Evaluation Of Functional Outcome Of Proximal Humerus Fracture Managed With Proximal Humerus Locking Plate-A Prospective Study

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Introduction
Proximal humeral fractures are the common fracture in elderly patients. The increased incidence in the older population is thought to be related to osteoporosis. Over the past decade, the trend has been toward angular stable plate fixation.

Aims and Objectives
The present study is designed to evaluate the functional outcome of proximal humerus fracture managed with proximal humerus locking plate fixation in adult patients.

Material and Method
This study will be done on patients with proximal humerus fracture admitted in during May 2011-May 2013. Inclusion criteria: Patient >18 year are included, Neer’s classification: grade 2 to grade 4. Exclusion criteria: Medically unfit patients, Pathological fractures, Fractures in pediatric age group, Shaft humerus fractures with proximal extension, Multiple fracture in same upper limb, Open fracture, Acute infection.

Results
20 patients were included in the study. The union of most of the patients was less than and equal to 10 wks (70.0%). 6 patients have treatment related complication (30.0%) with 10.0% screw perforation and 20.0% shoulder stiffness. However, at final evaluation, the functional outcome of most of the patients were found to be excellent (70.0%) followed by good (15.0%), poor (10.0%) and fair the least (5.0%).

Conclusions
The Proximal humerus LCP is a good implant which requires accurate positioning and fixation for satisfactory results. Proper physiotherapy and co-ordination of the patients during post-operative period is very important for obtaining better results.

Keywords
Proximal humeral fractures, stable angle plate, osteoporosis.
Exclusion criteria: Medically unfit patients, Pathological fractures, Fractures in pediatric age group, Shaft humerus fractures with proximal extension, Multiple fracture in same upper limb, Open fracture, Acute infection.

Result

Basic Characteristics
The present study evaluates the functional outcome of proximal humerus fracture management with proximal humerus locking plate in a prospective manner. A total of 20 patients were recruited and evaluated. The basic characteristics (demographic and clinical) of patients at admission are summarized in Table 1 and also shown graphically in Fig. 1 to Fig. 8.

The age of all patients ranged from 25-69 yrs with mean (± SD) 49.70 ± 12.16 yrs. Most of the patients were above 45 yrs of age (65.0%) and mostly males (60.0%). There were 9 patients with neer classification part 2 (45.0%), similarly with part 3 (45.0%) and 2 were with part 4 (10.0%). All patients had closed fracture (100.0%). The mode of injury of most of the patients were MF (40.0%), followed by RTA (35.0%), ERAA (5.0%) and DB the least (10.0%). The patients mostly affected at right side (75.0%). Among patients, 17 (85.05) patients were without associated injury while 1 (5.0%) each with left proximal tibia fracture, right distal radius fracture and right shaft tibia fracture injury. Similarly, 12 patients were without associated comorbidities (85.0%) while 8 patients with comorbidities (40.0%) with highest being of BP (15.0%). Further, 13 patients with dominant extremity (65.0%) and 7 were with non dominant extremity (35.0%).

Surgical Outcome
The surgical outcomes of all patients are summarized in Table 2 and also shown graphically in Fig. 9 to Fig. 15. The duration from injury to surgery of all patients ranged from 1-5 days with mean (± SD) 3.10 ± 1.37 days. The duration from injury to surgery of most of the patients was more than 2 days (55.0%). Similarly, the duration of surgery of all patients ranged from 70-140 min with mean (± SD) 100.00 ± 20.84 min. The duration of surgery of most of the patients was more than 90 min (55.0%). Further, the blood loss of all patients ranged from 200-500 ml with mean (± SD) 315.00 ± 108.94 ml. The blood loss of most of the patients was less than and equal to 300 ml (55.0%). Furthermore, the union of all patients ranged from 8-12 wks with mean (± SD) 10.40 ± 1.23 wks. The union of most of the patients was less than and equal to 10 wks (70.0%). Similarly, the duration of hospital stay after surgery of all patients ranged from 4-12 days with mean (± SD) 6.40 ± 2.04 days. The duration of hospital stay after surgery of most of the patients was less than and equal to 6 days (70.0%).

14 patients did not have treatment related complications (70.0%). However, 6 patients have treatment related complication (30.0%) with 10.0% screw perforation and 20.0% shoulder stiffness. However, at final evaluation, the functional outcome (i.e. efficacy of the treatment) of most of the patients were found to be excellent (70.0%) followed by good (15.0%), poor (10.0%) and fair the least (5.0%).

Association With Functional Outcomes
The association of functional (treatment or surgical) outcomes with different risk factors (demographic, clinical and surgical) is summarized in Table 3. Table 3 showed that the most favorable functional outcome “Excellent” did not (p>0.05). However, most favorable outcome mostly associated with male gender (78.6%), significantly (p<0.001) associated with neer classification especially part 2 (64.3%), mode of injury RTA (42.9%), affected side right (71.4%), without associated injury (92.9%), without associated comorbidities (78.6%), significantly (p<0.01) associated with dominant extremity (92.9%), duration of surgery ≤ 90 min (57.1%), blood loss ≤ 300 ml (71.4%), union ≤ 10 wks (78.6%) and significantly (p<0.001) without complications (100.0%).

Conclusion
The Proximal humerus locking plate is an example of a device that combines fixed angle locking screw technology with the option for conventional screw. From the present study the following points were concluded:

- In proximal humerus fractures 2 and 3 parts fractures (Neer Classification) are more common, road traffic accidents being the most common cause.
- 2 part fractures have better results as compared to 3 part and 4 part fractures.
- The Proximal humerus LCP is a good implant to use for these type of fractures, with requirement of accurate positioning and fixation for satisfactory results.
- Proper physiotherapy and co-ordination of the patients during post-operative period is very important for obtaining better results.
- Increased age of the patient, especially more than 50 yrs has a negative effect on functional outcome.
- Associated medical co-morbidities have a negative effect on functional outcome.
- Shoulder stiffness and infection are common complications to be looked for in subsequent follow ups, keeping in mind the injury severity, fracture configuration and patient profile.
- Dominant extremity has good functional outcome as compare to non dominant extremity

Clinical Importance
Proximal humeral LCP is a good implant for rigid internal fixation for the proximal humerus fracture, provided there is good anatomical reduction and accurate implant positioning.

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