparin. Since typically 1,000 to 2,000 units of heparin are administered at dialysis, a dose of 10 to 20 mg of protamine IV should be sufficient to reverse bleeding.

Other strategies to control hemorrhage from the access site include the use of topical thrombin or an IV drip of desmopressin. Once bleeding has been controlled, the patient should be observed for a minimum of 1 to 2 hours in the ED. If the bleeding still cannot be controlled, emergent consultation with vascular surgery services is required. Placing a suture at the site, or the use of a tourniquet proximal to the access site, can be used as a temporary measure until the surgeon arrives. The disadvantage of applying direct pressure is that it can cause thrombosis within the fistula or graft. However, given the alternative, this is an acceptable risk.

It is unfortunate that this case settled because it does not appear that any malpractice was committed. Vascular surgeons do not come to the ED to see functioning, nonbleeding AVFs. There was no published information explaining why the patient experienced rebleeding 10 to 12 hours after the initial event (perhaps some minor trauma precipitated it). Even if this patient had been observed in the ED for 8 hours, he would not have experienced rebleeding in the ED, but the tragic outcome would remain the same.

### References

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