Late Vascular Injury Following Intertrochanteric Fracture Reduction With Sliding Hip Screw

Carlos E. Moreyra, MD, Carlos J. Lavernia, MD, and Christopher C. Cooke, MD

Vascular injuries during the implantation of orthopaedic devices can lead to fatal complications. Most injuries will be apparent intraoperatively, while others may be delayed in their presentation. Most articles documenting these injuries during the treatment of hip fractures involve lacerations of the deep femoral vessels by cortical bone screws (1–6) and avulsed lesser trochanter bone fragments (5, 7–10). Hoffmann retractors (11) and guide wire pins (12) have also been implicated in intraoperative vascular injuries during hip surgery.

Late intrapelvic vascular injuries caused by femoral hardware such as Olden screws and similar devices have been reported (5, 13, 14) as well as acetabular penetration by sliding hip screws (15–18). To our knowledge, however, there are no reports on late intrapelvic vascular injuries caused by sliding hip screws. We report a case involving late injuries to the left external iliac artery and internal iliac arteries caused by a sliding hip screw penetrating the pelvis through the acetabulum.

Case Report

An 88-year-old male patient initially fell to the floor at a nursing home. The hospital evaluation revealed a displaced left intertrochanteric fracture (Fig. 1), which was fixed with a sliding hip screw along with a compression screw (Fig. 2). The screw-plate component used during the case allowed for the utilization of a locking pin and a compression screw, which prevent axial rotation of the sliding screw in reference to the barrel-plate and disengagement of the barrel-screw construct, respectively. Four months postoperatively the patient presented to the emergency room complaining of abdominal pain. While being evaluated, his cardiovascular status deteriorated, necessitating endotracheal intubation. An abdomen/pelvis computed tomography (CT) scan revealed a large left extraperitoneal and retroperitoneal hematoma with an intrapelvic hip screw resting on its posterior aspect. The patient immediately underwent an explorative laparotomy with a pelvic extension. A left external iliac artery laceration was found and repaired. No further bleeding was noted from any other vessels, and the hip screw was left in place (Fig. 3). The patient’s condition deteriorated following surgery. He expired 2 days later in the Intensive Care Unit.

The postmortem examination indicated that the fracture plate was still attached to the femur with the compression screw free-floating at the distal portion of the barrel. Pelvic dissection revealed a severed left internal iliac vein, which was in the path of the threaded end of the sliding hip screw (Fig. 4). No breach of the individual fracture hardware structural integrity was noted. Postmortem radiographs from the original surgery were studied to assess the insertion of the compression screw into the threaded barrel of the sliding hip screw. Our calculations demonstrated that the compression screw could have engaged anywhere between 0.2 and 1.4 cm into the lag screw, depending on the effect of rotation of the plate in reference to the radiographs.

Discussion

We have described a case involving late external iliac artery and internal iliac vein injuries following open reduction and internal fixation of an intertrochanteric fracture with a sliding hip screw. Review of the literature reveals several cases of similar injuries. Pelvic penetration of femoral components has been documented with the use of Olden screws, including a case of a 90-year-old woman with injuries to several branches of her right internal iliac artery due to pelvic migration of the screws (13, 14). Sundgren and Persson described four cases in which Olden screws penetrated the pelvis, one causing an iliac artery perforation (14). In one report the migration of a Steinmann pin caused a pelvic hematoma near the internal pudendal artery (19). Finally, Rilety et al. described an injury to the external iliac artery due to an intrapelvic protrusion of an acetabular component (20).

In 1955 Schumpflick and Jantzen published the first article describing the advantages of a sliding hip screw for the fixation of trochanteric fractures (21). However, it was not until 1964 that Clawson proposed the use of an impacting screw within the sliding screw in the fixation of a trochanteric fracture (22). Nonetheless, he encouraged its removal before wound closure once firm impaction and fracture stability were achieved. Since then, orthopaedic surgical textbooks have differed slightly in their indications for the use of compression screws in the fixation of intertrochanteric hip fractures. Campbell’s Operative Orthopaedics does not list indications for the use of compression screws, except that it maintains their use when using the short-barrel plate (23). Rockwood and Green’s Fractures in Adults recommends use of a compression screw if the lag screw cannot be visualized within the barrel or if there is a risk for postoperative screw-barrel disengagement (24). However, the authors discourage routine use of compression screws. In our reported case, we believe the proper use of a compression screw could have avoided the fatal result. It is possible, according to our calculations, that the orthopaedic surgeon did not tighten the compression screw properly, resulting in only limited engagement with the lag screw.

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Late intrapelvic vascular injuries caused by femoral head hardware such as Olinken screws and similar devices have been reported (5, 13, 14) as well as acutabular penetra-
tion by sliding hip screws (15–18). To our knowledge, however, there are no reports on late intrapelvic vascular injuries caused by sliding hip screws. We report a case involving late injuries to the left external iliac artery and internal iliac vein caused by a sliding hip screw penetrating the pelvis through the acetabulum.

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Discussion

We have described a case involving late external iliac artery and internal iliac vein injuries following open reduction and internal fixation of an intertrochanteric fracture with a sliding hip screw. Review of the literature reveals several cases of similar injuries. Pelvic protrusion of femoral components has been documented with the use of Olinken screws, including a case of a 90-year-old woman with injuries to several branches of her right internal iliac artery due to pelvic migration of the screws (13, 14). Sundgren and Persson described four cases in which Olinken screws penetrated the pelvis, one causing an iliac artery perforation (14). In one report the migration of a Steinmann pin caused a pelvic hematoma near the internal pudendal artery (19). Finally, Keilie et al. described an injury to the external iliac artery due to an intrapelvic protrusion of an acetabular compo-
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screw must be achieved in all cases of tightening the compression screw until engagement is confirmed by compression at the fracture site. Our case report also suggests a compelling argument for the routine use of compression screws in all intertrochanteric hip fractures. Prospective randomized studies need to be performed to properly evaluate this recommendation.

Summary
A case involving late injuries to pelvic vessels caused by a sliding hip screw penetrating through the acetabulum has not been previously reported. We present the case of an 85-year-old man who presented with a retrospective and exaperienced hernia 4 months after open resection and internal fixation of an intertrochanteric hip fracture. Surgical exploration showed a laceration of the left external iliac artery, which was repaired. However, the sliding hip screw was left in place. The patient’s condition deteriorated, and he expired 2 days later. Postmortem examination revealed a laceration of the left internal iliac vein. Our calculations show that the compression screw utilized in the fixation may not have been properly engaged into the sliding screw.

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Summary

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