Austin Moore Hemiarthroplasty For Displaced Femoral Neck Fractures In Patients Aged 55 Years And Above. An Ivorian Experience

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Summary

Objective  To present our experience with the Austin Moore hemiarthroplasty performed in patients aged 55 years and older.

Design   A retrospective study carried out between 1993 and 2002.

Setting  Department of Orthopaedics Surgery, Yopougon Teaching Hospital, Abidjan, Côte d'Ivoire.

Patients and methods  We performed 84 Austin Moore hemiarthroplasties in patients aged 55 years and above that sustain a displaced femoral neck fracture.

Results  There were 70 women and 14 men (ratio female/male: 5:1). Fractures in 53 (64%) cases were the result of a fall, while 31 (36%) patients were involved in a road traffic accident. The mean age of the patients was 65 years. The mean delay from the injury to the operation was 17 days. A Moore's posterior approach was used in 82 (97.6%) patients. The femoral head sizes commonly used were 41 and 43. Death during the hospitalisation was seen in seven (8.3%) patients. Postoperative wound infection occurred in four (4.8%) patients. Twenty-five (29.8%) patients developed postoperatively medical conditions. Dislocation of the prosthesis occurred in two (2.4%) cases. The average stay in hospital was 20 days. Most patients went back home to living independently. Fifty-six patients were evaluated at the final examination with a mean follow-up of 14 months. Forty-two patients could walk without support, and had completely recovered to pre-injury levels of daily activity, while fourteen patients used walking aids.

Conclusion  In our context, Austin Moore hemiarthroplasty can yield satisfactory results in patients aged 55 years and older.

Key words  Austin Moore, Côte d'Ivoire, Femoral neck fractures, Hemiarthroplasty

Introduction

Treatment of displaced intracapsular fractures remains one of the ongoing controversies in modern-day fracture care. In this group of fractures, several approaches to treatment have been proposed, ranging from reduction and fixation to prosthesis. While treatment of intra-capsular neck fractures in young patients by stable internal fixation as early as possible is favoured, the Austin Moore hemiarthroplasty (AMH), is one of the commonly used methods in the geriatric group.

We have broadened in our practice the indications of the uncemented AMH to include patients as young as 55 years of age with a displaced femoral neck fracture. The purpose of this study is to present this experience.

Patients and methods

Detailed records of all patients aged 55 years and above in whom a displaced intracapsular femoral neck fracture had been treated primarily by AMH in our department between 1993 and 2002 were retrospectively collected and analysed. This series does not include patients with pathological fractures or pre-existing osteoarthritis of the hip, polytraumatised patients, immobile patients prior to the injury, arthroplasty as a revision procedure for failed internal fixation. Patients with a history of dementia and those with initial decubital ulcer close to the posterior surgical approach were also excluded. The patients walked unaided before fracture. Low molecular weight heparin or aspirin as prophylaxis against thromboembolism was used routinely in all patients, starting from admission and ending after the discharge of the patient. All patients were evaluated by an anaesthetist.

Routine preoperative investigations included full blood count, urea, glycaemia, electrolytes, chest radiograph, and an electrocardiograph. Before surgery, skin traction was applied to the injured leg to reduce hip pain. Antibiotic
prophylaxis for 72 hours starting at induction of anaesthesia was used routinely in all cases. All patients were operated on under general anaesthesia. Operations were performed by consultants with residents as assistants in a conventionally ventilated theatre with the use of cotton drapes and gowns. In lateral position, a Moore's posterior approach was used in 82 (97.6%) patients and a Hardinge approach in two (2.4%). The surgical technique was described elsewhere. The sizes of the head commonly used were 41 and 43. The capsule was repaired with vicryl n°1, if possible. The reattachment of the external rotators to the greater trochanter with vicryl n°2 was performed by passing the needle through the bone. In cases of stronger bone, the needle was hammered in gently through a bone punch as recommended by Ko et al. In the early postoperative period, a knee splint was applied and the limb was maintained in the abducted position. Postoperative rehabilitation usually began within 48 hours after surgery, with mobilisation out of bed to a chair and progression to ambulation training. Partial weight bearing was started the third postoperative day depending on the general condition of the patient. Anatomical results were assessed according to the criteria used by Sharif and Parker. The degree of varus/valgus of the prosthetic stem was determined from the distance from the tip of the stem to the medial femoral cortex divided by the overall width of the femoral canal. The stem was neutral if the ratio was 0.5 and varus or valgus if the ratio was less than or greater than 0.5, respectively.

Results

A total of 84 patients with an average age of 65 years (range 55 to 88 years, SD:7.2) at the moment of the operation were enrolled in this study. Falls while walking were the cause of 53 (64%) of these fractures whereas the remaining 31 (36%) were caused by road traffic accidents. The gender distribution was such that there were 70 (83.3%) females and 14 (16.7%) males. Fractures were graded according to Garden into 27 (32.1%) grade III and 57 (67.9%) grade IV. The mean delay from the injury to the operation was 17 days (range 5 days to 3 months, SD: 10 days). The average operative time was 110 minutes (range 69 and 170 minutes, SD: 23 minutes). In four patients partial weight bearing began 21 days after the operation due to intra-operative fractures. The average stay in hospital was 20 days (range 10 to 47 days, SD: 5 days).

Intraoperative problems

Periprosthetic fractures of the femur occurred in four patients and were treated by cerclage fixation with monofilament wire.

Mortality

Seven (8.3%) cases of death had occurred during the hospitalisation. One patient died during the first 24 hours after the operation, while six died within 30 days of the index hemiarthroplasty. The causes of death were not conclusively gathered and are not reported on. The average age of those who died was 70 years.

Morbidity

Medical conditions requiring treatment developed in 25 (29.8%) patients. These conditions included urinary tract and chest infections, pressure sores, heart failure, confusion, acute abdominal problems, and thromboembolic disease which were diagnosed mainly on clinical evidence.

Wound problems

Postoperative wound infection was encountered in four patients. Three patients had superficial infections which did not progress to involve the prosthesis while one had deep infection requiring a conversion to Girdlestone hip.

Dislocation

This occurred in two (2.4%) patients who had undergone prosthetic replacement via a posterior approach. Dislocation occurred in one patient 5 days after operation and was reduced by closed means under general anaesthesia. The other patient sustained dislocation ten days after operation. Open reduction was necessary to achieve reduction.

Anatomical results

In thirty patients no shortening was seen. Forty-three patients had 1-2 cms shortening whereas the remaining 11 patients had 3-7cms shortening. The position of the prosthesis was valgus in 50 patients, neutral in 20, and varus in 14. Acetabular erosion was seen in 10 (17.8%) patients at the final evaluation. Acetabular erosion and debilitating groin pain had necessitated the switch to total hip arthroplasty in five patients at an outside institution.

Functional results

Patients were discharged directly back to their place of origin. The mean follow-up was 14 (8 to 48) months. Of the initial group of 84 patients, seven
patients died and twenty-one were lost to follow-up leaving 56 patients for the final assessment. Forty-two patients could walk without support, and had completely recovered to pre-injury levels of daily activity while fourteen patients used an assistive device.

Re-operations
There were seven re-operations at an overall rate of 8.3%, one for infection, one for dislocation, and five for acetabular erosion.

Discussion
The patients treated were representative of the condition in respect of the sex distribution and aetiology, when compared with data from studies conducted in developed countries. Women out numbered men in our series with a female/male ratio of 5:1 in keeping with the fact that femoral neck fractures are common in females due to osteoporosis. In Africa, our findings are in concordance with those reported by some authors and contradicted by other workers. The latter authors described femoral neck fractures as a condition of old men commonly injured in road traffic accidents. These different epidemiological figures are in line with the view that epidemiological data of fractures vary between communities as a result of differences in socioeconomic, cultural, degree of urbanisation and other population characteristics. In selecting patients, special mention should be made of some criteria. Immobility prior to the fracture should not preclude hip fracture patients from undergoing surgical repair as successful operative treatment would reduce the pain from the fracture and facilitate nursing care. Immobile patients before the injury were more often riddled with pressure ulcers and concomitant diseases. We have excluded patients under 55 years of age since we felt that they should be given a chance to retain the femoral head. In our context, patients aged 55 years are generally retired and therefore less mobile or active. As a result, they are less exposed to circumstances that could result in high energy trauma, such as road traffic accidents. Fractures involving the proximal end of the femur might be attributable to osteoporosis, especially in women. In term of age, our policy is in sharp contrast to that reported by David et al. Indeed in their series comprising 54 patients, the AMH was carried out in 27 patients. Of these, 18 were aged between 21 and 60 years, while nine had more than 60 years of age. These different approaches to care demonstrating variations in practice between hospitals, and even between surgeons within a hospital reflect uncertainties in this controversial area in hip surgery.

The mean age of 65 years is of the same magnitude as the 65.7 and 67.4 reported by Jadhav et al and Onche and Yinusa, respectively. When discussing intracapsular fractures a "young" patient is one aged less than about 65-70 years. They are generally best treated by internal fixation, because if an arthroplasty is used there is a risk that the increased functional demands and life expectancy will lead to the need for a revision arthroplasty. It is our opinion that in low-income countries, this threshold age should be reconsidered because of the lower life expectancy. Besides the patient's age, delay in presentation and its consequences is the next most important factor in determining treatment. Thirty percent of patients underwent traditional treatment resulting in late arrival at the hospital and probably in worsening of fracture displacement. Fractures severely displaced require repeated attempts for reduction. Repeated manipulations may cause additional trauma and potential vascular insult. Another feature making difficult the management of fractures is the fact that the hospital where the study was carried out had one theatre dedicated to orthopaedics. This theatre was used to cater for both trauma and elective procedures. Planned elective lists were carried out in the morning, and the rest of theatre time was used for orthopaedic trauma surgery. Osteosynthesis following closed reduction of these late diagnosed and displaced fractures was therefore not advisable. Such fractures are best treated by either open reduction and fixation or arthroplasty. In circumstances nearly similar to ours, Singh et al and Nagi and Dhillon had proposed the reconstruction of the femoral head by internal fixation with cancellous screw and free fibular graft in selected cases. This approach to treatment preserving the hip in young patients is compatible with some lifestyle and religious customs such as squatting and sitting in a cross-legged position. The extreme degree of movements at the hip required for these postures is not possible with replacement arthroplasty. This reconstruction can be achieved either by closed means or with the resort to open
operative reduction of the fracture.\textsuperscript{17}

We have no experience of this attractive procedure which requires the assessment of modifications occurring at the fracture site by the means of magnetic resonance imaging scans, unavailable in our context. Computed axial tomography scan available in our clinical practice is relatively expensive for our patients. Since the risk of non-union is increased after internal fixation in patients featuring displaced fracture and presenting to hospital after a long delay, and the results of AMH as a revision for failed osteosynthesis are inferior to that for primary hemiarthroplasty,\textsuperscript{18} primary arthroplasty remains the best method of treating such fractures. In our context, the primary AMH is a suitable tool.

This procedure carries the advantages of the relatively low cost, short duration of operation, acceptable intra-operative bleeding, and reasonable clinical outcomes. The average stay in hospital of 20 days in our series is consistent with the reports by Singh and Deshmukh\textsuperscript{19} and Merchant et al\textsuperscript{20} which demonstrated a mean length of stay of 21.5 and 18.7 days, respectively. Time elapsed before surgery and postoperative complications result in significantly longer hospitalisation.\textsuperscript{19} The retrospective design of this study and generally, difficulties with follow-up of patients in our environment prevented the use of scoring systems when evaluating functional results. Moreover the investigation of hip pain that develops following prosthetic replacement presents a diagnostic challenge as many of the causes are unrelated to the prosthesis. On the other hand, quantifying physical function in various tasks is difficult for the purposes of outcome comparisons.\textsuperscript{20} Walking ability and status of discharge were therefore considered for a threefold reason. First, the main component of functional recovery is regaining the ability to walk.\textsuperscript{21} Secondly, the ability to go home after hospitalisation for a fracture has become an increasingly important outcome measure.\textsuperscript{21} Thirdly, these criteria can be evaluated by any orthodox practitioner.

Even if in developing countries, the lack of nursing home and rehabilitation facility reduces the likelihood of discharge to these destinations, the status of discharge in our series as in other reports\textsuperscript{12,19} did not meet significant problem. Most patients go back home to living independently or benefit from cares from relatives, given the cultural solidarity commonly encountered.\textsuperscript{19} Almost main postoperative complications encompassing medical and surgical complications related to hip fractures the clinician is likely to encounter were seen in the present series. The postoperative wound infection crude rate of 4.8\% is lower than the 20\% reported by Onche and Yinusa.\textsuperscript{12} As our study was retrospective and the design of that conducted by these authors was prospective, we could not make any specific comment regarding these rates. In general duration of operation has been proven conclusively to be a potent risk factor in the development of postoperative infection.\textsuperscript{12} Moreover, the lack of water-proof drapes and surgical gowns as well as the lack of laminar ventilation are contributory factors in the higher incidence of deep infection.\textsuperscript{22} Our hospital mortality figure of 8.3\% falls within the hospital mortality rates in patients with hip fractures which varie from 1.8\% to 11.77\%.\textsuperscript{20,23} Mortality at six months is 13.5\% overall\textsuperscript{20} and one year mortality rate following hip fracture surgery is remarkably high, and is usually around 26\%.\textsuperscript{24} Other cases of death had probably occurred at home after the last consultation moving away any suspicion. We were unable to document the different rates given the nature of the study conducted in this work. Dislocation event was seen in two cases giving a rate of 2.4\%. Both patients had undergone a posterior approach, the routine approach at our institution. In the series by Ko et al\textsuperscript{10} made up of 1,832 hemiarthroplasties done through the standard posterior approach 28 (1.9\%) cases of dislocations were identified. The suggestion that there is an increased risk of dislocation associated with the posterior approach has not been substantiated.\textsuperscript{25} In general, this complication occurs in about 4\% for uni and bipolar hemiarthroplasties.\textsuperscript{25} Assessing the causes of this event is of utmost importance rather than the comparison of rates. More often the aetiology of postoperative dislocation is multifactorial, involving a number of surgical and patient factors. The knee splint in the early postoperative period might prevent dislocation of the prosthesis, especially in restless patients. As sound repair of the posterior sleeve was our policy and dislocations had occurred in the first month, we concur with Ko et al\textsuperscript{10} that the repair has not healed or fibrous tissue of better quality has not formed.
Acetabular erosion rate of 17.8% in our series was higher than that reported by Jadhav et al and Lapras of 10% and 8.3%, respectively. Lapras suggested that acetabular erosion could be prevented if the smallest diameter of the removed fractured femoral head was chosen, as the sphericity of the femoral head is imperfect with two diameter, one bigger, the other smaller. In our series, we had probably chosen the biggest diameter in some cases. Other factors such as the patient's level of activity may be responsible for this complication. The design of the study has limited our ability to assess the relationships between the postoperative and long-term radiographic criteria and the clinical findings strongly supported by Sharif and Parker and Yau and Chiu. In their reports, emphasis was placed on an adequate implantation technique, especially the cutting of the femoral neck and seating the collar of the prosthesis on the calcar, as AMH is often performed by inexperienced surgeons. We have however endeavoured to outline the impact of late presentation, inadequacies of traditional bonesetters, and the lack of theatre on the treatment decision-making.

In conclusion, based on the results of the present study, unique to our context, we believe that for patients aged 55 years and above with displaced intracapsular femoral fracture, the AMH can be offered as a reliable treatment, provided that the technique is perfect and the selection of patient proper. With further research and improvement of trauma care systems, this conclusion will undoubtedly change in the future and deviations from this regimen of treatment may be made at any time based on a physician's most reasonable judgment.

References
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