A Vascular Complication of Trochanteric-Entry Femoral Nailing on a Fracture Table

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Abstract

In this case report, we describe a complication of occlusion of a low-flow artery related to traction and compression against the center post of a fracture table during trochanteric femoral nailing. The ischemic limb subsequently underwent urgent revascularization by the vascular surgery team. The patient was placed on anticoagulation and recovered. Radiographically visible vascular plaques should alert the surgeon to potential vascular complications of traction and center-post compression.

Vascular complications of intramedullary fixation of femur fractures are rare but have been described in case reports and small case series.[1-6] Most vascular complications have involved retrograde femoral nailing,[1,3-6] and an anatomical study of 60 cadaveric specimens identified the precise location of the structures at risk.[7] A literature review with a focus on antegrade femoral nailing yielded only 1 case report of a delayed pseudoaneurysm of the superficial femoral artery caused by distal screws.[2] In the present case report, we describe a vascular complication of trochanteric-entry antegrade intramedullary femoral nailing on a fracture table. The patient provided written informed consent for print and electronic publication of this case report.

Case Report

The patient, a woman in her late 80s, sustained a left subtrochanteric femur fracture and a left elbow laceration after a mechanical fall. She did not strike her head and denied loss of consciousness, chest pain, palpitations, dizziness, aura, and other presyncopal symptoms. Past medical history was significant for myelodysplastic syndrome with chronic anemia and leukopenia, hypertension, type 2 diabetes mellitus with hemoglobin A_{1C} of 0.72, and bilateral cataract surgeries 3 years prior. She denied a personal history of peripheral vascular disease and coronary vascular disease and a family history of coronary artery disease. She had a 20 pack-year history of smoking but quit 20 years earlier. Functionally, she was a community ambulator. Current medications included darbepoetin, glyburide, hydrochlorothiazide, clonazepam, furosemide, lisinopril, and sustained-release verapamil.

When the patient arrived in the emergency department, she was hemodynamically stable and complained of severe left hip pain. She was neurologically intact and was documented as having a palpable left dorsalis pedis pulse by the covering orthopedic surgeon, the trauma surgery team, and the preoperative medicine consultant. Radiographs showed a left subtrochanteric femur fracture and extensive atherosclerotic vascular calcification (Figures 1–3). The trauma surgery team and the medical team cleared the patient for operative management of the left subtrochanteric fracture.

On the evening of admission, the patient underwent routine cephalomedullary nailing (Synthes trochanteric femoral nail) supine on a traction table. She arrived in the postanesthesia care unit in stable condition. On initial postoperative evaluation, both feet were warm under warmed blankets without palpable pulses. The patient was transferred to the floor. By the time she arrived there, an asymmetrically cool left foot was

Figure 1. Preoperative anteroposterior radiograph of left hip with disruption of medial buttress.

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Figure 2. Preoperative lateral radiograph of left hip.

Figure 3. Preoperative radiograph of pelvis shows marked calcification of iliac and femoral arteries bilaterally.

evident, and again no pulses were felt bilaterally. She complained of left calf pain and decreased sensation to light touch throughout the distal left leg. No pulses were Dopplerable on the left leg, and a faint posterior tibial pulse was Dopplerable on the right. A consultation with the vascular surgery team was called, and they recommended a heparin drip for a presumed thromboembolic event. Given the acute change in documented examination, they prepared their operative suite for an on-table angiogram and possible thrombectomy with bypass.

The vascular surgeons brought the patient into the operating theater and achieved percutaneous access through the right common femoral artery. They executed an aortogram with leg runoff. This study identified multilevel disease. The attending vascular surgeon thought that the traction post had temporarily occluded a low-flow artery and thereby created stasis, which resulted in an occlusive thromboembolism. On the basis of these findings, the patient underwent urgent endarterectomy of the proximal left external iliac artery, attempted left common iliac artery recannulization of a chronic occlusion, balloon angioplasty of the right common iliac artery, right common iliac artery stenting, left iliac-to-femoral artery bypass grafting, and right-to-left femoral artery bypass grafting.

During the rest of her case, the patient had no palpable posterior tibial pulses and was followed by serial pulse volume recordings, which demonstrated pulsatile flow bilaterally. Her clinical symptoms of ischemia resolved. She was transitioned from heparin to warfarin and discharged to a rehabilitation facility. Eventually she was discharged home. Postoperative radiographs are shown in Figures 4 and 5.

Discussion

It has been suggested that manipulation of atherosclerotic vessels may injure brittle endothelium, rupture plaques, and dislodge emboli.[8] Although this concept has been debated,[9] we know that forces imparted to the leg during use of a fracture table can mechanically disturb vessels significantly. Haddad and colleagues[10] reported inferior epigastric vessel avulsion with fracture table use. As our case report suggests, atherosclerotic vessels in a low-flow state may be especially sensitive to mechanical perturbation. Evidence of atherosclerosis on radiographs and abnormal vascular examination should give the surgeon pause before placing the patient on a fracture table. If preoperative limb hypoperfusion is suspected or the patient has calcified arteries on radiographs, the orthopedic surgeon should take care to minimize the torsional, axial,

Figure 4. Postoperative anteroposterior radiograph of left hip.

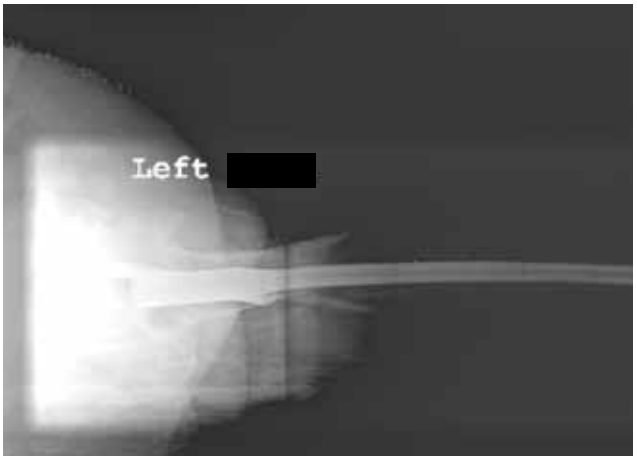

Figure 5. Postoperative lateral radiograph of left hip.

and angular forces on the fracture table; minimize how long these forces are applied; and contemplate alternative positioning. At the very least, surgeons should carefully evaluate vascular status after surgery.

Conclusions

We have presented the first case report of acute vascular compromise associated with trochanteric-entry antegrade femoral nailing on a fracture table—a potentially limb-threatening complication. A history of vascular disease should alert the surgeon to the possibility that standard positioning on a fracture table could result in vascular compromise. Similarly, in the absence of a reliable history, radiographically visible vascular plaques should alert the surgeon to potential vascular complications resulting from traction and center-post compression.

Authors' Disclosure Statement

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This paper will be judged for the Resident Writer's Award.