


Intrapelvic Migration of the Cephalic Screw of a Proximal Femoral Long Intramedullary Nail: Case Report*

Migração intrapélvica do parafuso cefálico da haste intramedular longa para fêmur proximal: Relato de caso

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Rev Bras Ortop 2020;55(1):121–124.

Abstract

Keywords

- ▶ femoral fractures
- ▶ fracture fixation, internal
- ▶ prostheses and implants

Resumo

Palavras-chave

- ▶ fraturas do fêmur
- ▶ fixação interna de fraturas
- ▶ próteses e implantes

The use of cephalomedullary devices has gained popularity in the treatment of proximal femoral fractures. Despite their biomechanical advantages, several complications are well described in the literature. One of these complications, which is rarely reported, is the medial migration of the cephalic screw. The authors present this unusual complication in a case of a long-nail implant, which was treated with removal of the implants as a first step, and posterior osteosynthesis with a locked proximal femur plate as a second step, as well the outcome until fracture consolidation and resolution of the case.

O uso dos dispositivos cefalomedulares tem ganhado popularidade no tratamento das fraturas do fêmur proximal. Apesar das vantagens biomecânicas, várias complicações são descritas, entre as quais a migração medial do parafuso cefálico é pouco conhecida. Os autores apresentam um caso dessa complicação incomum em um implante de haste longa tratada em dois tempos cirúrgicos para a retirada dos implantes e posterior osteossíntese com placa bloqueada para fêmur proximal, assim como o desfecho até a consolidação da fratura e resolução do caso.

Introduction

Intertrochanteric fracture of the proximal femur is one of the most common fractures in patients over 65 years old, and it is often associated with osteoporosis.¹

Cephalomedullary osteosynthesis is the preferred treatment for unstable fractures due to its biomechanical advantages. However, several complications are described, and the lateral and superior loosening of the femoral head screw is one of the most frequent problems, occurring in 3% to 10% of the cases.¹

In turn, medial cephalic screw migration is an uncommon complication, with few cases described in the orthopedic literature, despite the high potential for morbidity and mortality.²

* Study conducted at the Orthopedics and Traumatology Service, Centro Médico Hospitalar Vila Velha (CMHVV), Vila Velha, ES, Brazil. Originally Published by Elsevier Editora Ltda.





Fig. 1 Right hip anteroposterior (AP) radiograph (preoperative).

We describe a rare complication, the medial migration of the cephalic screw of an intramedullary Gamma 3 (Stryker, Kalamazoo, MI, US) nail, observed three months after osteosynthesis, as well as the conduction of the case until its consolidation.

Case Report

A 70-year-old female patient, with hypothyroidism and osteopenia, was admitted with a history of falls from her own height. She presented pain, shortening and external

rotation deformity of the right lower limb associated with inability to ambulate. Radiographs of the pelvis and right hip showed an intertrochanteric fracture (AO 31-A3) of the proximal end of the right femur (►**Fig. 1**).

She underwent an uneventful surgical treatment, following the principle of relative stability, with indirect reduction in the skeletal traction table, and cephalomedullary osteosynthesis using a long Gamma3 130° nail, with the help of intraoperative fluoroscopy.

In the postoperative radiographic evaluation, a 26.5-mm tip-to-apex distance (TAD) was observed (►**Fig. 2**). The patient presented favorable clinical conditions for hospital discharge on the fourth day, with prescription for home rehabilitation and partial and progressive weight bearing unloading in the right lower limb, according to tolerance. Due to the good clinical evolution, she abandoned the help of the four-support walker around the sixth week, but after three months of surgery, a sudden right hip pain started, without new trauma or fall, progressively worsening and progressing towards coxofemoral joint block after two days.

In the reassessment, we observed delayed fracture healing associated with medial migration of the cephalic screw of the nail to the pelvic region (►**Fig. 3**), without signs of peritoneal irritation upon physical examination.

The patient was readmitted and, after five days, she underwent exploratory laparoscopy with identification of the screw in the retroperitoneal region, close to the internal iliac vessels, without evidence of damage to organs or intra-abdominal or pelvic structures (►**Fig. 4**), which enabled the removal of the metallic implants by lateral access.

After one week, she underwent a new osteosynthesis with direct fracture reduction and fixation with principle of relative stability, with a plate locked to the proximal femur (DePuy Synthes, Raynham, MA, US) associated with cancellous bone graft from the iliac bone (►**Fig. 5**). The patient

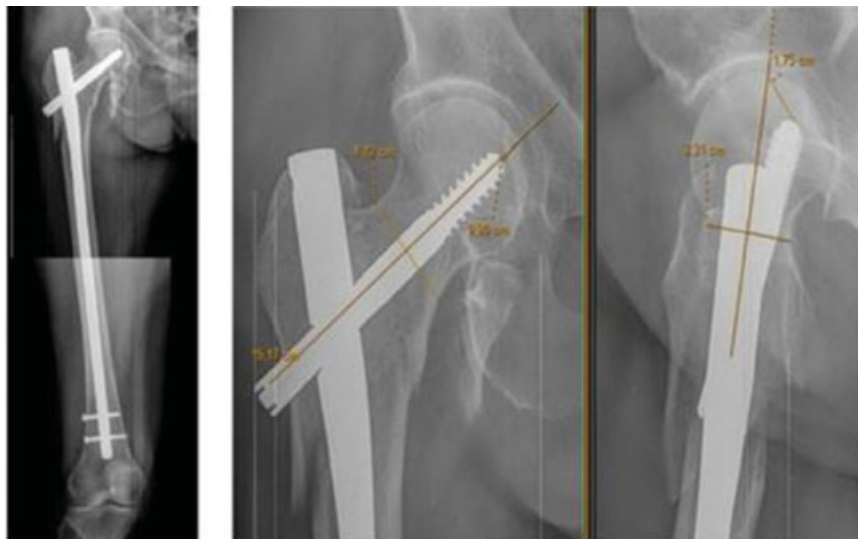


Fig. 2 Right femur AP radiographs + AP and right hip profile showing TAD calculation.



Fig. 3 Right hip AP radiograph showing the medial migration of the cephalic screw.



Fig. 4 Laparoscopic image showing the cephalic screw near the internal iliac vessels.

presented a satisfactory postoperative evolution, and was discharged after four days, in good condition to restart the rehabilitation process with partial load (15% of body weight). After eight weeks, fracture healing was evidenced, which enabled movement with full load.

Discussion

In the literature review, we did not identify the complication of medial migration of the cephalic screw in long-

stem implants, as all reports found were associated with short femoral nails. Nor was the treatment of this complication found in association with proximal femur locked plaque.

Tauber and Resch³ reported a case of intrapelvic migration of the cephalic screw with perforation of the sigmoid portion of the intestine in a patient who subsequently underwent total hip arthroplasty (THA) cemented with a long revision femoral stem. Flint et al⁴ reported a case of intrapelvic migration in an 82-year-old female patient, 7 months after the fixation of an unstable pertrochanteric fracture, and a cementless THA was performed.

Heineman et al⁵ described the case of an 83-year-old woman who, after three weeks of fixation, presented pin migration to the pelvic region, and was submitted to a two-stage treatment: initially, removal of the implants, and later, cementless THA. Takasago et al⁶ presented a case of a 63-year-old woman with medial migration, 6 weeks after surgery. They also performed the review in two stages, with implant removal and subsequent THA.

Another migration report was made by Thein et al⁷ in a patient with five weeks of osteosynthesis, in whom the internal iliac artery was embolized by the contact evidenced on computed tomography (CT), and, afterwards, THA was performed. Li et al² described a case of a 77-year-old woman who had a short cephalomedullary implant that was medially displaced in the 10th postoperative week. The patient underwent osteosynthesis review with placement of a shorter cephalic pin associated with a cannulated screw for anterior cancellous bone. Lucke et al⁸ also described two cases of medial migration treated with partial arthroplasty of the bipolar hip.

Most recently, Pinheiro et al⁹ described the same complication in a 92-year-old woman after 5 weeks of osteosynthesis with a short cephalomedullary nail. The patient underwent plate and sliding screw revision, evolving with a cut-out observed six months postoperatively, which was not reopened due to refusal of the patient and her relatives.

Several causes have been postulated to justify this potentially serious complication. Weil et al¹⁰ tested five cephalomedullary implants and created a biomechanical simulation model. They identified that certain conditions would need to be present to achieve medial migration, such as lateral support deficiency and unstable medial cortex, constant friction within the femoral head, and varus axial load. They also suggest that the phenomenon seems to present a higher risk of occurring in unstable fractures. Other possible causes also reported in the literature are cephalic screw misplacement, improper insertion of the anti-rotation locking device, increased TAD, femoral head damage by repetitive milling, and avascular necrosis of the femoral head.⁶

Medial migration of the cephalic screw is an uncommon complication in the orthopedic literature, without description of reported cases associating it with the long cephalomedullary nail or with the treatment with proximal femur locking plate.

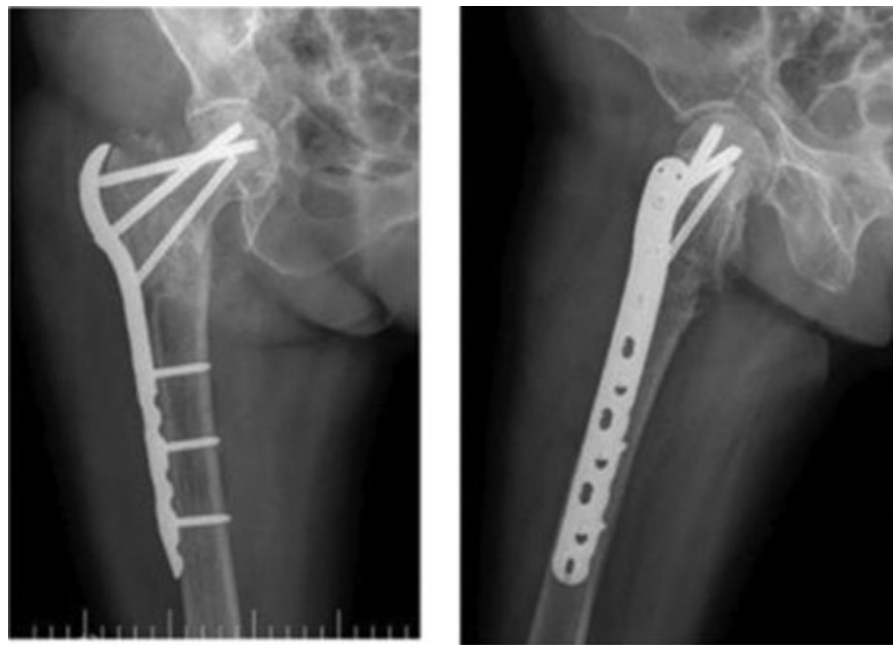


Fig. 5 Right hip AP and profile radiographs after definitive treatment.

Conflict of Interests

The authors have no conflict of interests to declare.

References

- Campbell WC, Canale ST, Beatty JH. Campbell's operative orthopaedics. 11th ed. Philadelphia: Mosby/Elsevier; 2008
- 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; 5:62
- Tauber M, Resch H. Sigmoid perforation after medial migration of lag screw in gamma nailing. *Arch Orthop Trauma Surg* 2006;126(02):118–122
- Flint JH, Sanchez-Navarro CF, Buckwalter JA, Marsh JL. Intrapelvic migration of a gamma nail lag screw: review of the possible mechanisms. *Orthopedics* 2010;33(04):
- Heineman DJ, van Buijtenen JM, Heuff G, Derksen EJ, Pöll RG. Intra-abdominal migration of a lag screw in gamma nailing: report of a case. *J Orthop Trauma* 2010;24(12):e119–e122
- Takasago T, Goto T, Toki S, et al. Intrapelvic migration of the lag screw in intramedullary nailing. *Case Rep Orthop* 2014;2014:519045
- Thein E, De Cannière A, Burn A, Borens O. Medial migration of lag screw after gamma nailing. *Injury* 2014;45(08):1275–1279
- Lucke M, Burghardt RD, Siebenlist S, Ganslmeier A, Stöckle U. Medial migration of lag screw with intrapelvic dislocation in gamma nailing—a unique problem? A report of 2 cases. *J Orthop Trauma* 2010;24(02):e6–e11
- Pinheiro AC, Alpoim B, Félix A, Alves C, Sousa C, Rodrigues A. Medial migration of the intramedullary Gamma 3 nail - a case report. *Rev Bras Ortop* 2016;51(06):720–724
- Weil YA, Gardner MJ, Mikhail G, Pierson G, Helfet DL, Lorich DG. Medial migration of intramedullary hip fixation devices: a biomechanical analysis. *Arch Orthop Trauma Surg* 2008;128(02):227–234