SAS Journal of Surgery
Abbreviated Key Title: SAS J Surg
ISSN 2454-5104
Journal homepage: https://www.saspublishers.com

OPEN ACCESS

Orthopedics & Traumatology

Peri-Prothetic Femoral Hip Fractures: Retrospective Study of 15 Cases

Gomes Pedro[1*], Reda Badaoui[1], Adil Tamdy[1], Mohamed Boussaidan[1], Youssef Benyas[1], Jalal Boukhriss[1], Driss Benchaba[1], Bouchaib Chafry[1]

[1]Orthopedics and Traumatology Department of the Mohamed V-Rabat Military Training Hospital, Rabat, Morocco

DOI: 10.36347/sasjs.2024.v10i07.032 | **Received:** 12.06.2024 | **Accepted:** 22.07.2024 | **Published:** 30.07.2024

***Corresponding author:** Gomes Pedro
Orthopedics and Traumatology Department of the Mohamed V-Rabat Military Training Hospital, Rabat, Morocco

Abstract **Case Report**

A periprosthetic fracture occurs in a bone around or near a prosthetic implant. Given the increasing number of prostheses fitted, its incidence is constantly increasing. There are several risk factors, some of which are related to the patient and others to the implant. The key points of the diagnosis are the history and the radiological assessment, since they will make it possible to distinguish between an implant still fixed and a loosened implant. This distinction is essential for treatment, which may be conservative treatment, osteosynthesis, or prosthesis replacement, depending on the general condition of the patient and the local status. The aim of this study is to evaluate the results of the different methods, propose indications according to criteria linked to the terrain, the type and the Location of the fracture and the state of the prosthetic fixation at the time of the fracture.

Keywords: Fracture, peri-prosthetic, hip.

INTRODUCTION

A peri-prosthetic fracture occurs by definition in a bone located around or near a prosthetic implant. It can occur during implantation of the prosthetic implant or, more frequently, after the intervention, during trauma. The number of peri-prosthetic fractures is likely to increase exponentially, for several reasons: the number of primary prostheses placed increases in parallel with the increase in life expectancy of the population. The excellent results obtained with modern implants have led to an expansion of indications, particularly in younger and more active subjects, who will therefore live even longer with their prosthesis in place, and will therefore also be at greater risk of suffering trauma during their life. After surgery, especially in the lower limb, local osteopenia often appears following underuse, which increases the risk of fracture even after minor trauma. Fractures of the femur occurring in a hip prosthesis pose difficult therapeutic problems due to the often advanced age of the patients, osteoporosis and the threat that these fractures pose to the fixation of the sometimes already failing prosthesis. The analysis criteria concerned the patient and the type of fracture using the modified Vancouver classification SO. FCOT (Figure 1) for the hip. The analysis of the surgical technique, the perioperative evolution and the bone consolidation made it possible to evaluate.

METHODS

This is a retrospective study of 15 patients treated between 2016 and 2021 in the orthopedics and traumatology department of the Mohamed V-Rabat military training hospital and reviewed with an average follow-up of 7 months. Femur fractures occurring on all types of hip prosthesis (total, intermediate) were included, regardless of their level and treatment. Pathological fractures, intraoperative fractures and fractures occurring during the first three months following placement of the prosthesis were excluded from this study. The fracture was analyzed using the Vancouver classification [6-8]. Complications were recorded on the one hand for the postoperative period until the fifteenth day and on the other hand until the sixth month. The results were evaluated at maximum follow-up, by clinical and radiographic examination.

RESULTS

Patient: Among these 15 patients, 6 were men (40%) and 9 women (60%). The average age is 67 years, with extreme ages of 40 and 88 years. 10 patients lived at home and independently and 5 patients lived in a medical facility. 8 patients walked without a cane, 3 patients used two canes, 2 patients moved with a walker and 2 patients were bedridden. The affected side was straight in 80% of cases. The initial trauma was a simple fall from height in the majority of patients (13 cases or 86%), a public road

accident in 2 patients. the fracture occurred in 9 cases on a total hip prosthesis (60%), 6 on an intermediate prosthesis (40%). According to the Vancouver classification (Table 1), the fractures are distributed between 1 case of type A (6.66%), 12 cases of type B (80%) and 2 cases of type C (13.33%) (Figure 1, Figure 2, Figure 3, Figure 4).

Table 1: Vancouver classification for fractures peri-prosthetics of femur in presence of a prosthesis stem _ total hip _

Types	Location of there fracture	Subtypes _
A	Region trochanteric	A_G: big trochanter A_L: lesser trochanter
B	Around Or just distal to the stem	B1: _ stem fixed B2: _ stem unsealed B_3: stem unsealed and quality bone inadequate
C	GOOD distal has there stem	

Table 2: Treatment in depending on the type of fracture according to the Vancouver classification

	Orthopedic	Osteosynthesis		Change of prosthesis
		Strapping alone	Plate +/- strapping	
A	1	-	-	-
B1	-	6	3	-
B2	-	1	-	1
B3	-	1	-	-
C	-	-	2	-

Figure 1: Vancouver type B1 fracture treated with cerclage alone

Figure 2: Change of total hip prosthesis (THA) stem for type B_2 fracture there classification of Vancouver, allowing a mobilization early in charge according to THE pain

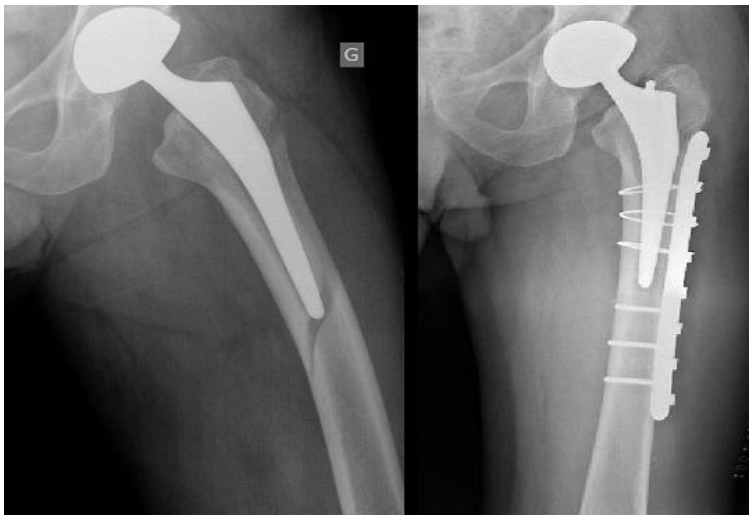

Figure 3: Vancouver type B1 fracture with a split below the stem plate treated

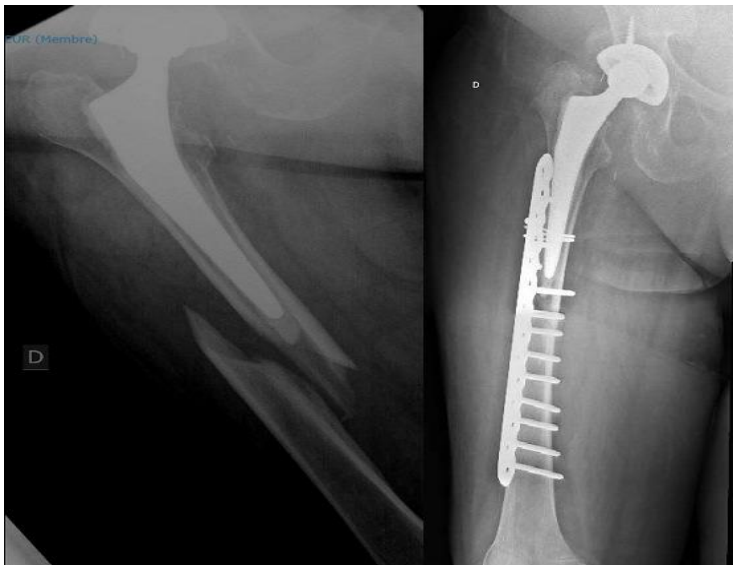

Figure 4: Vancouver type C fracture treated with a screwed plate and cerclage

Treatment: The treatment was a simple orthopedic treatment for a single case (6.66%) and surgical for the other cases (93.33%): cerclage alone for 8 patients, osteosynthesis by plate for 5 patients and change of the femoral stem with cerclage for a single patient (Table 2). The average time from the intervention to the trauma was 6 days and the duration of hospitalization was on average 13 days.

Mortality: The overall mortality rate at 6 months was 6.66% (only one case).

Complications: The complication rate at 6 months was 20% including two immediate post-operative complications: a case of superficial infection of the wall (6.66%) and a case of phlebitis of the leg (6.66%) treated medically and a late complication at 5 months: dislocation of a PIH following a fall (6.66%) reduced by external maneuver.

Consolidation: The fracture was consolidated in all cases and bone fixation was good in 86% (13 cases) with no obvious signs of loosening.

DISCUSSION

Patient: The average age in our series is similar to other series: 67 years for Beals and Tower [9], 69 years for Haddad and Duncan [10] and 68 years for Berry [11]. Peri-prosthetic femoral fractures most often affect women living at home, probably due to lack of help. This female predominance is found in the main series of literature [12-15]. We found minimal trauma in the vast majority of cases, like Beals and Tower [9].

Mortality: The seriousness of these peri-prosthetic fractures is underlined by the mortality rate which reaches 6.66% at 6 months. No series in the literature specifically analyzes the mortality and morbidity rate, the various published series, always retrospective, focusing mainly on describing the results of the different surgical techniques.

Complications: the type of treatment does not seem to have influenced the rate of infection and dislocation. Cases of nonunion are absent in our series, however we have a high rate of infection and dislocation compared to other series.

Therapeutic indications: The therapeutic choice in the face of a hip prosthesis fracture must remain realistic and is based on 3 main parameters: the general condition of the patient, its associated defects and the precise radiological evaluation of the fracture which allows a consensual classification for therapeutic - the experience of the surgeon in prosthetic revisions and the equipment available, type A or C fractures do not seem to pose a problem of therapeutic indication, most often relating to orthopedic treatment and osteosynthesis respectively , except in the case of obvious loosening. Type B fractures pose the most difficulties in the choice between osteosynthesis and prosthesis change. For B3 fractures, where the fixation is failing, it seems logical to change the prosthesis [16-18]. For types B2 we offer osteosynthesis to patients with low functional demand and/or in very poor general condition and prosthetic change for others. With regard to B1 fractures, osteosynthesis seems to us to be the rule.

Prevention of peri-prosthetic fractures: the occurrence of a femur fracture around a hip prosthesis and its management are accompanied by a high rate of complications and can be life-threatening in defective or fragile patients. Which requires good mastery of the installation of hip prostheses, preferring long femoral stems as second intention and regularly monitoring the loose prostheses of the elderly person, particularly in the event of excessive varising forces before the occurrence of a fracture.

CONCLUSION

As the number of hip replacements increases, these once rare fractures are becoming more common. They pose the problem of their management due to age and poor bone quality. Osteosynthesis must be reliable and respect the criteria of conventional mechanics.

State of knowledge on the subject

An increasingly common pathology due to the increase in the number of hip prostheses fitted worldwide; if the injury diagnosis does not pose a problem, the therapeutic approach to adopt often remains intuitive based on the experience of the surgeon and the type of fracture.

Contribution of our study to knowledge

Fracture often affects the elderly and is life-threatening; requires solid osteosynthesis or even prosthetic replacement from the outset; monitor any prosthesis regularly and detect radiological signs favoring a peri-prosthetic fracture.

Conflicts of Interest: The authors declare no conflict of interest

Author Contributions

All authors contributed to the writing of this manuscript, all read and approved the final version.

REFERENCES

1. Dg, L. (1998). Periprosthetic fracture of the femur after total hip arthroplasty: treatment and results to date. *Instr Course Lect*, *47*, 243-249.
2. Lindahl, H., Malchau, H., Herberts, P., & Garellick, G. (2005). Periprosthetic femoral fractures: classification and demographics of 1049 periprosthetic femoral fractures from the Swedish National Hip Arthroplasty Register. *The Journal of arthroplasty*, *20*(7), 857-865.

3. Adolphson, P., Jonsson, U., & Kalen, R. (1987). Fractures of the ipsilateral femur after total hip arthroplasty. *Archives of orthopaedic and traumatic surgery*, *106*, 353-357.
4. Fredin, H. O., Lindberg, H., & Carlsson, A. S. (1987). Femoral fracture following hip arthroplasty. *Acta Orthopaedica Scandinavica*, *58*(1), 20-22.
5. Garcia-Cimbrelo, E., Munuera, L., & Gil-Garay, E. (1992). Femoral shaft fractures after cemented total hip arthroplasty. *International orthopaedics*, *16*(1), 97-100.
6. Brady, O. H., Garbuz, D. S., Masri, B. A., & Duncan, C. P. (2000). The reliability of validity of the Vancouver classification of femoral fractures after hip replacement. *The Journal of arthroplasty*, *15*(1), 59-62.
7. Duncan, C. P., & Masri, B. A. (1995). Fractures of the femur after hip replacement. *Instr Course Lect*, *44*, 293-304.
8. Dunwoody, J., Duncan, C. P., Younger, A., & Masri, B. A. (1998). A review of the reliability and validity of a new classification system for periprosthetic fractures of femur in hip arthroplasty. *J Bone Joint Surg (Br)*, *80*(suppl 1), 17.
9. Beals, R. K., & Tower, S. S. (1996). Periprosthetic fractures of the femur: an analysis of 93 fractures. *Clinical Orthopaedics and Related Research®*, *327*, 238-246.
10. Haddad, F. S., & Duncan, C. P. (2003). Cortical onlay allograft struts in the treatment of periprosthetic femoral fractures. *Instructional Course Lectures*, *52*, 291-300.
11. Berry, D. J. (2002). Management of periprosthetic fractures: the hip. *The Journal of arthroplasty*, *17*(4), 11-13.
12. Sarvilinna, R., Huhtala, H., Sovelius, R., Halonen, P., Nevalainen, J., & Pajamäki, K. J. (2004). Factors predisposing to periprosthetic fracture after hip arthroplasty A case (n= 31)-control study. *Acta Orthopaedica Scandinavica*, *75*(1), 16-20.
13. Siegmeth, A., Menth-Chiari, W., Wozasek, G. E., & Vecsei, V. (1998). Periprosthetic femur shaft fracture. Indications and outcome in 51 patients. *Der Unfallchirurg*, *101*(12), 901-906.
14. Somers, J. F. A., Suy, R., Stuyck, J., Mulier, M., & Fabry, G. (1998). Conservative treatment of femoral shaft fractures in patients with total hip arthroplasty. *The Journal of arthroplasty*, *13*(2), 162-171.
15. Tsiridis, E., Narvani, A. A., Haddad, F. S., Timperley, J. A., & Gie, G. A. (2004). Impaction femoral allografting and cemented revision for periprosthetic femoral fractures. *The Journal of Bone & Joint Surgery British Volume*, *86*(8), 1124-1132.
16. Berry, D. J. (2003). Treatment of Vancouver B3 periprosthetic femur fractures with a fluted tapered stem. *Clinical Orthopaedics and Related Research®*, *417*, 224-231.
17. Ko, P. S., Lam, J. J., Tio, M. K., Lee, O. B., & Ip, F. K. (2003). Distal fixation with Wagner revision stem in treating Vancouver type B2 periprosthetic femur fractures in geriatric patients. *The Journal of arthroplasty*, *18*(4), 446-452.
18. Springer, B. D., Berry, D. J., & Lewallen, D. G. (2003). Treatment of periprosthetic femoral fractures following total hip arthroplasty with femoral component revision. *JBJS*, *85*(11), 2156-2162.