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Outcomes of Surgical Treatment of Proximal Humerus Fractures at Kati University Hospital

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Abstract **Original Research Article**

Proximal humerus fractures represent about 4% of all fractures. Conservative treatment of these fractures is common. The choice of surgical treatment is based on a multiparametric analysis. This surgery is threatened by several complications, notably shoulder stiffness. The aim of this work was to evaluate the anatomical and functional outcomes of the surgical treatment of proximal humerus fractures. This is a descriptive study with retrospective data collection over 5 years from January 2020 to December 2024. We collected sixteen cases. The average age of our patients was 35.6 years, with extremes of 18 and 80 years. There were 10 men and 6 women. The type of fractures was Neer II in 3 cases (Fig. 1), Neer III in 9 cases, and Neer IV in 4 cases. The types of osteosynthesis were Kirchner-wires fixation in 4 cases and locking plate in 12 cases. Functional outcomes were assessed according to the Constant score. Bone consolidation was achieved in all patients. We recorded 1 case of surgical site infection and 4 cases of shoulder stiffness. The mean absolute Constant score was 60.2 points ranging from 38 to 90 points. The result was excellent and good in 12 cases, fair in 3 cases, and poor in 1 case. The decision for surgical treatment depends on a multifactorial analysis. Osteosynthesis of displaced proximal humerus fractures yields satisfactory results. This surgery remains threatened by surgical site infection and shoulder stiffness. Osteosynthesis with a locking plate via a minimally invasive approach appears to be a good alternative.

Keywords: Proximal humerus, Fractures, Osteosynthesis, Locking plate, Kati.

INTRODUCTION

Proximal humerus fractures represent about 4% of all fractures [1]. They are the third most common fracture in people over 65 years old, and their incidence increases with age [2,3]. They are the most frequent fractures of the upper limb after distal radius fractures [4]. Majority of these fractures are treated conservatively.

Regarding the choice of surgical treatment, a decision based on a multiparametric analysis is recommended [2]. This surgery can be performed by either open or closed approach. It is threatened by several complications, including shoulder stiffness and aseptic necrosis of the humeral head. The high rate of poor outcomes and complications observed in some studies reflects the real challenges of managing proximal humerus fractures in developing countries [5].

The aim of this study was to evaluate the anatomical and functional outcomes of surgically treated proximal humerus fractures in our department.

METHODOLOGY

Series characteristics:

This was a descriptive study with retrospective data collection over 5 years from January 2020 to December 2024. All patients admitted to the Orthopedics-traumatology department of Kati University Hospital, who underwent surgery for proximal humerus fracture during the study period and had a minimum follow-up of 6 months, were included in this study. We collected sixteen cases. Incomplete files and patients lost to follow-up were excluded. The data were processed using SPSS software. The average age of our patients was 35.6 years, ranging from 18 to 80 years. There were 10 men and 6 women. The left side was affected in 9 cases and the right side in 7 cases. Traffic

accidents were the most frequent etiology at 43.7%, followed by sports accidents (18.7%), domestic accidents (18.7%) and accidents at work (18.7%). A direct mechanism was noted in 11 cases and an indirect mechanism in 5 cases. The type of fractures was Neer II in 3 cases (Fig. 1), Neer III in 9 cases, and Neer IV in 4 cases. Associated injuries were mainly skin openings in 2 cases and one case of neurological injury.

Therapeutic protocol:

Axillary block anaesthesia was used in 9 cases and general anaesthesia in 7 cases. Closed surgery was performed in 4 cases and open surgery in 12 cases The deltopectoral route was used for open surgery. The types of osteosynthesis were Kirchner-wires fixation in 4 cases and locking plate in 12 cases (Fig. 1). The average operative time was 88.5 minutes, with extremes of 30 and 120 minutes. The average length of hospital stay was 3 days, with extremes of 2 and 5 days.

Evaluation Method:

The average follow-up of the cases was 18 months, with extremes of 6 months and 48 months. The variables studied were Bone union, shoulder mobility, limb axis, reduction, complications (intraoperative, secondary, and late), and residual pain. Functional outcomes were assessed according to the Constant score [6].

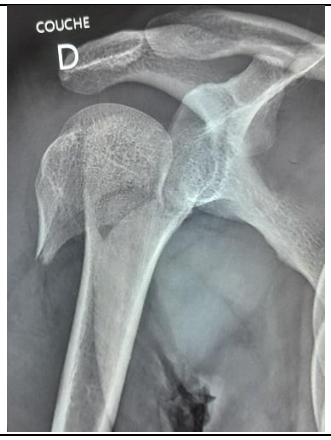

Fig. 1 Surgical neck fracture NEER II

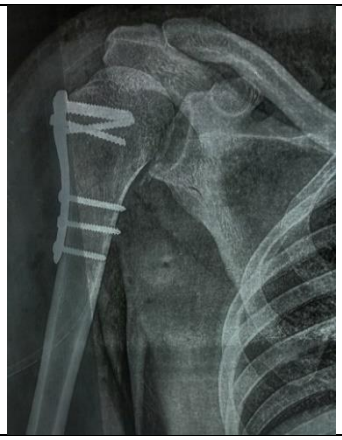

Fig. 2 Osteosynthesis using a locked plate

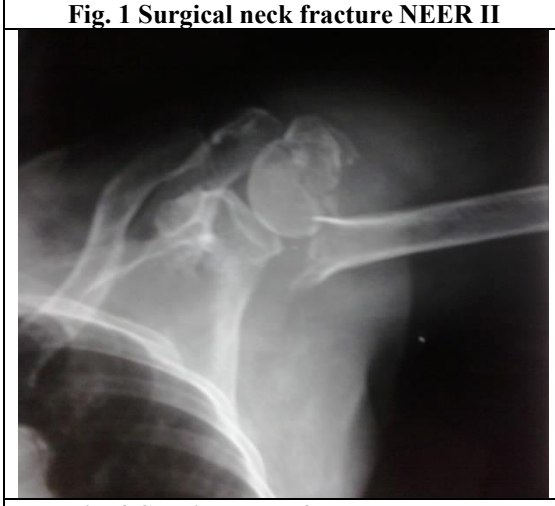

Fig. 3 Surgical neck fracture NEER II

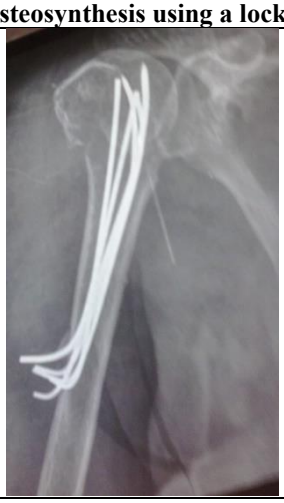

Fig. 4 K-wires fixation (Kapandji method)

RESULTS

Fracture reduction was considered satisfactory in 15 cases and unsatisfactory in one case. We recorded 2 cases of intraoperative complications: one case of diffuse bleeding due to coagulation disorders and one accidental vascular breach that was immediately repaired. Bone union was achieved in all patients. The average healing time was 14.3 weeks, with a range of 12 to 16 weeks. We recorded 1 case of surgical site infection and 4 cases of shoulder stiffness. No humeral head necrosis or pseudarthrosis was noted in our study.

The mean absolute Constant score was 60.2 points, ranging from 38 to 90 points. The mean weighted Constant score was 80.7%, ranging from 50.3% to 110.7%. The outcome was excellent or good in 12 cases, fair in 3 cases, and poor in 1 case. Subjectively, the functional outcome was satisfactory in 15 cases (93.7%) and unsatisfactory in 1 case (6.3%).

DISCUSSION

Our study population was mainly young. The average age was 35.6 years. The predominance of men has been observed by several authors in African series

[7,8]. The gender distribution was bimodal. Among young subjects aged 18 to 49 years, the sex ratio was 3.0, whereas among older people aged 50 and over, the sex ratio was 0.3. This bimodal distribution could be explained by the high frequency of these fractures both in young adult males following road traffic accidents and in elderly women with osteoporosis following a simple fall [9].

The main criteria evaluated when making treatment decisions were the type of fracture, the displacement of the fragments and the risk of osteonecrosis [2]. The main objective of surgical treatment for proximal humerus fractures is to restore anatomy in order to achieve maximum mobility. All Neer classes were involved in osteosynthesis. Neer-classes III and IV were involved in the majority of cases, i.e. 81.3%. Other authors have made the same observation [10]. The proximal humerus is a region well protected by musculature, which would explain the low frequency of associated skin lesions.

The close relationship of this region with the axillary nerve means it is constantly at risk. We recorded one case of axillary nerve paralysis. Beveled fragments can threaten the skin. Two cases of skin opening were noted in our study. We mainly used two surgical methods: Kirchner-wires fixation and the locked plate, each with its advantages and disadvantages. Closed Kirchner-fixation involves less morbidity, but the fixation is less stable. In our study, Kirchner-fixation was performed in 4 cases and plate fixation in 12 cases. Osteosynthesis with a screwed plate is stable, usually with an anatomical reduction, but the risk of infection is real. It is also at risk of stiffness and cephalic necrosis. The locked plate was used in our patients who underwent screw plate osteosynthesis. It has the advantage of providing a more stable fixation and allowing early mobilization. We achieved bone union in all patients. In our study, the complications observed were mainly shoulder stiffness. We did not record any cases of cephalic necrosis and non-union. In the literature, cephalic necrosis and non-union after osteosynthesis of proximal humeral fractures have been noted [5,11,12]. We recorded a case of surgical site infection. Infection rates more or less elevated have been reported [12,13]. The mean absolute Constant score was 60.2 points, ranging from 38 to 90 points. Functional outcome was satisfactory in 93.7% of cases. We obtained similar results to those reported by other authors [8,14,15].

Conclusion

The decision for surgical treatment requires a multifactorial analysis. Osteosynthesis of displaced proximal humerus fractures yields satisfactory results. Locked plate appear to be better in terms of reducing postoperative complications and functional recovery. This surgery remains threatened by infection of surgical site and shoulder stiffness. Osteosynthesis using a locked plate through a minimally invasive approach appears to be a good alternative.

Conflict of Interest: None

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