Results of treatment of fractures of the femoral neck in adults by intermediate hip Monoblock Prosthesis: About 125 cases

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DOI: https://doi.org/10.22271/ortho.2019.v5.i4j.1728

Abstract
Introduction: Fractures of the upper extremity of the femur (EFSF) occur by far, most frequently in the elderly and are the most serious because of their morbidity, mortality and their economic impact. Partial joint arthroplasty (PIH) is a solution of choice for the management of femoral neck fractures. The objective of our study was to analyze the therapeutic results after monobloc hip joint arthroplasty.

Material and Methods: This is a bi-center retrospective study from January 2014 to June 2017. A total of 125 cases were identified in 73 women and 52 men with a mean age of 68 years +/- 10.12. The average time between the first consultation and the surgery was 12.30 days (extreme: 2-548 days). The etiologies were dominated by falls (72.2%). The study parameters were the therapeutic data (recent fracture or nonunion, type of anesthesia, approach, type of implant, possible intraoperative complications) and postoperative anatomo-radiological data (stem orientation, femoral offset, ILMI, seal quality, possible complications and functional assessment according to the PMA score).

Results: There were 96 recent fractures and 29 nonunions. The approach was translateral (86 patients) and postero-external (39 patients). Prosthesis sizes 46 and 48 were the most used. Cemented stems represented 87.2% of cases. In intraoperative 5 trochanteric cracks, 1 acetabular fracture and one wrong note were noted. A node earner decrease (mean 16.3 months for extremes of 6 and 42 months), 76% of the stems were medialized against 9% lateralized. The femoral offset was restored in 32%, increased in 36% and decreased in 32% of cases. The lower limbs were iso-qual in 37.6% of cases and an ILMI of 0.5 cm in 62.4% of patients. Sealing was good in 89%. We observed 20.8% of cases of lameness, 4% of cases of early dislocation, 3.2% of cases of loosening. According to the PMA rating, our results were satisfactory in 74.4% and bad in 7.2%.

Conclusion: In view of our results, PIH ensures, in the short and medium term, satisfactory functional results. A mastery of the technique and a rigor in its realization must make it possible to ensure a satisfactory survival of the implant.

Keywords: Intermediate prosthesis, indications, evaluation

Introduction
Fractures of the upper extremity of the femur (EFSF) occur by far, most frequently in the elderly and are the most serious because of their morbidity, mortality and their economic impact [1]. Femoral fracture is a frequently encountered lesion in Traumatology. The arthroplasty hip has provided solutions in support of care mainly with fractures in the elderly. Intermediate hip prosthesis (PIH) (Figure 1) is a therapeutic choice next to the prosthesis Moore and total arthroplasty. It’s simplest embodiment, there is less bleeding as well as good short and medium term results [2].

The objective of our study was to analyze the therapeutic results after monobloc hip joint arthroplasty.

Material and Methods
Equipment
It is retrospective study bi-centric spread over a 46 months period January 2014 to June 2017. In this study, we included patients who had been operated on for articular replacement by a
monobloc PIH with an armored cup following a recent fracture of the femoral neck or complicated nonunion and followed until the last follow-up. All patients with incomplete, unreviewed or unexamined records (49 files). A total of 125 files were retained in 125 patients, 73 women for 52 men with a mean age of 68.18 years with extremes of 59 to 90 years. The average time between consultation and surgery was 12, 30 days to two days of extremes and 548 days. The dominions were dominated by falls with 72.2% of cases. The right hip was the most affected with 52% of the lesions. The areas of occurrence were arterial hypertension and diabetes predominating with 32.8% and 10.6%, respectively. There were 96 recent fractures and 29 non-unions.

**Methodology**

The parameters Studied were

- Therapeutic data we are interested in the classification of Garden for recent fractures or nonunion neck for old fractures, type of anesthesia (ALR and / or AG), the surgical approach (Moore and Hardinge), type of implant (PIH piece shielded with cup sizes), any intraoperative complications (fractures or fissures according to the Vancouver classification \(^3\) and postoperative (infections, dislocations, loosening.....).

- Anatomo-radiological data postoperative femoral offset, the unequal leg length (ILMI), has the quality of scellement, the orientation of the rod and a presence of calcification according to the classification of Brooker (Figure 2) \(^4\).

- The measurements were performed by the same operator postoperatively following the radiographic criteria for implantation of the intermediate hip prosthesis by means of a pelvis face x-ray.

- The postoperative functional evaluation was made using the Postel Merle d’Aubigné score (PMA) \(^5\) at the last follow-up.

**Results**

The approach was transgluteal in 86 patients compared with 39 cases of the postero-external route. The prosthesis sizes 46 and 48 were the most used. We noted 5 cases of femoral fissures (trochanteric region) type A according to the Vancouver classification, 1 case of acetabular fracture and 1 case of femoral false-tooth

The postoperative evaluation was performed after an average follow-up of 16.3 months for 6 and 42 months extremes. At the anatomo-radiological level, 76% (95 cases) of the stems were centered, 16% medialized against 9% of lateralized stems; 87.2% (109 cases) were cemented with 89% good sealing. The femoral offset was restored in 32% of cases, increased in 36% of cases and decreased in 32% of cases. The limbs were iso-equal in 37.6% and an ILMI less than or equal to 1 cm was found in 62.4% of patients.

According to the rating of PMA, our results were satisfactory in 74.4% of the cases and bad in 7.2% of the cases. Postoperative complications were marked by an infectious complication (0.8%), early dislocations (Figure 3) and loosening with respectively 4% and 3.2%.

**Discussion**

It will mainly focus on the therapeutic results and data from the literature. Intraoperatively, mechanical complications accounted for 5.6% with 5 cases of trochanteric fissures, one of which was treated by strapping and the other four cases on uncemented PIH were left as they were. A case of perforation of the acetabulum and a false diaphyseal route were noted. They are frequent and occur respectively during the extraction of the femoral head or the reduction of the PIH.
The fissures of the femur are minor incidents that do not reach the femoral diaphysis without significant repercussions on the function of the hip, especially since there are pathways in which osteotomies are performed. On the other hand, the support will be delayed by about one month [6]. Pourreyron [7] also reports 7 cracks and 3 perforations on a series of 132 prostheses without any repercussions on the function. We did not have perioperative or prothetic postoperative fractures.

In post-operative, at the Anatomo-radiological level, 4 criteria were used: the quality of the seal, the orientation of the stem, the femoral offset and the ILMI.

In our series, we noted a good quality of the cementation in 89% of the cases. Breusch [8] states that with the new so-called second-generation technique, the revision rate can be reduced by 20%. The objectives of the filling are essentially the reinforcement of the bone strength but also the fact of avoiding empty residual spaces, factors favoring complications. The filling must therefore make a real “sealing” of the cavity, the filling material to creep into the slightest crevice. A smooth surface coating is the only criterion retained which guarantees good cementation. The first postoperative image allows to determine the thickness of the cement mantle. A border immediately present postoperatively speaks in favor of insufficient curettage of the cancellous bone [9]. The conditions of a good cementation are: the thickness of the cement mantle (2 to 3 mm at the femoral level), the type of cement, the rigor of the technique, the appreciation of the local conditions and the quality of preparation granted to the making of cement. The main criterion of comparison is the survival time of the implants.

In relation to the orientation of the stem, our series noted a neutral position of the stem in 76% of cases. The principle is to fix the rod in the bone in a good position while respecting the anatomy of the patient. Since the stem is inserted into the medullary canal with 15° anteverision, the femur loses much of its natural elasticity because of the artificial hip stem, the fixation of the lower limb, and the stress of loosening related to an increase in pressure [10]. This is an inevitable complication up to the present time. Only better surgical technique and correct implantation can delay its onset. Loosening is a frequent and serious complication, it is the most troublesome evolutionary problem of hip hemiarthroplasty, this failure sooner or later leads to revision made difficult by the degradation of bone support. Aseptic loosening is the most common complication, defining the survival of implants. It can be of two types: mechanical (linked to constraints and fixation) or biological (related to peri-prosthetic osteolysis). Most often, loosening is due to these two interlocking factors, the mechanical failure of implant fixation being favored by peri-prosthetic osteolysis [21]. Intermediate prostheses were created to overcome the acetabular complications of the Moore prosthesis and improve the prognosis of conventional femoral prostheses. It is certain that the intermediate prosthesis reverses the acetabulum degradation and makes it asymptomatic the inequality of length.

The functional evaluation involved 125 patients with a mean follow-up of 496.41 days. Our functional results were satisfactory in 74.4% (excellent and good) according to the rating of Postel-Merle d’Aubigné (PMA). This result is close to those found in the literature [22].

The postoperative evaluation is generally satisfactory, the PIH is a good alternative to other types of arthroplasty of the hip. However, 9 of our patients had a bad result which in part could be explained by the complications that occurred in the postoperative period.

**Conclusion**

The intermediate hip prosthesis is a therapeutic option for the treatment of recent fractures of femoral neck in the elderly. It allows for a painless hip and also restores the stability and function.

**References**

1. Coste J, Piette F, the Park JM. Epidemiology of fractures of the proximal femur. Press Med. 1992; 21:76-82.
2. Bendaouia M. Hip arthroplasty: which prosthesis, for which indication? Med Thesis N° 116, Cadi Ayyad University Marrakech, 2011.

3. Duncan CP, Masri BA. Fractures of the woman after hip replacement. Instr Course Lect. 1995; 44:293-304.

4. Brooker AF, Bowerman SW, Robinson RA, Riley LH. Ectopics ossifications following total hip replacement. Incidence and a method of classification. J Bone Joint Surg. 1973; 55-A(8):1629-32.

5. Merle d’Aubigné R. Quoted figure of hip function. Rev Chir Orthop. 1970; 56(5):481-6.

6. Sow I. Treatment of fractures of the femoral neck by an intermediate prosthesis. Thesis Med N° 54, Ucad Dakar, 2016.

7. Pourreyron D, Ayadi H, Bonnomet F. PTH in patients under 30, presentation of the series and methods of analysis. Rev Chir Orthop. 2008; 94(6):135-7.

8. Breusch S. The conditions of good cementing for THA. Mastery Orthop, 2003, 126.

9. Alomene B, Nguyenphouc DC. Fractures of the upper extremity of the femur in middle stay Geriatric. Lyon Surgical, 1992; 88(4):350-355.

10. Pellicci PM, Salvati EA, Robinson HJ. Mechanical failures in total hip replacement requires reoperation. J Bone Joint Surg Am. 1979; 61(1):28-36.

11. McGrory BJ, Morrey BF, Cahalan TD, Kai-Nan AN, Cabanela ME. Effect of femoral offset on the range of motion and abductor muscle strength after total hip arthroplasty. J Bone Joint Surg (Br). 1995; 77(6):865-89.

12. Massin P, Jea L, Astoin E, Simondi M, Lavaste F. The anatomical basis for the concept of lateralized femoral stem: A frontal X-ray study of the proximal femur J Arthroplasty, 2000; 15(1):93-101.

13. Noble PC, Alexander JW, Lindhal LJ, Yew DT, Granberry WM, Tullos HS. The anatomical basis of the femoral component design. Clin Orthop. 1988; 235:148-62.

14. Ebied A, Hoad-Reddick DA, Raut V. Medium-term results of the Charnley low-offset femoral stem. J Bone Joint Surg (Br). 2005; 87(7):916-20.

15. Vidal J, Bensadoun J, Maurg P. Fracture on hip prosthesis Rev Chir Orthop, 1991, 77.

16. Cannestra VP, Berger RA, Quigley LR, Jacobs JJ, Rosenberg AG, Galante JO. Hybrid total hip arthroplasty with a precoated offset stem: Four to nine years results. J Bone Joint Surg (Am). 2000; 82(9):1291-9.

17. Olofsson K, Digas G, Kärrholm J. Influence of design variations on early migration of a cemented stem in THA. Clin Orthop Relat Res, 2006; 448:67-72.

18. Danesh-Clough T, Bourne RB, Rorabeck CH, Mc Calden R. The mid-term results of a dual offset uncemented stem for total hip arthroplasty. J Arthroplasty. 2007; 22(2):195-203.

19. Bonneville P, Cahuzac JP. Surgical treatment of recent and old fractures of the femoral neck of the adult and the child. Encycl Med Chir (Elsevier, Paris), Surgical Techniques-Orthopedics-Traumatology. 1998; 44-610:12.

20. Pellegrini VD, Heiges BA, Bixler B et al. Minimum tenyear results of primary bipolar hip arthroplasty degenerative arthritis of the hip. J Bone Joint Surg (Am). 2006; 88(8):1817-1825.

21. Azarkane M. Late complications of total hip arthroplasty: about 42 cases Pan Afr Med J. 2013; 14:17.

22. Rabah A. Fracture of the femoral neck treated by intermediate hip prosthesis. Thesis N° 224, Meknès, 2014.