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Original Research Article

Fate of Undisplaced fracture neck of femur-managed by osteosynthesis using multiple cannulated cancellous screws (A 6 yr multicentre follow-up)

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Abstract
It's a multicentre study in which 67 patients who underwent Osteo-synthesis for undisplaced fracture neck of femur in adult patients done by two different surgeons at different places had been followed up for a period of 6years. It's a prospective study in which 46 males and 21 females were followed up for post-operative signs and symptoms of Avascular Necrosis of femoral head, Osteoarthritis of hip, Pain over the gluteal region. The Post-op Harris hip score was measured to quantify the results of follow-up. Eight Patients had complained of pain in the Greater Trochanteric area and had an average Harris hip score of 92 at 6year follow up.

Keywords: At least 3 to 6 key words osteo-synthesis, undisplaced fracture neck of femur, Harris hip score

1. Introduction
Management of undisplaced fracture neck of femur that is Garden Type 1 and 2 has been by conservative treatment or by Osteosynthesis using multiple cannulated cancellous screws or Dynamic hip screw. Conservative method is advocated when the patient is not surgically fit. The purpose of the study is the follow up of the undisplaced fracture neck of femur managed by absolute fixation of fracture using Multiple Cannulated screws and to look for any Post-operative problems like Avascular Necrosis of head of Femur, Osteoarthritis of Hip, Trochanteric bursitis or Pain in the post-operative period. Avascular necrosis is known to occur due to rupture of retinacular vessels caused by rotation of femoral head[1] .While fixation of fracture reduces micromotion and aids to revascularization [2]. Multiple studies have observed that avascular necrosis doesn't present in the first year but after two years and above [3] so we planned to follow up all the 67 patients for any evidence of avascular necrosis. We also wanted to follow up the elderly patients and find any evidence regarding vascular damage to femoral head. Harris hip score was used in postoperative period to evaluate the outcome

2. Materials and Methods
This was a prospective study of sixty-seven patients referred to the Orthopedics department of the Tertiary care hospitals from December 2012 through December 2019. This study was conducted in two different tertiary centers and was carried out by the first two authors in the same manner. All the patients in the study were adults ranging from 45 to 75 years. Informed and written consent was obtained from all the participants and the patients were also explained about the need of follow-up and the study. None of the participants rejected the study. There were 46 males and 21 females in the study and we had observed 39 of them were on the right side and 28 were on the left side. We never had any bilateral cases in our study. All of them presented after a history of trivial fall. All of them were followed till last December.

2.1 Surgical Procedure
Spinal epidural anesthesia was used in all the cases. We use a fracture table and reduction was checked after providing moderate traction and the limb is positioned in slight Internal rotation under c-arm guided image intensifier in both Antero-Posterior & Lateral Views .After draping under sterile precautions the incision is placed on the lateral side of length 3-4 cms from the base of Greater Trochanter and Iliotibial band is incised and Vastus Lateralis is reflected antero-medially.
A guide wire is passed and position is checked to be in the centre in AP & Lateral view. We use a jig containing holes in the periphery and dial the jig and pass the guide wires in inverted triangle configuration the first one along the calcar. Second one along the postero superior part of neck and the final one along Antero-superior part of neck. The jig is removed and cannulated drill bit is used to drill and screws of size 6.5 mm partially threaded cancellous screws are placed in the same order of guide wire fixation and drilling.
We use washer in the inferior screw and try to add one more washer if space permits. The reduction rechecked in multiple planes with image intensifier and wound closed in layers and skin

sutured with 3-0 monocryl.
Dressing would be inspected every third day and mobilization started with walker support from Post-op day one preferably non-weight bearing and progressing to guarded weight bearing .We followed them after 6 weeks, 3 months, 1 year, 2 years, 3 years and at 6 yrs. We used Harris hip scoring system to evaluate the quantitative outcome.

3. Results
We regularly evaluated the patients after 6 wks [3], months, 1yr, 2yrs, 3yrs & 6yrs and also at any time they have a discomfort. All of them were counseled about the regular need of follow-up Out of sixty seven patients eight patients at 6yr follow up complained of occasional pain in the Greater trochanteric area and they also use Cane or walking stick for long distance walking bringing their average Harris hip score to 92%. There were no cases of periprosthetic fracture in the above series.

We didn't encounter any case of Avascular Necrosis in our study. There were no bilateral cases in our study

4. Discussion
Failure of fracture fixation, Nonunion, Osteonecrosis of femoral head and conversion to arthroplasty are the known complications of osteosynthesis of fracture neck of femur. Inadequate reduction of fracture fragments and poor choice of implants would cause failure of fracture fixation. We haven't done capsulotomies to reduce intracapsular pressure though some authors advocate doing it for young patients to prevent Osteonecrosis. In the metaanalysis done by Damany DS [4] *et al.* on 564patients in 18 studies 14% of patients in undisplaced group developed Osteonecrosis. This was attributed to improper reduction. The current study focuses on proper reduction and minimal handling of soft tissue cover along with absolute stable fixation to achieve good outcome along with guarded mobilization.

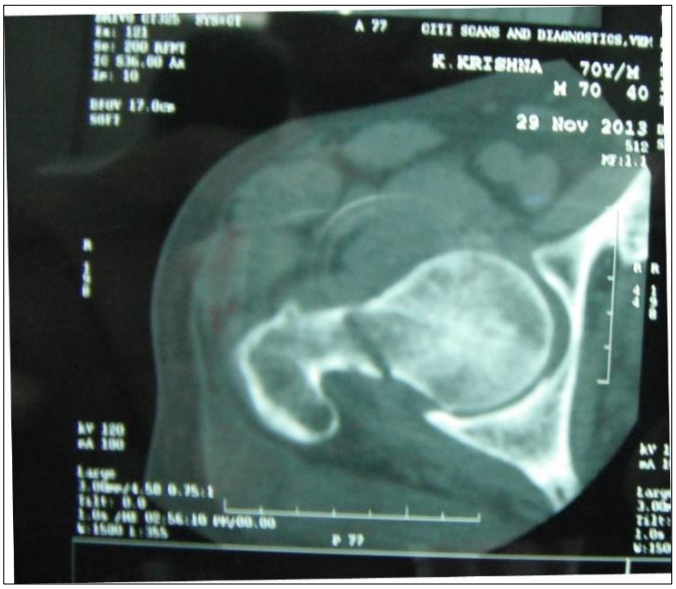

Fig 1: CT scan of fracture neck of femur

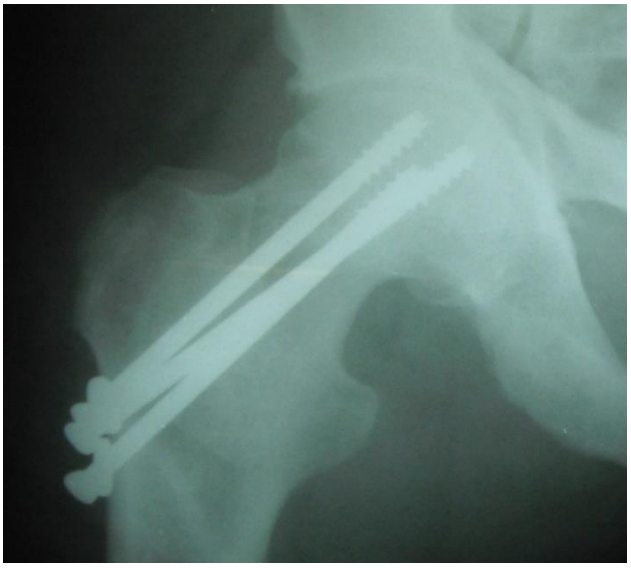

Fig 2: Post –op Follow-up

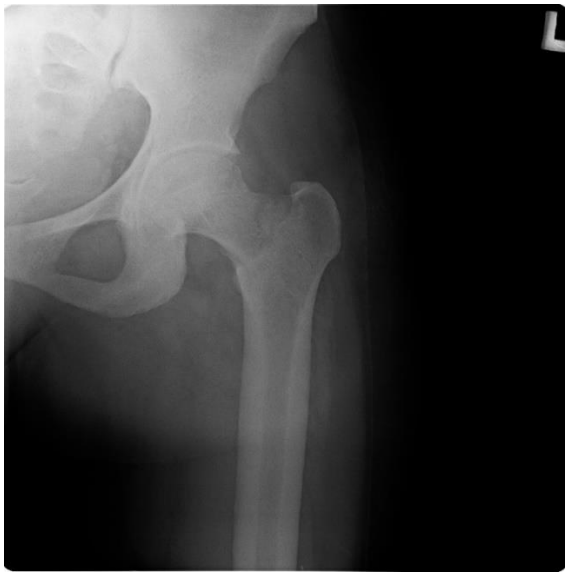

Fig 3: Pre –op Undisplaced fracture neck

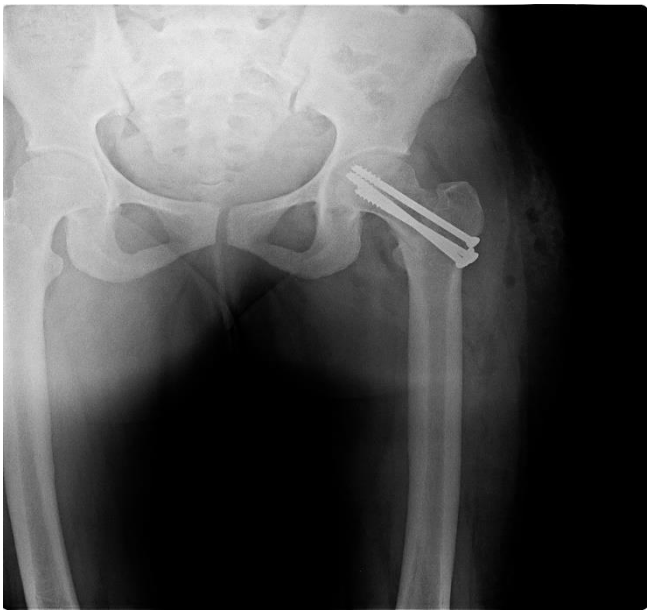

Fig 4: Post-Op Follow-up

4. Conclusions

To conclude Undisplaced fracture neck of femur have always shown good results with Osteosynthesis irrespective of age and gender. All of them united and none had signs of Avascular Necrosis even after 6 years. We do not advocate primary arthroplasty of hip for undisplaced fracture neck of femur. The limiting factor for the study was a small sample size. We need more multicentre studies to reinforce our results. The reason for successful results could be early fixation, proper reduction, Minimal soft tissue stripping, stable fixation and guarded mobilization

5. Acknowledgments

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6. References

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