IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 14, Issue 4 Ver. VIII (Apr. 2015), PP 73-82
www.iosrjournals.org

Comparision of Dynamic Hip Screw and Plate with Proximal Femoral Nail in Trochanteric Fractures of Femur

Chaitanya.m.[1] Ankur Mittal[2*], Ramprasad Rallapalli[3], Biju R[4], Siva Prasad Y[5]
[1]Senior Resident[2]Senior Resident [3]Assistant professor,[4]Professor, [5]Professor & HOD;*

Abstract
Introduction:*Incidence of intertrochanteric fractures has increased significantly during recent decades and this tendency will probably continue to rise in near future due to increased span of life. Closed methods of treatment for intertrochanteric fractures have shown higher mortality rates & have largely been abandoned. Rigid internal fixation and early mobilization has been the standard protocol of treatment now a days.This study is intended to compare the results of Intertrochanteric fractures by DHS over PROXIMAL FEMORAL NAILING.*
Materials & Methods:*This is a randomized prospective study of 60 cases of intertrochantericfractures, admitted to Narayana Medical College & Hospital, NELLORE; treated with PROXIMAL FEMORAL NAILING and DHS. The Patients were divided randomly into two groups, each of 30 patients, 30 were treated by Dynamic Hip Screw & 30 were treated with proximal femoral nail (P.F.N) all patients were follows up for one year except two.*
Results:*In our series of 60 patients of Intertrochanteric fractures, 30 were treated with sliding hip screw with plate and 30 were treated by an intra medullary hip screw. Most of the patients were between 60 to 80 years. Slip and fall accounted for 70% cases. Right side was more common accounted for 58.34% of cases. AO type A2 fractures accounted for 66.6% of cases. Out of 60 cases two cases were died. Harris hip scores of D.H.S and P.F.N for 6 months and 1year follow up were same (94.2 for D.H.S, 94.6 for P.F.N).*
Conclusion:*From the study, we consider PFN as better alternative to DHS in more unstable fractures (AO types; A2.22, A3.3) and sliding hip screw remains the implant of choice for stable type fractures (AO types; A1.12, A2.1). Finally both the implants are here to stay: it is the fracture geometry & bone quality that will influence the choice of fixation. The quality of the reduction & proper positioning of the implant are the keys to achieve the best post operative out come.*
Keywords:*IT fracture, DHS, PFN*

I. Introduction

Fractures in the vicinity of the hip region represent a significant number of patients worldwide. Intertrochanteric fractures are commonly seen in elderly patients, mostly due to trivial trauma. The incidence of intertrochanteric fractures varies from country to country. Gulberg[1] has predicted that the total number of hip fractures worldwide will reach 2.6 million by 2025. Hagino et al reported a lifetime risk of hip fracture for individuals at 50 years of age of 5.6% for men and 20.0% for women [2]. Any medical condition associated with bone loss, like Diabetes, Hyperparathyroidism, Hyperthyroidism and Cushing's syndrome is associated with rise in the risk for hip fracture[3].Before the introduction of suitable fixation devices, the treatment of intertrochanteric fractures was predominantly non-operative. The conservative approach has now fallen into disrepute because of the high complication rate[4,5].The common problems of prolonged immobilization, decubitus ulcers, U.T.I., joint contractures, pneumonia and thromboembolism contribute to the high mortality rate [5].The increased incidence of varus deformity and shortening results in poor function. With advancing life expectancy and geriatric care, more patients who were treated conservatively in the past are now candidates for surgery.Operative treatment for hip fractures was introduced in 1950s with expectation of improved functional outcome and reduced complications of prolonged bed rest[6,7].Since then a variety of treatment options have evolved likeExtramedullary implants (Fixed angle plates or recent modifications of D.H.S.),Intramedullary implants (Gamma nail, P.F.N., T.F.N., etc),External fixator and Arthroplasty (Bipolar hemiarthroplasty or T.H.R.).

The most commonly used implant is the Dynamic hip screw (DHS) with side plate. It is currently considered the gold standard for fixation of IT fractures[8].However, mechanical and technical failures continue to occur in as many as 6% to 18% of cases treated by a compression hip screw and side plate [9,10].The Gamma nail was developed to circumvent the drawbacks of the Dynamic hip screw by combining the advantages of intramedullary fixation with those of a sliding screw. Theoretically intramedullary sliding nail possesses certain advantage[11].The implant itself serves as a buttress against translation of the proximal fragment.The

intramedullary location of the junction between the nail and lag screw makes the implant stronger at resisting the bending forces.The intramedullary device has a reduced distance between the weight bearing axis and the implant that is a shorter lever arm.An intramedullary device bears the bending load which is transferred to the intramedullary nail and is resisted by its contact against the medullary canal.The intramedullary hip screw is a more biological method of fixation. For the above-mentioned reasons it was believed that, the intramedullary hip screw would be superior implant for the fixation of intertrochanteric fracture. Long term studies however revealed that the use of this device was associated with higher intra operative and late complication often requiring revision surgery[12,13].This has lead to modifications in the device and technique of the intramedullary devices giving rise to second generation intramedullary implants namely P.F.N., T.F.N., P.F.N-A, etc.It is now that a debate started on which would be the best implant to fix IT fractures. Was the Sliding hip screw with plate to be replaced with the intramedullary hip screw was the intramedullary hip screw just a passing fashion?Despite of lot of comparative studies there is no clear-cut guideline regarding which implant should be used and when? Our study was aimed at comparing the Dynamic hip screw with side plate to the proximal femoral nail. The total duration of surgery, blood loss, infection rate, wound complications, implant failure, post-operative function was to be compared between both devices.

II. Materials & Methods

The Study is a randomized prospective study involving 60 patients of intertrochanteric fractures treated by operative management at ORTHOPAEDICS DEPARTMENT, NARAYANA MEDICAL COLLEGE & HOSPITAL, NELLORE. From August 2011 to February 2013. The Patients were divided randomly into two groups, each of 30 patients, 30 were treated by Dynamic Hip Screw & 30 were treated with proximal femoral nail (P.F.N) all patients were follows up for one year except two.

Inclusion Criteria

1. All patients above 60 years with intertrochanteric fractures were selected.

Exclusive Criteria

1. Patients with pathological fractures due to metastasis, tumors were excluded.
2. Compound fractures were excluded.

Pre-Operative Evaluation

All patients were evaluated pre-operatively by History & clinical evaluation, Medical evaluation (Clinical evaluation, ECG, etc), lab investigations (CBC, BSL,RFT's, LFT's etc) and radiographs (A.P.view of the pelvis & Lateral view of the fractured hip, Chest Xray).All patients were evaluated by a physician for fitness to surgery. If associated medical conditions were detected, they were set right preoperatively. Implants used are shown in (table 1)

Anaesthesia: Epidural anesthesia (E.A)

Patient Positioning: All cases were operated on a standard fracture table. The fracture table is essential to achieve reduction & as it allows free access for the C-arm in both views. Great care is taken in padding the heels in the foot stirrups & the perineal region. The other limb is placed in an attitude of extension & abduction.

Antibiotic Prophylaxis Preoperatively antibiotic combination of III generation Cephalosporin and Aminoglycoside were given intravenous half hour before skin incision.

III. Surgical Steps

Dynamic Hip Screw With Plate :

Surgical Techniique: An 8 to 10 Cm incision was taken at the base of the greater trochanter & extended distally. The iliotibial band was incised to expose the vastuslateralis which was cut in the line of its fibers to expose the underlying bone. The guide wire was passed at a point along the lateral cortex just opposite the lesser trochanter. This should lie in the dead centreor inferior of the head in A.P&centre or posterior in lateral Views. Once guide pin position was confirmed the reamer was set to within 5mm of the guide wire length & reaming was done, taking care to prevent entry of the guide pin into the pelvis. Taping was done but this step was omitted in severely osteoporotic bone. Screw was insertedGuide wire angle with shaft was confirmed and accordingly angled four hole side plate was then fixed to the lateral cortex. In cases with fractures of the grater trochanter which are displaced a T.B.W was used which is passed through the gluteus medius around the barrel of the plate. The wound was closed in layers over a suction drain.

Proximal Femoral Nail (P.F.N)

Surgical technique: Care was taken for an anatomical reduction before the insertion of the nail. A 5 cm skin incision was taken of approx. 2-3 cm from the greater trochanter. A guide wire was passed to hold the reduction making sure it was not in the medullary canal.The entry point was marked with a wire & a cannulated cutter or awl was used to make entry. The entry point was gently reamed. Nail was inserted with zig attached to it.Two guide wired were passed using the aiming device. Using appropriate drills the hip pin & the neck screw were inserted. Distal lockingis done with the aiming device. 1 or 2 locking screws are used depending or the fracture stability. The wound was closed in layers. No drain was used.

Post – Operative Protocol

Antibiotic prohylaxis was given in form of iv for 5 days then converted to oral for 5 days Thromboprophylaxis**in** most patients in our study were treated with physical methods such as early mobilization, manual compression of the calf & elastic stockings. All drains were removed once the drainage stopped. Most drains were removed by 48 hours. The wounds were inspected on the 3^{rd}& 7^{th}post operative day. Stitches were removed on the 12^{th} or 13^{th} day if the wound margins were healthy. Wounds showing any suspicious signs of infection were treated with higher antibiotics & subsequently by debridement, if needed Blood transfusion was given preoperatively, intraoperatively or postoperatively depending on preoperative evaluation of Hb. and intraoperative blood loss

Mobilization & Rehabilitation

Day 1: Ankle & calf exercises.
Day 2: Knee flexion with the patient sitting by the edge of the bed after drain removal..
Day 3: Skate board exercise started to strengthen hip abductors.
Walking with the aid of a walker with toe touching was allowed.
Day 12: The patients were discharges. At home they were instructed to all with a walker with toe touching, sit on chair or high stool.

Follow Up Protocol

- All patients were followed up for a period of one year; the follow up visits were done at: 1,3,6,12 months Clinically for Wound condition, Function on Harris hip score and Shortening Radiologically for Union and Amount of collapse

Statistical Analysis

All the data was then assessed by using various statistical test. For quantitative data i.e duration, blood loss, harris hip scores, then "Z-test" (the standard error of difference between two means) was used. For the qualitative data the test of difference between two proportions was used. Applying the null hypothesis the observed difference was considered to be significant if the P-value was <0.05.

IV. Results & Observations

The Study involved 60 patients of intertrochanteric fractures, which were operated in Orthopeadic department at Narayana Medical College & Hospital, Nellore. 30 patients were treated by a sliding hip screw with plate& 30 were treated by an intramedullary hip screw (Proximal Femoral Nail). The study involved patients above 60 years of age. The age distribution of total 60 patients was from 60 to 88 years. The average age 70.9 in P.F.N group.The largest group of patients being from 60 to 65 years. In our study out of 60 patients 37 patients had intertrochanteric fracture involving right side while 23 patients had fracture of left side. The Study involved 30 males & females. The more complex fracture patterns A-1 types & A-3 types were seen more commonly in females, with fractures patterns A3-2 & A3-3 seen exclusive in females All the fractures were classified as per the A.O. (O.T.A) classification shown in (table 2) The average blood loss in the P.F.N Group was 96.3 ml & in the D.H.S group was 233 ml. this data was statically significant ($P<0.05$) indicating more blood loss in the S.H.S group. The amount of blood transfusions were accordingly more with 27 out of 30 (90%) requiring blood transfusions in the S.H.S group as compared to 15 out of 30 (50%) in the P.F.N group. Also the amount of blood transfused exceeded one unit in 16 out of 30 (53%) patients in the D.H.S group as compared to no patient in the P.F.N Group requiring more than one unit of blood. All patients were subjected to the Harris hip score[14]at the one month, three months, six months & one yearly follow ups. In the D.H.S group the one month hip score (Avg.24.4) was less than that of the P.F.N group (Avg.33.4), $p<0.05$ however this difference disappeared with the two group on the sixth monthly & yearly follow up with both scores being same. (D.H.S-94.2 & P.F.N-94.6) (table 3) The duration of surgery as calculated from the time of incision to skin closure was counted in each case. The average duration of the two group was compared & it was noted that the D.H.S (Avg. time 88 min) required a statistically significantly more time as compared to the P.F.N (Avg 67.16 min). The

sliding of both groups was compared at the end of one year on the X – rays, there was an average 0f 5.3.mm of sliding in the P.F.N group as compared to 7.5mm in the S.H.S group ($P<0.05$). The average limb shortening in the P.F.N group was 5.2 mm as compared to 10.9 mm in the S.H.S group, though there was more shortening in the S.H.S group, it was not significant, as it did not cause any functional impairment. Implant related complication In the P.F.N group there were only 2 (6%) cases of implant displacement (Z-deformity phenomenon). In both cases revision surgery was required. In the S.H.S group there was only 1 (3%) case of screw cut out. In the P.F.N group there were no cases of non union, the 2 patients with implant displacement united after revision surgery. In the S.H.S group there was one case of nonunion, which was due to non sliding of screw, this patient responded to bone grafting. There were 2 cases of infection seen in the D.H.S group. They were seen within 20 days of surgery & were by local debridement & did not require implant removal. There was no infection in P.F.N group. There was one death each in both groups. Death in both cases occurred after three months, and was unrelated to surgery. In both the groups the results were comparable. In the P.F.N group one patient developed acute renal failure & the other developed pulmonary ordema. In the S.H.S group one patient develop diabetic ketosis & the other developed D.V.T Above cases in both groups were transferred to surgical I.C.U No deaths occurs in the immediate post op period in either group. Complications in the P.F.N. & D.H.S. summarized in (table 4). Summary of results compared between two groups (mean+sd, n=30) is shown in (table 5)

V. Discussion

Our study was aimed at comparing the sliding hip screw with side plate to the proximal femoral nail for IT fracture in patients above 60 years of age. The total duration of surgery, blood loss, infection rate, wound complication, implant failure, post – operative function was compared between both groups.In the present study 60 patients with intertrochanteric fractures were studied. 30 patients were treated with a Dynamic hip screw & 30 patients were treated with proximal femoral nail. The study group included 30 males & 30 females. The average age of patients was 70.8 years in both groups combined while avg. age was 70.66 in D.H.S group and 70.9 in P.F.N group respectively. The most common age group being 60-65 years. All fractures were classified as per the A.O[15] (Muller) classification & included 11 stable fractures (A-1.1 to A-1.3) & 49 unstable fractures (A-2.1 to A-2.3 & A-301 to A-3.3) in both groups Unstable fractures were seen more frequently in females than males. In similar studies done by Hardy [16], Leung [17], Bridle [18], Baumgerner [19]avg. age incidence was 79, 78, 81.5, 79 respectively, while average incidence in our study being 70.9 indicated younger Indian-population is at risk of fracture. The P.F.N group has a distinct, reduction in the operative blood loss with an average blood loss of 96ml per case as compared to average blood loss of 233 ml. per case in D.H.S group. Thus greater blood loss was statistically significant with the use of sliding hip screw. This finding is in accordance with the reported series by Hardy [16]with mean blood loss of 144ml in P.F.N Group and 198 ml in D,H.S group. Similarly Leung [17] reported mean blood loss of 765 ml and 157 ml in P.F.N and D.H.S groups respectively. These findings are in contrary with those of Huang [20]the outcome shows no significant difference of blood loss with PFN than with DHS.The operation time was considerably less in P.F.N group with average time of 67.16 mins as compared to 88 mins in patients treated with sliding hip screw with plate. However with increasing experience the time required for performing P.F.N is even much reduced. These findings are in contrary with those of Hardy [16], Leung [17], and Bridle [18], who had more operative time for P.F.N than D.H.S. while Baumgaertner [19] required more operative time for D.H.S than for P.F.N. These findings are in contrary with those of Huang [20] which indicated that there was no statistical difference in operation time between the two groups. The Harris Hip scores of the P.F.N group was initially higher than that of the sliding hip screw group in the initially post op period up to one month. However by the end of 6 months both groups matched with each other in mobility scores. This is in accordance with the series of Hardy [16]at 6 months. The possible explanation given by him was the P.F.N group had significantly less shortening so these patients were mobilized earlier than the D.H.S group. By radiological comparison of the amount of sliding seen in between the immediate postoperative X-ray & the one-year follow up X-ray in both groups. It was noted that the amount of sliding in the P.F.N group was less as compared to the Dynamic hip screw. Distraction was maintained in P.F.N because of less sliding. This finding is in accordance with the studies of Kyle [21]& Hardy [19]In the P.F.N group 7 of 30 patients (23%) showed evidence of fracture healing on X-rays by 3 months & 21 (70%) patients by 6 months. There was I case of non-union in the sliding hip screw with side plate, which was treated by bone grafting. In the S.H.S group 6 of 30 (26%) patients showed evidence of fracture healing X rays by 3 months & 20 (67%) patients by six months. The mortality rates in both groups were the same with one death in each group. Both deaths occurred after more than three months after surgery, not related to operative interference. Hardy [16] and Leung [17] reported similar findings with no deaths directly related to surgery. Both the groups had equal no. of medical complications postoperatively. In the P.F.N group one patient developed acute renal failure & the other developed pulmonary edema. In the D.H.S group one patient developed diabetic ketosis & the other developed D.V.T. These complications are explained by the fact that

these are elderly patients. And had major episode of fracture hip, required surgical interference in addition to their previous ailments. Similar findings were observed by Hardy [16], Leung [17], and Bridle [18], In the P.F.N group there was 2 cases of implant related complication, in both the cases the displacement was noted in the Z pattern [22]. The exact causes for the 'Z' phenomenon is not known, however it is believed to occur as a result of differential compression & tensioning of two screws. One case was treated by removal of implants and refixation by a sliding hip screw, while in the 2nd case addition of a third screw passed from outside the nail fixing the trochanter and femoral head. Both fractures united well. The most common complication association with gamma nail in studies by Hardy [16], Leung [17] and Bridle [18] was fracture femur at the tip of the gamma nail. In our study group, there was not a single case of fracture femur at the tip of nail. The absence of this complication is believed to the due to introduction of valgus angle (6 deg. To 10 deg by various manufacturers) in the P.F.N compared to original gamma nail which had no valgus angle which caused gamma nail to abut against the anterior cortex causing stress fracture. In the sliding hip screw 1 case of implant related complication was noted. The cancellous screw cut out the femoral neck superiorly causing loss of fixation. Improper screw position, failure to maintain the Tip Apex distance (T.A.D) & poor bone quality were found out to be the causes. In second case sliding mechanism did not work due to, impaction of barrel and screw causing distraction of fracture area resulting in non-union. This required reoperation and bone graft at non union site. Finally the fracture healed: screw cut out was also reported as most common complication associated with D.H.S group by Hardy [16], Leung [17] with incidence of one out of fifty and three out of one hundred thirteen respectively. In present series incidence of implant related complications are similar in both groups but are of different pattern. This is in accordance with results of Hardy[16], Leung [17] and Bridle [18] there were 2 cases of post operation noted in the sliding hip screw group. All infections occurred in the early post op. period within 14 to 21 days. In both cases, an early debridement was performed with higher antibiotics according to culture and sensitivity. In all cases union occurred & no patient required implant removal as a result of infection. There were no cases of infection in the P.F.N group, may be because of small incision. However, the incidence of infection in D.H.S group is not statistically significant. This was also observed in reported series of Hardy [16], Leung [17] Bridle [18]and Baumgaertner [19], they reported similar less infection in the P.F.N group. The sliding hip screw with plate remained the gold standard for fixation of intertrochanteric fractures for years with the arrival of the intramedullary hip screw it was thought that the sliding hip screw would be replaced forever, however this is not true. The intramedullary hip screw has its own set of complications, a higher learning curve & all at a higher cost. The sliding hip screw is still the implant of choice in the stable types of intertrochanteric fractures. If the proper intra operative guidelines are adhered to then the results in this group of parties in excellent. In the more unstable types of fracture the P.F.N has distinct advantages over the plate & should be the preferred implant for fixation. The need to achieve an anatomical reduction is mandatory since there is less sliding with this implant. Any gap on the post operation X-rays could always lead to a future non-union. P.F.N should be preferred in cases of severe osteoporosis as it has got inherent stability and being intramedullary there is no question of screw pullout which is very common complication in osteoporotic fractures treated with D.H.S. Finally, it could be stated that the implants are here to stay, it is the fracture geometry & borne quality that will influence the choice of fixation. The quality of the reduction & proper positioning of the implant are the keys in achieving the best post operative out come. Comprising of present series with other reported series is shown in (table 6)

VI. Conclusion

IT fractures are seen commonly in elderly population more so in patients with osteoporotic bones. The conclusion regarding fixation of IT fracture in elderly population from our study is the sliding hip screw remains the implant of choice for the stable types. (AO types: A-1.1, A-1.2, A-1.3, & A-2-1) While P.F.N is to be reserved for the more unstable types (AO types: (A-2.2, A-2.3, A-3.1, & A-3-2 & 3.3) Finally both the implants are here to stay: it is the fracture geometry & bone quality that will influence the choice of fixation. The quality of the reduction & proper positioning of the implant are the keys to achieve the best post operative out come.

Conflict Of Interest:

None of the authors has any conflict of interest.

Acknowledgements

The authors did not receive any funds for the preparation of this manuscript.

References

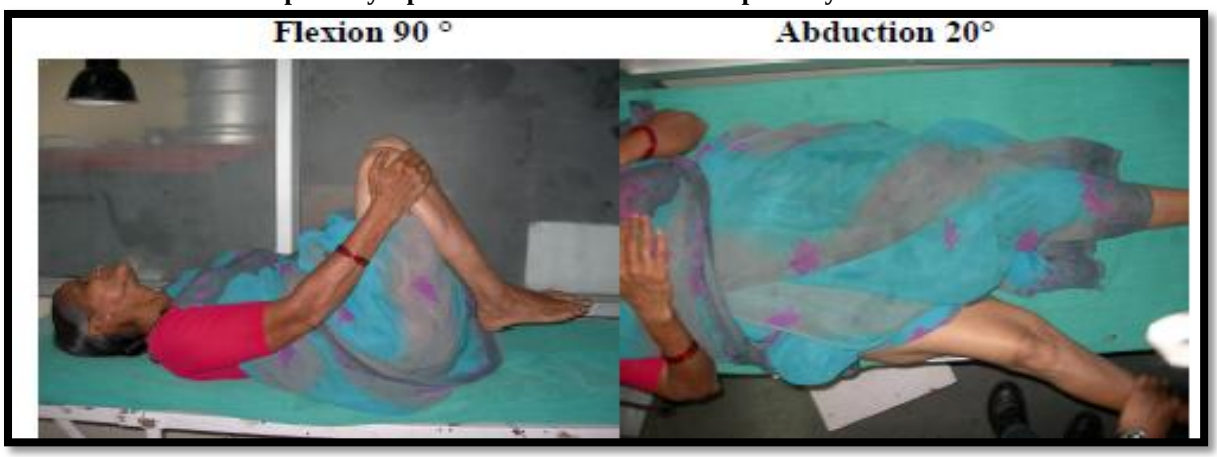
[1]. Gulberg B, Jhonell O, Kanis J. Worldwide projection for hip fractures Osteoporosis Int. 1997; 7:407-413
[2]. Hagino H, Furukawa K, Fujiwara S, et al.Recenttrands in incidents and lifetime risk of hip fracture in Tottori, Japan Osteoporos Int. 2009;20(4):543-548
[3]. Jarnlo GB, Thorngren KG, Background factors to hip fractures. Clinorthop 1993; 287:41-49
[4]. Kyle RF, CabanelaME,RusellTA,et al. Fractures of the proximal part of the femur. Instr Course Lect 1995; 44:227-253.
[5]. Zuckerman JD, Comprehensive care of orthopaedic injuries in the elderly, Baltimore : Urban and Schwarzenberg, 1990
[6]. Schumpelick W, Jantzen PM: A new principle in the operative treatment of trochanteric fracture of the hip, J.Bone Joint Surg 1988, 70-A:1297-303.
[7]. Massie WK: Fracture of the Hip, J.Bone Joint Surg 1964, 46-A: 658-90
[8]. Jenssen JS, Sonne-Holemj S, Tondevold E. Unstable trochanteric fractures: A comparative analysis of four methods of internal fixation. ActoOrthopScand 1980, 51:949-962
[9]. Simpson AHRW, Varty.K Dodd CAF : Sliding hip screws Modes of Failure, Injury 1989, 20:227-231.
[10]. Davis TR, Sher JL, Horsman A, Simpson M, Porter BB, Checketts RG: intertrochanteric femoral fractures: mechanical failures after internal fixation J Bone Joint Surg Br 1990, 72B:26-31.
[11]. Kulkarni GS, Limaye R, Kulkarni M, Kulkarni S: intertrochanteric fractures. Indian J Orthop 2006; 40:16-23
[12]. Parker MJ, Handoll HH Gamma and other cephalocondylic intramedullary nails versus extramedullary implants for extracapsular hip fractures in adults. Cochrane Database Syst Rev. 2010 Sep 8; (9) : CD000093.
[13]. Hesse B, Gachter A. Complications following the treatment of trochanteric fractures with the gamma nail. Arch Orthop Trauma Surg. 2004 Dec; 124 (10) : 692-8.
[14]. Gundle R, Gargan MF, Simpson AHRW. How to minimize failure of fixation of unstable intertrochanteric fractures. Injury 1995; 26:611-614.
[15]. Thakur AJ. Elements of fracture fixation. New York: Churchill- Livingstone; 1997:p 111-114
[16]. Hardy D, Descamps P, Krallis P, et al Use of an intramedullary hip screw compared with a compression hip screw with a plate for intertrochanteric femoral fractures. A prospective randomized study of one hundred patients. J Bone Joint Surg Am 1998; 80:6180-630
[17]. Leung KS, so WS, Shen WY, Hui PW. Gamma nails and dynamic hip screws for pertrochanteric fractures. A randomized prospective study in elderly patients J Bone Joint Surg Br 1992; 74:345-351
[18]. Bridle SH. Patel AD, Bircher M, Calvert P. Fixation of intertrochanteric fractures of the femur: a randomized prospective comparison of the gamma nail and the dynamic hip screw. J Bone Joint Surg Br 1991; 73:330-334
[19]. Baumgaertner M, Curtin S. LindskogD.Intramedullary versus extramedullary fixation for the treatment of intertrochanteric hip fractures. Clinorthop 1998; 348:87-94.
[20]. Huang X, Leung F, Xiang Z, Tan PY, Yang J, Wei DQ, Yu X. Scientific World Journal. 2013;2013:805805. doi: 10.1155/2013/805805. Epub 2013 Feb 19
[21]. Loch DA, Kyle R F The forced required to slide a 2nd generation intra medullary nail. J Bone Joint Surg Am 1998; : 1626-1631
[22]. Bucholz RW, Heckman JD, Koval KJ. Rockwood & Green's fractures in abults.6thed Philadelphia: Lippincot Williams & Wilkins; 2005

Case illustration

PRE-OP X-RAY

Postop X-Ray Ap View

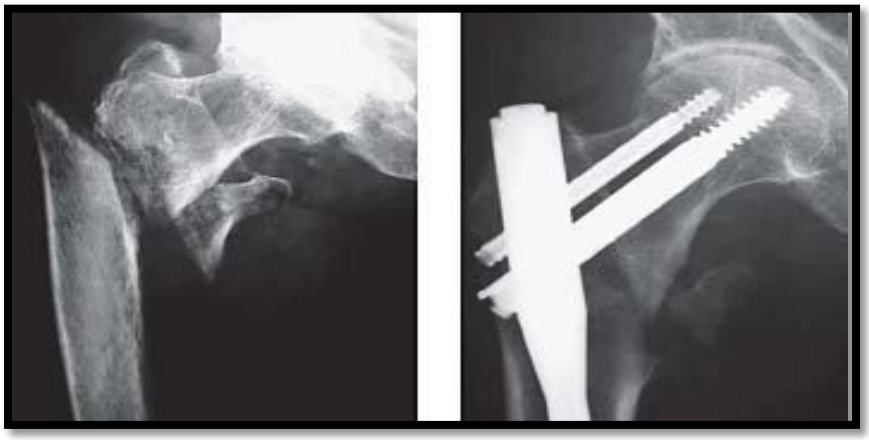
Follow Up X-Ray At 12 Weeks



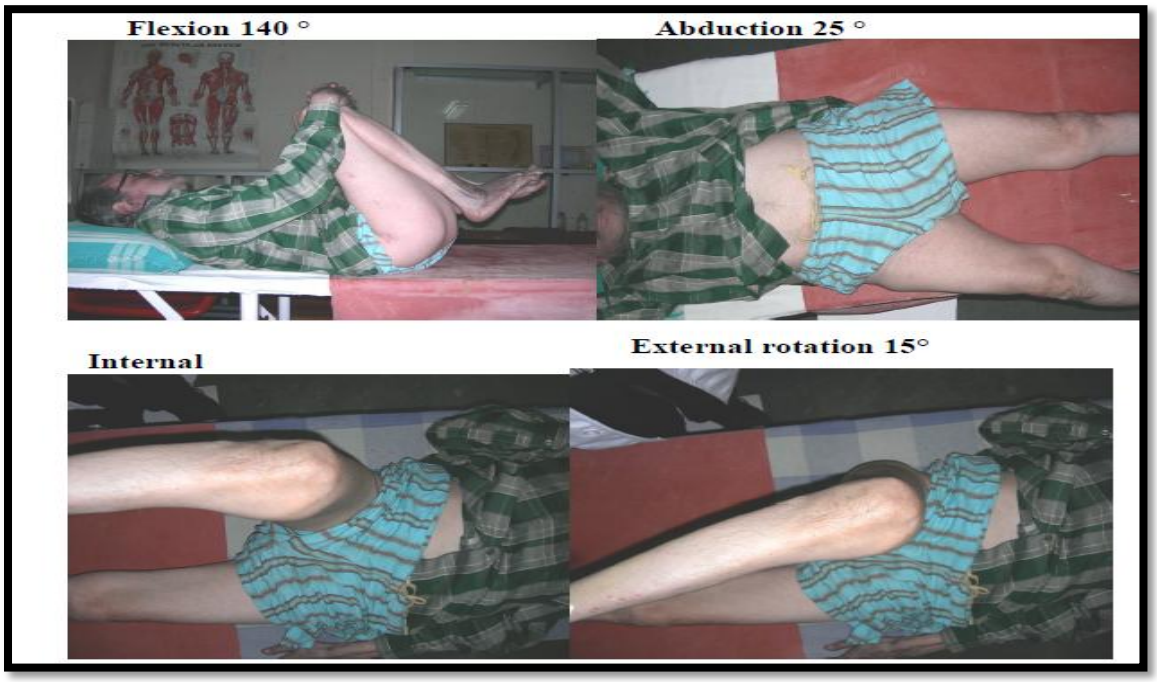
Internal rotation 35° **External rotation 40°**

Standing

Pre Op X- Ray **Post Op X-Ray**



After 24 Weeks



Standing

Tables

Table 1

DHS	PFN
1. Barrel angle: 120 : 0 patients 125 : 0 patients 130 : 0 patients 135 : 27 patients 140 : 3 patients No.of holes – 4, 5:30 patients Screw length – 85 mm : 2 patient 90 mm : 27 patients 95 mm : 1 patients	1. NAIL DIAMETER : 10MM : 28 patients 11 MM : 2 patients Screw Angle : 130 : 5 patients 135 : 25 patients

Table 2

	Male	**Female**
A1\1	1	3
A1\2	4	3
A1\3	0	0
A2\1	9	7
A2\2	9	9
A2\3	6	0
A3\1	1	2
A3\2	0	2
A3\3	0	4

Table 3

Average Harris hip scores at	Dynamic Hip Screw (D.H.S)	Proximal Femoral Nail (P.F.N)
1 Month	24	33
3 month	53	58
6 month	90	90
1 Year	94.2	94.6

Table 4

Complications	**Dynamic Hip Screw (D.H.S)**	**Proximal Femoral Nail (P.F.N)**
A. Infection	2	0
B. Non – Union	1	0
C. Impant Related	1	2
D. Medical Related Complication	2	2
E. Deaths	1	1

Table 5

	P.F.N	D.H.S	P-Value
Blood Loss (mL)	96 ± 34.8	233 ± 76.6	<0.05
Blood Transfusion Required	15 (50%)	27 (90%)	<0.05
Duration of Surgery (min)	67.16 ± 20.1	88 ± 27.7	<0.05
Harris hip score at 1 month	33 ± 2.6*	24 ±3.3	<0.05
Harris hip score at 3 month	58 ±10.1	53 ±3.0	<0.05
Harris hip score at 6 month	90 ±2.51	90 ±1.6	>0.05
Harris hip score at 1 month	94 ± 2.7	94 ± 2.1	>0.05
Collapse (mm)	5.3	7.7	<0.05
Shortening (mm)	5.2	10.9	<0.05
Implant Failure	2 (6%)	1 (3%)	>0.05
Non- Union	0	1 (3%)	>0.05
Deaths	1 (3%)	1 (3%)	>0.05
Infection	0	2 (6%)	>0.05
MED.COMPLICATIONS	2	2 (6%)	>0.05

Table 6

Name of study	**Number of Cases**		**Blood loss (in ml)**		**Time (in minutes)**		**Non union**		**Infection**	
	I.M.N	**D,H.S**	**I.M.N**	**D.H.S**	**I.M.N**	**D.H.S**	**I.M.N**	**D.H.S**	**I.M.N**	**D.H.S**
Hardy[42]	**50 (Gammanail)**	**50**	**144**	**198**	**71**	**57**	**0**	**1**	**0**	**0**
Leung[39]	**113 (Gammanail)**	**113**	**765**	**1157**	**53**	**42**	**1**	**0**	**1**	**3**
Bridle[38]	**49 (Gammanail)**	**51**	**116**	**133**	**36**	**33**	**-**	**-**	**1**	**2**
Baumgaertner[41]	**67 (Gammanail)**	**68**	**245**	**275**	**72**	**80**	**1**	**1**	**0**	**0**
Present Series	**30 (P.F.N)**	**70.90**	**233**	**195**	**150**	**0**	**1**	**0**	**0**	**2**