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Management of proximal humeral fractures with philos locking plate: A prospective study

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Abstract

Introduction: Proximal humeral fractures are the second most common fractures of the upper extremity accounting for 4% to 5% of all fractures. The treatment of proximal humeral fractures is divided into non-operative and operative methods. The non-operative method gives good results in stable and minimally displaced fractures. Displaced humeral neck fractures used to be managed conservatively in the past, but these were complicated by loss of reduction, malunion, non-union, stiffness and ultimately poor functional outcome.

Aims and Objectives: Our study aimed to evaluate the clinical, functional and radiological result of displaced proximal humeral fractures managed by open reduction and internal fixation with Proximal Humerus Internal Locking System (PHILOS) Plating.

Materials and Method: 30 patients with displaced proximal humeral fractures that were treated by PHILOS plating between Jun 2016 to Jun 2018 were included in this study. All cases were managed by open reduction and internal fixation using PHILOS plate. The Constant Scoring System was used to evaluate the outcome of this procedure.

Result: Out of 30 patients in this study 17 were male and 13 were female. The mean age was 55 years (range 20-75 years). The mean surgical time was 90 min (range 75-140 min). The mean fracture union time was 11 weeks (range 10-20 weeks). The mean constant score was 76 (Range 50-100). The constant score was excellent in 17 cases (57%), Good in 8 (27%), Fair in 3 (10%), Poor in 2 (6%) cases.

Conclusion: PHILOS plating is a safe and a reproducible option for managing displaced proximal humeral neck fractures. It gives a high rate of union, good functional outcome, is less time consuming and has minimal complications.

Keywords: philos plating (Proximal humerus internal locking system), proximal humeral fractures, deltopectoral approach

Introduction

Proximal humeral fractures are common and debilitating injuries and the incidence of them are increasing especially in the elderly due to osteoporosis. They account for about 5% of all injuries to the appendicular skeleton. About 80% of these fractures are stable and minimally displaced, whereas the remaining 20% are displaced and unstable, and may have disrupted vascular supply [1]. The nonoperative method gives good results in stable and minimally displaced fractures [2, 3, 4]. Operative treatment is necessary for the management of displaced, unstable fractures and fractures associated with dislocation [5]. Various modalities of treatment have been evolved which include closed reduction and percutaneous pinning, nailing, open reduction and internal fixation with various techniques like tension band wiring, transosseous suture fixation [6], conventional plate, advanced locking plate (PHILOS Plate) and hemiarthroplasty. The aim of this study was to evaluate the clinical and functional outcome of management of displaced proximal humeral fractures with PHILOS (Proximal Humerus Internal Locking System) Plating over a minimal follow up period of two years.

Material and Methods

Thirty patients with displaced fractures of the proximal humerus were treated using PHILOS (Proximal Humerus Internal Locking System) Plating Technique between June 2016 and June 2018. All the patients had a minimum follow up of two years. The inclusion criteria included displaced fractures of the proximal humerus in patients aged 20 to 80 years, who consented to the study. The operative procedure was performed within 2 days of the injury. Exclusion

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criteria included compound fractures, pathological fractures, bilateral proximal humeral fractures, fractures with vascular insufficiency and polytrauma patients. A preoperative clinical examination of the affected arm was done with respect to local area, swelling, contusion, abrasions and neurovascular defect. Preoperative Antero-Posterior (AP) and Lateral radiographs of the affected side were taken.

Surgical technique

The patients were operated in a supine position. All patients were given general anaesthesia. A standard Delto Pectoral approach was used in all the cases. After freshening the fracture fragment, fractures were reduced and held temporarily with K wires. After temporary fracture reduction was achieved, the precontoured locking plate was positioned 5-10 mm lateral to the intertubercular sulcus and 10 mm caudal to the tip of the greater tuberosity. Tuberosity fixation was carried out through plate holes and sutures. Proximal locking screws were extended till subchondral purchase. The distal humeral screws were having bicortical purchase. Intraoperative assessment was done on image intensifier to check the fracture fixation and range of

motion. Post operatively a shoulder immobilizer was applied. The limb was kept immobilized with a shoulder immobilizer until stitches were removed (14th day). After this the patient was advised to perform gentle active range of motion exercises.

The patients were called for follow up after two weeks for stitch removal, and then every monthly for 6 months and then once every six months until 2 years. The patients shoulder function was assessed using the Constant Scoring System.

Result

Out of the 30 patients that were included in the study 17 (57 percent) were male and 13 (43 percent) were female. The age group of the patients ranged from 20 to 75 years with a mean age of 55 years. The most common mechanism of injury was road traffic accident followed by domestic fall and then fall from height. The mean surgical time was 90 min with a range of 75 to 140 min. The mean fracture union time was 11 weeks with a range of 10 to 20 weeks. The shoulder function was excellent in 17 cases (57 %), Good in 8 (27 %), Fair in 3 (10%), Poor in 2 (6 %) cases on the Constant Scoring System.



Case 1: (A, B)-Pre-Op Xray, (C, D)-Post-Op Xray, (E, F, G)-Clinical Result

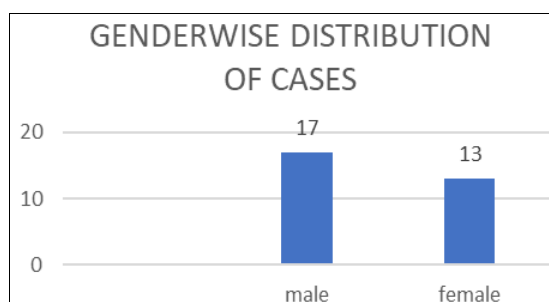


Fig 1: Sex Wise distribution of cases

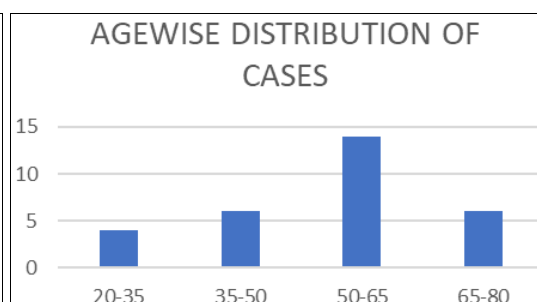


Fig 2: Age wise distribution of cases

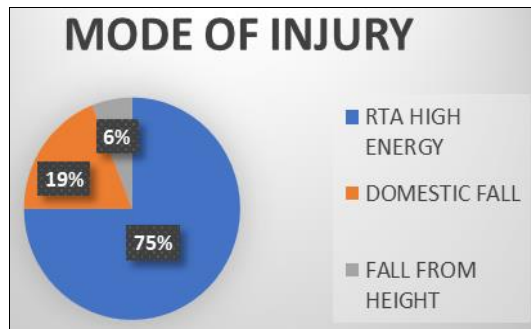


Fig 3: Mode of Injury

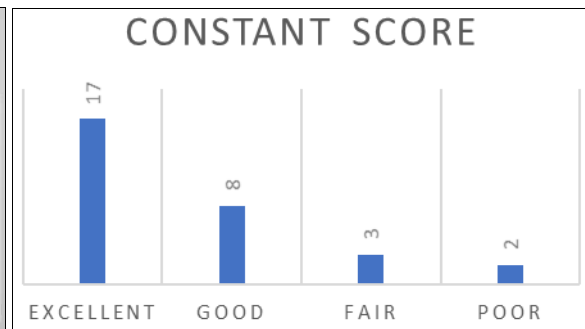


Fig 4: Constant Score

Discussion

Proximal humeral fractures are the second most common fractures of the upper extremity after distal radius fractures. These fractures usually show a bimodal age distribution with high energy velocity injuries in younger population to trivial trauma in older age groups. Surgical management of displaced proximal humeral fractures aims at restoring the prefracture functional status of the patients, as far as occupational and recreational activities are concerned. In order to return to activity as soon as possible and to avoid complications associated with conservative management for a patient with displaced proximal humeral fracture, internal fixation has been accepted as the standard procedure. Surgical treatment with minimal soft tissue stripping enables satisfactory reduction, stable fixation, and early mobilisation, but the technical difficulties include poor bone stock, minimum subchondral bone in the humeral head, and excessive soft tissue damage. The most common risks include screws cut out, penetration of the humeral head, loss of reduction, avascular necrosis, and subacromial impingement. The proximal humerus locking plate provides excellent fixation to the humeral head, even in the osteoporotic bone, gives angular stability, adequate buttressing and load sharing support to prevent collapse of the fragments. To conclude PHILOS (Proximal Humeral internal Locking System) Plating technique of displaced Proximal Humeral fractures is a promising and a reproducible technique with fewer complications and better results as compared to other conventional methods.

Conclusion

Treatment of displaced proximal humeral fractures can be quite challenging and the management options have been controversial as several modalities of treatment exist. In our study we have concluded that PHILOS (Proximal Humeral Internal Locking System) Plating is an effective and reproducible option as it allows a stable fixation allowing early mobilization of the patients and has a fewer incidence of complications even in very osteoporotic patients.

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