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Research Article

Patient Survival and Functional Outcome of a Moore's Cervico-Cephalic Prosthesis

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Abstract

Introduction: One-piece cephalic prostheses retain their indications in the management of femoral neck fractures in the elderly in countries with low economic resources. The objectives of this study were to determine the survival curve of patients and to report the functional status of hips operated on with Moore's hemiarthroplasty.

Patients and Methods: This was a cross-sectional survey of patients treated with a Moore prosthesis. The functional status of the patients was evaluated by the functional score of Postel Merle d'Aubigné (PMA), the survival of the patients by the Kaplan-Meier method. The data was collected from the survey cards and the patient file.

Results: A total of 15 patients were selected for the study. The median age of patients was 70 years old [43 to 86 years]. The sex ratio was 1.5 (9/6), the mean follow-up was 46 months. The mean functional score (PMA) was 16/18 (satisfactory), three patients had a score of 18/18 (excellent). Regarding patient survival, 3 patients died versus 12 survivors. The patient survival curve predicted a

Conclusion: The Moore prosthesis offers a good functional result in the medium term. In our context, the patients who benefit from it are younger with longer survival.

Keywords: *Femur Neck; Hip; Moore; Prosthesis; Functional Outcome; Survival*

Introduction

Fractures of the proximal end of the femur are classic in the elderly and involve 11.5% of traumatic limb injuries with female predominance [1]. Because of its complications, they can be life-threatening with a mortality rate of between 17 and 29% at 12 months of the accident. Management of a displaced intra-capsular fracture of the femoral neck aims to avoid prolonged bed rest by appropriate surgical treatment and the completion of a hemiarthroplasty including the Austin Moore prosthesis is one of them [2]. In affluent countries, more anatomical and stable prostheses had replaced the Moore prosthesis, which is known to cause acetabular irritation. Nevertheless, it seems obvious to us that monobloc cephalic prostheses always keep their place in the management of fractures of the femur neck in the elderly especially in countries with low economic resources.

The purpose of this study is to determine the survival curve of patients and to report the functional status of hips operated on a hemiarthroplasty of Moore following fracture of the femoral neck in our center.

Patients and Method

This was a cross-sectional survey carried out from 01 to 30 June 2017 patients over 40 years old hospitalized in the service from 01 January 2011 to 31 June 2015. For a femoral neck fracture treated by the establishment a prosthetic Moore. The study excludes patients whose file is incomplete or lost sight of. The studied parameters were: The state prior to the accident, the functional state of the patients by the functional score of Postel Merle d'Aubigné (PMA), the survival of the patients by the Kaplan-Meier Method. The data was collected from the survey cards and the patient file. Once the patients were listed, a survey was conducted in each patient's home to complete the individual function cards. The data thus collected were analyzed, recorded, entered and used in Excel and Epi-info7.

Results

During the study period, 18 patients underwent surgery with a Moore prosthesis implant. The indication was in all cases a displaced and neglected intracapsular fracture of the femoral neck. Among which, 3 patients were lost of sight. Thus, a total of 15 patients were selected for the study.

The median age of the patients was 70 (43 to 86 years). The sex ratio was 1.5 (9/6). The fracture was neglected, more than a month old, for 10 patients and 2 patients had a pathological fracture on a secondary bone site. A mechanical fall at home was the cause for 8 patients and a traffic accident for the 7 others. Regarding the functional status of patients before the accident, 2 patients were active, 5 autonomous, 7 had a functional dependence and 1 patient a permanent dependence. The average duration of hospitalization was 18 days (15 days to 36 days). General anesthesia was performed for 10 patients against locoregional anesthesia for 3 others. The average duration of the intervention was 63 minutes (40 minutes - 2 hours 45 minutes). The average blood loss during the procedure was 383ml (150 to 450 ml).

Regarding patient survival at the time of the survey, 3 patients had died compared to 12 survivors. No cases of intra-hospital death were observed. For the surviving patients, the average follow-up was 46 months including 2 patients operated in 2011, 3 patients in 2012, 4 patients in 2013, 2 patients in 2014 and 1 patient in 2015 [22 months - 72 months].

Regarding the 3 patients who died: A 61-year-old patient with a pathological fracture on a secondary location of a mammary tumor died 10 months after surgery, the second patient was 80 years old and also had a pathological fracture on multiple myeloma that had died 4 months after the operation, the third patient was 81 years old and had died beyond one year of the operation for a medical cause. The patient survival curve versus postoperative delay predicted that 93% could survive the first six months; six months to one year for 86% and 76% beyond one year (Figure 1).

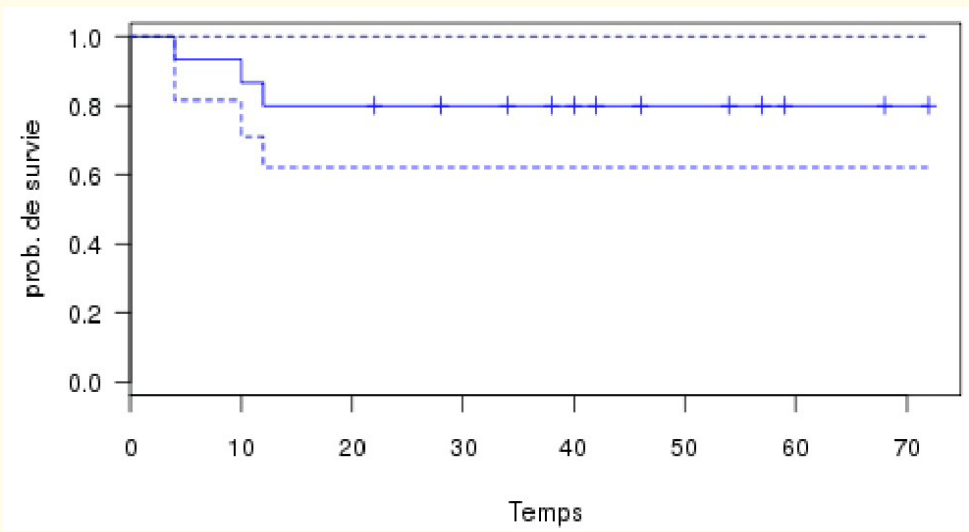

Figure 1: *Survival curve of patients (Kaplan-Meier).*

For functional status at the time of the survey, all living patients could be contacted and evaluated. The mean functional score (PMA) was 16/18 (satisfactory). The lowest score was 15/18 in an 86-year-old man with functional dependence prior to the accident. Of the 13 patients, 3 cases had a score of 18/18 (excellent) (Figure 2 and 3).

Figure 2: *Radiographic control of a 2-year hip of a Moore prosthesis in a 64-year-old man with a PMA score of 16/18.*

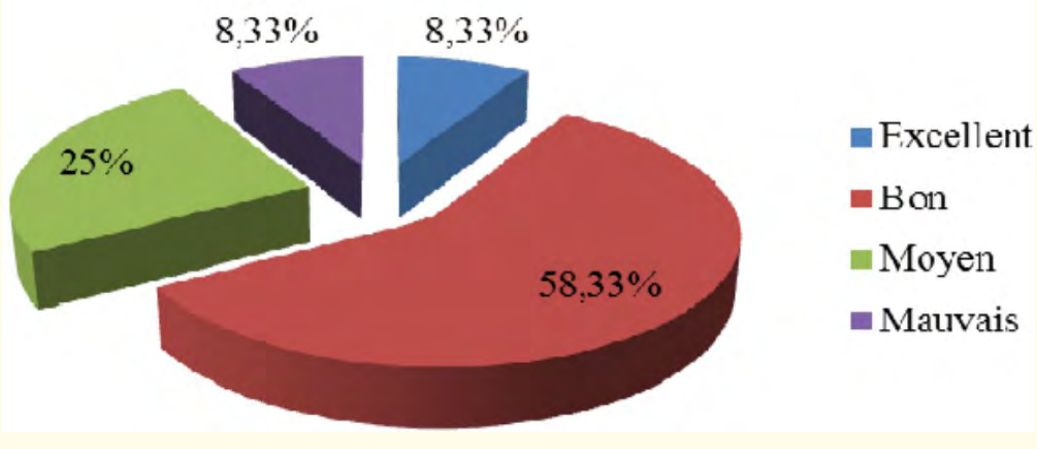

Figure 3: *Functional outcome of patients on a mean follow-up of 46 months.*

Discussion

The one-piece cervico-cephalic prosthesis was developed in 1939 by Frederic R Thompson in New York and Austin Moore in South Carolina for the treatment of displaced fractures of the femoral neck and hip osteoarthritis [3]. Although currently these prostheses are rarely used in developed countries, it is commonly used in countries with low economic resources for the management of displaced femoral neck fractures [4].

One-piece cervico-cephalic prostheses offer good functional results in the medium term. The functional status of the post-operated hips according to the Postel and Merle d'Aubigné score revealed that the majority of patients (66.6%) had a satisfactory function (excellent or good) of which 58.33% "good" and 8.33% "excellent". A study in Cotonou had also shown an excellent, very good and good functional result on all Moore prostheses implanted for a cervical fracture of the femur. On the same study, they also showed that there is no difference in the medium-term function between a Moore prosthesis and a modular neck intermediate prosthesis [4]. Anshu S., *et al.* [5] followed, over two years, forty four patients who had benefited from a Moore prosthesis that they cemented. They noted excellent functional results as well as decreased morbidities. These results objectively show that the Moore prosthesis restores function effectively and reliably relieves pain in patients.

Cotyloiditis (cartilaginous destruction due to early wear) is the complication attributed to cervico-cephalic prosthesis a priori by the aggression of the metal on the cartilage. This cotyloiditis is demonstrated on a control x-ray by the thinning of the cartilage (bone-metal space) with progressive onset of mechanical pain "pseudo-osteoarthritis" which may require in the long term recovery by a total prosthesis. An animal study was conducted by Cruess., *et al*. [6] by the establishment of a unipolar prosthesis in 36 dogs, they found a degradation of cartilage in all cases after 24 weeks. Another study by Cook., *et al*. [7] still on dogs but by different types of implants had shown that wear was more pronounced with metal prostheses. Dalldorf., *et al*. [8] have also shown, on a follow-up of different types of hemiarthroplasty, that metal-headed monopolar prostheses cause cartilage wear much more rapidly. Nevertheless, it would be advisable to take into account other factors of wear other than the type of implant, among others: congruence, stability, anatomical restitution and the intensity of physical activity that play a role at least as well. important than the nature of the implant. Indeed, one of the defects of cervico-cephalic prostheses is its non-modularity. This does not allow the restitution of the femoral offset as well as the anatomical length of the cervix and the limb.

The main advantage of a cervico-cephalic prosthesis is its affordable cost which is at least ten times cheaper than an intermediate prosthesis in its basic version. The ancillary of a cervico-cephalic prosthesis is simplistic and thus facilitates its implementation. It does not present polyethylene debris causing loosening and resumption of intermediate prostheses. Authors report cervico-cephalic prostheses that lasted more than 40 years. Burak B., *et al*. [9] reported the case of a woman who underwent bilateral hemiarthroplasty on rheumatic coxarthritis of both hips with her left side at 21 years of age and the right side at the left. 22 years old. The right side was revised after 25 years of installation and the left side was still functional at 44 years of decline. Thompson [10] also stated that this prosthesis preserves the cartilage if it is healthy at the time of implantation.

Among the cervico-cephalic prostheses, several studies showed the superiority of cemented monoblock prostheses (Thomson) compared to uncemented prostheses (Moore). Rog mark C., *et al*. [11] showed that re-operation, periprosthetic fracture and dislocation were much more common with Austin Moore's uncemented prostheses. In fact, the sealed implants have a more favorable operation following the absence of migration by femoral impaction and thus avoid the post-operative pain of the first step. To overcome these disadvantages, Anshu., et al. [5] had sealed Moore's prostheses with a follow-up of two years, they found a reduction of pain, a better functional recovery. The usual indications for Moore prostheses are the elderly with multiple comorbidities that will need to be considered for possible complications of cementing. Indeed, in their series of 44 patients, they reported two cases of intraoperative arterial hypotension.

Given the advanced age of patients with a cervical fracture, it is essential to know the survival and mortality factors of these patients in the medium and long term. This will allow you to dexterously select the correct implant type for each patient, taking into account the ratio, cost, benefit and risk. A retrospective study by Wei-Wei-TL., *et al*. [12] in Asia of 101 patients found a 30-day mortality rate of 9.9% and

17.3% at 1 year. Causes of postoperative death were pneumonia and myocardial infarction. A retrospective observational study conducted by PH Chia., *et al*. [13] in 2013 in Australia on 185 patients admitted for femoral neck fracture found that patients with femoral neck fractures in this country are at high risk of postoperative complications and mortality as in other developed countries. After admission, one in ten patients dies within 30 days, and one in five in the year. Sakr M., *et al*. [14] in 2008 on 51 patients had found a mortality of 15.7%. The mortality rate in the year of a patient with a fractured femoral neck is therefore between 15% and 29%, with a 30-day mortality between 8% and 10%. For our series, the survival of patients who had a Moore prosthesis implant was 86% in the first year; the risk of death was 14%. This lower mortality can be explained by the age of patients who are, on average, younger compared to other series.

Conclusion

The Moore prosthesis offers a good functional result in the medium term. It is accessible to patients with low economic resources. In our context, the patients who benefit are younger. This requires a lot of rigor during the pose to preserve the cartilages in order to limit as much as possible the occurrence of an acetabulum and to thus guarantee a longevity.

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