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Original Research Article

A Prospective Study on Management of Intertrochantric Fractures in Elderly Osteoporotic Patients using Cemented Bipolar Hemiarthroplasty

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Abstract: Inter trochanteric fractures or Hip fractures are devastating injuries that most commonly affect the elderly and have a tremendous impact on both the health care system and society in general. The objective is to study the age and sex incidence of intertrochanteric fracture of femur, to study the quality of life after hemiarthroplasty in intertrochanteric fractures and to study the morbidity and mortality rate associated with the procedure. A prospective study was done on 20 patients with comminuted intertrochanteric fracture treated by cemented bipolar hemiarthroplasty, conducted in Department of Orthopedics, Government Mohan Kumaramangalam Medical College, and Salem during the period of Jan 2009 to August 2010. More number of patients was in the age group of 71-75 yrs (35%), with the Mean age as 71.4years more than half of the patients (60%) had intertrochanteric fracture on their left lower limb. Most number of patients (9) had type II intertrochanteric fracture. One patient with previous implant failure was included. Type IV was not included in the study because most of them showed poor results. Many number of patients had their intertrochanteric fracture due to fall from height (40%) and Motor vehicle accident (40%). Out of 20 patients only 7 patients had associated injuries apart from their intertrochanteric fracture. Other 13 patients had no associated injuries. The greatest advantage of having this surgery is of less blood loss, less duration of hospital stay and early ambulation. This also gives way for good range of movements and leeser complications.
Keywords: Intertrochanteric fracture, cemented, bipolar, hemiarthroplasty.

INTRODUCTION

Intertrochantric fractures is one of the most common fractures of the hip especially in the elderly with osteoporosis .It usually occurs due to low energy trauma like simple falls. The incidence of intertrochantric fracture is rising because of number of increase in the senior citizens with osteoporosis. By 2040 the incidence is estimated to be doubled. In India the figure may be much more [1]. The incidence of trochanteric fractures is more in the female population compared to the male due to postmenopausal osteoporosis. Inspite of the advances in anesthesia, nursing care and the surgical techniques, hip fractures remain a significant cause of morbidity and mortality in the elderly population. Hip fractures are devastating injuries that most commonly affect the elderly and have a tremendous impact on both the health care system and society in general[1].

Various methods of treatment have been employed since ages. But the problem remains an enigma unsolved till today [2]. The prolonged immobilization in elderly will jeopardize the life span of patient and further complicates the problem. This forces one to totally abandon the complete immobilization to achieve a bony union, and to resort early ambulatory procedures like DHS, IMN with SHS, and hemi replacement arthroplasty to achieve fair degree of function.

Hemi replacement arthroplasty by using vit Allium or stainless steel was popularly practiced by Austin Moore, produced fairly good results [3, 4]. But it had its limitations in loosening and reactions at acetabulum etc. Many of the shortcomings of this procedure were overcome by a new type of prosthesis, which had the great advantage of second joint, below the acetabulum. It was named as bipolar prosthesis,

since it had an outer head of metal which articulates with the acetabulum and a second inner small metallic head which articulates with the high density polyethylene (HDPE), lining the inner surface of the outer head. This prosthesis is very useful and results are encouraging [5].

Our aim of this study is to see whether bipolar hemiarthroplasty meets desired end results.in the treatment of intertrochanteric fractures in elderly osteoporotic individuals. The bipolar hemiarthroplasty has lesser morbidity and an advantage of earlier mobilization in elderly patients

METHODOLOGY:

The present study is a prospective study done on patients with comminuted intertrochanteric fracture treated by cemented bipolar hemiarthroplasty was conducted in Department of Orthopedics, Government Mohan Kumaramangalam Medical College, and Salem during the period of Jan 2009 to August 2010. Twenty Elderly Patients admitted with intertrochanteric fracture of femur in Govt. Mohan Kumaramangalam Medical College were included in the study. Inclusion criteria for the study are, all type1, 2 and type 3 comminuted intertrochanteric fractures of femur in age more than 65 with osteoporosis and failed previous fixation (DHS). The patients excluded from the study are, type 4 fractures, patient who have concurrent infection or previous local infection and patients who have not provided informed consent for participation.

METHOD OF COLLECTION OF DATA:

On admission general condition of the patient was assessed. A thorough clinical examination was performed as per predesigned and pretested proforma including detailed history related to age, sex, occupation, mode of injury, time since injury, past and associated medical illness and pre-injured morbid status.

Routine investigations like haemogram, blood sugar, urea levels, serum electrolytes, chest X- ray, ECG, BT, CT, were done for all the patients on admission. All patients were evaluated clinically and radiologically to assess for any other injuries. X-rays of fractured limb were taken in two planes, AP and lateral view. Patients were operated as early as possible once the general condition of the patient is stable and is fit for surgery.

RESULTS:

In the present study, 20 patients with intertrochanteric fracture of femur were treated with bipolar hemiarthroplasty. The study was conducted in Govt. Mohan Kumaramangalam medical College hospital during the period of Jan 2009 to August 2010. Following observations are made in the present study. The patients who had undergone surgery were 20 which comprises of 8 male and 12 female patients (table 1).

More number of patients was in the age group of 71-75 yrs (35%), with the Mean age as 71.4 years more than half of the patients (60%) had intertrochanteric fracture on their left lower limb. Most number of patients (9) had type II intertrochanteric fracture. (table2) One patient with previous implant failure was included. Types IV were not included in the study because most of them showed poor results. Many number of patients had their intertrochanteric fracture due to fall from height (40%) and Motor vehicle accident (40%).

Out of 20 patients only 7 patients had associated injuries apart from their intertrochanteric fracture. Other 13 patients had no associated injuries. 50% of the patients did not have any co- morbid conditions. Other 50% had other illness during surgery. Among the study participants 45% of the patients had seeked medical care within 1 day after injury. Only 15 % of the patients had taken more than 5days to get hospitalized. Out of 20 patients 55% of them stayed more than 3 weeks before the surgery was performed. This may be because that 50% of the patients had associated co-morbid illness**.** 60% of the patients stayed in the hospital after surgery for less than 15 days as shown in table 3.

Table 1: Age & Sex distribution of the patient's undergone hemiarthroplasty:

Age Group	**Male**	**%**	**Female**	**%**	**Total**	**%**
60-65	1	5	2	10	3	15
66-70	1	5	4	20	5	25
71-75	3	15	4	20	7	35
>75	3	15	2	10	5	25
Total	8	40	12	60	20	100

Table 2: Descriptive statistics for the side, type of fracture according to Boyd & Griffin Type, mode & the associated injuries of the Patients

Side	**Frequency**	**Percent**
Right	8	40
Left	12	60
Total	20	100
Type of fracture		
Type I	8	40
Type II	9	45
Type III	2	10
Previous implant failure	1	5
Total	20	100
Mode of Injury		
Fall	8	40
Fall (moderate height)	3	15
RTA	8	40
Assault	1	5
Total	20	100
Associated Injury		
Nil	13	65
Head injury	1	5
Abrasions	4	20
Other site fracture	2	10
Total	20	100

Table 3: Distribution of the patients by duration of hospital stay:

Interval between trauma & hospitalization	**Frequency**	**Percent**
Less than 1 day	9	45
2-5 days	8	40
More than 5 days	3	15
Total	20	100
Pre-op hospital stay		
Less than two weeks	5	25
Three weeks	11	55
More than 3 weeks	4	20
Total	20	100
Post-op hospital stay		
>10 days	0	0
11-15 days	12	60
16-21 days	6	30
More than 21 days	2	10
Total	20	100

This result shows that patients were able to ambulate with in short period of time. Out of 20 patients more than 60 % of them stayed less than a month in the hospital on toto. Total mean hospital stay was 29 days. (Figure 1) Persisting pain 30%, Knee stiffness 20% and 20% had infection as post-operative complication. Only slight pain (45%) and mild pain (30%) was observed in many of the patient who underwent surgery.

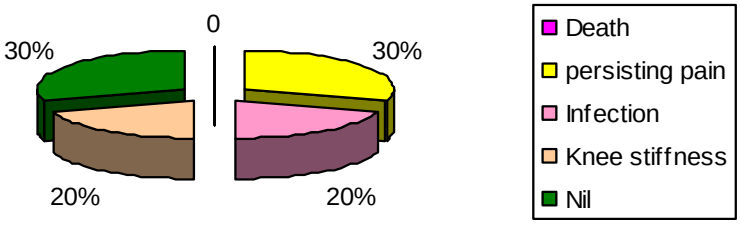

Fig 1: Pie diagram showing by complications

Marked pain was reported by only one patient and patient would have pain because of infection, which was treated by antibiotics.

Out of 20 patients 4 patients (20%) showed excellent, 7 patients (35%) showed good, 5 patients (25%) showed fair and 4 patients (20%) showed poor Harris hip score and there was no significant relationship between age of the patient and the hip scores. Mean Harris hip score was 75.9 (table 4).

Table 4: Association between Age Group & Harris Hip Scores.

	Age Group			
Harris hip score	60-70	71-75	>75	Total
Poor	2	1	1	4
Fair	2	2	1	5
Good	3	2	2	7
Excellent	1	2	1	4
Total	8	7	5	20
$\chi^2 = 0.915$, df. = 6, p = 0.989				

DISCUSSION

Intertrochanteric fractures of the femur are relatively common injuries among the elderly individuals. Sometimes the associated geriatric problems make it a terminal event in the lives of elderly individuals. In order to reduce the morbidity and mortality associated with conservative management of intertrochanteric fractures, surgical management of the intertrochanteric fractures is advocated as the best modality of management of these fractures. Various fixation devices are available for the fixation of intertrochanteric fractures. Many studies were done, to show the effectiveness of bipolar hemiarthroplasty over other procedures. The present study has showed the effective results on treating patients with cemented bipolar hemiarthroplasty.

Surgery in elderly patients:

In the present study, most of the patients (55%) belonged to the age group of 71-75 yrs. Their mean age group was 71.4 yrs. Similarly in an article given in Springer link journal of international orthopedics [6] among 54 elderly patients on whom surgery was done the mean age was 75.6 (64-91). In a study done by Yin Q, Jiang Y *et al.;* [7] in China in 2006, has reported among 89 cases with average age group of 82.6 yrs, with intertrochanteric comminuted fracture treated with bipolar femoral neck prosthesis has proved to be very effective. Similarly to this study done by Raaymaker EL *et al.;* [8] has justified that bipolar hemiarthroplasty is the choice of treatment in the elderly, above 75 yrs of age group.

Sex incidence:

Intertrochanteric fractures are more common in females because of hormonal changes. The female preponderance in our study is similar to that of many studies. In the present study, out of 20 patients, 12 (60%) were female and only 9 (40%) were male patients. Similarly G.S. Kulkarni *et al.;* [1] in their study has observed 55% were females and 45% are males. Hunter and Krajbich [9] in their study have showed 62% were females and 38% were males who had intertrochanteric fracture.

Mode of injury:

In this study done on elderly patients, 40% of the cases were due to trauma, like fall at home, slipping in the bathroom, etc. Road traffic accident was one of the causes of injury in another 40% of the cases. Incidence of trauma is more. 80% & 70% in the studies done by Hornby *et al.;* [10] and Ganz *et al.;* [11] respectively.

Type of Fracture:

In the present study the intertrochanteric fractures were classified according to Boyd and Griffin's classification. There were 8 types I, 9 type II, 2 type III and 1 old implant failure.

In the study majority were type II fractures, which is the same as that observed by many other authors in the literature. The degree of comminution depends on the quality of bone; in the elderly individuals as the bone is osteoporotic the incidence of comminution is more.

Site of fracture:

This study out of 20 patients many of the fractures were on the left lower limb (12 patients) and only 8 patients had their fracture on their right lower limb. Similarly Cleveland *et al.;* [12] in their study showed left sided fractures were common.

Associated injuries & co morbid diseases:

In this study only 7 patients had associated other injuries. Associated injuries are less common may be because many of the injuries occur due to fall from minimal height. Co morbid condition is more in many studies because these studies are mainly done on elderly patients. In the present study 50% of the elderly patients are suffering mainly from non-communicable diseases like DM/HT/IHD, etc. This factor may influence the duration between hospitalization and surgery, post-operative stay, complications, etc.

Duration of surgery and blood loss:

As mentioned earlier, duration of surgery depends upon the type of fracture, condition of the patient and the surgical skill of the surgeon.

The present study shows duration of surgery was less than 90 min in 55% of the patients and more than 90 min in 45% of the patients. The mean duration of surgery was 100 minutes (60-150 min). This study shows 65% of the patients had blood loss more than 300 ml and 35% less than 300 ml. The average blood loss was 275 ml (200-400 ml).

SKS Marya *et al.;* [13] in their study after operating for 19 patients, he has observed the mean duration of surgery was 60 minutes in bipolar hemiarhroplasty. He has also reported that the mean blood loss for bipolar hemiarthroplasty was 400 ml when compared to 600ml in Total hip replacement surgery.

Less duration & less blood loss has been observed in another study done by Yin Q, Jiang Y *et al.;* [7] Surgery was done on 89 patients, Mean surgery duration was observed to be 62 minutes (50 min – 70 min) and mean blood loss was 150 ml (100 ml – 250 ml).

Total duration of hospital stay:

The present study shows 60% of the patients stayed in the hospital for less than 30 days. 10% of the patients stayed more than 40 days. Average period of hospitalization was 29 days (21-37 days). The patients were discharged two weeks after the surgery if there were no post-operative complications. The total duration of hospital stay in few cases was more than 4 weeks, due to delay in acceptance and consent for surgery, medical evaluation in cases of patients with associated medical diseases. Some studies have reported average length of stay in the hospital was about 16 days, among total of 18 pts and 18.6 days, among total of 89 pts by Zhang Q *et al.;* [14], and Yin Q *et al.;* [7] respectively.

Pain:

Pain is an important criterion for the evaluation of intertrochanteric fractures. Following surgery pain in the hip joint may be due to mechanical complications or infection. 10% of the patients did not have pain post operatively. 30% of the patients had pain even at the end of 6 months.

Mild and marked post-operative pain was reported by 30% and 5% of the patients respectively. In one patient the pain was due to a mechanical complication. In the other two patients there was no mechanical complication, or infection or Secondary changes, but the patient still complained of pain in the hip joint. Some other studies also quote less incidence of pain (1%) and less pain by Zhang Q *et al.;* [14] and Gjerstsen JE *et al.;* [15] when compared with other procedures, respectively. Mild pain was observed in 19 patients (63%) and severe pain in 2 patients on the total of 30 elderly patients on whom sugery was done by Gallinaro *et al.;* [16].

Complications:

30% of the patients in the present study did not have any complications. 30% had persisting pain, 20% of them had infection and knee stiffness respectively. One patient had superficial infection which showed positive for streptococcus aureus in culture and sensitivity. The patient was treated with parental antibiotics. In a study done by Yusuf Ozturkmen *et al.;* [17] has reported 12% complications in the patients who had under gone hemiarthroplasty. No complications and pain was observed in19 patients who had undergone hemiathroplasty in a study done by SKS. Marya *et al.;* [13].

Harris Hip Score:

Out of 20 patients 4 patients (20%) showed excellent, 7 patients (35%) good Harris Hip score. Only 4 patients (20%) showed poor results. Mean Harris Hip score was 76 points. Similarly in an article given in Springer link journal of international orthopedics (2004) (18) among 54 elderly patients on whom surgery was done 33 pts, Harris hip score was excellent in 17% and good in 14% of cases.

CONCLUSION:

Intertrochantric hip fractures can be best treated with using cemented bipolar hemiarthroplasty. The greatest advantage of having this surgery is of less blood loss, less duration of hospital stay and early ambulation. This also gives way for good range of movements and leeser complications.

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