Delayed Arterial Complication Following Femoral Cerclage Cabling: A Case Report.

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Citation

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Abstract

Vascular complications following femoral cerclage cabling and wiring in total hip arthroplasty are uncommon. We present a case of unusually late symptoms after an arterial injury secondary to cerclage cabling in the setting of femoral shaft cortical strut grafting.

OBJECTIVE:

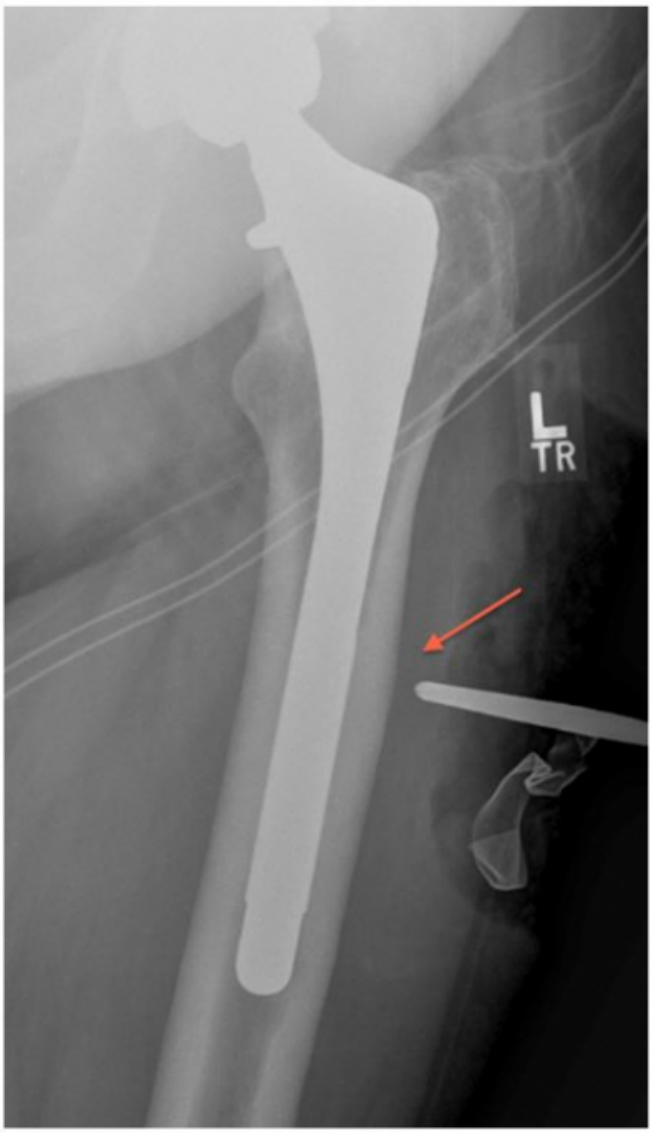
To describe a late-presenting and rarely reported complication of femoral cerclage cabling.

CASE REPORT:

A 50 year-old morbidly obese female presented with left anterior thigh pain two years after total hip replacement performed by another surgeon. Following a thorough infectious and aseptic loosening workup, it was determined that her source of pain was likely from anterior and lateral femoral stem cortical bone remodeling, around the large and stiffer femoral prosthesis (figure 1). After several months of conservative treatment, the patient continued to have debilitating anterior thigh pain with activities and with rest. Risks and benefits of allograft fibular strut grafting and cerclage cabling around the area of femoral stress reaction was discussed, and the patient wished to proceed surgically. Surgery was undertaken with femoral strut grafting and cabling and concluded without any apparent intraoperative complications.

Figure 1

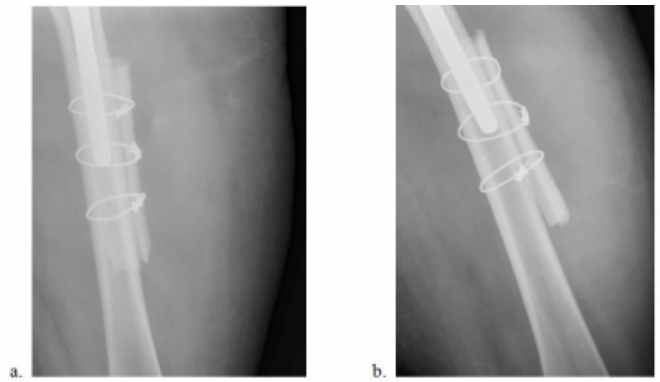
AP intraoperative x-ray demonstrating mid and distal anterior and lateral femoral stem impingement and increased cortical thickness.



In the initial postoperative period, the patient progressed well and was discharged to a skilled nursing facility on postoperative day three (figure 2). However, three weeks after surgery, the patient presented to the clinic with acute increased thigh pain and swelling. A workup at that time revealed a large post-operative thigh hematoma.

Figure 2 a&b

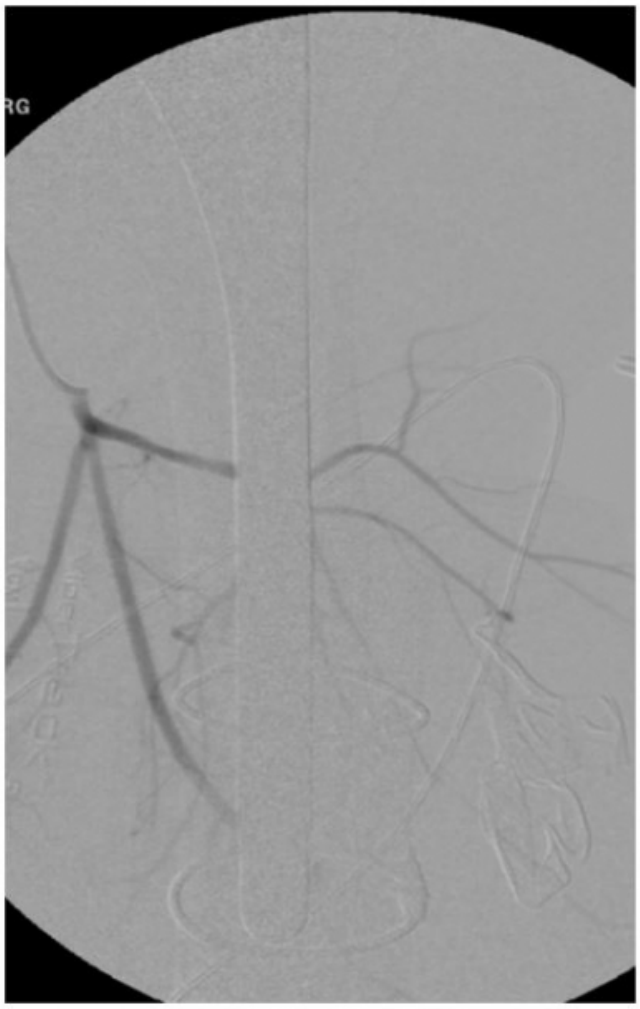
Initial post-operative AP (a) & lateral (b) views



An evacuation of the hematoma was performed, at which time approximately 1,100 mL of bright red blood consistent with arterial bleeding was noted. The wound was packed, a sterile tourniquet was applied, and an emergent intraoperative consultation to vascular surgery for persistent bleeding was undertaken. An intraoperative arteriogram at the time of the hematoma evacuation did not show any signs of vascular injury, and the bleeding significantly decreased (figure 3). The wound was closed without difficulty and the patient was admitted to the intensive care unit for monitoring and blood transfusions.

Figure 3

Intraoperative arteriogram during evacuation of hematoma demonstrating no significant bleeding.



Post-operatively, the patient continued to display signs of active bleeding. The patient had a decrease in her hemoglobin and hematocrit levels despite multiple transfusions, as well as increasing thigh circumference and firmness by postoperative day two. The vascular surgeon performed a second arteriogram, this time in the vascular-equipped suite. This revealed an incomplete laceration around the second perforating artery, a branch of the deep femoral artery. This area was adjacent to two of the three cerclage cables. Coil embolization to that perforating artery was performed and the patient went on to have an uneventful and successful recovery with resolution of thigh pain (figure 4 & 5).

Figure 4 a&b

Second arteriogram (a) demonstrating cerclage cable causing arterial bleeding (red arrows) and (b) after multiple coils were deployed for embolization.

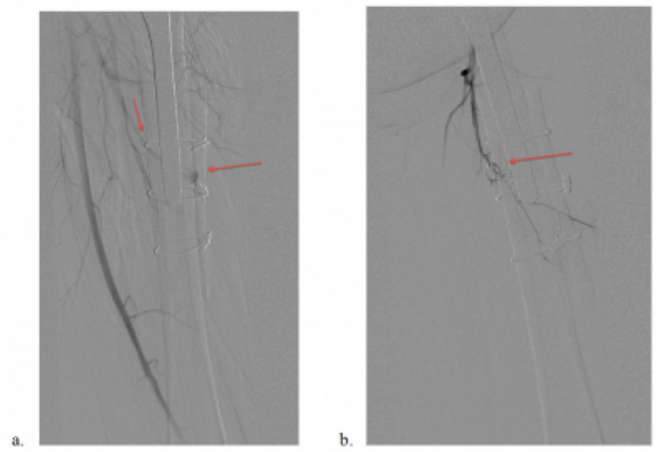


Figure 5 a&b

(a) AP and (b) lateral views 2 months

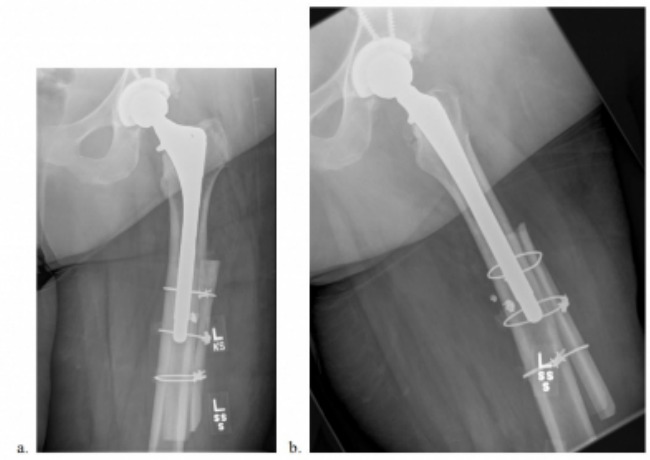
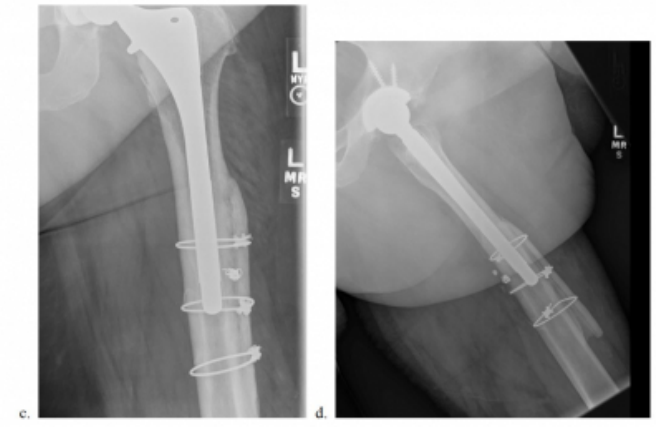


Figure 5 c&d

(c & d) 2 years post operatively.



DISCUSSION:

Vascular complications during total joint arthroplasty are rare 1-6 . Vascular complications can include ischemia, ischemia with hemorrhage, hemorrhage, and pseudoaneurysm 1,3,6 In one of the largest studies done to date, the overall incidence of vascular injuries in arthroplasty surgery was found to be 0.13% 6 . Other studies have found complication rates ranging from 0.017% to 0.25% 1-7 . Most vascular complications during total joint surgery occur in the revision surgery setting 1-4,7-15 . Risk factors for vascular injury include revision surgery, particularly knee revision surgery, and African-American race 1,3-6,14 .

The mechanisms by which vascular injuries occur are numerous. These include direct and indirect trauma from hardware, pins, cables, and retractors, complications from cement polymerization and heat production, and vascular tearing during hardware impaction or removal 1-22 . Complications have been divided as being recognized as acute or late, with the vast majority being found in the acute post operative period if not intraoperatively. Injuries found in the acute stage have been associated with the highest success rates with revascularization surgery 1,5,7 .

In the case described above, the patient did not present with signs of a complication until three weeks post operatively. No signs of vascular insufficiency or compromise were identified prior to the evacuation of the thigh hematoma. Recognition of the laceration to the second perforating artery was not appreciated on the intraoperative angiogram, which led to a further delay in diagnosis.

In a case report, Aleto et al 8 describe the close proximity of the femoral vessels to the middle and distal thirds of the femur. They advocate a technique of passing cerclage wires prior to the insertion of strut grafts, so as to have less bulk and distance for the cerclage wires to pass. Mehta et al 14 was the first to describe a similar instance of femoral artery and vein strangulation while using cerclage wires in a revision hip surgery. The femoral vessels were occluded at Hunters canal, where the vessels are tethered to the femur by fascial attachments and at closest proximity to the bone. Apivatthakakul et al 23 measured femoral blood flow after the application of percutaneous cerclage cables in 18 cadaveric femurs. They confirmed that percutaneous cerclage cables could be applied with minimal risk to the femoral vessels, but stressed the importance of surgical technique and keeping the wire passer as close as possible to the femur.

In conclusion, vascular injuries are a rare event in total joint arthroplasty. However, when using cerclage cables or wires on the femur during arthroplasty surgery, one must be vigilant and pay close attention to the surgical technique in applying these implants. In addition, a thorough preoperative vascular assessment is crucial for the post operative diagnose of any vascular injury. Early diagnosis of vascular injuries allows for early intervention and potentially leads to the best possible outcomes following vascular injury.

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