

Late Migration of a Broken Trochanteric Cerclage Wire into the Abdominal Wall Three Years after Total Hip Arthroplasty: A Case Report

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Abstract

Background: Cerclage wires are commonly used for fixation of the greater trochanter during total hip arthroplasty (THA). Breakage of the fixation material is a recognized complication, but distant migration of a broken fragment is rare. **Case Presentation:** An 83-year-old woman underwent primary THA with a double-mobility prosthesis for an intertrochanteric fracture associated with symptomatic hip osteoarthritis; the greater trochanter was fixed with a trochanteric claw plate and four metallic cerclage wire loops. She remained asymptomatic for three years and then presented with abdominal pain and diarrhea. Plain radiographs showed a broken segment of one cerclage wire projecting over the right iliac fossa, whereas the remaining construct and the arthroplasty components were stable and the trochanter was united. At surgical exploration of an abdominal wall eventration, the fragment was found contained within the abdominal wall, without peritoneal breach or visceral injury. It was removed and the abdominal wall was repaired with mesh. Symptoms resolved within a few days, and at six months there were no complications and hip function was normal. **Conclusion:** A broken trochanteric cerclage wire fragment can migrate far from the greater trochanter years after THA and present with abdominal rather than hip symptoms. In patients with prior trochanteric wiring and unexplained abdominal complaints, pelvic radiographs should be reviewed, and cross-sectional imaging is advisable to define the relationship of a migrated fragment to the viscera and vessels before removal.

Keywords

Arthroplasty, Replacement, Hip, Bone Wires, Foreign-Body Migration, Abdominal Wall, Prosthesis Failure, Case Report

1. Introduction

Fixation of the greater trochanter with cerclage wires, cables, or cable-grip and cable-plate systems is a common adjunct in total hip arthroplasty (THA), particularly in the presence of trochanteric fractures and osteoporotic bone [1]. Breakage of the fixation material is frequent: in a comparative series with five-year radiographic follow-up, breakage of fixation was observed in 46% of hips fixed with wires and 36% of those fixed with cables [2], and in contemporary cable-plate constructs trochanteric nonunion has been associated with broken cables [3]. Most broken fragments remain near the trochanter. Distant migration has been reported only occasionally, for example medially to the inguinal region and adductor musculature [4] and as cable debris to the knee joint [5]. Migration of hip implants into the pelvis may present with abdominal rather than hip symptoms and may require an abdominal approach for removal [6]-[8].

We report late migration of a broken trochanteric cerclage wire fragment into the abdominal wall three years after THA, presenting with abdominal pain and diarrhea. This report was prepared in accordance with the CARE guidelines.

2. Case Presentation

An 83-year-old woman with hypertension, dyslipidemia, chronic obstructive pulmonary disease, osteoporosis, and a previous cholecystectomy sustained a fall from standing height. Radiographs showed a right intertrochanteric fracture associated with advanced symptomatic hip osteoarthritis (**Figures 1-3**). Given the poor bone quality and pre-existing degenerative joint disease, primary THA was selected instead of internal fixation.

She underwent right THA with a double-mobility prosthesis. The greater trochanter was fixed with a trochanteric claw plate (DePuy Synthes) secured with four metallic cerclage wire loops. The immediate postoperative course was uneventful, and radiographs confirmed satisfactory implant positioning (**Figures 4-6**). The patient regained good function and remained asymptomatic for three years.

She then presented with abdominal pain and diarrhea. Anteroposterior pelvic and oblique radiographs were obtained; computed tomography (CT) was not performed. The radiographs showed that a broken segment of one of the four cerclage wires had migrated away from the greater trochanter and projected as a curvilinear radiopaque structure over the right iliac fossa, extending medially toward the pelvic inlet (**Figures 7-9**). The remaining three wire loops were intact, the claw plate was in place, the greater trochanter was united, and the femoral stem and



Figure 1. AP Radiograph of the right hip at presentation.



Figure 2. Lateral Radiograph of the right hip at presentation.



Figure 3. AP pelvic radiograph at presentation.



Figure 4. Post op pelvis AP radiograph.



Figure 5. Post op hip AP radiograph.

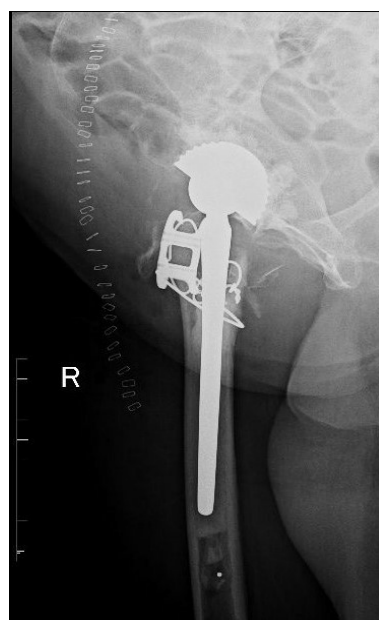


Figure 6. Post op lateral AP radiograph.

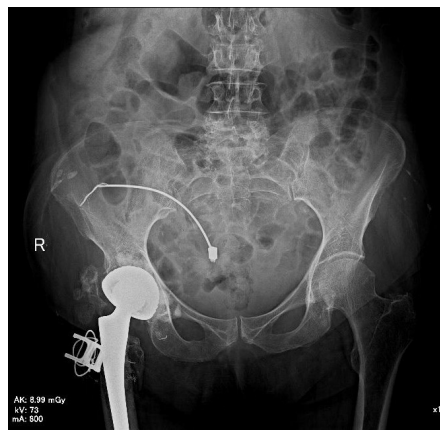


Figure 7. Pelvis AP radiograph three years after surgery showing the broken cerclage wire.



Figure 8. Hip AP radiograph three years after surgery showing the broken cerclage wire.

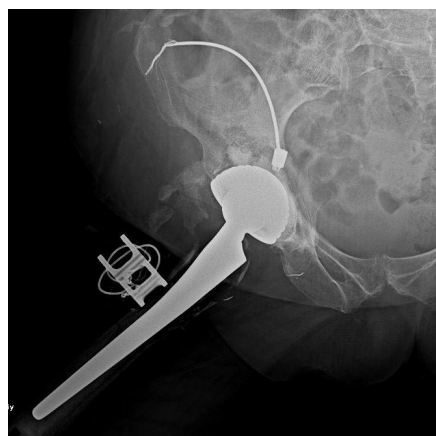


Figure 9. Hip lateral radiograph three years after surgery showing the broken cerclage wire.

acetabular component were stable, without radiographic signs of loosening. Because cross-sectional imaging was not obtained, the relationship of the fragment to the abdominal viscera, the iliac vessels, and the layers of the abdominal wall could not be determined preoperatively. Work-up for other causes of abdominal pain and diarrhea was negative.

The patient underwent surgical exploration of an abdominal wall eventration by a combined team of an orthopaedic surgeon and a general surgeon. The wire fragment was found entirely contained within the abdominal wall. The peritoneum was intact, the fragment had not entered the peritoneal cavity, and no visceral injury was identified. The fragment was removed and the abdominal wall was repaired with mesh. No hip hardware was removed, as the remaining trochanteric construct and the arthroplasty components were stable.

3. Outcome and Follow-Up

The abdominal pain and diarrhea resolved within a few days of the procedure. At six months of follow-up there were no complications, and hip function was normal. The timeline of the case is summarized in **Table 1**.

Table 1. Timeline of the case.

Time point	Events
Index admission	Fall from standing height; right intertrochanteric fracture with symptomatic hip osteoarthritis. Primary THA (double-mobility) with trochanteric claw plate and four cerclage wire loops.
Postoperative period—3 years	Uneventful recovery; good function; asymptomatic.
3 years after THA	Abdominal pain and diarrhea. Radiographs: broken wire segment over right iliac fossa; remaining construct intact, trochanter united, components stable. Work-up for other causes negative.
Surgery	Exploration of abdominal wall eventration; fragment contained within the abdominal wall, peritoneum intact, no visceral injury. Fragment removed; mesh repair. No hip hardware removed.
Within a few days	Abdominal pain and diarrhea resolved.
6 months	No complications; normal hip function.

4. Discussion

Cerclage fixation of the greater trochanter is widely used because of its simplicity and versatility, but breakage of the fixation material is common [1]–[3]. In the five-year comparative series by Berton *et al.*, wires broke more often than cables, whereas cables were associated with more metal debris, nonunion, and osteolysis [2]. Most broken fragments remain in situ and are clinically silent; migration of a fragment away from the trochanteric region is uncommon.

Distant migration of trochanteric fixation material has nevertheless been described. Karaismailoglu *et al.* reported a 40-year-old woman in whom a broken trochanteric cable segment migrated medially to a subcutaneous position in the inguinal region four years after THA, with its tip lying in the medial adductor muscles between the femoral neurovascular bundle and the sciatic nerve; both parts of the cable were removed [4]. Kollitz *et al.* described numerous fragments

of braided trochanteric cable that migrated from the hip to the knee joint [5]. Migration of other hip implants into the pelvis has also been reported, including protrusion of an acetabular component into the subperitoneal space requiring a trans-abdominal approach [6], medial pelvic migration of a lag screw removed laparoscopically [7], and pelvic migration of hip fixation hardware presenting to the emergency department with lower abdominal pain, vomiting, and diarrhea [8]. These reports show that migrated hip hardware may present with nonspecific abdominal symptoms rather than hip pain, which can delay diagnosis.

Our case differs from these reports in the final location of the fragment, which was confirmed at surgery to lie within the abdominal wall, without peritoneal breach or visceral injury, three years after an uneventful THA. The remaining construct was intact, the trochanter was united, and the arthroplasty components were stable. We did not identify a previous report of migration of a trochanteric cerclage wire fragment to the abdominal wall in the literature we reviewed, although our search was not systematic. This case illustrates that a broken trochanteric wire segment may migrate a considerable distance several years after surgery, even when the initial construct appeared satisfactory on postoperative radiographs.

The relationship between the fragment and the gastrointestinal symptoms should be interpreted with caution. Because the fragment was extraperitoneal and no visceral injury was found, a direct effect on the bowel is unlikely. The abdominal pain may plausibly be attributed to the fragment within the abdominal wall and the associated eventration. The diarrhea resolved after removal and other causes were excluded, but a causal link cannot be established from a single case.

Removal of the fragment was indicated because it was symptomatic, sharp, and located close to the peritoneal cavity. Removal through the abdominal wall, combined with repair of the eventration, addressed both problems in a single procedure, and the stable, united trochanteric construct did not require revision. Before removal of migrated hardware close to the pelvis or abdomen, cross-sectional imaging is advisable; for intrapelvic implant protrusion, CT angiography has been recommended to plan the surgical approach [9]. In our patient, CT was not performed, and the extraperitoneal location of the fragment was established only at surgery. This is a limitation of the report.

5. Hypothesis on the Mechanism of Migration

The mechanism of migration in this patient could not be established, and the following is offered as a hypothesis only. The documented findings are a broken segment of one cerclage wire, located over the right iliac fossa on radiographs and confirmed at surgery to lie within the abdominal wall, with the remaining construct intact and the trochanter united. Fatigue failure of the wire at the greater trochanter is the most plausible initiating event. Once detached, a sharp wire segment may advance through soft tissues under repetitive hip motion and muscle contraction, as proposed for a previously reported broken trochanteric cable [4].

The final position of the fragment suggests that it may have tracked proximally from the lateral aspect of the hip toward the iliac crest and into the anterolateral abdominal wall, but the exact route was not demonstrated. Osteoporosis and age-related soft-tissue atrophy may have contributed; their role remains speculative.

6. Strengths and Limitations

The strengths of this report are the availability of radiographs before and after the index procedure and at presentation, operative confirmation of the location of the fragment and the absence of visceral injury, and clinical follow-up after removal. Its limitations are those inherent to a single case report, the absence of preoperative cross-sectional imaging, the speculative nature of the proposed migration mechanism, and the relatively short follow-up of six months.

7. Clinical Lessons

Clinicians should consider migrated orthopaedic hardware in the differential diagnosis of unexplained abdominal complaints in patients with prior hip arthroplasty and trochanteric wiring, and should review pelvic radiographs in such patients. Broken trochanteric wires or cables should be followed clinically and radiographically [4], and cross-sectional imaging should be obtained before removal of a fragment that has migrated toward the pelvis or abdomen.

8. Conclusion

Late migration of a broken trochanteric cerclage wire into the abdominal wall is a rare complication of THA. It may present with abdominal rather than hip symptoms. Awareness of this possibility, review of pelvic radiographs, preoperative cross-sectional imaging, and timely removal can help prevent serious complications.

Consent

Written informed consent was obtained from the patient for publication of this case report and the accompanying images.

Author Contributions

A.H Wrote the manuscript; C.T Revised the manuscript; M.H.M Revised the manuscript; J.C.L Revised the manuscript; S.M Revised the manuscript; F.H Revised the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

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