

**EXTERNAL FIXATION OF INTERTROCHANTERIC FRACTURES AS AN OPTION IN HIGH RISK GERIATRIC PATIENTS**A. R. Badoo<sup>1</sup>, Naveed Bashir<sup>2</sup>, Syed Baasit Shafi Shah<sup>3</sup>, Mohammad Ahsan<sup>4</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT: OBJECTIVE:** The purpose of this study is to evaluate the usefulness of external fixation of intertrochanteric fractures in high risk geriatric patients. **DESIGN:** Prospective clinical study. **SETTINGS:** Level-1 trauma Centre. **PATIENTS:** Fifty high risk geriatric patients with intertrochanteric fractures. **INTERVENTION:** Close reduction and external fixation using AO external fixator. **OUTCOME MEASURED:** fracture union, time to union, pin tract infection rate, shortening, varus collapse and range of motion at knee. **RESULTS:** Fifty patients with average age of 68.5 years all high anaesthetic/surgical risk were managed by closed reduction and external fixation. Forty were operated under regional and ten under local anaesthesia. Eight patients died before fracture union and four were lost in follow up after removal of fixator. Remaining thirty eight were in regular follow up for at least six months. Pin tract inflammation was the most common complication while shortening and varus collapse occurred in ten cases. **CONCLUSION:** external fixation of intertrochanteric fractures is useful in high risk geriatric patients.

**KEYWORDS:** intertrochanteric fractures, external fixation.

**INTRODUCTION:** Hip fractures are a leading cause of death and disability among the elderly.<sup>1</sup> These fractures include femoral neck and intertrochanteric fractures. Intertrochanteric fractures generally occur as a result of low energy trauma in advanced age, whereas they are caused by high energy trauma in young age.<sup>2</sup> The incidence of intertrochanteric fractures is increasing day by day as is the life expectancy. Life time risk in industrialized countries of intertrochanteric fractures is 6% for men and 18% for women.<sup>3</sup> Thus we have old patients, many of them with co morbidities, having intertrochanteric fractures. Treatment goals in this population include early rehabilitation, restoration of the anatomic alignment of the proximal part of the femur and maintenance of the fracture reduction.<sup>4</sup>

Various treatment methods used for intertrochanteric fractures include operative and nonoperative.<sup>5</sup> Historically, non-operative management took one of the two different protocols. In first approach, directed at early mobilization within the limits of the patient discomfort, the patient is allowed out of bed and in chair within a few days of injury. Ambulation was delayed, but the early bed to chair mobilization helped prevent many complications of prolonged recumbence. This approach did not attempt to treat the fracture specifically and accepted the deformity that invariably ensues. The second approach, in contrast, attempted to establish and maintain a reasonable reduction via skeletal traction (Hamilton Russel traction) until fracture union occurred. This technique was prolonged with difficulty in maintaining the reduction; further all the complications of prolonged recumbence like pressure sores, urinary tract infection, deep vein thrombosis, pulmonary embolism, chest infection are there. Operative methods include open reduction and internal fixation by sliding hip screw and its variants, intramedullary devices like gamma nails, PFN and their variants. Operative

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methods are treatment of choice in such fractures with their own advantages and disadvantages for particular implants. The sliding hip screw is widely used for fixation of peritrochanteric fractures and it may be considered as gold standard for both stable and unstable fractures.<sup>6</sup> However, in many situations it is not feasible to go for open reduction and internal fixation in patients because of poor health and very high surgical/anaesthetic risks. In such patients conservative method by traction (Hamilton Russel traction) is an option. It has very high rates of complications because of prolonged recumbence.<sup>7</sup> In such situations closed reduction and external fixation is an option which may be considered as semi conservative method of treatment. Anderson et al used external fixators for the treatment of intertrochanteric fractures for the first time in 1943.<sup>8</sup> The advantages of external fixators in treatment of intertrochanteric fractures, have since been recognised by several authors.<sup>1,3,7,9,16,18,20</sup>

We used AO external fixators in the treatment of intertrochanteric fractures in elderly patients who were otherwise high surgical/ anaesthetic risks and evaluated the results to assess this treatment option in this patient group.

**MATERIAL AND METHODS:** We evaluated the results of 50 patients treated by AO unilateral external fixator for intertrochanteric fractures between September 2010 and September 2012 at our hospital. All patients with intertrochanteric fractures who were of > 60 yrs age, having other systemic illnesses, poor health, American Society of Anaesthesiology<sup>10</sup> (ASA) grading >3, which would make them high surgical/ anaesthetic risk were included. Patients with dementia, poly trauma and patients who were not independent ambulators prior to fall or who had pathological fractures were excluded. The average age was 68.5 years (Range 60 to 92 yrs). There were 28 males and 22 females, 23 had right and 27 left sided fractures. Seven were Evans type 1, eight type 2, ten type 3, fourteen type 4 and eleven type 5. The inclusion of patients was based on anaesthetic/surgical risks rather than fracture classification. The study was approved by the hospitals scientific committee.

All patients were operated upon within 3 days of admission to the hospital. Thirty eight patients reached hospital on the day of trauma others on an average of 3.5 days, range (2 to 7) after trauma. Patients were operated on a fracture table under fluoroscopic control. Forty (80%) patients were operated under spinal/epidural anaesthesias and ten (20%) under local anaesthesia supplemented by analgesics. Patients were properly positioned and draped and closed reduction done. The quality of reduction was checked and accessed by as per criteria described by Baumgartner et al (for a reduction to be considered good, there had to be normal or slight valgus alignment on AP radiograph, less than 20 deg angulations on lateral and no more than 4mm displacement of any fragment, to be considered acceptable, a reduction had to meet the criterion of a good reduction with respect to either alignment or displacement, but not both. A poor reduction met neither criterion.<sup>11</sup> Once reduction was achieved it was maintained by unilateral AO fixator using 4 pins. The proximal two pins were put in the region of greater trochanter through neck into head and were advanced to within 5-10 mm of joint surface. Distal two pins were put in shaft bicortically. Only stab wounds were used, pin sites were dressed with betadine dressing. Time duration of surgery was noted from start of close reduction to pin site dressing. Time duration of surgery was noted from beginning of close reduction to wound dressing. Patients were encouraged to sit on 1<sup>st</sup> POD and bear weight as tolerated on 2<sup>nd</sup> POD. They were taught pin site care and discharged on 2<sup>nd</sup> POD with instructions of pin site care, quadriceps exercise, and range of motion (ROM) exercise of knee, weight bearing, and walking

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on frame. First visit was done after one week and then monthly or as required. On each follow up patients were evaluated for pin tract inflammation (PTI), ROM at knee, limb length discrepancy and radiologically for varus collapse and signs of union. PTI were graded according to Checketts and Otterburn.<sup>12</sup> Fixators were removed when signs of union appeared on X- rays (presence of trabeculae bridging the fracture site or obvious periosteal callous) usually 12—14 wks. Final follow up was at six months though there are patients with more than two years follow-up.



Pre-operative x-ray showing intertrochanteric fracture right side



Immediate post-operative x-ray showing external fixator in place



External fixator in place two months post-operative showing signs of union



Healed fracture 6 months post-operative

**RESULTS:** There were eight (16%) deaths before removal of fixators' i.e. within three months. These deaths were due to medical causes unrelated to surgical intervention. All forty two patients who were in follow up till removal of frame united. Four (8%) patients were lost after removal of fixator and never turned up again and as such their results cannot be commented upon. Fixators were removed at 12 weeks in thirty eight (90.5%) patients and at 14 weeks in three (7%). In one patient fixator was removed at 10 weeks because of severe (grade 5) infection, he was put on skin traction for 4 weeks and iv antibiotics for 5 days, he united and infection subsided. The time to union in our study was 12 to 14 weeks (average 12.25 weeks).

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The operating time including closed reduction and putting in external fixator including application of dressing was around 20 to 30 minutes (average 26 minutes). With more experience operating time decreased. Spinal/epidural anaesthesia was used in forty (80%) patients while in ten (20%) local anaesthetic and analgesia was used. Good reduction was achieved in forty (80%) patients and acceptable in ten (20%). All pins were passed in accordance with set protocol using manual drills. No death or significant intra-operative complication occurred in any patient. No blood transfusion was needed intra or post operatively. Hospital stay for patients was three to five days with a mean of 3.5 days. PTI occurred in eight patients. All of them settled with oral/iv antibiotics and local care. In one patient with grade 5 infection fixator was removed early and local drainage done and i/v antibiotics given for five days. Most of the patients had some amount of knee stiffness at the time of removal of fixator. At one year only six out of thirty eight (16%) had knee flexion less than full and out of them three (8%) had less than 90 degree of knee flexion. Clinically shortening > 2 centimetres (cms) and radiologically varus > 20 degree was noted in 10 (26%) cases. At six months post-operative 22 (57%) out of 38 available for follow up were using some sort of support for walking, whereas 2 (5%) were reluctant to walk even with support though their fractured had united.

**COMPLICATIONS:** No major intra operative complication/death occurred in our study. Pin tract infection (PTI) was the most common complication in our study. Occurring in 10 (23%) of 42 patients, early mortality group excluded. This included two with loosening and one with deep infection. All but one settled by oral/IV antibiotics and local care. One with deep infection needed removal of fixator. Other common complications include stiffness of knee, varus collapse and limb shortening.

**DISCUSSION:** The purpose of the study was to evaluate the usefulness of external fixation in the treatment of intertrochanteric fractures in high risk patients. The hip fracture is an injury and a disease at the same time.<sup>13</sup> Charlson's co morbidity index, which predicts death in hospitalized elderly patients with fragility fractures at one year, for hip fractures is on an average 3.4 which corresponds to 52% of mortality at one year.<sup>14</sup> Intertrochanteric fractures are one of the most important fractures and their incidence is increasing due to increase in life expectancy and osteoporosis. Their incidence is expected to double for each decade beyond the age of 50 years.<sup>15</sup> These fractures usually occur in elderly patients who have other co- morbidities. All co-morbidities benefit from early operation and mobilization. Keeping in view the life expectancy, the first goal is patient survival.<sup>16</sup>

Treatment in intertrochanteric fractures ranges from conservative to operative. Achieving union is not a problem, since intertrochanteric fractures are through vascular cancellous bone. The problem is to maintain or reconstitute the neck shaft angle. The best a surgeon can achieve is to secure this position while allowing the patient to enjoy early ambulation.<sup>17</sup> Operative treatment is the treatment of choice and DHS is the implant of choice for intertrochanteric fractures both stable and unstable,<sup>18</sup> but there are situations where ORIF is not feasible owing to patient conditions. In these patients an option is conservative treatment (modified Russel traction) which has very high complication rates.<sup>7</sup> Keeping in view the rate of complications associated with conservative treatment and the high surgical risk associated with operative treatment a middle path is needed. A surgical procedure that has minimal surgical blood loss, short operating time and hospital stay, minimal anaesthetic risks, least morbidity and mortality rate and early weight bearing is favoured.<sup>19</sup>

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External fixators can be considered as a semi conservative method.<sup>20</sup> External fixation gives a stable fixation, allows early mobilization thus preventing the complications of prolonged recumbence. The selection of patients for the procedure was based on poor state of general health producing a moderate or high surgical and anaesthetic risk in prolonged surgery. Severity of patient condition was done by using American Society of Anesthesiologists (ASA) rating.

In our study we had 16% mortality within three months and further 8% patients did not turn up for follow up after removal of frame and as such their survival remains doubtful. Other studies have comparable mortality ranging from 14 to 39%.<sup>8,16,14</sup> The union rate in our study was 100% excluding the early mortality group and the time to union was 12.25 wks which is comparable to other studies.<sup>7,9,16,18</sup> PTI was the most common complication though most of them subsided with antibiotics and local care. It occurred in 10 out of 42 (23%) of reported patients. Other's reported PTI ranging from 7%<sup>16</sup> to 32%.<sup>18</sup> It was superficial in most of the cases. Pin loosening due to infection was seen in 2 patients at around 6 to 8 weeks post-operative. They were managed by antibiotics, local care and limited weight bearing to prevent varus but both of them had > 20 degree varus at union. The large variation in the number of PTI in different studies may be due to different criteria of recording PTI. Another cause of variation may be patient/attendants education level and his/her motivation to pin site care. All PTI in our study were controlled by local care and antibiotics excluding one who required frame removal. The fracture united in varus and patient was reluctant to walk even with support at final follow up. Other complications include stiff knee, shortening, varus collapse. As far as knee stiffness is concerned it was present in most of the patients at the time of removal of frame but improved in most of them over a period of time. At one year only 6(16%) had less than full flexion and only 3(8%) of them had less than 90 degree flexion. Two of them were reluctant to walk. Though knee flexion beyond 90 degree is not of much concern but in our part of world where people sit cross legged and squat some difficulty in daily living was present in them. Varus > 20 degree along with shortening > 2cm has been reported to occur in all major studies. Most studies report around 10 to 15%.<sup>16,18</sup> Varus > 20 degree and associated shortening > 2 cms was present in ten (26%) of patients but was of little concern for the patients. Most of them had unstable fractures or PTI in post-operative period and loosening. Dhal<sup>7</sup> explained it as due to either fracture fixation in varus or collapse of neck shaft angle on weight bearing. In our study it was due to both. We had varus collapse in patients with PTI with loosening or frame removal and also in patients who had acceptable reduction as most of them were done under local anaesthesia and close reduction was not done properly as it was painful. Obtaining a perfect reduction of peritrochanteric fracture may not be the main objective for this high risk group but to operate with least blood loss in shortest time and an anaesthetic technique of low risk, which ultimately facilitates early mobilization in the post-operative period, may be preferred. When we consider the patient sub group in whom this method was used the results may be considered as excellent.

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