Study of Fracture Neck Femur Treated with Cemented Bipolar Prosthesis vs. Austin Moore Prosthesis in Elderly

ABSTRACT

Introduction Intracapsular femoral neck fractures are common in the elderly population. Replacement arthroplasty is now the established modality of treatment in fracture of femoral neck in the elderly due to reasons like failure of internal fixation, high rate of nonunion and avascular necrosis, poor hold of implant in internal fixation due to osteoporosis, pulmonary complications and deep vein thrombosis. This is a prospective study and results are short term. Outcomes were analysed by Harris Hip scoring system and radiographs taken during follow up.

Aim and Objectives To analyse the results of Hemi arthroplasty with bipolar or Austin Moore prosthesis using Harris Hip score and determine the ideal prosthesis for study group. To study the morbidity and mortality rate and associated complications with the procedure.

Materials and Methods This prospective study included 60 patients who are more than 60 years of age of both sexes. Intracapsular neck femur fracture where randomly allocated.

Results It showed excellent results in 93.33% of bipolar group of patients as compared to 73.33% of Austin Moore group of patients with p value 0.05 which is significant and thus bipolar group patients have significantly higher scores as compared to Austin Moore group patients.

Conclusion Results of bipolar prosthesis seems to be better compared to Austin Moore prosthesis.

KEYWORDS bipolar, Austin Moore prosthesis, Harris Hip score

INTRODUCTION

Hip fractures are devastating injuries that most commonly affect the elderly and have a tremendous impact on both healthcare system and society, in general. Despite marked improvements in implant design, surgical technique and patient care, hip fractures remains an enigma unsolved till today.

Fracture neck of femur has been recognised since the time of Hippocrates1,2 and is a common orthopedic problem in all age groups and more so in elderly because of osteoporosis and associated diseases.

The blood supply to the neck and head of the femur is extensive, intricate and complicated. Healing process mainly depends on the good blood supply. This further handicap the treatment of these fractures and the healing process is always in doubt.

Sir Watson Jones3 considered this fracture to be the terminal event in the life of feeble and fragile patients who used to die of cardiac, pulmonary and renal complications aggravated by immobilisation and recumbency. Under such circumstances one has to decide whether the prolonged immobilisation has to be employed to achieve the bony union or quick ambulation by replacement arthroplasty, to achieve fair degree of function.

The patient also needs to go through in many instances, multiple surgical procedures and a prolonged rehabilitation in order to preserve the original joint.

Replacement arthroplasty is now the established modality of treatment in fracture of femoral neck in the elderly due to following reasons like failure of internal fixation, high rate of nonunion and avascular necrosis, poor hold of implant in internal fixation due to osteoporosis, complication of
prolonged recumbency like bed sore, pulmonary complications and deep vein thrombosis.

Hence, we decided to compare results of hemiarthroplasty using Austin Moore prosthesis vs. bipolar prosthesis in displaced femoral neck fractures in the elderly. This is a prospective study and results are short term. Outcomes were analysed by Harris Hip scoring system and by radiographs taken during follow up (Figs. 1, 2).

AIM AND OBJECTIVES

**Aim**
The aim of this study is to evaluate the efficacy of hemiarthroplasty in management of fracture neck femur in elderly with bipolar or Austin Moore prosthesis.

**Objectives**
To analyse the results of hemiarthroplasty with bipolar or Austin Moore prosthesis using Harris Hip score, to study the morbidity and mortality rate associated with the procedure and to study the associated complications.

MATERIALS AND METHODS

The present study is a prospective study. The study analysis the result in 60 randomly divided patients with fracture neck femur treated by hemi replacement arthroplasty using either Austin Moore prosthesis or bipolar prosthesis during the period from July 2013 to September 2015. Institute Scientific & Ethics Committee Clearance was obtained before the start of the study.

Inclusion criteria
All patients with fracture neck femur more than 60 years of both sexes with either unilateral or bilateral fracture.

Exclusion criteria
Patients with less than 60 years of age with intertrochanteric and subtrochanteric fracture.

OPERATIVE DETAILS

Anesthesia
Patients were operated under either regional (spinal or epidural) or general anesthesia.

Pre-operative antibiotics
All patients were given 1 gm of Cefotaxime injection intravenously, 30 min prior to surgery.

Position
Lateral position on simple table with the affected side facing upwards. Patients were anchored firmly using side supports and straps.

SURGICAL TECHNIQUE

**Approach**
Modified Gibson (Modified by Macry and Fletcher).

**Incision**
Begin the proximal limb of incision at a point 6–8 cm anterior to posterior superior iliac spine and just distal to the iliac crest, overlying the anterior border of gluteus maximus muscle. Extend it distally to the anterior edge of the greater trochanter and further distally along the line of femur for 15–18 cm.

**Deep incision**
The subcutaneous tissue was dissected from the facial plane for approximately 1 cm anteriorly and posteriorly to make identification of this plane easier at the time of closure. The gluteus maximus was bluntly split proximally in the direction of its fibers and any vessels within the substance of the muscle were coagulated.

The trochanteric bursa was divided and bluntly swept posteriorly to expose the short external rotators and the posterior edge of the gluteus medius. The tendons of the piriformis and obturator internus were palpated and tagged sutures were placed in the tendons for later identification at the time of closure and were divided at their insertion on the femur. The capsule was incised by a T-shaped incision and femoral head was extracted using Judet’s head extractor. Residual soft tissues were excised along the intertrochanteric line and the upper edge of the lesser trochanter was exposed. The femoral neck was prepared with an osteotome or oscillating or reciprocating power saw, keeping 2–2.5 cm of calcar above the lesser trochanter as determined by the offset of the implant.
The femoral canal was then prepared using femoral reamers and rasp.

**Insertion of prosthesis**
The prosthesis (Austin Moore prosthesis) was then inserted into the femoral shaft in about 10–15 degree of anteverision and impacted into the femur till the sitting of the prosthesis was complete on calcar. The reduction of the prosthesis was done with gentle traction and external rotation of hip.

**For bipolar prosthesis**
After calculating length of prosthesis, cement restrictor was introduced and cement was inserted into the medullary cavity by the method of manual cement packing until it was completely packed firmly in the canal with a finger before the stem was introduced.

The bipolar prosthesis was then inserted maintaining anteverision and mediolateral position as desired. The prosthesis was then holed motionless with pressure till the cement hardened and hip was reduced by gentle traction and external rotation. Stability was confirmed. Adequate closure of the posterior capsule and anatomical reattachment of short external rotators was done. Rest of the wound was closed in layers. All the patients who were operated were kept in supine position which involved lower limb in 20–30 degree of abduction using abduction pillow (Figs. 3–15).

**RESULTS**
Data was collected based on detailed patient evaluation with respect to history, clinical examination and radiological evaluation (Fig. 1). Average age of patient was...
70.5 years (60–95). Patients sustaining fracture neck of femur included 29 males and 31 females. Most fractures of femoral neck (73.33%) occurred following trivial trauma. Thirty-four cases were categorised under Garden Type IV.

In 77% of cases, stem was in neutral position, in 3% of cases it was in varus position while in 20% of cases it was in valgus position.

**Post-operative pain**

Ninety percent patients (54 patients) were mobilised on the 3rd post-operative day with the help of walker, in 10% of cases (6 patients, 3 in each group) patients were not mobilised early due to associated injuries. In the
present series, one patient of bipolar group had posterior dislocation which was reduced by closed reduction and abduction bar was advised.

Two patients, one in each group developed signs of superficial infection in the first week of operation which resolved by change in antibiotics, systemic illness or age-related problems. Results were graded according to Harris Hip score at 2 years of follow up (Table 1).

In our study 95% of patients had excellent to good results. Thus p-value is less than 0.05 which is significant and thus bipolar group patients have significantly higher scores as compared to AMP group patients.

**DISCUSSION**

Management of fracture of femoral neck still remains a major and difficult undertaking for an orthopaedic surgeon. The pendulum of treatment is swinging between reduction and internal fixation with various supplementary methods such as osteosynthesis to total hip replacement. It is now the general feeling that reduction and internal fixation should be reserved for the younger patients in whom if needed revision surgery may be done at a later date. Primary prosthetic replacements in older patients who need early mobilisation should be considered.
In this context we undertook the present study to evaluate the results of hemiarthroplasty in fracture neck of the femur in elderly using Austin Moore prosthesis or bipolar prosthesis keeping in view the social and economic condition of an average Indian. The average age of patients of present series was 70 years.

In present series, the intracapsular fracture of femoral neck was found to be more common in females. The elderly females are more prone to fracture neck of femur due to osteoporosis.

Depending on the anteroposterior radiographic view available, they were grouped into subcapital and transcervical type. In our series, 46.67% patients had subcapital fracture and 53.33% patients had transcervical fracture.

In the present series, 73.33% of patients had trivial trauma and rest of the cases of fracture were due to low velocity trauma or severe trauma like fall from height or vehicular accident.

The common problems in present series were anemia, hypertension, diabetes mellitus, COPD and other medical problems. Sixty-three percent of patients in this series had one or more of the problem.

In present series, hospital stay ranges from 14 days to 26 days with a mean average of 13.5 days.

Two patients had superficial wound infection. They developed signs of infection in the first week of operation. They were treated with proper antibiotics and dressings. There were no cases of deep infection in the present series. All these infections were found when the patients were still in the hospital, and treated appropriately.

Only 1 patient of bipolar group had posterior dislocation which was reduced and patient was given abduction bar.

Seventy-eight percent of patients had no pain at final follow up, of which 90% were of bipolar group and 67% of were of AMP group, 15% experienced slight pain which amounted to awareness of pain of low grade with no compromise in activity, of which 23% of were of AMP group and 7% were of bipolar group. Mild to moderate pain were experienced in 6.67% of patients (10% in AMP group and 3.33% in bipolar group).

Eighty percent of patients had no limp (77% of bipolar group and 63% of AMP group). Four patients required continuous support due to pain and age-related problems.

The final result after hemiarthroplasty in present series was analysed by Harris Hip score.

Ninety-six percent of bipolar group of patients were able to enter public transport, 90% of AMP group were also able to do so. More than 70% of present series were able to climb staircase without support, 65% were able to sit comfortably, 75% were able to wear appropriate foot wear and 93.33% of bipolar group had excellent results.

In 3.33% of bipolar group results were good, 73.33% of AMP group of patients had excellent results while in 23.33% of AMP group results were good. In both groups in 3.33% results were fair.

**CONCLUSION**

The results obtained from bipolar prosthesis seem to be better compared to Austin Moore prosthesis.

**REFERENCES**