



Cemented Bipolar Hemiarthroplasty for Fracture

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Ashley Cooper recognized fractures in the proximal femur distal to the insertion of capsule. He noted that they invariably united without difficulty often with external rotation and shortening leading to coxa vara. Till the 1940s the standard treatment was reduction of the fracture and immobilization in plaster spica or in traction. The long period of immobility required for this treatment carried considerable morbidity, particularly in elderly patients. In addition to problems of prolonged bed rest, reports about various management strategies were not satisfactory. The justification for early rehabilitation in this group was accurately summed up by this quotation by Evans. " The very old patients who sustain this injury tolerate pain and immobility badly; their mental state is often precarious and is quick to develop bed sores or pulmonary complications. We believe that they should be treated as surgical emergency and the older and more feeble the patient the more urgent is the need for the operation" The aim of this prospective and retrospective study is to analyse the short term follow up results of cemented bipolar hemi arthroplasty in neck of femur fracture and unstable intetrochanteric fractures of the elderly done in our institution.

Keywords: Ashley Cooper; coxa vara; rehabilitation; arthroplasty.

1. INTRODUCTION

Hip fractures most often affect the elderly and have a tremendous impact on both the health

care system and society in general. In human beings any affection of the hips is of much concern since it offers locomotion [1-4]. From the very beginning most of the proximal femur

fractures in the elderly were associated with considerable co morbidity.

The intertrochanteric fractures and femoral neck fractures occur in the more elderly age group. Most inter trochanteric hip fractures can be treated successfully with internal fixation [5-8]. Failure rates as high as 56% have been noted in certain problematic fracture patterns - Haidukewych et al . The failure after internal fixation had been due to initial fracture pattern, comminution , sub optimal fracture fixation and poor bone quality. The failed treatment of hip fractures typically leads to profound functional disability and pain [9-11].

In these patients treatment with primary cemented hemiarthroplasty could perhaps return the patients to their pre injury level of activity more quickly, thus obviating the post operative complications caused by immobilization or failure of the implant [12-16].

The purpose of the present study was to evaluate the results, technical problems with cemented hemi arthroplasty for comminuted, osteoporotic fracture neck of femur and comminuted unstable intertrochanteric fractures of the elderly.

2. MATERIALS AND METHODS

This study was conducted at Sree Balaji Medical College and Hospitals on 30 elderly osteoporotic patients with neck of femur and unstable intertrochanteric fractures from May 2011 to October 2013. All these patients were treated with cemented Thompson or Bipolar prosthesis

Pre operatively for the entire patients X-ray pelvis with both hips AP and X-ray of the involved hip AP view were taken . The grade of osteoporosis was evaluated by Singh's Index over the normal side

Table 1. Distribution based on sex

Sex	No of patients
Male	13
Female	17

Table 2. Distribution based on age

Age group	No of patients
50-60	4
61-70	4
71-80	16
81-90	6

Table 3. Distribution based on side involved

Side involved	No of patients
Right	11
Left	19

Table 4. Distribution based on fractures

Type of fracture	No of patients
Neck of Femur	15
Unstable Inter Trochanteric	15

Table 5. Based on co morbid distribution conditions

Comorbids	No of patients
Diabetes Mellitus	19
Systemic Hypertension	13
Coronary Artery Disease	6
Chronic Renal Failure	1

Table 6. Distribution based on Singhs' Index

Singhs Index	No of patients
GRADE3	17
GRADE2	11
GRADE I	2

**3. SURGICAL PROCEDURE
PREPARATION OF PATIENT**

On the day of the surgery, the skin is prepared using povid one iodine solution and covered with sterile clothes and brought to the theatre where the final preparation is done. Prophylactic antibiotic is given on the table. A third generation cephalosporin is preferred in the dose of 1 gm given Intra Venously.

4. OPERATION THEATRE

Nowadays most hip arthroplasties are being done in theatres with laminar flow, using body exhaust systems to reduce exogenous bacterial contamination. Adequate precautions are taken to maintain asepsis such as thorough fumigation, air conditioning, limiting the flow of traffic through the theatre to essential personnel only and use of prophylactic antibiotic.

5. ANESTHESIA USED AND POSITIONING

Epidural or General anesthesia is usually employed. The patient is then positioned lateral or supine according to the approach used.

This study was conducted at Sree Balaji Medical College and Hospital on 30 elderly osteoporotic patients with neck of femur and unstable intertrochanteric fractures from May 2011 to October 2013. All the patients were treated with cemented Thompson or Bipolar prosthesis. The following observations are made in this study :

1. There was a slight female preponderance (56.66%)
2. The incidence of fracture was common in the age group of 71 to 80 years . This shows those elderly age groups were more susceptible
3. In most of our patients left side (63.33%) was commonly affected

4. In the distribution of fracture types based on this study 50% were based on neck of femur fractures and the other 50% were on intertrochanteric fractures

5. In majority of our patients the common pre existing co- morbid conditions are Diabetes mellitus (63.33%) , Systemic hypertension (43.33%) , Coronary artery disease (20%), Chronic renal failure (3.33%)

6. In most of the patients the Singh's Index was Grade 3 (56.66%)

6. COMPLICATIONS

1. Mrs. M , 82/F



Fig. 1. Post Operative Dislocation



Fig. 2. After Reduction

2. Mrs.L , 79/F



Fig. 3. Fracture Greater Trochanter With Dislocation



Fig. 4. Post Reduction And Trochanteric Reattachment

3. Mrs.B, 64/F



Fig. 5. Shortening - Prosthesis Sinking

4. Mr.B , 72/M



Fig. 6. Periprosthetic Fracture On Dynamic Compression Plating

7. DISLOCATION

Of the two patients with dislocation one had dislocation in the immediate post operative period for which closed reduction and immobilization in derotation boot was done for 3 weeks. This patient was then able to weight bear and walk normally. The other patient had a fall one month after surgery and sustained refracture of greater trochanter with dislocation, for which open reduction and trochanteric reattachment was done.

7.1 Superficial Infection

One patient had superficial infection which subsided with antibiotics. There were no deep infections.

Periprosthetic fracture:

One patient had Johansson's type I periprosthetic fracture due to fall one month after surgery. The patient was treated by open reduction and internal fixation with Broad

Dynamic Compression Plating. The patient expired after 6 months from the initial injury and was excluded from the study.

Shortening: One patients had shortening of about two centimeter, due to sinking of the prosthesis. This was mainly due to severe osteoporosis. This can be prevented to some extent by reconstruction of the posteromedial fragments before reaming using cerclage wires or reduction clamp.

8. RESULTS AND DISCUSSION

This study was conducted at Sree Balaji Medical College and Hospital on 30 elderly osteoporotic patients with neck of femur and unstable inter trochanteric fractures from May 2011 to October 2013. In our study all the patients were evaluated clinically using Harris Hip Score at various follow up period.

Kenzora et al. found on overall mortality rate of 15 percent in fractures about the hip compared to

an expected mortality rate of 9 percent for the normal population. In his study, significant risk factors were identified. Patients over age 70 had three times the mortality of younger patients. Greater than three pre-existing medical conditions was associated with a 25 percent mortality rate, more than twice that of healthier patients. Surgery performed on the first day of admission and beyond the fifth day was associated with a 34 percent mortality rate.

Those patients operated in during days 2 through 5, had a 5.8 percent mortality rate.

Laros et al and Moore et al showed that patients with bone quality of Singh's grade 3 or less had 33 percent complications, whereas those with Singh's grade 4 or better had 15 percent complications.

Sonstegard et al. tested the stability of the cemented prosthesis-

- fracture complex and found it was significantly greater than any nail- reduction complex tested. They found that it was able to withstand a maximum load of about 1,007 kg, far in excess of loading forces encountered during normal ambulation.

Larsson et al & Regazzoni et al studies showed that excessive collapse, loss of fixation and cutting of the lag screw resulting in poor function are major problems associated with internal fixation of unstable intertrochanteric fractures in elderly patients with osteoporotic bone.

Harwin et al. Broos et al., Rodop et al. [17,18] reported that, to allow early post operative weight bearing and to avoid excessive collapse at the fracture site, primary prosthetic replacement is the method of choice for treatment of unstable intertrochanteric fractures.

Rodop et al. reported on patients who had been treated with a Bipolar Leinbach hemiprosthesis. A good to excellent result was obtained in 80% of the patients. There were no dislocations or cases of stem loosening.

Chang et al. and Gill et al. have reported on the use of cemented hemiarthroplasty in the elderly osteoporotic patients with unstable intertrochanteric fractures and concluded that the results of the arthroplasty equalled that of more conventional methods of fixation.

Haentgens et al reported that in patients treated with arthroplasty, rehabilitation was easier and faster and the incidence of pressure sores, pulmonary infection and atelectasis were significantly lower ($P < 0.05$). The early walking with full weight bearing is considered to be the major contributory factor to these results. In our study with short term analysis (56.66%) were female which compares favourably with that of Stuart et al (75%) which shows definite female preponderance in whom there is an increased prevalence of osteoporosis . The mean age of our patients was (72) years which were lower than that of other studies Stuart et al (82.2 years) , Chang et al (84.2 years) . This may be due to shorter life span for Indians when compared to western population . In (63.33%) of our patients left side was involved. This was similar to Mark B Stem et al (left- 58%)

Also in our study there was no failures related to inadequate stem or mechanical loosening . The tendency to dislocation can be clinically identifiable by major discrepancy in length . Some authors have recommended preservation and systematic closure of the capsule and reinsertion of the peritrochanteric muscles onto the vastus lateralis to prevent dislocation. Others have advocated systematic postoperative bracing and intensive muscular rehabilitation. We do not routinely use bed rest , balanced suspension or a hip spica , since the post operative dislocations in our series did not affect the long term functional results. We allow early mobilization with immediate full weight bearing as in our opinion this is the major benefit and goal of the procedure [19-23]. However in our study there were 2 post operative dislocations. 1 patient in the immediate post operative period which was closely reduced and immobilized in a de rotation boot for 3 weeks after which the patient had a stable hip . The other patient had a fall after 1 month with dislocation for which open reduction was done

There was no case of deep infection, 1 patient had a superficial infection which was treated with iv antibiotics . Direct comparison of mortality rates is not feasible because of difficulty in matching critical factors such as age , pre injury health status , social dependency and fracture type . The mortality rate in our patients was 3.33% which was less than Kenzora et al (15%) and Chang et al (31.5%) In our study 1 patient had shortening of about 2cms post operatively which was slightly better than that of James et al

(11%) . 1 patient with grade 3 osteoporosis had a fall post operatively after 2 months and sustained Johansson's type 1 periprosthetic fracture which was managed with open reduction and internal fixation with broad dynamic compression plating In our study (96.66%) of patients (29 out of 30 patients who survived) retained walking ability after surgery (82% Chang et al , 76% Laskin et al, 78% Miller et al) (3-22)

Potential long term problems associated with prosthetic replacement such as loosening, acetabular erosion , stem failure , late infection and dislocation may yet occur and it needs a long term followup.

9. CONCLUSION

In fracture neck of femur and unstable intertrochanteric fractures of the elderly with osteoporosis, cemented bipolar hemiarthroplasty is one of the best options. This study as is shown in other similar studies stresses that cemented bipolar hemiarthroplasty gives good results than internal fixation. On the other hand this study also stresses that cemented bipolar hemiarthroplasty was better than treated with other modalities like DHS and conservative management. The major advantage is full weight bearing and rapid rehabilitation. It markedly reduces the problems associated with long periods of inactivity such as pneumonia, venous thrombosis, pulmonary embolism and decubitus ulcers. It also obviates the possibilities of non union , delayed union , mal union , nail or screw cut through , various collapse , etc.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline patient's consent and ethical approval has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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