

Austin Moore Hemiarthroplasty Visa Vis Bipolar Arthroplasty in the Management of Neck of Femur Fractures

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ABSTRACT

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Background: Fracture neck of femur remains an unsolved fracture to orthopedic surgeons. Hemiarthroplasty with Austin Moore prosthesis in long term follow-up showed unsatisfactory results due to femoral stem loosening, acetabular erosions, intrusion of prosthesis into pelvis and difficulties to total hip conversion. These factors led to the development of bipolar prosthesis which may prevent the grinding of the metallic head over the bony acetabulum and degenerative changes.

Materials and Methods: This is a descriptive study, case series of femoral neck fractures, 20 cases each (Total 40 cases) using Austin Moore and Bipolar prosthesis were done. The results were evaluated using Merele'D' Aubigne–Charnley hip score with regards to ability to walk, pain in hip and movement of hip.

Results: In the prospectively studied cases, Austin- Moore hemiarthroplasty showed 77.78% of excellent result and 22.22% of good results, where as in Bipolar arthroplasty 87.5% showed excellent result and 12.5% showed good result. In the retrospectively studied cases, Austin- Moore hemiarthroplasty showed 72.73% good result and 27.27% poor results, where as in Bipolar arthroplasty 41.67% showed excellent results and 58.33% showed good results. Conclusion: Bipolar arthroplasty is a good operation for fracture neck of femur with satisfactory results in rural patients in long term follow up (follow-up to 5½ years). But in case of short term follow-up (followed up to 2 ½ years) both Austin-Moore arthroplasty Bipolar arthroplasty showed more or less similar end results.

Keywords: Austin-Moore Arthroplasty, Bipolar Arthroplasty, Fracture Neck of Femur, Prosthesis

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BACKGROUND

Fracture neck of femur remains an unsolved fracture to orthopaedic surgeons. Non union of femoral neck, avascular necrosis of femoral head and the degree of fracture comminution precluded good results in many. Non anatomical reduction and inadequate fixation cause prolonged disability, pain, immobility and repeated surgical procedures. It is because of these inherent problems replacement of femoral head and neck becomes the treatment of choice in elderly people. Hemiarthroplasty of femur is the gold standard in the treatment of fracture neck of femur in elderly, practiced over many decades.

The widely used hemiarthroplasties are stemmed, single component, stainless steel implants named Austin Moore. However, in long term follow-up, unsatisfac-

tory results remain high due to femoral stem loosening acetabular erosions, intrusion of prosthesis into pelvis and difficulties to total hip conversion. These factors led to the development of bipolar prosthesis.

In 1947, Dr. James Ennis Bateman, an orthopedic surgeon and Averill, a bio-engineer devised bipolar prosthesis, which is a self articulating prosthesis designed for femoral head replacement. Bipolar hip arthroplasty involves the seating of an implant that also has a metabolic acetabular component. The acetabular cup is believed to prevent the grinding of the metallic head over the bony acetabulum; is also considered to be a factor in preventing degenerative changes of wear and tear in the acetabulum.

The retrospective and prospective study of femoral neck fractures using Austin-Moore and Bipolar

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prosthesis were done. The follow up of these cases were done to assess the end results as to ascertain which prosthesis is better compared to other between Austin-Moore and Bipolar prosthesis.

MATERIALS AND METHODS

This is a descriptive study, case series of patients who had undergone Austin-Moore hemiarthroplasty and bipolar arthroplasty for fracture neck of femur in a tertiary care centre during the period of March 2004 to August 2006. 20 patients each who underwent Austin-Moore and bipolar arthroplasty were selected. The pre-operative and follow up results were evaluated using Merle'D' Aubigne-Charnley hip score with regards to ability to walk, pain in hip and movement of hip.

Surgery: The patients selected for surgery underwent a thorough preoperative assessment. Radiological evaluation included pelvic roentgenogram, AP-view including both hips and proximal femur taken with the hips in 15 degrees internal rotation. A traction internal rotation view was taken to note the amount of calcar femorale left behind.

Preoperative planning was done to determine the size of the prosthesis. The templates were used for the selection of proper implants with correct fit, adequate size and a neck length that is required to correct limb length discrepancy was selected. The skin preparation was done prior to surgery with povidone iodine solution. At the time of induction cefotaxime 1gm (I.V) was given. Epidural, spinal or GA was used.

Posterior approach-Southern/Moore was used for all patients in the study .After insertion of the prosthesis, stability of prosthesis was checked and hip was reduced. One closed suction drainage tube was inserted, deep to fascia. Cefotaxime 1gm (I.V) was given postoperatively for three days. Drain was removed after 48 hours. Quadriceps exercises and ankle mobilization were started from first post operative day. After drain removal, patients were made to walk with walker support. Gradual weight bearing was advised for operated limb. Patients were advised not to sit cross legged or squat on floor. They were also instructed to avoid adduction and internal rotation. Sutures were removed on the eleventh day.

Follow Up: Prospectively studied, cases which were operated between March 2004 and August 2006 were followed up once in 15 days for first 3 months, once in a month for next 3 months, once in 3 months for next 6 months and after which follow up as and when

required. Both pre-op and follow up results using Merle 'D' Aubigne- Charnley hip score was done.

Also retrospectively studied, patients who were operated 2.5 years before, with maximum follow up of 5.5 years. In this group only follow up of Charnley hip score was available for comparison between Austin-Moore hemiarthroplasty and bipolar arthroplasty. In this study both radiological and clinical examinations were done to know functional outcome. X-ray of hip, AP standing view was taken and checked for any complications like aseptic loosening, acetabular erosions etc.

RESULTS

In the study of Austin- Moore hemiarthroplasty (**Figure 1**), out of 20 cases, prospective study of 9 cases and retrospective study of 11 cases were done. In the study of bipolar arthroplasty (**Figure 2**), out of 20 cases, prospective study of 8 cases and retrospective study of 12 cases were done.

In this study, in Austin- Moore hemiarthroplasty, the commonest age group was 61-70 years, comprising 40% of the total cases, and in bipolar arthroplasty the commonest age group was 56-65 years. Maximum and minimum ages in the study were 51 years and 70 years respectively and average age being 60.78 years. In Austin- Moore hemiarthroplasty, females constituted the majority, 60% of the total cases, and in bipolar arthroplasty, females constituted the majority, 70% of the total cases. 60% of Austin- Moore hemiarthroplasty were on the right leg, and 55% of bipolar arthroplasty were on the left side.

The outcome of procedures were compared using Merle 'D' Aubigne-Charnley hip score (**Table 1**), in prospectively studied cases, 77.78% Austin- Moore hemiarthroplasty showed excellent result and remaining 22.22% showed good results. In bipolar arthroplasty, 87.5% showed excellent result and remaining 12.5% showed good result. In the retrospective studied cases, 72.73% (8 out of 11 cases) Austin- Moore hemiarthroplasty showed good result and remaining 27.27% (3 out of 11 cases) showed poor results. In bipolar arthroplasty, 41.67% (5 out of 12 cases) showed excellent results and remaining 58.33% (7 out of 12 cases) showed good results.

In terms of pain, the prospectively studied cases shows there is not much difference in the post operative grade of pain in both modalities of treatment. In retrospective studied cases shows, bipolar arthroplasty (pain

AUSTIN-MOORE HEMIARTHROPLASTY

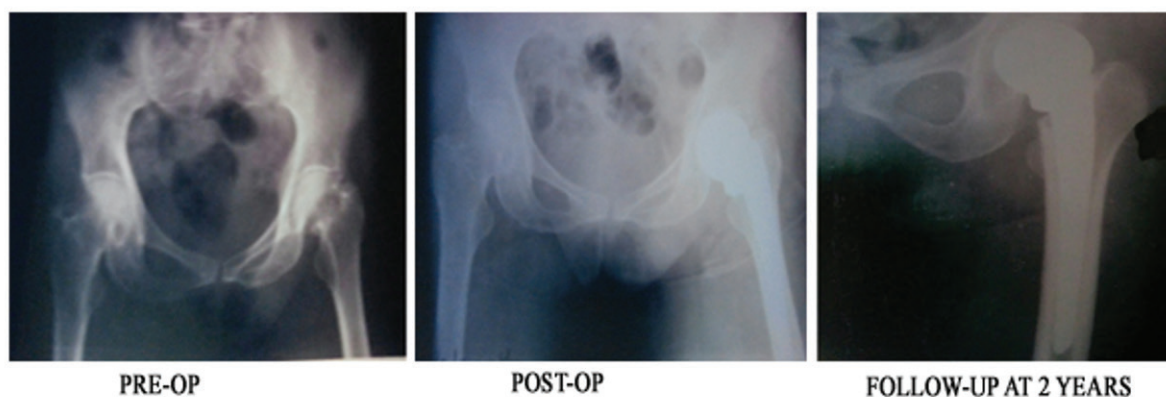


Figure 1. Austin-Moore Hemiarthroplasty

BIPOLAR ARTHROPLASTY

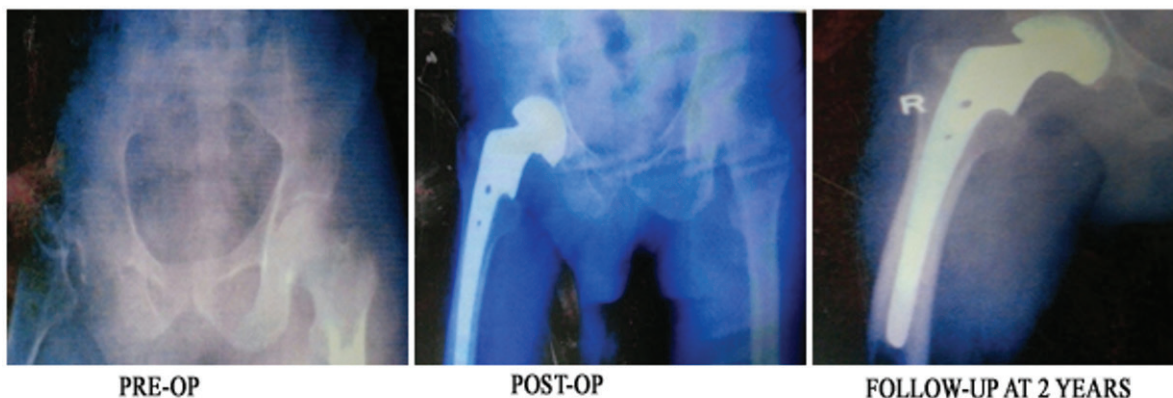


Figure 2. Bipolar Arthroplasty

score 5.5) is better than Austin- Moore hemiarthroplasty (pain score 3.73) in terms of pain gradation.

There is not much difference between both modalities of treatment in terms of ability to walk. In the retrospective studied cases, bipolar arthroplasty (score 4.83) is better than Austin- Moore hemiarthroplasty (score 3.73) in terms of ability to walk.

This study shows, there is not much difference in the post operative grade in case of range of motion in both modalities of treatment. In the retrospective study bipolar arthroplasty (score 4.82) is better than Austin- Moore hemiarthroplasty (score 3.64) in terms of range of motion.

This study shows that there were few complications reported in both Austin-Moore Hemiarthroplasty and Bipolar arthroplasty, one case of limb length discrepancy, three cases of superficial infection, one case of femoral stem loosening and 2 cases of acetabular erosions.

DISCUSSION

Of all the patients who came to this tertiary care centre with fracture neck of femur, most of them were unaffordable for total hip arthroplasty. So unipolar Austin-Moore hemiarthroplasty and Bipolar arthroplasty were preferred in this rural setup.

In this study, the commonest age group was 61-70 years in the case of Austin-Moore hemiarthroplasty, which accounts for 40% of the cases and in Bipolar arthroplasty, the commonest age group involved was 56-65 years, constitutes 40%. The minimum and maximum ages in study were 51 years and 70 years respectively and the average age being 60.8 years. Some other reports show the average age group undergoing this procedure is 61 years,¹ which is comparable to this study. A report from another textbook shows, the average age is 77 years,² but reports of other western Authors show the average age is 70 years.³ Higher age incidence was much less in the study probably because the longevity of Indians is less compared to the western population.

Table 1. Merle ‘D’ Aubigne – Charney Hip Score

Grade	Pain	Ability to walk	Range of movements
1	Severe Spontaneous	Bedridden, Cannot walk	0-30 degrees
2	Severe spasm on attempting to walk	Needs 2 crutches for a few steps	0-60 degrees
3	Rest pain, permits limited activity	Needs 1 crutches for short distance with gross limp	60-100 degrees
4	No rest pain Pain only after activity	Limited distance without cane Long distance with cane/crutch	100-160 degrees
5	Mere discomfort	Long distance without cane	160-210 degrees
6	No pain	Normal	More than 210 degrees

In this case series, it was observed that female to male ratio was 2.08:1. Most of the reports agree that neck of femur fracture is more common in females.^{4,1,3,5}

Our study showed that Bipolar arthroplasty is a good operation for fracture neck of femur with 100% satisfactory results in rural patients in long term follow up. Many authors believed that bipolar arthroplasty may be a better option to Austin -Moore hemiarthroplasty especially when the patient is likely to live longer after the surgery.⁶ Some others were of the opinion that there was no difference in outcome between both modalities of treatment.^{7,8}

In this study there were no mortality reported from any cause related to both Austin-Moore hemiarthroplasty and Bipolar arthroplasty. In the study one case of limb lengthening of <1 cm was noticed. So the patient required no heel raise. This patient had good postoperative result. In Gallinaro series, out of 88 cases, one case had mild limb length discrepancy.⁹

In this study, 3 cases had superficial infection during early post operative period, which were treated with specific antibiotics, the final outcome of this patient were good in terms of end results. Some other studies showed 4.4% and 2.8% post operative infection.^{9,5} In a series by Mohsheim et al, out of 87 cases of bipolar arthroplasty one case of deep infection and 2 cases of superficial infection were reported.¹⁰ In this study 1 case of femoral stem loosening has occurred, and it was revised successfully with the longer stem and cement augmentation. In Bateman series, 6 cases of aseptic loosening were reported.¹¹

In this study, we encountered 10% (2 cases) acetabular erosion in Austin –Moore hemiarthroplasty, during the follow-up period of 5 years for one patient and 5 ½ year for another patient. The first patient was of age 67 years old, in this case acetabular erosion may be due to

generalized osteoporosis of old age. D’Arcy and Devas noted acetabular erosion in 26% of patients younger than 70 years old in Austin-Moore hemiarthroplasty. Another study showed that, out of 74 patients of an average follow up of 7.8 years and identified with an active life style, obesity and length of follow-up being associated with acetabular erosion.¹²

In the study, there were no cases of sciatic nerve injury, dislocation and no clinical evidence of deep vein thrombosis or pulmonary embolism. We did not use any prophylaxis for deep vein thrombosis in any of our cases.

CONCLUSION

This study of Austin-Moore Hemiarthroplasty and Bipolar hip arthroplasty was done in 40 patients for fracture neck of femur to compare and evaluate the functional outcome. In case of retrospectively studied cases, Austin-Moore hemiarthroplasty showed good results in 8 cases out of 11 and remaining 3 cases showed poor results. But in Bipolar arthroplasty showed Excellent/Good results. Bipolar arthroplasty is a good operation for fracture neck of femur with 100% satisfactory results in rural patients in long term follow up. But in case of short term follow-up both Austin-Moore arthroplasty and Bipolar arthroplasty showed more or less similar end results. However patients need to modify their daily routine activities and preferably avoid squatting and sitting cross-legged on the floor.

END NOTE

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Conflict of Interest: None declared

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