

Bilateral Femoral Neck Fracture Secondary to Seizure: Treatment with Total Hip Arthroplasty by the Direct Anterior approach*

Fratura bilateral do colo do fêmur secundária a crise convulsiva: Tratamento com artroplastia total do quadril pelo acesso anterior direto

Osamu de Sandes Kimura¹ Rui Felipe Pache de Moraes¹ Marco Bernardo Cury Fernandes¹ 
Emílio Henrique Carvalho Freitas¹ Alexandre Seabra¹ George Kalif Lima¹

¹Instituto Nacional de Traumatologia e Ortopedia (Into), Rio de Janeiro, RJ, Brazil

Address for correspondence Osamu de Sandes Kimura, Instituto Nacional de Traumatologia e Ortopedia (Into), Rio de Janeiro, RJ, Brasil (e-mail: osamukimura@gmail.com).

Rev Bras Ortop 2020;55(2):254–257.

Abstract

Bilateral fracture of the femoral neck secondary to seizure is a rare event. The occurrence of these lesions is related to vigorous tonic-clonic muscular contractions and to the use of anticonvulsive medications. Femoral neck fractures in young adults treated with total hip arthroplasty are the exception, and the choice of surgical access should consider several factors; the direct anterior approach is a possibility for total hip arthroplasty.

Keywords

- ▶ femoral neck fractures
- ▶ arthroplasty, replacement, hip
- ▶ seizure
- ▶ epilepsy

The authors present the case of a 36-year-old male with bilateral fracture of the femoral neck secondary to seizure, and in regular use of phenytoin. Due to the risk of fixation failure and prolonged evolution time, bilateral total hip arthroplasty was the procedure of choice. The choice of the approach should take into consideration the patient's anatomy, material availability, and surgeon's experience. Thus, the greater ease of preparation and positioning of the patient, the shorter hospital stay, the early postoperative rehabilitation, and the mastery of the technique by the surgeon, are possible justifications for the adoption of the direct anterior approach.

Resumo

A fratura bilateral do colo do fêmur secundária à crise convulsiva é um evento raro. A ocorrência dessas lesões está relacionada a contrações musculares tônico-clônicas vigorosas e ao uso de medicações anticonvulsivantes. As fraturas do colo do fêmur no adulto jovem tratadas com artroplastia total do quadril são exceção e a escolha do acesso cirúrgico deve levar em consideração diversos fatores; o acesso anterior direto é uma possibilidade para artroplastia total do quadril. Os autores apresentam o caso de

* Study developed at Hip Surgery Center, National Institute of Traumatology and Orthopedics (Into), Rio de Janeiro, RJ, Brazil. Originally Published by Elsevier Editora Ltda.

Palavras-chave

- ▶ fraturas do colo femoral
- ▶ artroplastia de quadril
- ▶ convulsões
- ▶ epilepsia

um homem de 36 anos com fratura bilateral do colo do fêmur secundária a crise convulsiva e em uso regular de fenitoína. Devido ao risco de falha da fixação e ao tempo de evolução prolongado, optou-se pela artroplastia total do quadril bilateral. A escolha da via de acesso deve levar em consideração a anatomia do paciente, a disponibilidade de materiais e a experiência do cirurgião. Dessa forma, a maior facilidade de preparo e posicionamento do paciente, o menor tempo de internação, a reabilitação pós-operatória precoce e o domínio da técnica pelo cirurgião são possíveis justificativas para a adoção do acesso anterior direto.

Introduction

Bilateral fracture of the femoral neck secondary to seizure is a rare event, with few cases described in the literature.¹⁻³ The occurrence of these lesions is related to vigorous tonic-clonic muscular contractions, which generate fractures or dislocations of the proximal segments of the members.¹ In addition, the use of anticonvulsant medications lead to changes in the bone matrix, which predisposes to fractures.^{4,5}

Femoral neck fractures in young adults are preferentially treated with fixation; total hip arthroplasty is indicated in exceptional cases.⁶ The choice of surgical access should consider several factors, and the direct anterior approach is a possible access for hip arthroplasty.

Our objective is to report the case of a young patient with bilateral fracture of the femoral neck after seizure, managed with total direct anterior hip arthroplasty.

Case Report

The patient was 36 years old, male, white, and worked as a motorcycle courier. Previous history of traumatic brain injury 4 years earlier, submitted to neurosurgical procedures. He had reported seizures since then, under continuous phenytoin use and regular neurological follow-up, but the seizures persisted.

The patient was referred to the service with 30 days of evolution due to bilateral femoral neck fracture secondary to seizure. Initially treated in his home city, the patient pre-

sented pain and functional limitation in both limbs. He denied history of associated trauma, but the seizure was witnessed by a relative.

On physical examination, he presented bilateral external rotation deformity, associated with functional limitation and pain. Radiographic images showed bilateral deviated subcapital fracture, with resorptive signs in both femoral necks (▶ Fig. 1).

After clinical discussion, we opted for bilateral total hip arthroplasty through the direct anterior approach. The procedure was performed in a single surgical time, by the same surgeon, without changing the position of the patient. No traction device was needed, it was made on a traditional operating table in the supine position (▶ Fig. 2). Both members were prepared at the same time (▶ Fig. 3). Cementless bilateral total hip arthroplasty was chosen, the components used were the Summit Tapered Hip System femoral stem and the acetabular component of the Pinnacle Hip Solutions – DePuy Synthes type. The tribological pair used was the 32 mm diameter metal head associated with the cross-linked polyethylene insert of the model ALTRX Altra-Linked™ Polyethylene (▶ Fig. 4).

Discussion

Patients with epilepsy present two to six times higher risk of fractures than the general population, whether from falls or seizures.⁴ Antiepileptic drug use is associated with decreased bone mineral density and increased risk of fractures.^{4,5} Middle-aged men with poorly controlled epilepsy are the patients most subject to post-seizure fractures due to more developed musculature.⁵ In the case presented, it is believed that the cause of the fracture was multifactorial, due to osteopathy secondary to



Fig. 1 Anteroposterior radiograph of the preoperative pelvis.



Fig. 2 Femoral exposition.



Fig. 3 Patient Positioning and Preparation.



Fig. 4 Anteroposterior radiograph of the postoperative pelvis.

phenytoin and tonic-clonic contractures, the seizure was not the cause, but the triggering event of the fractures.

Femoral neck fracture fixation is the preferred option in patients under 60 years; arthroplasties are indicated in older patients or in specific situations.⁶ Poor reduction in femoral neck fracture after osteosynthesis is known to be the most important predictor of fixation failure. However, there is no evidence that there is a direct correlation between fixation time versus the occurrence of femoral head osteonecrosis.⁶ Duckworth et al⁷ described a direct correlation between comorbidities affecting bone quality and fixation failure in

deviated femoral neck fractures in young adults. According to the same authors, patients over 40 years old with bone quality alterations are possible candidates for total hip arthroplasty due to the high risk of fixation failure.

In this case, although the literature does not show a direct correlation between the time of evolution and the occurrence of femoral head osteonecrosis, excessively prolonged development time associated with possible osteometabolic alteration, and the high risk of fixation failure, led us to arthroplasty, despite fears about the possibility of dislocation.

Bilateral total hip arthroplasty by the right anterior access, at the same surgical time, was performed due to single anesthesia, lower financial costs and convenient positioning. In addition, Shao et al⁸ reported that one-time total hip arthroplasty has a lower cumulative risk of complications than two-stage total hip arthroplasty, except for periprosthetic infection.

The access route is fundamental for hip arthroplasty. Several factors must be considered, such as the anatomy of the patient, the experience of the surgeon, and the availability of material. Direct anterior access provides better early postoperative rehabilitation, shorter hospital stay, lower need for opioids, and shorter surgical incision.^{9,10} However, this access is associated with increased blood loss, increased surgical time, and a long learning curve.^{9,10} Posttotal hip arthroplasty dislocation rates in patients with femoral neck fractures are higher than in patients undergoing the same procedure due to coxarthrosis. But the choice of access does not change these rates significantly.¹⁰ According to Marratt et al,¹⁰ the anterior access presents dislocation rates similar to those of the posterolateral access with posterior capsular repair; there is no difference in the incidence of dislocation. Thus, greater ease of preparation and positioning of the patient, shorter hospital stay, early postoperative rehabilitation, and mastery of the technique by the surgeon are possible justifications for the adoption of direct anterior access.

Conclusion

The occurrence of fractures in epilepsy patients is increased by several factors. The use of anticonvulsant medications that lead to alterations in bone quality, associated with seizures, may lead to bilateral femoral neck fractures.^{4,5} The hip access route for arthroplasty should consider the anatomy of the patient, the experience of the surgeon, and availability of material. Direct anterior access is a viable option, with clinical outcomes similar to those of posterolateral access.

Conflict of Interests

The authors have no conflict of interests to declare.

References

- 1 Grimaldi M, Vouaillat H, Tonetti J, Merloz P. Simultaneous bilateral femoral neck fractures secondary to epileptic seizures: treatment by bilateral total hip arthroplasty. *Orthop Traumatol Surg Res* 2009;95(07):555-557

- 2 Ribacoba-Montero R, Salas-Puig J. Simultaneous bilateral fractures of the hip following a grand mal seizure. An unusual complication. *Seizure* 1997;6(05):403–404
- 3 Vanderhoof E, Swiontkowski M. Bilateral femoral neck fractures following a grand mal seizure. *Ann Emerg Med* 1994;24(06):1188–1191
- 4 Mattson RH, Gidal BE. Fractures, epilepsy, and antiepileptic drugs. *Epilepsy Behav* 2004;5(Suppl 2):S36–S40
- 5 Patil MM, Sahoo J, Kamalanathan S, Pillai V. Phenytoin Induced Osteopathy -Too Common to be Neglected. *J Clin Diagn Res* 2015;9(11):OD11–OD12
- 6 Araujo TPF, Guimaraes TM, Andrade-Silva FB, Kojima KE, Silva JdosS. Influence of time to surgery on the incidence of complications in femoral neck fracture treated with cannulated screws. *Injury* 2014;45(Suppl 5):S36–S39
- 7 Duckworth AD, Bennet SJ, Aderinto J, Keating JF. Fixation of intracapsular fractures of the femoral neck in young patients: risk factors for failure. *J Bone Joint Surg Br* 2011;93(06):811–816
- 8 Shao H, Chen CL, Maltenfort MG, Restrepo C, Rothman RH, Chen AF. Bilateral total hip arthroplasty: 1-stage or 2-stage? A meta-analysis. *J Arthroplasty* 2017;32(02):689–695
- 9 Meermans G, Konan S, Das R, Volpin A, Haddad FS. The direct anterior approach in total hip arthroplasty: a systematic review of the literature. *Bone Joint J* 2017;99-B(06):732–740
- 10 Maratt JD, Gagnier JJ, Butler PD, Hallstrom BR, Urquhart AG, Roberts KC. No difference in dislocation seen in anterior vs posterior approach total hip Arthroplasty. *J Arthroplasty* 2016;31(9, Suppl)127–130