

## Late-Onset Screw Migration into Iliac Vessels 21 years after Hip Arthrodesis

Taishi Hirai, Yutaka Inaba, Naomi Kobayashi, Shu Takakagawa, Yohei Yukizawa, Hiroyuki Ike and Tomoyuki Saito

Department of Orthopaedic Surgery, Yokohama City University Graduate School of Medicine, Kanazawa-ku, Yokohama, Japan.

**ABSTRACT:** Iatrogenic injuries to the vascular system are a rare but serious complication of hip surgery. We report a case of an 83-year-old man who presented with intrapelvic migration of a screw into the space between the external iliac artery and vein 21 years after hip arthrodesis. The patient was treated with laparotomy, and the damaged artery was excised and sutured. This is the first case of a late vascular complication secondary to screw migration after hip arthrodesis.

**KEYWORDS:** hip arthrodesis, iliac artery injuries, nonunion, screw migration, tuberculosis

**CITATION:** Hirai et al. Late-Onset Screw Migration into Iliac Vessels 21 years after Hip Arthrodesis. *Clinical Medicine Insights: Case Reports* 2014;7:123–125 doi: 10.4137/CCRep.S16159.

**RECEIVED:** April 16, 2014. **RESUBMITTED:** July 25, 2014. **ACCEPTED FOR PUBLICATION:** August 6, 2014.

**ACADEMIC EDITOR:** Athavale Nandkishor, Associate Editor

**TYPE:** Case report

**FUNDING:** Authors disclose no funding sources.

**COMPETING INTERESTS:** Authors disclose no potential conflicts of interest.

**COPYRIGHT:** © the authors, publisher and licensee Libertas Academica Limited. This is an open-access article distributed under the terms of the Creative Commons CC-BY-NC 3.0 License.

**CORRESPONDENCE:** [yute0131@med.yokohama-cu.ac.jp](mailto:yute0131@med.yokohama-cu.ac.jp)

This paper was subject to independent, expert peer review by a minimum of two blind peer reviewers. All editorial decisions were made by the independent academic editor. All authors have provided signed confirmation of their compliance with ethical and legal obligations including (but not limited to) use of any copyrighted material, compliance with ICMJE authorship and competing interests disclosure guidelines and, where applicable, compliance with legal and ethical guidelines on human and animal research participants.

### Introduction

Hip arthrodesis was commonly used in the treatment of end-stage hip disease and tuberculosis of the hip. Long-term studies have suggested that although patients with fused hips functioned relatively well, they frequently had severe low back pain or ipsilateral knee pain that increased with time.<sup>1</sup> In modern times, hip arthrodesis is mainly superseded by successful total hip arthroplasty (THA), and little room remains for arthrodesis of the hip.<sup>2</sup> However, in certain scenarios, THA is a difficult procedure with an increased risk of failure that often requires multiple revisions. In these selected patients with severe hip pathology due to trauma or infectious causes, arthrodesis may be a suitable solution with an acceptable outcome.<sup>3,4</sup> If arthrodesis is performed with optimal alignment of the leg, mobility and an acceptable quality of life can be achieved.<sup>4</sup>

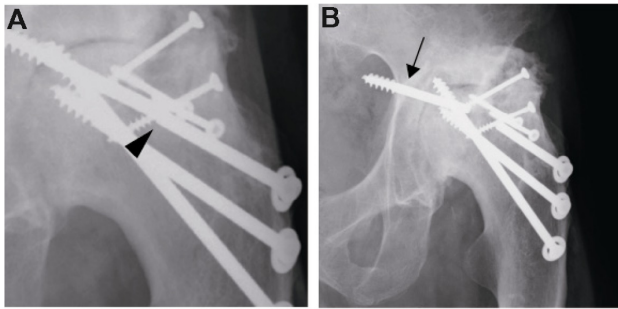
The major complications of arthrodesis include nonunion and lower back pain (range, 8–75%) and ipsilateral knee pain (range, 8–57%).<sup>5</sup> Nonunion causes metal fatigue and leads to implant breakage.<sup>6</sup> Brien et al reported compression plate and fixation screw breakage 38 months after hip arthrodesis.<sup>7</sup> In

cases of delayed union or nonunion, metal fatigue caused by corrosion and environmental stress cracking is expected.<sup>8</sup>

Iatrogenic injuries to the vascular system are uncommon complications of hip surgery, although such accidents pose considerable threats to life and limb. Cases of vascular injuries associated with surgery of the hip joint<sup>9</sup> have been reported, but no reports have noted vascular injury caused by late migration of screw into the pelvis as a complication of arthrodesis. This report addresses an unusual complication that we believe has not been reported previously.

### Case Presentation

In 1987, a 60-year-old man with tuberculous arthritis of the left hip underwent extra-articular iliofemoral arthrodesis. Over the next 13 years, radiography of the hip joint revealed that one of the screws was broken and no trabeculae crossed the original joint space (Fig. 1A). However, the patient did not complain of any discomfort, so he was followed-up twice a year. The distal part of the broken screw gradually migrated medially and deep into the pelvis through the medial wall of the acetabulum 21 years after the surgery (Fig. 1B).

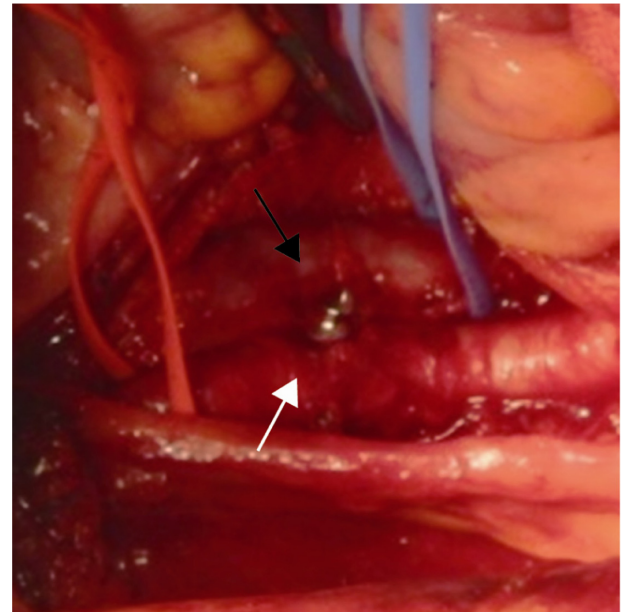


**Figure 1.** Anteroposterior radiograph of the left hip. One of the screw breakages (black arrow head) 13 years after surgery (A). No trabeculae crossed the original joint space. The distal portion of the broken screw (black arrow) migrated into the pelvis 21 years after the surgery (B).

Computed tomography of the pelvis demonstrated that the distal part of the screw migrated into the pelvis (Fig. 2A). Clinical and radiographic evaluations did not reveal any injuries to the intestinal organs. Angiography of the iliac artery showed arterial compression by the screw (Fig. 2B). As there was a potential risk of further migration of the screw and damage to the external iliac vessels and pelvic organs, surgery was performed to remove the distal portion of the screw. During surgery, the tip of the screw was found using median laparotomy. The distal tip of the screw was located between the medial portions of the left external iliac vessels (Fig. 3). The adventitia of the left external iliac artery was damaged by the adhesion of the screw. Since it can lead to false aneurysm, 0.5 cm of the external iliac artery was excised and sutured. Postoperative radiography of the pelvis showed removal of the medial piece of the broken screw (Fig. 4). The patient had an uneventful recovery and was discharged after the surgery.

## Discussion

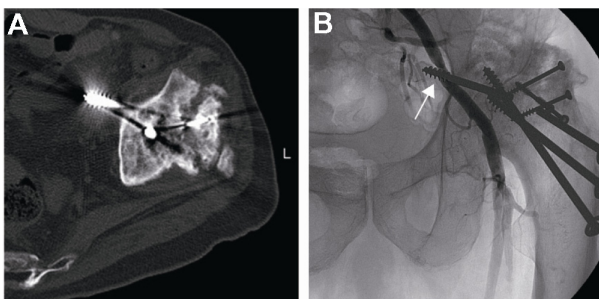
Iatrogenic vascular injuries constitute a rare but possible complication after hip surgery.<sup>10</sup> These complications can have devastating effects that pose considerable threats to life and limb. Nachbur et al reported that the incidence of vascular accidents occurring in the course of hip surgery was 0.2–0.3% during the



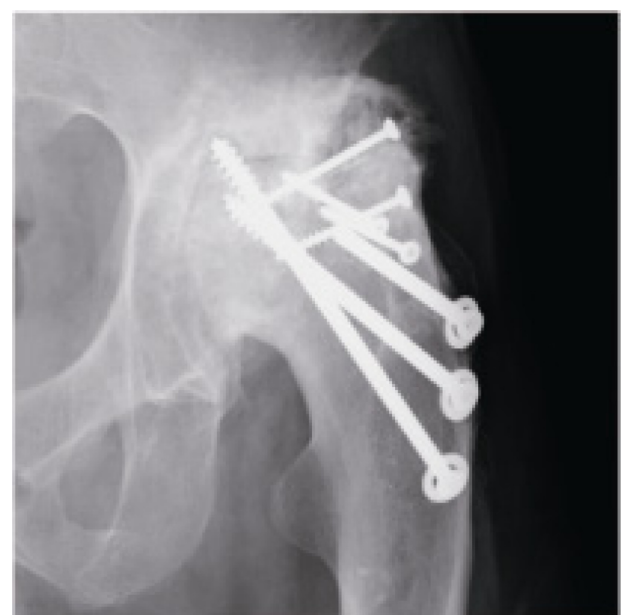
**Figure 3.** Intraoperative photography. The distal tip of the screw was located between the iliac artery (white arrow) and vein (black arrow).

period of 1970–1978.<sup>9</sup> Lazarides et al reported that 74% of cases involved injuries that occurred during various types of total or subtotal hip replacement, while 21% of cases were related to hip fracture correction. The complication may be caused by drilling, cement-related, retractor, thermal, or screw injuries, or by the sharp ends of the Kirschner wires used in the fracture repair.<sup>11</sup> Arterial injury may occur at the time of the surgery or later, once the hardware has eroded into the vessel.<sup>12</sup>

Medial pelvic migration of a sliding hip screw has been reported in the literature.<sup>13–16</sup> Most cases of medial pelvic



**Figure 2.** Computed tomography image and angiogram of the pelvis. The tip of the screw migrated into the pelvis (A). Angiogram of the iliac artery showing that the iliac artery was compressed (white arrow) by the tip of the migrating screw (B).



**Figure 4.** Anteroposterior radiograph of the left hip. The distal portion of the broken screw was removed.

migration of a screw occur during surgery. Li et al reported a case of medial migration of a lag screw into the pelvis 10 weeks after surgery without any history of trauma.<sup>16</sup> The authors explained that such incidents occur partially because of poor device placement and postoperative weight bearing on osteoporotic bone. However, the mechanism of postoperative implant migration remains obscure. Walking and normal weight bearing subject the implant and bone surface to combined axial and torsional load that may play a role in screw migration.<sup>16</sup>

The case presented here is unique in two ways. First, intrapelvic migration of the broken screw occurred after the arthrodesis. Second, its presentation was delayed. Cases have been reported of complications occurring within a few years after the surgery. On the contrary, in our case, the screw migration did not occur until 21 years after the surgery. Hussain et al reported a novel case of a late vascular complication due to component migration 5 years after revision THA.<sup>12</sup> To our knowledge, this is the first reported case of a late vascular complication secondary to screw migration >20 years after hip arthrodesis.

The most common cause of implant breakage is metal fatigue secondary to delayed union or nonunion.<sup>6</sup> The occurrence of nonunion is one of the major complications after arthrodesis.<sup>5</sup> Jain and Giannoudis reported that there were eight studies that were suitable for review in which the union rates were 37.5–100%.<sup>5</sup> Brien et al defined union as “the presence of bony trabeculae on two radiographic views”.<sup>7</sup> Matta et al. reported that fusion was complete when the patients had “no or minimal pain during ambulation” and that there was evidence of “bone formation across the joint with no or minimal visibility of the former joint space on two radiographic views”.<sup>17</sup> In the present case, bone formation across the hip joint was not seen, and so the screw breakage was thought to have occurred due to nonunion 13 years after the arthrodesis. In cases of nonunion after arthrodesis, clinicians must be aware of implant failure, which may lead to severe complications.

In our case, external iliac artery was excised and sutured to prevent the formation of the false aneurysms. However, current treatments for false aneurysms are ultrasound-guided compression, ultrasound-guided thrombin injection, and endovascular stenting. Because of the high risk of infection associated with open surgery, surgical repair is reserved for failure of percutaneous techniques, rapid expansion in an unstable patient, distal ischemia and rupture, etc.<sup>18</sup> Therefore, removing of the migrated screw and less-invasive treatment might be appropriate in this case.

Although our patient was very fortunate that the screw did not penetrate the iliac vessels, he could have had a fatal

outcome as previously described.<sup>10</sup> We believe that there is a possibility of screw migration in cases with osteoporosis and nonunion. For such cases, yearly radiological follow-up will be preferable since the late detection of intra-pelvic screw migration could be extremely hazardous.

### Author Contributions

Conceived the concepts: YI. Analyzed the data: TH. Wrote the first draft of the manuscript: TH. Contributed to the writing of the manuscript: YI. Agree with manuscript results and conclusions: TH, YI, NK, ST, YY, HI, TS. Jointly developed the structure and arguments for the paper: TH, YI, NK, ST, YY, HI, TS. Made critical revisions and approved final version: YI. All authors reviewed and approved of the final manuscript.

### REFERENCES

1. Callaghan JJ, Brand RA, Pedersen DR. Hip arthrodesis. A long-term follow-up. *J Bone Joint Surg Am.* 1985;67:1328–35.
2. Peterson ED, Nemanich JP, Altenburg A, Cabanela ME. Hip arthroplasty after previous arthrodesis. *Clin Orthop Relat Res.* 2009;467:2880–5.
3. Schafroth MU, Blokzijl RJ, Haverkamp D, Maas M, Marti RK. The long-term fate of the hip arthrodesis: does it remain a valid procedure for selected cases in the 21st century? *Int Orthop.* 2010;34:805–10.
4. Stover MD, Beaulieu PE, Matta JM, Mast JW. Hip arthrodesis: a procedure for the new millennium? *Clin Orthop Relat Res.* 2004;418:126–33.
5. Jain S, Giannoudis PV. Arthrodesis of the hip and conversion to total hip arthroplasty: a systematic review. *J Arthroplasty.* 2013;19:00152–6.
6. Iwakura T, Niikura T, Lee SY, et al. Breakage of a third generation gamma nail: a case report and review of the literature. *Case Rep Orthop.* 2013;2013:172352.
7. Brien WW, Golz RJ, Kuschner SH, Brien EW, Wiss DA. Hip joint arthrodesis utilizing anterior compression plate fixation. *J Arthroplasty.* 1994;9:171–6.
8. Gardner MJ, Silva MJ, Krieg JC. Biomechanical testing of fracture fixation constructs: variability, validity, and clinical applicability. *J Am Acad Orthop Surg.* 2012;20:86–93.
9. Nachbar B, Meyer RP, Verkkala K, Zurcher R. The mechanisms of severe arterial injury in surgery of the hip joint. *Clin Orthop Relat Res.* 1979;141:122–33.
10. Mehta V, Finn HA. Femoral artery and vein injury after cerclage wiring of the femur: a case report. *J Arthroplasty.* 2005;20:811–4.
11. Lazarides MK, Arvanitis DP, Dayantas JN. Iatrogenic arterial trauma associated with hip joint surgery: an overview. *Eur J Vasc Surg.* 1991;5:549–56.
12. Hussain WM, Hussain HM, Hussain MS, Manning DW. A late vascular complication due to component migration after revision total hip arthroplasty. *J Arthroplasty.* 2011;26:31.
13. Rao SB, Pringle RG. Intrapelvic penetration of a sliding screw: a rare complication. *Injury.* 1992;23:56–7.
14. Naidu Maripuri S, Debnath UK, Hemmati S, Wilson C. Sliding hip screw in pelvis: a rare intra-operative complication. *Arch Orthop Trauma Surg.* 2007;127:523–5.
15. Singh R, Rohillai RK, Siwach R, Singh Z, Magu NK, Sangwan SS. Intra-operative migration of dynamic hip screw into the pelvis. *J Coll Physicians Surg Pak.* 2010;20:341–2.
16. Li X, Heffernan MJ, Kane C, Leclair W. Medial pelvic migration of the lag screw in a short gamma nail after hip fracture fixation: a case report and review of the literature. *J Orthop Surg Res.* 2010;5:5–62.
17. Matta JM, Siebenrock KA, Gautier E, Mehne D, Ganz R. Hip fusion through an anterior approach with the use of a ventral plate. *Clin Orthop Relat Res.* 1997; 337:129–39.
18. Dawson J, Fitridge R. Update on aneurysm disease: current insights and controversies: peripheral aneurysms: when to intervene – is rupture really a danger? *Prog Cardiovasc Dis.* 2013;56:26–35.