

Arthroscopic Reduction and Transosseous fixation of Three and Four Parts Fracture of the proximal humerus in Osteoporotic patients

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Aim

In this study we describe a new technique developed by the last Author and evaluate the functional results of arthroscopic transosseous reconstruction of three and four parts of proximal humeral fracture in patients with osteoporosis. To our knowledge no study in the literature describing arthroscopic reduction and suture fixation of three to four parts proximal humeral fractures in patients with osteoporosis is published.

Osteoporosis in old patients is a problem in Proximal Humeral fracture reconstruction

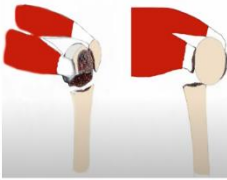


Epidemiology

- Proximal humerus fractures account for 5% of all fracture
- 71% of these fracture occur in patient over the age of 60y
- Second most common fracture of the upper extremity in patients >65 y
- Incidence increase with the age

Three parts fracture

- Surgical neck & Greater tuberosity
- Surgical neck & lesser tuberosity



Problems of Osteosynthesis Reconstruction



HARD WARE FIXATION

- Implant failure with Osteoporosis 65%
- Morbidity old patients 60%
- Infection
- Neurologic and vascular injuries
- Disturb blood supply AVN

Methods

The surgery is done with arthroscopic reduction of the bony fragments and fixation with temporary K-wires. Intraarticular and extraarticular straight holes will be made in which sutures are placed and the fragments fixed. Then the wires are removed and after an immobilization period of 4 weeks exercises will start following radiological control.

FOUR TECHNIQUES OF TRANSOSSEOUS SUTURE FIXATION

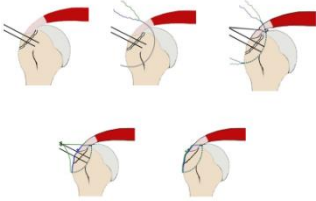
1. Vertical (Giant needle)
2. Horizontal
3. Mattress
4. Vertical (PS-wire)



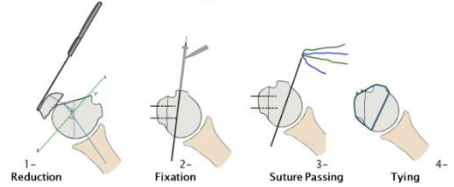
Giant Needle Technique for Upward G.T Displacement



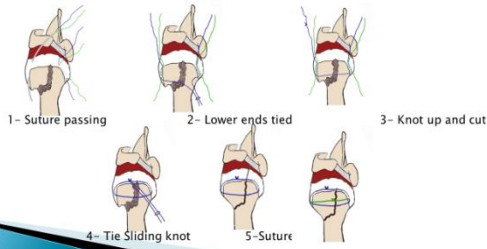
1. Vertical suture fixation (Transosseous Giant Needle)



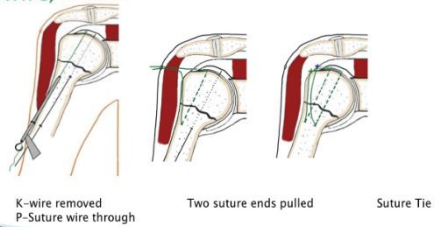
2- Horizontal transosseous suture fixation of the greater tuberosity



3. MATTRESS Transtendenous Giant Needle Fixation Greater Tuberosity



4. VERTICAL SUTURE FIXATION (Transosseous Penetrating-Suture wire)



29 patients were treated with this technique between March 2014 and December 2020. Three patients were lost and 26 were followed with an average follow up 34 months (between 18 months and 6 years). There were 16 cases of three parts fracture with moderate dislocation, 6 cases of 4 parts and 4 cases with 3 parts and rotator cuff tear. All patients had osteoporosis. All cases were re-examined clinically and radiologically.

Results

According to Neer classification excellent results were present in 6 cases (37%) of the 3 parts, Satisfactory results were in 6 of the 3 parts (37%) and 3 of the 4 parts (50%) while unsatisfactory results were present in 3 of the 3 parts (25%) and 3 of the 4 parts (50%).

AUTHOR'S TREATMENT OF CHOICE

Minimal displacement:	3 weeks immobilization followed by passive progressing to active exercises
Two-parts:	} Closed reduction and arthroscopic transosseous suture fixation (Giant Needle PS wire suture fixation + arthroscopic cuff repair)
Three parts:	
Four parts: Head-splitting	
Failed 4 parts marked displacement	- Prosthesis

RECOMMENDATION

- Most geriatric proximal humerus fractures (65%) are best treated nonoperatively.
- ORIF with locked plating has complications in cases of fracture comminution, poor bone quality and vascularity.
- ARIF with transosseous sutures has no significant complications, applicable in cases of fracture comminution and osteoporosis with no complication of AVN. Technically demanding. Best accepted by old patients.
- Reverse Total Shoulder Replacement is recommended if ARIF is not possible in surgically indicated cases in old patients.

Conclusions

The early result strongly encourages using the arthroscopic techniques to treat proximal humerus fractures especially in cases of osteoporosis and old patients who refuses open surgery or are not suitable for open surgery.