COMPLICATIONS OF INTERTROCHANTERIC FRACTURE MANAGED WITH HEMIARTHROPLASTY OR INTERNAL FIXATION USING DYNAMIC HIP SCREW

Abstract:
Intertrochanteric fractures are common problem in the elderly population and are associated with high rate of morbidity and mortality. Increased rate of these fractures is due to increased life expectancy of the people and due to increased incidence of osteoporosis in the old age. Before the advent of the term osteoporosis Sir Astley Cooper wrote “that regular decay of nature which are easily detected in the dead body and one of the principal of these is found in the bones, for they become thin in their shell and spongy in their texture. Hence the present study was conducted at our tertiary care hospital to compare results and complications of intertrochanteric fracture managed with hemiarthroplasty or internal fixation using dynamic hip screw.

Material And Methods: 45 patients aged 60 years and above with Type 3, Type 4 Evans intertrochantric fracture femur operated between February 2015 to Jan 2017 were studied. Case selection was done on the criteria of history, clinical examination and radiological (X-ray) examination. Soon after admission, clinical data was recorded as per the proforma.

Inclusion Criteria:
- Age of patient is at least 60 years and older.
- Femoral intertrochanteric fracture confirmed on antero-posterior and lateral hip radiographs.
- Unstable fracture (Evans type 3, 4, 5). Reverse oblique type.
- Patient ambulatory prior to fracture, though they may have used an aid like a cane or a walker.
- No other major trauma in patient.

Exclusion Criteria:
- Age less than 60 years
- Associated major injuries of lower extremity.
- Any infection around the affected hip (soft tissue or bone).
- Stable fracture (Evans type 1, 2).

Results: The average trauma admission time was 3.85 days and inpatient duration was 15.18 days. All fractures were fixed using DHS and bone wires, k wires and screws were used to provide additional stability in some fractures. Complete weight bearing was started after average period of 10.6 weeks. 3 patients had bed sore treated with air bed and wound dressing while 1 patient had lacunar infract in lentiform nucleus and right frontal area postoperatively, and was treated accordingly. 1 patient was admitted for...
physiotherapy in 6th month for gait training and muscle strengthening. 1 patient who had palpable implant and pain in hip had implant removal after 1 year and fracture was united after collapse. No patient had deep infection. After 6 months of follow up, 2 patients had poor results, 3 had fair results, 16 had good results and 4 had excellent result. At the end of 1 year, all patients who were available for follow up had good to excellent results. No implant cut out was seen and no revision surgery was required.

**Conclusion:** Most of the fractures occurred above 50 years were due to trivial trauma. As age advances there is weakening of bones due to osteoporosis and decreased mineralization and deterioration of general condition due to which cancellous bones are prone to fracture with trivial trauma. Although the clinical outcomes were comparable at the end of one year in both groups, arthroplasty patient had lower post-operative complications like bed sores, pulmonary infection and atelectasis. Major difference was in the duration after which full weight bearing was started, which was significantly early in arthroplasty group. We conclude that hemiarthroplasty is a better option in patients with unstable intertrochanteric fractures.

**Key words:** External Fixator, K wire, Locking compression plate, distal end radius fractures

**Introduction:**

Intertrochanteric fractures are common problem in the elderly population and are associated with high rate of morbidity and mortality. Increased rate of these fractures is due to increased life expectancy of the people and due to increased incidence of osteoporosis in the old age. Before the advent of the term osteoporosis Sir Astley Cooper wrote “that regular decay of nature which are easily detected in the dead body and one of the principal of these is found in the bones, for they become thin in their shell and spongy in their texture.” In the early days these fractures were treated with conservative treatment in traction or non - rotating boot for 6-8 weeks. It is now accepted that internal fixation is the best method because it allows early mobilization and prevention of complications due to prolonged immobilization. Treatment with primary bipolar hemiarthroplasty rather than internal fixation could perhaps return these patients to the pre-injury level of activity more quickly thus obviating the postoperative complications caused by immobilization or failure of the implants. This study was conducted at our tertiary care hospital to compare results and complications of intertrochanteric fracture managed with hemiarthroplasty or internal fixation using dynamic hip screw.

**Material And Methods**

**Study site:** Tertiary centre

**Study Population:** 45 patients aged 60 years and above with Type 3, Type 4 Evans intertrochanteric fracture femur operated between February 2015 to Jan 2017 were studied.

Case selection was done on the criteria of history, clinical examination and radiological (X-ray) examination. Soon after admission, clinical data was recorded as per the proforma.

**Inclusion Criteria**

- Age of patient is at least 60 years and older.
- Femoral intertrochanteric fracture confirmed on antero-posterior and lateral hip radiographs.
- Unstable fracture (Evans type 3, 4, 5). Reverse oblique type.
- Patient ambulatory prior to fracture, though they may have used an aid like acane or a walker.
- No other major trauma in patient.

**Exclusion Criteria**

- Age less than 60 years
- Associated major injuries of lower extremity.
- Any infection around the affected hip (soft tissue or bone).
- Stable fracture (Evans type 1, 2).

The diagnosis was mainly based on clinical examination and was supported by radiological (X-ray) examination.

The outcome measures were to compare results and complications of intertrochanteric fracture managed with hemiarthroplasty or internal fixation using dynamic hip screw.

**Results**

Hemiarthroplasty (Group1) consisted of 20 patients that had undergone hemiarthroplasty while Internal fixation(Group 2) had 25 patients that had undergone internal fixation using dynamic hip screw. There were no significant differences between the 2 groups in terms of demographic data (age, sex), fracture type, hospital stay, operating time, metabolic diseases and associated diseases. Full weight bearing started significantly earlier in patients of Hemiarthroplasty (Group1). Patients who underwent internal fixation had more early complication than those with hemiarthroplasty.

In Hemiarthroplasty (Group1), the mean age of patients was 78.4 years, female to male ratio was 10:8 and...
mean follow up period was 1.2 yrs. Of the total 20 patients, 10 patients were Type 3 fractures, 8 were Type 4 fractures, 1 of Type 5 and Type reverse oblique each. Mechanism of injury in this group was mainly trivial trauma in the form of slip and fall and only one patient had road traffic accident. All patients were ambulatory pre-fall either community or household. The average trauma admission time was 2.5 days with average stay of 16.14 days in hospital. All were operated with cemented prosthesis bipolar prosthesis. Complete weight bearing was started after average period of 8.12 days. 1 patient had superficial wound infection which was treated with meticulous wound care and antibiotics. No patient had deep infection or pulmonary infection. 1 patient had bed sore which was treated with air bed and wound dressing. 1 patient had post-operative constipation and abdominal distention (known operated case of carcinoma stomach). GI scopy was done and treated accordingly, which increased stay in hospital. After 6 months of follow up, 2 patients had poor result, 3 had fair results, 16 had good results and 4 had excellent result. At the end of 1 year, all patients who were available for follow up had good to excellent results. No implant cut out was seen and no revision surgery was required.

The comparison of patient characteristics between the two groups is given in Table 1:

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age</td>
<td>78.4 years</td>
<td>71.3 years</td>
</tr>
<tr>
<td>Female: Male ratio</td>
<td>10:8</td>
<td>7:16</td>
</tr>
<tr>
<td>Evans type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 3</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Type 4</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Type 5</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Reverse oblique</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Systemic illness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Neurological</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Diabetes</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Hypertension</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Tumour</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chronic renal failure</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Liver failure</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Psoriasis</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Trauma-admission interval</td>
<td>2.5 days</td>
<td>3.85 days</td>
</tr>
<tr>
<td>No. of days inpatient</td>
<td>16.14</td>
<td>15.18</td>
</tr>
<tr>
<td>Mean follow up period</td>
<td>1.2 years</td>
<td>1.3 years</td>
</tr>
</tbody>
</table>

In Internal fixation (Group 2) the mean age of patients was 71.3 years, female to male ratio was 7:16 and mean follow up period was 1.3 years. Of the total 25 patients, 12 patients are of Type 3, 9 are of Type 4 and 4 are of Type 5. The mechanism of injury in this group was also trivial trauma in the form of slip and fall. 3 patients had road traffic accident and had fall from height. All patients were ambulatory pre fall except 1 patient who had hemiplegia on same side. The average trauma admission time was 3.85 days and inpatient duration was 15.18 days. All fractures were fixed using DHS and bone wires, k wires and screws were used to provide additional stability in some fractures. Complete weight bearing was started after average period of 10.6 weeks. 3 patients had bed sore treated with air bed and wound dressing while 1 patient had lacunar infract in lentiform nucleus and right frontal area postoperatively, and was treated accordingly. 1 patient was admitted for physiotherapy in 6th month for gait training and muscle strengthening. 1 patient who had palpable implant and pain in hip had implant removal after 1 year and fracture was united after collapse. No patient had deep infection. After 6 months of follow up, 2 patients had poor results, 3 had fair results, 16 had good results and 4 had excellent result. At the end of 1 year, all patients who were available for follow up had good to excellent results. No implant cut out was seen and no revision surgery was required.

The comparison of patient characteristics between the two groups is given in Table 1:
The comparison of weight bearing parameters between the two groups is characterized in Table 2:

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non weight bearing</td>
<td>2.75 days</td>
<td>5.87 weeks</td>
</tr>
<tr>
<td>Partial weight bearing</td>
<td>5.48 days</td>
<td>5.31 weeks</td>
</tr>
<tr>
<td>Complete weight bearing</td>
<td>8.12 days</td>
<td>10.6 weeks</td>
</tr>
</tbody>
</table>

**Graph 3: Mobilization**

**Discussion**

Surgical outcome in elderly patient is unsatisfactory with associated co-morbid conditions like medical illness, osteoporosis and fracture instability. Elderly patients, even if they are in good general health cannot be mobilized without some weight being borne on the involved limb. Early mobilization may decrease the risk of morbidity. In patients with osteoporotic fractures, and major comminution, maintenance of reduction can be a major problem, so many surgeons recommend hip to be protected throughout the healing period. To reduce the healing time, dynamic devices are replaced with the static ones. Dynamic implants have more weight bearing capacity than static implants. Partial weight bearing creates a micro movement in dynamic system which increases union rate. The weak and porotic bone tolerates screws poorly so cut out is the major problem in internal fixation. Central position of the screw in the femoral neck is the recommendable position. Use of internal fixation has decreased the morbidity rate but rate of complications are high bearing, many surgeons prefer arthroplasty for the treatment of unstable intertrochanteric fractures. The patient’s rapid return to the prefacture level of activity has essentially prevented post-operative complications such as bed sores, pulmonary infections and atelectasis.

In the current study, 84.4% patient had excellent to good results after follow up period of 1 yrs. In the study of Kadam R et al, 21 out of 22 patients, 21 had excellent to fair outcomes with primary cemented bipolar hemiarthroplasty. The study of Pal CPet al observed that 91% of bipolar hemiarthroplasty group (Group 1) and 100% of total hip arthroplasty (Group 2) has an excellent to fair outcome. HaentjensP et al compared results of bipolar arthroplasty and internal fixation and reported 75% satisfactory results with less post-operative complications in arthroplasty group.

Rosenfeld RT et al reported 86% of satisfactory results in early period using arthroplasty.

In patients with internal fixation, it is advised to put minimal weight on the affected limb. Despite the advice patient bear more weight and it is difficult to teach them to bear weight only on normal limb. The placement of the screw near the subchondral bone can improve the fixation and associated weight bearing aids can help in the healing of the fracture.

In the current study rate of deep infection is 0% in arthroplasty. It should be remembered that even in the conventional total hip replacement, the rate of deep infection is higher in patients who have a previous operation on the hip. Ehlinger M et al reported that about 6% of patients with intertrochanteric fractures treated with the DHS device suffered from infections; however, no implant loosening was observed.

In the current study, rate of postoperative complications are higher in internal fixation as compared to arthroplasty, full weight bearing was delayed in internal fixation. No dislocation was seen in this study. Sengodan MM observed in his study that 3 patients had immediate complications (2 cases of limb length discrepancy, 1 case of superficial infection) and 1 patient had delayed complication (dislocation at 1.5 years follow up following an attempt to sit on the floor). The rate of dislocation is aggravated by improper prosthetic length, larger the femoral component greater the tendency to dislocate. Sinno K et al conducted a retrospective study on 102 patients with intertrochanteric fracture and compared the results of bipolar and DHS usage. The authors observed that the function, complication rate and FWB in the bipolar group were significantly better.

Shah K et al compared open reduction and internal fixation (ORIF) and bipolar outcomes in 124 patients with intertrochanteric fractures. In a two-year follow-up of patients, who were treated with ORIF, there were better results of pain reduction, ability to walk and HHS compared with the bipolar hemiarthroplasty groups. Bhattacharyya T et al compared results of bipolar with total hip arthroplasty (THA) in intertrochanteric fractures. In the THA group, duration of surgery, blood loss and need for blood transfusion, patient costs and dislocation rate was significantly higher than the bipolar group. However, the duration of hospital stay, complications, pain and function were not difference between the two groups.
They concluded that in patients with intertrochanteric fractures, bipolar is the better treatment in comparison with THA.

Conclusion

Patients treated with internal fixation started full weight bearing (avg. 10.6 weeks) late as compared to hemiarthroplasty (avg. 8.12 days), hence the functional recovery was delayed with internal fixation group. Early post-operative Harris Hip score were good in patients treated with hemiarthroplasty as compared to internal fixation group but at the end of 1 year score was comparable. Post-operative complications were more internal fixation group than hemiarthroplasty group and were comparable with other studies.

Most of the fractures occurred above 50 years were due to trivial trauma. As age advances there is weakening of bones due to osteoporosis and decreased mineralization and deterioration of general condition due to which cancellous bones are prone to fracture with trivial trauma. Although the clinical outcomes were comparable at the end of one year in both groups, arthroplasty patient had lower post-operative complications like bed sores, pulmonary infection and atelectasis. Major difference was in the duration after which full weight bearing was started, which was significantly early in arthroplasty group. We conclude that hemiarthroplasty is a better option in patients with unstable intertrochanteric fractures.

References


