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Original Research Article

A Study to Assess the Clinical and Functional Outcomes of Cemented Bipolar Prosthesis in Unstable Intertrochanteric Fractures in the Elderly

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Abstract:

Aim: The aim of the present study was to evaluate the clinical and functional outcomes of cemented bipolar prosthesis in unstable intertrochanteric fractures in the elderly.

Methods: We conducted a prospective study in which we included 30 patients who presented to Orthopedics Outpatient Department and Emergency with inter-trochanteric femoral fractures.

Results: Mean age of the patients was 77 years (range: 65–85 years). Out of 30 patients, 24 (80%) were female and 6 (20%). Left-side (66.66%) involvement was more than right-side involvement (33.34%). Most cases required 1 U of postoperative blood transfusion, and four cases required 2 U. Mean duration of surgery was 84 min, ranging from 55 to 105 min. The mean blood loss was 272 ml and ranged between 200 and 400 ml. The dislocation rate in our study was zero. The mean Harris hip score improved progressively with time of follow-up. The mean score was 46.34 on the third day, which increased to 57.63 at 2 weeks, whereas at 3 and 6 months the scores were 76.14 and 79.81, respectively. The final average Harris hip score at last follow-up was 82.92. 30% excellent, 33.34% good, 26.66% fair results obtained in our study according to Harris Hip Score.

Conclusion: Intertrochanteric fractures of femur are very common among old age patients, females being more commonly affected. According to our results, we believe that Cemented Bipolar Hemiarthroplasty is of choice in freely mobile elderly patients above sixty years of age with an intertrochanteric femoral fracture. In elderly patients with intertrochanteric fractures of the femur treated with hemiarthroplasty gave early mobilization, early return to pre injury level, superior the quality of life and gave a long term solution. Postoperative early full weight bearing after Hemiarthroplasty avoids long-term immobilization, rehabilitation, deformities and need for revision surgeries.

Keywords: Cemented Bipolar Prosthesis, Elderly, Harris Hip Score, Internal Fixation, Unstable Intertrochanteric Fracture.

Introduction

The intertrochanteric fracture is one of the most common fractures of the hip in the elderly, and usually is a result of low-energy trauma; [1] it accounts for up to 48% of all hip fractures. [2] These fractures are associated with substantial morbidity and mortality, mechanical complications, and great financial burden to patients and their families. [3,4] Stable fractures can be easily treated with osteosynthesis with predictable results. However, the management of unstable intertrochanteric (Evans type II and AO/OTA type 31-A2.2 and 2.3) [5,6] fractures in elderly patients is a challenge because of the difficulty in obtaining anatomical reduction and the increased rates of morbidity and mortality.

Unstability, osteoporosis and severe medical comorbidities in senile patient treatment are perilous. The spectra of treatment modalities starting from conservative to surgical intervention such as, advanced internal fixation have been employed since ages. But the problems remains an enigma unsolved till today. Before 1960 IT fractures treated conservatively, which resulted in conservative methods resulted in advanced mortality rates and complications like decubitus ulcer, urinary tract infections, pneumonia, thromboembolic complications. Intertrochanteric fractures with severe displacement and communication are common in elderly patients. These patients have a poor bone quality and the fractures are often associated with complications such as nonunion, metal failure and femoral head

perforation. [7,8] The primary treatment goal is a stable fixation, early mobilization and immediate full-weight- bearing. [9]

Osteosynthesis gives good results in stable intertrochanteric fractures where as in unstable intertrochanteric fracture is challenging, with predictable good results, whereas the management of unstable intertrochanteric fractures is challenging, due to poor bone quality. The comminuted intertrochanteric fractures being in cancellous area, fixation of all fragments is difficult. The posteromedial void is generally present which makes the fracture very unstable. [10] Recent modality of fixation of these fractures is by 4th generation of intramedullary nails like the proximal femoral nails [11] immobilisation is required even in this implants. Management of such cases with primary hemiarthroplasty permits early mobilization, thus avoiding most complications such patient are mobilised early. [12]

The aim of the present study was to evaluate the clinical and functional outcomes of cemented bipolar prosthesis in unstable intertrochanteric fractures in the elderly.

Materials and Methods

We conducted a prospective study in which we included 30 patients who presented to Orthopedics Outpatient Department and Emergency of Aayush Multi-Speciality Hospital,Morbi, Gujarat, India for one year with inter-trochanteric femoral fractures.

Inclusion Criteria

1. Patient with age group >60 years of either sexes who are able to walk before injury
2. Intertrochanteric fracture classified as unstable fracture according to Boyd and Griffin classification (type II, III, IV).

Exclusion Criteria

1. Polytrauma patients.
2. Patient <60 years of age.
3. Compound intertrochantric fractures.
4. Patients medically unfit for surgery.
5. Patients with immunocompromised status.

Operative Technique

Patient positioning: Position the patient with the affected hip upward in lateral position. Prepare the skin over the hip and square off the lateral aspect of the hip from the iliac crest to the proximal thigh with towels and drapes. All patients were operated by the same surgeon. We used the posterior approach in lateral position.

Subcutaneous tissue is divided along with a skin incision in a single plane down to fascia lata and fascia covering gluteus maximus superiorly. Fascia is divided in line with the skin wound over the center of the greater trochanter; gluteus maximus is bluntly split proximally in the direction of its fibers. Short external rotators and posterior edge of the gluteus medius were exposed. Fracture fragments were exposed and proper assessment was done without cutting short external rotators. Femoral head is dislocated posteriorly and removed after taking high cut in the neck. When the lesser trochanter is found as a separate fragment with neck, both of them are tied to the shaft using steel wires. In cases of greater trochanter fracture en masse, it is attached to the main shaft using steel wires. In cases in which the greater trochanter is coronally split, a tension band wiring is used. In cases in which the greater trochanter is severely comminuted, Ethibond sutures are used to suture together the inter-trochanteric pieces and the soft tissues to make a stable construct. After proper neck cut, the femoral canal is broached with adequate anteversion. After trial reduction, we inserted a cemented bipolar prosthesis by using first generation cementing technique.

Rehabilitation protocol: The patients were allowed to sit up on the bed hanging legs by the side on the second day. Quadriceps strengthening exercises, knee flexion, and extension exercises were started from the second day and patients were allowed full weight-bearing walk with a walking aid after the third day and/or as the pain and discomfort were tolerated. Adduction and abduction exercises of the hip started after 1 week, after which the patient was allowed to roll by the sides. Squatting and sitting cross-legged was totally restricted and patients were encouraged to leave their walking aids as soon as possible. Postoperative hip function was evaluated using the Harris hip-scoring system. Mean follow-up period was 3.5 years (2–5 years).

Results

Table 1: Patient characteristics

Parameters		*n* (%)
Age group (years)		
65–70		7 (23.34)
71–75		15 (50)
76–80		3 (10)
81–85		5 (16.66)

Sex distribution		
Male		6 (20)
Female		24 (80)
Side		
Side		
Left		20 (66.66)
Right		10 (33.4)

Mean age of the patients was 77 years (range: 65–85 years). Out of 30 patients, 24 (80%) were female and 6 (20%). Left-side (66.66%) involvement was more than right-side involvement (33.34%).

Table 2: Other parameters

Parameters	N %
Blood transfusion required (Number of units)	
One	24 (80)
Two	6 (20)
Mean duration of surgery (min)	84 (55–105)
Mean blood loss (ml)	272 (200–400)
Limb length discrepancy	7 (29)
Average shortening (cm)	1.2 (0.5–1.8)
Postoperative dislocation	None
Superficial infection	3 (10)
Harris hip scores at follow-up (mean score) Time of follow-up	
Third day	46.34
Second week	57.63
3 months	76.14
6 months	79.81
12 months	82.92

Most cases required 1 U of postoperative blood transfusion, and four cases required 2 U. Mean duration of surgery was 84 min, ranging from 55 to 105 min. The mean blood loss was 272 ml and ranged between 200 and 400 ml. The dislocation rate in our study was zero. The mean Harris hip score improved progressively with time of follow-up. The mean score was 46.34 on the third day, which increased to 57.63 at 2 weeks, whereas at 3 and 6 months the scores were 76.14 and 79.81, respectively. The final average Harris hip score at last follow-up was 82.92.

Table 3: Functional results according to Harris hip score

Functional outcome	No. of Patients	%
Excellent	9	30
Fair	8	26.66
Good	10	33.34
Poor	2	6.66
Death	1	3.33
Total	30	100

30% excellent, 33.34% good, 26.66% fair results obtained in our study according to Harris Hip Score.

Discussion

Intertrochanteric fractures comprise approximately 45%–50% of all hip fractures in older persons [13] and 50%–60% of them are classified as unstable. [14] Unstable intertrochanteric fractures are of major cause of concern in older patients because of the associated high morbidity and mortality. [15] Intramedullary nailing is the treatment of choice for stable hip fractures. Intramedullary nailing techniques require only a small incision and protect patients' bone structure. Intramedullary nailing reduces surgical complications, blood loss, and infection. [16] Thus, the minimally invasive procedure of intramedullary nailing is considered the most appropriate for geriatric patients. Management of unstable intertrochanteric fractures is challenging in older patients because of their poor bone quality and high risk of morbidity and mortality. [17] Osteoporosis and instability are two of the most important factors leading to unsatisfactory treatment outcomes. [18,19]

Unstable intertrochanteric fractures in elderly patients are characterized by osteoporosis, severe comminution, and displacement. In patients with osteoporotic and/or comminuted fractures, maintenance of reduction can be a major problem

during the healing period. To reduce the healing time, dynamic devices are replaced with the static ones. Biomechanical studies show that dynamic implants have more weight-bearing capacity than static implants. [19-22] It has been recommended that position of the screw in the femoral head should be in the center [23], which yields a cut-out rate of about 13%. Mean age of the patients was 77 years (range: 65–85 years). Out of 30 patients, 24 (80%) were female and 6 (20%). Left-side (66.66%) involvement was more than right-side involvement (33.34%). Hemiarthroplasty has been used for unstable intertrochanteric fractures since 1971[24] however less frequently as compared to femoral neck fractures.[25] Its initial use was as a salvage procedure for failed pinning or other complications.[26] Tronzo claimed to be the first to use long, straight-stemmed prosthesis for the primary treatment of intertrochanteric fractures.p [27] Rosenfeld, Schwartz, and Alter reported good results with the use of the Leinbach prosthesis.[28] Since then there are multiple studies showing good results using this technique.

Most cases required 1 U of postoperative blood transfusion, and four cases required 2 U. Mean duration of surgery was 84 min, ranging from 55 to 105 min. The mean blood loss was 272 ml and ranged between 200 and 400 ml. The dislocation rate in our study was zero. The mean Harris hip score improved progressively with time of follow-up. The mean score was 46.34 on the third day, which increased to 57.63 at 2 weeks, whereas at 3 and 6 months the scores were 76.14 and 79.81, respectively. The final average Harris hip score at last follow-up was 82.92. 30% excellent, 33.34% good, 26.66% fair results obtained in our study according to Harris Hip Score. Because of high failure rates, complications associated with internal fixation, use of hemiarthroplasty, and total hip arthroplasty as primary treatment of these fractures have emerged. Tronzo [29] pioneered the use of prostheses for the primary treatment of comminuted intertrochanteric fractures. Stern and Goldstein [30] used the Leinbach prosthesis for the primary management of 22 intertrochanteric fractures and concluded that early mobilization and early recovery to preinjury status are definite advantages. Rodop et al [31] in a study of primary bipolar arthroplasty for unstable intertrochanteric fractures in 37 elderly patients obtained 17 (45%) excellent and 14 (37%) good results after 12 months according to the Harris hip-scoring system. Haentjens et al [32] compared the outcomes of internal fixation and hemiarthroplasty and reported a significantly reduced incidence of pneumonia and pressure sores in the hemiarthroplasty group. Bipolar Hemiarthroplasty having less complications than in unipolar implants like-loosening, dislocation, protrusion, and acetabular wear. Due to dual bearing surfaces in prosthesis good advantages such as sharing of the motion at the two surfaces and hence, it reduces the net wear at either surface, thus reducing erosion at the acetabular joint interface. In addition, the total range of motions at the joint is increased. In wide femoral canal Cemented fixation gives the implant good stability. an unstable intertrochanteric fractures, allowed early walking with full weight bearing and helped the patients to return to prefracture level of activity rapidly, preventing complications such as pressure sores, pneumonia, atelectasis and pseudoarthrosis".

Conclusion

Intertrochanteric fractures of femur are very common among old age patients, females being more commonly affected. According to our results, we believe that Cemented Bipolar Hemiarthroplasty is of choice in freely mobile elderly patients above sixty years of age with an intertrochanteric femoral fracture. In elderly patients with intertrochanteric fractures of the femur treated with hemiarthroplasty gave early mobilization, early return to pre injury level, superior the quality of life and gave a long term solution. Postoperative early full weight bearing after Hemiarthroplasty avoids long-term immobilization, rehabilitation, deformities and need for revision surgeries.

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