Intraoperative periprosthetic fractures around Austin Moore hemiarthroplasty performed for hip fracture

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ABSTRACT

Displaced femoral neck fractures in the elderly are usually treated with hemiarthroplasty. Published literature suggests more complications with uncemented implants.

Our study was designed to detail our complication rate with the Austin Moore prosthesis (AMP). We performed a retrospective study of the AMP implanted in our unit from January 2010 to February 2014. From the 177 cases recorded, in 22 of them (12.4%) an intraoperative periprosthetic fracture occurred and in 5 of them (2.8%) loosening was seen. 8 of the fractures and 2 cases of loosening required to change the indication to a bipolar cemented hemiarthroplasty. Subsidence of the stem was seen in 7 patients (5.1%) in the first visit at one month from surgery.

Our findings represent a high rate of early complications when using AMP in this population, especially due to intraoperative periprosthetic fractures. More studies are needed to establish the causes of these complications in order to minimize them.

KEYWORDS

Hip fracture, hemiarthroplasty, Austin Moore, periprosthetic fracture

INTRODUCTION

Hemiarthroplasty is considered to be the treatment of choice in elderly patients with a displaced fracture of the femoral neck, but there is still controversy about the type of prosthesis preferred. Recent literature shows increased rate of complications with uncemented hemiarthroplasty compared to cemented implants, in particular due to periprosthetic fractures. [1,2] Accordingly, the NICE guidelines (2011) recommend that arthroplasties for hip fracture should be cemented. [3]

Revision surgery is associated with increased morbidity and mortality in elderly patients, so it is particularly important to reduce complications in these population.
The objective of this study is to address the incidence of complications in patients with femoral neck fractures treated with the Austin Moore prosthesis (AMP) at our institution.

METHOD

A retrospective review of patients who had undergone Austin Moore hemiarthroplasty at our hospital from January 2010 to February 2014 was performed. This prosthesis was used to treat displaced femoral neck fractures in low demand elderly patients, according to surgeon preferences. Medical records of these patients were reviewed and the data collected included age, sex, date of operation and discharge day, surgical approach, ASA grade [4], previous function, intraoperative complications and medical or surgery related complications during hospital stay.

Patients were seen at clinic 1 month after surgery for clinical and radiological evaluation and cases that required revision surgery were recorded. At the time of the study a telephone interview was carried out to the surviving patients for clinical assessment and a radiograph was offered. At this telephone consultation an assessment of pain and mobility was done. Pain was evaluated by asking either they had no pain, mild pain or severe pain. Mobility was assessed with regard to ambulation without assistance, with assistance of either a cane or walker or inability to walk. In relation to radiographic analysis the next were evaluated: subsidence of the stem, signs of loosening, acetabular protrusion and/or erosions, heterotopic ossification and dislocations.

RESULTS

During the studied period, 199 Austin Moore hemiarthroplasties were initially planned to implant in our unit for displaced femoral neck fractures. In 22 cases hospital records were missing or incomplete and they were excluded from analysis. From the remaining 177 cases, in 10 of them, indication was changed to cemented bipolar hemiarthroplasty because of intraoperative complications, in eight cases due to intraoperative femoral fracture and in two to poor fixation. These cases were only included to rate intraoperative complications.

A total of 167 AMP were implanted, in 57 males and 110 females. The average age was 87 years (range 71-100 years). The mean delay between the admission and operation was 2.46 days (1-12) and average hospital stay was 11.2 days (5-36). The mean length of follow up for these patients was 24 months (range 4-50). Posterior approach was used in 134 cases (80.2%), and lateral transgluteal approach in 33 (19.8%).

At the time of the study, 82 patients (49%) were dead: 14 patients died within 30 days from surgery, 54 in the first year and 28 after the first year.

According to the American Society of Anaesthesiologists’ (ASA) classification of Physical Health [4], 26 cases were classified as grade II, 78 cases as grade III, 62 cases as grade IV and 1 case as grade V. 58 patients were able to walk without any help before sustaining the fracture, 106 patients needed some kind of help (cane or walker), and 3 were unable to walk.

Figure 1. Intraoperative periprosthetic femoral fracture managed with cerclage wire.
Intraoperative periprosthetic fractures were sustained in 22 of the 177 initial cases (12.4%). 13 cases were treated with cerclage wires (Fig. 1), 8 cases required to change the implant to a cemented bipolar hemiarthroplasty and 1 case did not require any additional treatment.

In 5 cases (2.8%) poor primary fixation of the prosthesis was observed during surgery so in 2 of them a cemented bipolar hemiarthroplasty was implanted but the other 3 cases were left untreated.

During hospital stay 42 patients (25%) sustained medical problems but no complication related to the prosthesis was seen. 136 patients were seen at clinic 1 month after surgery. In 7 cases (5.1%) subsidence of the stem (Fig. 2) was observed (not related to any documented fracture), 3 patients sustained a traumatic femoral periprosthetic fracture, 2 developed an infection and 1 suffered subsidence of the prosthesis after a simple fall.

Revision surgery was done in 5 cases. 3 of them were due to periprosthetic fracture (two cases were Vancouver B1 treated with plate and cerclage wiring and one Vancouver B2 treated with prosthetic revision) (Fig. 3) [5], one to infection (irrigation and debridement) and the other case to subsidence (revision to a bipolar hemiarthroplasty).

Only 65 patients answered the questionnaire about pain and function at the time for the final follow-up. 4 patients referred to have no pain, 14 mild pain and 47 severe pain. In terms of mobility 25 patients could walk without any assistance, 37 needed some help and 3 were unable to walk. These patients were offered to take a radiograph of the affected hip but only 30 of them accepted it. In 9 cases a subsidence of the stem > 3mm was seen and in 14 cases signs of loosening were appreciated. No acetabular changes, heterotopic ossifications or dislocations were observed.

DISCUSSION

Hemiarthroplasty is the recommended treatment for displaced femoral neck fractures in the elderly, but the optimal design continues to be controversial. Recent studies comparing cemented and uncemented prostheses have shown higher risk of complications with the uncemented implants, particularly due to periprosthetic fractures [1,2], but there are few series documenting intraoperative fractures.

In our study we found a 12.4% rate of intraoperative periprosthetic femoral fractures while inserting the AMP. Published literature shows an incidence that ranges from 0 to 14%.
Fernández-Valencia et al [6] identified an intraoperative periprosthetic femoral fracture rate of 6.8% in a study of 365 consecutive Austin-Moore arthroplasties. 80% of them were detected during the surgery and the 20% in the postoperative radiology, but considered to be unnoticed fractures during the surgery. Weinrauch et al [7] showed 14% of intraoperative fractures during implantation of 147 consecutive Austin Moore prostheses.

Foster et al [8] reviewed 244 patients who had undergone hip hemiarthroplasty. 7% of patients where AMP was implanted sustained a periprosthetic fracture (2 intraoperative and 3 postoperative), while in the Thompson cemented group no periprosthetic fracture was seen. A multicentre retrospective review published by Weinrauch et al [9] reported that 11.8% of AMP sustained an intraoperative periprosthetic fracture compared to 1.8% in the cemented Thompson group. Singh et al [10] found an incidence of 3.4% of intraoperative periprosthetic fractures in the AMP group compared to 0% in the cemented Thompson group. Khan et al [11] described three iatrogenic periprosthetic fractures (2.5%) while inserting un cemented AMP compared to none fracture in the cemented Austin Moore group.

In addition to the intraoperative periprosthetic fractures observed, our study revealed 2.8% of cases of loosening when AMP was inserted and 5.1% of subsidence of the stem during the first month after surgery. These findings represent a high rate of early complications when using Austin Moore hemiarthroplasty in this population.

Periprosthetic femoral fractures around a hip arthroplasty are a serious complication that becomes a challenge for the orthopedic surgeon and worsens the prognosis of the patient. Some studies like the recently published by Moreta et al [12], have showed marked functional deterioration and high rate of complications in spite of correct treatment of postoperative periprosthetic femoral fractures.

Literature shows that the Austin Moore is a technical demanding prosthesis. Weinrauch et al [7] found that the most common error was the inadequate length of femoral neck. Additionally they recommended to have the narrow stem available in case it was required. In any case, Yau et al [13]
advised a minimum of 70% canal filling by the stem at the level of the lesser trochanter to avoid subsidence of the prosthesis. Sharif et al [14] emphasized the importance of technical aspects when inserting this implant, in particular the correct seating of the collar of the prosthesis on the calcar.

Based on National Joint Replacement Registers orthopedic surgeons have decreased their use of Austin Moore implants in Australia [15] and Sweden. Rogmark et al [16] analyzed the data from Swedish Hip Arthroplasty Register between 2005-2009 and found that uncemented monoblock implants, as Austin Moore implants, led to an increased risk of re-operation, in particular due to periprosthetic fracture and suggested that should not be used in modern orthopaedic care.

There are several limitations in our study including that the data are retrospective and the absence of a control group. No conclusion about the results obtained can be done due to the important loss of patients and the associated comorbidity of this population. A large prospective randomized trial may be needed to establish definite conclusions.

More studies are necessary in order to identify the causes of early complications with AMP and to minimize them.

REFERENCES


