Unstable trochanteric Fracture Fixation with P.F.N. with addition of T.B.W.

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Abstract :

For inter trochanteric fracture Proximal Femoral Nail (PFN) is a better choice of implant biomechanically. But in communicated inter trochanteric fractures it is associated with screw breakage, cut out through femoral head, "Z" & reverse "Z" effect and lateral migration of screws. The purpose of this study is to evaluate the results of PFN in terms of post-operative complication and failure rates in unstable trochanteric fracture with addition of 1 or 2 tension band wires. **Material & Method:** We did study of 21 unstable trochanteric fractures from January 2016 to November .2020. 14 patients were males & 7 patients were females. Age group between 25 to 80 was included in this group. There were 15 A0 A2 (2.2, 2.3) and 6 were A0 A3 (3.1, 3.2, 3.3). All fractures were fixed with 25cm, 135^0 PFN mainly 11 mm, 12mm in diameter with addition of one or two 16 gauge tension band wire, strengthening lateral trochanteric wall and holding either communiated fragments or lesser trochanteric fracture. **Results:** The fracture was united in all cases with mean period of 16 weeks. Two patients developed complication of TBW (Tension Band Wire) breakage; one developed lateral migration of screws. Patients were followed till bone was united. At the end of follow up hip function were 30 (out of 40) in 80% patients by using Salvati and Wilson hip score. **Conclusion:** The stabilization of lateral trochanteric wall fracture and communiated fragments of inter trochanteric fractures, additional one or two TBW increases the stability of construct enhancing bony union & better results.

Keywords: Proximal Femoral Nail, Unstable Trochanteric fracture, lateral trochanteric wall, communiated fragments.

Introduction:

Unstable trochanteric fractures are challenging fractures for orthopedic Surgeons. Though fractures unites eventually leaves compromised functional outcome.

Sliding hip screw in unstable trochanteric fracture causes significant medial displacement due to sliding of screws within barrel and higher incidence of screws cut out.[1,2] Intact lateral wall helps in stabilization of trochanteric fractures providing lateral buttress which avoids collapse and varus malposition.[3] In DHS lateral wall is stabilized but due to opening of fractures causes significant blood loss.[4] MIPPO (Minimum Invasive Plate Osteosynthesis) locking plate causes more complications.[5, 6]

In adults IM (Inter Medullary) nailing has become a popular method of stabilization of unstable trochanteric fractures due to its biomechanical advantages it provides support to posteromedial wall and prevents collapse. [7-10] For good outcome anatomical reduction and reasonable positioning of implant is required.

Though there are good results due to PFN, one does encounter complications due to fracture communiation . Most common complication is implant failure due to backout of screws, cut through of screws, " Z" or reverse "Z" effect or breakage of implant.[11]

The objective of study is to achieve anatomical reduction with TBW only to support lateral wall & communicated postero-medial fragment. One or two TBW stabilizes the communiated fragments and lateral wall resulting in reduction in the complication.

Material & Methods:

The study was conducted from January 2016 to November 2020. 21 Unstable trochanteric fractures were studied with mean age of 68 years. (25 years – 80 years) with 14 male patients & 7 female patients. To classify the fractures AO / OTA classifications was used (A2, 2-3=15, A3 =6). Commonest cause of fracture was fall from height and road traffic accidents.

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Proximal Femoral Nail of 250 mm was used for all fracture with 16 mm TBW. For easy insertion nail has 6 degree medio-lateral angle. The tapered distal tip avoids stress generation.[10] Only one dynamic distal locking bolt was used in all cases which helps in slight collapse & early fracture union.

Three days was average time for fixation. All cases were performed under spinal anesthesia. Lateral position was used to help AP and lateral viewing of fracture under image intensifier. Lateral position also reduces the blood loss. Fracture was reduced by closed method and stabilized with two, 2mm 'K' wires anteriorly in the neck & head from greater trochanter. Five patients needed open reduction due to obesity and inability to get closed reduction. The steinmann pin was used as joystick for closed reduction. 5 cm incision was taken above greater trochanter for entry by awl. A guide wire was passed followed by trochanteric reaming. Proximal two screws were passed as usual. 20 mm was as Tip Apex Distance (TAD). The postero medial communiation & lateral wall fracture was held by 16mm TBW one or two as per requirement. TBW also helped in abductor stabilization which prevents lurch post operatively. Image intensifier was used for entire procedure for both AP and lateral views. In all patients drain was kept.

The record of operative time, blood loss, blood transfusions pre & post-operative was maintained. Post operatively patients were encouraged to sit in bed on same day, on second day X-ray was done in AP & Lateral view & patient was made to walk with the help of walker with toe touch. Drain was removed on third day. On tenth day stiches were removed. Patients were followed on OPD basis on every month. Clinical & radiological evaluation was done. Patients were advised physiotherapy as per stage of union. Patients were given oral & injectable supplements of calcium, Vit. D3, Vit. B12 & proteins.

Patients were followed radiologically and clinically at regular intervals for minimum of one year. Salvati and Wilson scoring system helped to evaluate the result.[12]

Final radiological evaluation included complications like nonunion, malunion, implant breakage screw cut out excessive sliding of screws.

Results:

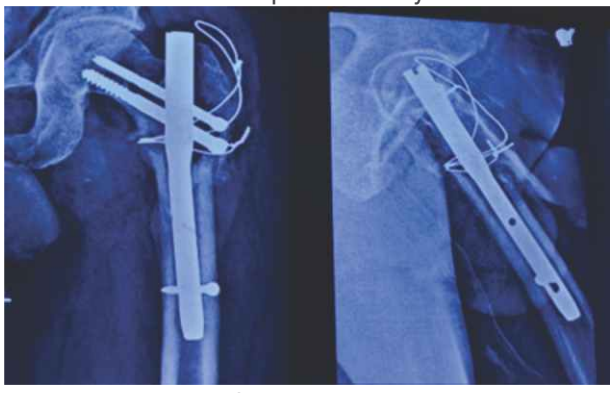
Average follow up was 1 year. X-ray examination showed anatomical reduction in 15 cases & acceptable reduction in 6 cases. Radiological union was observed in 16 weeks' time. 90 min was the average surgical time. 150 ml was average blood loss. Patient's Hb less than 10gm pre & post operatively received blood transfusions.

Two patients were developed TBW breakage. 1 developed lateral migration of screw which was removed after 1 yr of bone union. 6 patients who had acceptable reduction resulted in 2-5cm shortening which was compensated by shoe raise. 2 patients had abductor lurch. The average pain score was 8 out of 10. 15 patients regained normal walking. 6 patients needed walking aid. Pre injury function was regained in 15 patients. While little restriction was observed in 6 patients. The Salvati & Wilson score for overall hip function was around 30 in 15 patients & more than 20 in 6 patients.

Case 1

Pre Operative X-ray

Post-Operative X-ray



After union X-ray

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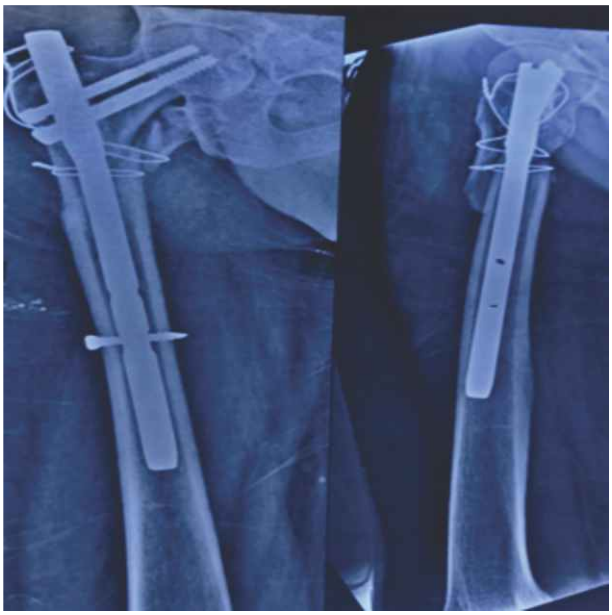
Case 2

Pre Operative X-ray

Post-Operative X-ray



After union X-ray

Discussion:

In stable trochentaric fractures sliding hip screw is a gold standard. In communiated inter trochanteric fractures it results in excessive collapse with shortening & high failure rate.[1,13] In unstable trochanteric fracture the intra medullary devise is a load sharing implant with lesser bending forces results in early weight bearing & preventing excessive collapse.[14] Since it has biomechanical advantage in communiated fractures as compare to extra medullary devices.[15,16] Various studies have shown good results after various intra medullary devices. PFN was introduces by AO 1996 with 2 proximal screws. Still in communated trochanteric fractures complications like lateral protrusion of screws, cut out, "Z" or reverse "Z" effect was seen.[17]

Postero-medial communiation was to be blamed for these complications.[18] Also lateral wall communiation was also responsible for these complications.[3,19,20] Lateral wall communiation was also responsible for failure in DHS fixation. PFN stabilizes postero-medial defect but fails to provide stability on the lateral wall communiation. We have used simple technique of one or two TBW to stabilize lateral & postero-medical communiation enhancing the results. The TBW prevents varus collapse. This helps in getting better results. Excessive fracture collapse causes shortening of abductor lever arm resulting in permanent limping. In our study 2 patients had abductor lurch. This shows importance of preventing varus collapse.

The limitation of our study was, we only used TBW to enhance the fixation of PFN due to financial constraints.

Conclusion:

By using simple technique of TBW, to enhance the fixation by PFN in commuiated inter trochanteric fractures which involves lateral wall and postro medial bone communiation, resulted in less varus collapse, less screw migration resulting in better union and less complications.

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