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Hip arthroplasty in unstable trochanteric fractures in elderly

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Abstract

Unstable osteoporotic intertrochanteric fractures are common in the elderly population. Failure rate of as high as 56% have been noted with internal fixation of unstable fractures mainly due to inadequate purchase in the osteoporotic bone and early full weight bearing. Hemiarthroplasty is a frequently employed alternative as it gives stability and allows immediate full weight bearing. This study evaluates the role of primary cemented hemiarthroplasty in the treatment of unstable trochanteric fractures in elderly and physiologically elderly patients. 30 elderly patients who were above 60 years of age with unstable osteoporotic intertrochanteric fractures, who underwent cemented bipolar hemiarthroplasty were studied prospectively from July 2017- July 2019. Patients who were less than 60 years of age, non ambulatory before injury and patients with stable intertrochanteric fractures, pathological fractures cognitive impairment were excluded from the study. Fractures were classified based on Boyd and Griffin classification.

All the patients were treated with cemented bipolar prosthesis through posterior (Moore's) approach. Mean follow up period was 12 months. Patients were assessed using modified Harris hip score. This study included 12 males and 18 female patients with mean age of 73. There were 24 patients with a Boyd and Griffin type 2 injury and 6 patients sustained a Boyd and Griffin type 3 injury. The average intra operative blood loss was 357 ml and average operative time was 75 mins. On an average patients were allowed to bear full weight on 7th post operative day. 2 patients had superficial infection and 1 patient had a shortening more than 2 cms. 9 patients had abductor weakness. There were no cases of prosthetic dislocation, periprosthetic fracture, acetabular erosion and stem loosening. Primary cemented hemiarthroplasty for unstable osteoporotic elderly trochanteric fractures appears to be a good alternative treatment modality. Early full weight bearing and rehabilitation is a definitive advantage of this method.

Keywords: unstable Intertrochanteric fracture, primary cemented bipolar hemiarthroplasty, elderly patients.

1. Introduction

Trochanteric fractures make up 45% of all hip fractures and are the major cause of death and disability in elderly. Trochanteric fracture is common fracture in older age group. Their incidence has increased due to the increased life expectancy and osteoporosis^[1-3]. There is a worldwide increase in the incidence of intertrochanteric fracture among elderly patients. Increased life expectancy and osteoporosis has led to increase in the incidence of the fracture trochanter in elderly population. Most of the fractures occur from trivial trauma. Intertrochanteric fracture is defined as the fracture extending from the extra-capsular basal neck region to region along the lesser trochanter before medullary canal development. Unstable fractures are those with comminution in the posteromedial cortex. Stable trochanteric fractures are managed with osteosynthesis with results that can be predicted. The treatment of type 3 and 4 osteoporotic fracture is still matter of concern. Initially, in earlier days fixing the unstable fractures with fixed blade plate and Enders nail had more rate of implant cut through and displacement of fracture^[4,5]. Subsequently use of sliding hip screw gained a lot of success and become the most common modality of fixation of unstable trochanter fractures. However, even with this device, early full weight bearing mobilisation of unstable osteoporotic fracture can result in rotational deformity and limb length shortening, due to uncontrolled telescoping, metal fracture, screw cut out through head. There are various complications which includes perforations of head, shortening due to excessive sliding, pull-out of plate, and breakage of the

plate continued to be a matter of concern, particularly in unstable type of fractures. Early weight bearing following internal fixation of comminuted trochanteric fractures by various means in physiologically elderly and osteoporotic patients leads to fixation failure and poor results. Hence such fractures demand a long period of restricted mobility, which leads to complications such as atelectasis of lungs, bed sores in back, pneumonia, deep venous thrombosis [6-8]. At present intramedullary interlocking devices shows better results in fixing unstable fractures. However long term outcome of these devices is not yet defined. Recently prosthetic hip replacements have achieved early mobilisation of patients and have shown better results in long-term [9-11]. Although more prospective randomized studies are necessary before one can reach to a conclusion.

Hence an ideal treatment method for unstable intertrochanteric fracture is still matter of concern. The study evaluates role of primary hip hemiarthroplasty in the management of non stable inter-trochanteric fractures in the people above 60 years and in physiologically older patients.

2. Materials and Methods

30 elderly and physiologically elderly patients with comminuted trochanteric fractures who met the inclusion criteria were studied prospectively in the Department of Orthopedics, IMS and SUM hospital, Bhubaneswar during the period from July 2017 to July 2019. Inclusion criteria: (1) Patient above 60 years of age. (2) Independently ambulatory before sustaining the fracture. (3) Comminuted intertrochanteric femur fracture (type II/III Boyd & Griffin) (4) Patients medically fit for surgery. (5) Closed fractures.

Exclusion criteria: (1) Patient less than 60 years. (2) Non ambulatory patients before the surgery. (3) Patients with pathological fractures. (4) Open fractures (5) Stable fractures (Boyd and griffin type 1) (5) Patients medically unfit for surgery (6) Polytrauma patient (7) Non united or mal united fracture of femur (8) Implant failure

Informed written consent was taken from all the patient who met the inclusion criteria post admission regarding the inclusion to the study. The advantages and disadvantages of all available surgical options were said to them and patients consenting for the same were included to the study. Demographic and preoperative data including age, gender and fracture type according to Boyd and Griffin classification were recorded before the procedure along with the postoperative data including duration of hospital stay, blood loss, time of bed side mobilization, time taken for full weight bearing. Post-operative complications and mortality were recorded in the follow up. Patients were taken up for surgery 48 to 72 hours after the fracture, after obtaining anesthetic fitness.

All routine blood investigations were carried out on admission which included haemogram (Hb, TLC count, TPC count etc), blood grouping and cross matching, fasting and post-prandial blood glucose levels, serum electrolytes and serum urea and creatinine. Radiological investigations were done which included X-ray of both hips in AP view and involved hip in Lateral view with legs in traction and 15 degrees of internal rotation. X ray chest in AP view was also done for all the patients.

Pre-operative templating of x rays of the affected side and contralateral side was done to estimate the approximate size of the stem. The stem position was also estimated and the estimated femur neck horizontal offset was calculated. Injection Xylocaine 0.5cc intradermally and injection TT

0.5cc intramuscularly given the day prior to surgery. Intravenous antibiotic were given an hour before the surgery. The back, the outer aspect of the hip from the iliac crest to the distal thigh, groin was prepared. "The patient was placed in a straight lateral position. The patient lying on the unaffected side." Knee of the unaffected side is flexed to 45 degree which is used as intraoperative reference for measuring limb length. The skin over the hip was prepared with a scrub and application of povidone-iodine and surgical spirit. The operative field was outlined by 4 sterile towels held in place by clips.

A point was marked 10 cms distal to the PSIS (Posterior Superior Iliac Spine) and was marked as point A. An incision was made from point A extending distally and going laterally to the posterior margin of the greater trochanter. Then it is extended 10 cms parallel to femoral shaft. Exposure of the deep fascia was done and it was splitted. Fibers of the gluteus maximus were splitted along the line of the incision using blunt dissection. This is done protecting the branches of inferior gluteal artery and nerve. Insertion of the gluteus maximus was divided corresponding to the longitudinal limb of incision. Proximal fibers of the muscle were retracted proximally and the greater trochanter was exposed. "The fractured greater trochanter was reflected anteriorly." After exposure of posterior part of the capsule, capsulotomy done in a 'T' shaped manner. The hip and knee are flexed to right angle and the hip is rotated medially to expose the (NOF) neck of the femur and osteotomy of the neck was done at the level. The head of the femur was removed out of the acetabulum and size was measured using head sizing template. The femoral shaft was rasped using a broach (rasp) and prepared for the insertion of the prosthesis. Trial reductions were performed to determine the exact length that would provide the desired tension and tissue balancing of the abductor muscles and an equal leg length. Bone cementing done by standard cementing technique. Then bipolar prosthesis introduced in the proximal femur and then reduced into the hip joint once the bone cement set in. Trochanteric wiring was done whenever it was necessary. Suturing of the capsule was done followed by the suturing of the short external rotators. The surgical cut was closed in separate layers with a romovac suction drain in-situ.

The drain is then removed at the first dressing after 48 hours. "Post operatively Patients were made to sit up on the second day, stand up with support (walker) on the third day and were allowed to full weight bear and walk with the help of a walker on the fourth postoperative day, depending on his/her pain tolerance and were encouraged to walk thereafter. Sitting cross-legged and squatting were not allowed. Suture removal was done on the 12th postoperative day. Patients were followed up at an interval of 6 weeks, 3 months, 6 months and 12 months. Patient was analysed clinically and radiologically at each follow up. Radiologically the patient was assessed for position of stem, stem loosening, and periprosthetic fracture. "Functional outcome was assessed using modified Harris hip score. Harris hip score is a validated 15 item questionnaire in which scores range from 0 to 100.

3. Results

A total of 30 patients with comminuted inter-trochanteric fractures were included in this study. It included 12 males and 18 females. The average age for patients in this study was 73. It included 13 patients from 60 - 70 years, 12 patients from 70 - 80 years and 5 patients above 80 years. Right trochanter (19) was more commonly involved than left trochanter (11).

Out of all 30 patients included in this study 24 patients sustained a Byod and Griffin type 2 of fracture, 6 patients had type 3 type of fracture and no patients had Byod and Griffin type 4 fractures.

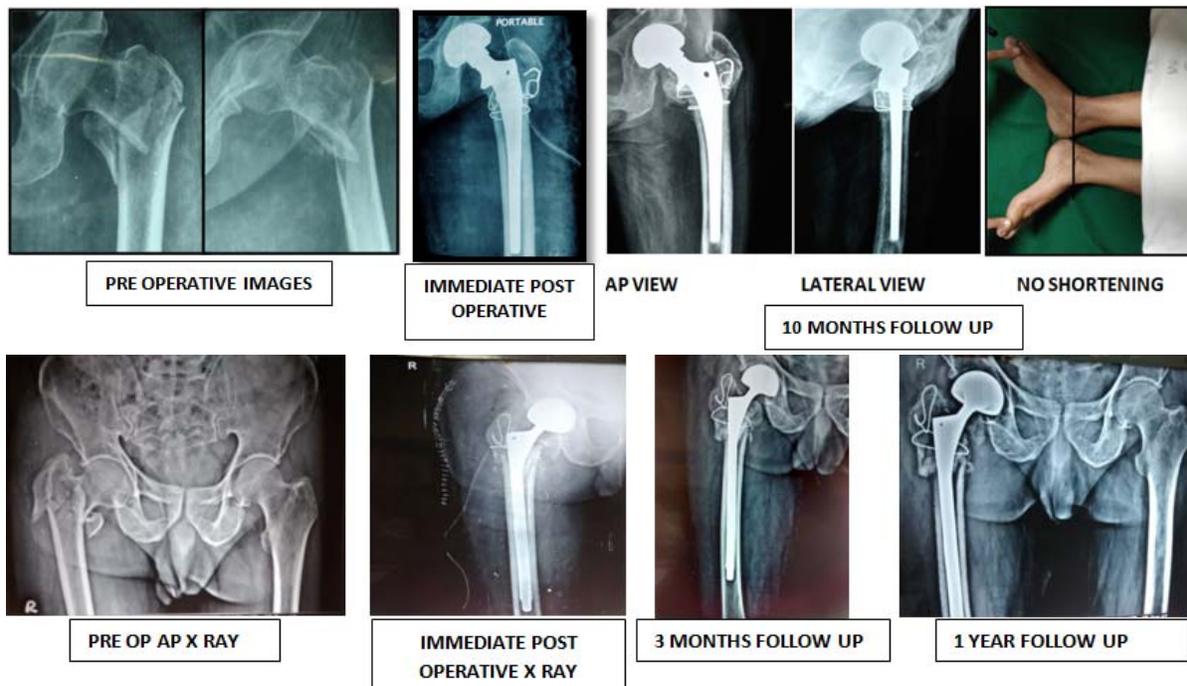
The mean number of days from fracture to surgery was 6 days. All patients were treated with cemented bipolar prosthesis through posterior southern Moore approach with patients in lateral position. "The most common associated co-morbid medical problem was hypertension in 16 patients followed by type II diabetes mellitus in 18 patients, hepatic failure in 2 patients and renal failure in 1 patient. Tension band wiring of greater trochanter was done in 6 cases to hold the fragments together. Calcar reconstruction using cement was done in 15 cases. Intra operatively average volume of blood loss was 357 ml. Mean operative time was 75mins. There was one intraoperative death probably due to hypotension following application of bone cement into femoral canal. Intra-operatively 11 patients (36%) had blood transfusion and post operatively 16 patients (53%) had blood transfusion, which were uneventful. The mean day of full weight bearing was on the 7th post-operative day.

Post operatively 2 patients had superficial infection which was treated with intravenous antibiotics and regular dressings. 3 patients had shortening of the operated limb, of which 2 had less than 2 cms, so they were given a heel raise. They walked with the help of a cane, 1 patient had shortening more than 2 cm and he had a slight limp." 9 patients (33%) had abductor weakness at 12 months of follow up." The average count of

days of stay by a patient in hospital in the postoperative period was 12days. Out of 30 patients, 1 patient had intra operative on table death which was attributed to a possible cement reaction, 2 patients died within 6 months of surgery, both were known cases of CKD and died of renal complication. They had started to mobilize with walker following OT. Other 27 patients were followed up at 6 weeks, 3 month, 6 months and 12 months post operatively. At 12 months 4 patients of walked with no support, 11 patients walked using a cane, 4 patients complained of occasional anterior thigh pain on long distance walking, which was relieved on taking rest and analgesics. 2 patients were bedridden, 3 patients died due to unrelated causes. There was no incidence of deep vein thrombosis, pneumonia, pressure sores or cardiovascular complication in the early post operative period.

"The functional results were graded according to Harris Hip Scoring System. In our study, 7 patients had excellent results, 9 patients had good results, 5 patients had fair results, 4 cases had poor result. In our study, 21 cases (70%) had excellent to fair result as assessed by Harris hip score."

Radiological analysis revealed Bipolar Stem was fitted in valgus position in 2 cases, varus position in 1 patient, whereas the position of the stem was centre (normal) in 2 patients. Cement filling was adequate in 28 cases, whereas it is inadequate in 1 case. There was no prosthetic dislocation, stem loosening, acetabular erosion or periprosthetic fracture after a period of 12 months follow up in our series.



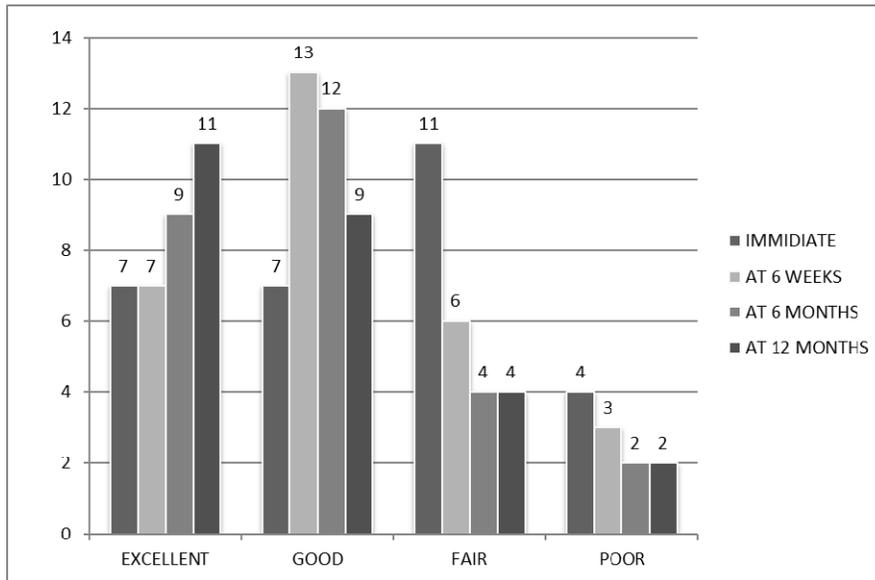


Fig 1: Graph Showing The Trends In Haris Hip Score

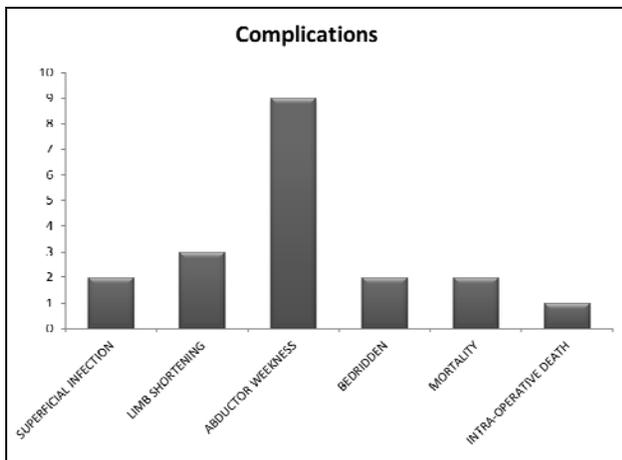


Fig 2. Complication

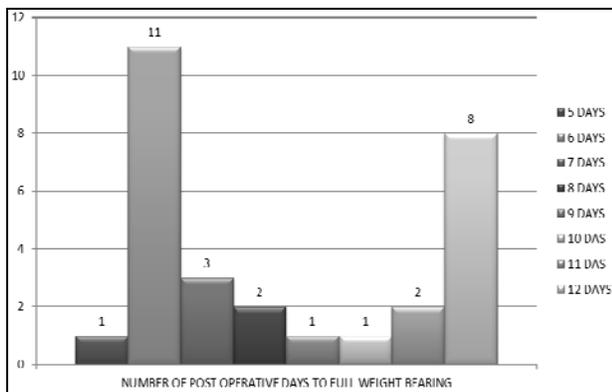


Fig 3. Number of post operative days to full weight bearing

4. Discussion

Internal fixation with dynamic hip screw is the treatment of choice for stable intertrochanteric fracture. However the scenario is different when comes to the management of unstable fracture. In cases of unstable trochanter fractures treated with internal fixation a high rate of failure was observed [33, 34]. Early weight bearing following internal fixation of communitated trochanteric fractures by various

means in physiologically elderly and osteoporotic patients leads to fixation failure and poor results [6]. Hemiarthroplasty is a most used alternative because that provides more stability and it also allows early and complete weight bearing. Most of the usual complications associated with osteosynthesis are not seen with the use of prosthetic replacements [37-39]. Initially hemiarthroplasty is used only in the management of failed fixation of trochanteric fractures. In 1974 Tronzo [9], was the first surgeon to use long- stem Matchett Brown endoprosthesis for the management of unstable trochanteric fractures.

Following this many other surgeons also reported good results with the use of various prosthesis.

Pho *et al.* [10], achieved good results with use of Thompson prosthesis.

In 1987, Green *et al.* [15], reported good results with bipolar endoprosthesis.

In this study we used bipolar endoprosthesis in all 30 cases. The average age of patients in our study was 73 years. The mean age in studies by Hantjens *et al* was 80 years, by sanchetti *et al.* [23] was 77 years, by Atul patil *et al.* [31] was 65.5 years, by Casey C.K *et al.* [17] was 84.2 years, and by Rodop O *et al.* [18] was 75.6 years. It is evident that elderly people commonly encounter this kind of fracture due to poor bone quality, more chances of fall due to debilitating diseases. Females were more commonly involved than the males because of more chances of osteoporosis in females.

Boyd and griffin type 1 were excluded from this study as it does not include unstable trochanter fractures. There were no byod and griffin type 4 fractures as they involved poly trauma. This study included 24 cases of byod and griffin type 2 patients and 6 cases of byod and griffin type 3 patients.

All patients were operated within 12 days of admission depending upon clearance from cardiology and pulmonary departments. Similarly the mean duration to operation in Sancheti *et al.* [23] was found to be 15 days.

Geiger *et al.* [22], reported a significant increase in blood loss (1050 ml) and operating time (115 min) compared to the internal fixation group. Stappaerts *et al.* [40], found no significant difference between outcomes of prosthetic group and internal fixation group except for the higher transfusion need in replacement group. Sanchetti *et al* 23, reported average blood loss of 350 ml and operative time of 71 mins.

In this study mean blood-loss was 357 ml with 16 patients required blood-transfusion and the operative time was 75mins. Our results are comparable with other authors.

“Stern and Goldstein^[14], used Leinbach prosthesis for treatment of 22 intertrochanteric fractures and found early ambulation and early return to pre-injury status as a definite advantage. In this study the average days to weight bearing is 7 days as compared to 2 days in Sanchetti *et al.*^[23]. Grimsurd *et al* 19, in a study of 39 patients of unstable intertrochanteric fractures treated with cemented bipolar hip arthroplasty, reported a relatively low rate of complication.”

In this study there was no complications like pressure sores, pneumonia, Deep vein thrombosis, since most of our patients were ambulatory immediately after surgery.

Siwach *et al.*^[27], reported shortening of < 5mm in 64% of cases, 28% of cases had limb lengthening between 5mm and 10 mm. He noticed shortening was due to excessive sinking of prosthesis following weight bearing. Kiran kumar *et al.*^[30], reported 20% cases had shortening of less than 2cm, 10% of case had shortening of more than 2 cm. In our series there was 2 cases (7%) had shortening less than 2 cm and 1 case (4%) had shortening > 2 cm which is statistically significant (p value is 0.000875 which is less than 0.05).

In this study 2 out of 29 patients (6%) had superficial infections which were similar to other studies which showed 6% superficial infection in Khaldoun Sinno *et al.*^[24].

Sanchetti *et al.*^[23], reported 6 patients (16%) with abductor weakness, in a study of 37 trochanteric fractures treated with bipolar hemiarthroplasty. In our study 9 patients out of 30 cases had abductor weakness (30%). The values are statistically significant as p value is 0.018 which is less than 0.05.

The earliest complications as discussed by Haentjens *et al* is pulmonary infection and bed sores in osteosynthesis group which were not encountered when treated arthroplasty Sanchetti *et al.*^[23], reported 71% of good to excellent results according to Harris hip score, in their series of 35 patients treated with hemiarthroplasty. Rodop *et al.*^[18], in a study of 37 intertrochanteric fractures treated with bipolar hemiarthroplasty achieved 82% of good to excellent results as assessed by Harris hip score. In our study fair to excellent results was achieved in 70% of cases. The values are statistically not significant with p value 0.876 which is more than 0.05

Thus the results of hemiarthroplasty in the management of intertrochanteric fractures are definitely promising.

Post-operative mortality reports were conflicting as cited in the literature, varying from 5.4% to 48.8%. Most of the comparative studies have shown a slight increase in mortality rate in prosthetic group than the internal fixation group. Kesmezacare *et al.*^[20], reported post-op mortality rate of 48.8% following a average of 6 months among the patients managed with bipolar hemiarthroplasty.

Sanchetti *et al.*^[23], reported post op mortality only in 2 patients out of 37 patients (5.4%) within 6 months of surgery. They have predicted delay in treatment is the most common cause for post op mortality and morbidity.

In our series 3 out of 30 patients died within 6 months of operation of which one was probably due to a cement reaction and 2 were because of chronic kidney failure.

5. Conclusion

In this study primary hemiarthroplasty, was performed for intertrochanteric fractures in 30 elderly patients of more than 60 years, in our institute, Institute of Medical sciences and

Sum Hospital, Bhubaneswar.

“This procedure offered painless and mobile hip, with early mobilisation, early rehabilitation and early return to functional level, when standard techniques were used.”

“The potential of the bipolar prosthesis in varied indications shows its versatility. This speaks for the superiority of the procedure.”

“Bipolar hemiarthroplasty reduced the complications of prolonged immobilisation, prolonged rehabilitation, marked residual deformities and need for revision surgeries. The procedure offered, faster mobilization, rapid return to pre injury level, improved the quality of life and gave a long term solution in elderly patients with intertrochanteric fractures of the femur.”

6. References

1. Kannus P, Parkkari J, Sievanen H, Heinonen A, Vuori I, Jarvinen M. Epidemiology of hip fractures. *Bone* 1996; 18:57S-63S.
2. Koval KJ, Zuckerman JD. Hip fractures are an increasingly public health problem. *Clin Orthop Relat Res.* 1998; 348:2.
3. Rockwood PR, Home JG, Cryer C. Hip fractures: A future epidemic? *J Orthop Trauma.* 1990; 4:388-393.
4. Laros GS, Moore JF. Complications of fixation in intertrochanteric fractures. *Clin. Orthop.* 1994; 101:110.
5. Jensen J Steen, Tondevold E, Sonne-Holm. Unstable trochanteric fractures. A comparative analysis of four methods of internal fixation. *Actaorthop. scand.* 1980; 51:949-962.
6. Wolfgang GL, Bryant HH, O'Neill JP. Treatment of intertrochanteric fractures of the femur using sliding screw plate fixation. *Clin Orthop.* 1982; 163:148-158.
7. Suriyajakayuthana W. Intertrochanteric fractures of femur: Results of treatment with 95 degrees condylar blade plate. *J Med Assoc Thai.* 2004; 87:1431-1438.
8. Kyle RF, Gustilo RB, Premer RF. Analysis of six hundred and twenty two intertrochanteric hip fractures. *J Bone Joint Surg Am.* 1979; 61:216-221.
9. Tronzo RG. The use of an endoprosthesis for severely comminuted intertrochanteric fractures. *OrthopClin North Am.* 1974; 5:679-681.
10. Pho RW, Nather A, Tong GO, Koru CT. Endoprosthetic replacement of unstable, comminuted intertrochanteric fracture of the femur in the elderly. *J Trauma* 1981; 21:792-797
11. Chan KC, Gill GS. Cemented hemiarthroplasties for elderly patients with intertrochanteric fractures. *Clin Orthop Relat Res.* 2000; 371:206-215.
12. Kim WY, Han CH, Kim JY. Failure of intertrochanteric fracture fixation with dynamic hip screw in relation to pre-operative fracture stability and osteoporosis. *Int. Orthop.* 2001; 25:360-362.
13. James E Bateman. Single-assembly total hip prosthesis preliminary report. *Clinorthop.* 1990; 251:3-6.
14. Stern MB, Anger man A. Comminuted Inter trochanteric fractures treated with a Leinbach prosthesis. *Clin orthop.*1987; (218):755-780.
15. Green S, Moore T, Prano F. Bipolar prosthetic replacement for the management of unstable Inter trochanteric hip fractures in the elderly, *Clin Orthop* 1987; 224:169-177.
16. Vahl AC, Dunki Jacobs PB, PPatka HJ, Haarman THM. Hemiarthroplasty in elderly, debilitated patients with an unstable femoral fracture in the trochanteric region. *Acta*

- orthopaedica Belgica. 1994; 60(3):274-279.
17. Casey Chan K, Gurdev S Gill. Cemented Hemi arthroplasties for Elderly patients with Inter trochanteric hip fractures. Clin Orthop. 2000; 371:206-215.
 18. Rodop O, Kiral, Kaplan H, Akmaz I. Primary bipolar hemiprosthesis for unstable Inter trochanteric fractures. Int Orthop. 2002; 26(4):233-237.
 19. Chris Grimsrud, Raul J Monzon, Jonathan Richman, Michael D Ries. Cemented Hip Arthroplasty With a Novel Cerclage Cable Technique for Unstable Intertrochanteric Hip Fractures. J Arthroplasty. 2005, 337-343.
 20. Kesmezarcar H, Ogut T, Bilgili MG, Gokay S, Tenekecioglu Y. Treatment of intertrochanteric fractures in the elderly patients. Internal fixation (or) hemiarthroplasty. Acta Orthop Traumatol Tur. 2005; 39:287-294.
 21. Kayali C, Agus H, Ozluk S, Sanli C. Treatment for unstable intertrochanteric fractures in elderly patients. Journal of Orthopaedic Surgery. 2006; 14(3):240-244.
 22. Florian Geiger, Monique Zimmermann-Stenzel Christian Heisel, Burkhard Lehner, Wolfgang Daecke. Trochanteric fractures in the elderly: the influence of primary hip arthroplasty on 1-year mortality. ArchOrthop Trauma Surg. 2007; 127(10):959-966.
 23. Sancheti *et al.*: Primary hemiarthroplasty in elderly unstable osteoporotic intertrochanteric fracture. Indian J orthop. 2010; 44(4):428-434