

Original Article

Functional Outcome Of Conservatively Managed Proximal Humerus Fracture

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Abstract

Background and objectives: One of the common osteoporotic fractures being the proximal humerus fractures accounts for nearly 4% of all fractures. Undisplaced fractures are usually managed conservatively. But here we study the outcome of 3part and 4part proximal humerus fractures managed conservatively.

Materials and methods: This is a observational study of 30 patients with 3 part and 4 part proximal humerus fractures above the age 50years, who are managed conservatively with U-slab. Functional outcome was evaluated with constant scoring system.

Results: In our study among the 30 patients, most common age group was 50-60years, with female preponderance (60%). Most common mode of injury was slip and fall with 76.7%. mean constant score at the end of 6months follow up was found to be 77.9.

Conclusion: significant improvement was seen in the functional outcome compared from 1month follow up to final follow up at 6months.

Keywords: proximal humerus fracture, conservative management, U-slab, constant scoring system.

Introduction

Proximal humerus fracture are one of the common fractures in the elderly age group along with hip and distal radius fractures due to osteoporosis and in young patients due to high energy trauma.¹Fractures of the proximal humerus comprise nearly 4% of all fractures and 26% of fracture of humerus.^{2,3}Around 80% of fractures are undisplaced and can be treated non operatively.⁴The remaining 20% of the displaced fractures require surgical intervention. Recently, there is a trend towards a more aggressive surgical treatment and early rehabilitation rather than conservative measures. The choice of treatment in the elderly population is always a challenge. The dilemma

over surgical versus non-surgical management continues to remain despite various studies showing superiority of one over the other.

Objectives of study

To evaluate the functional outcome of proximal humerus- Neer's 3part and 4 part fracture managed by conservative management in patients aged more than 50 years.

Methodology of study

The study consists of patients with 3 part and 4-part proximal humerus fracture who underwent treatment at Koppal Institute of Medical Sciences between the period 1st June 2020 to 31st May 2021. Consent was taken from each patient enrolled in the study. Those patients who were available for the regular follow-up for a period of 6 months were included in the study with a total being 24 patients.

Inclusion Criteria

1. Patients aged >50 years
2. Patients with proximal humerus willing to follow up

Exclusion Criteria

1. Open fracture
2. Neer's type 1 and 2 proximal humerus fracture
3. Fracture associated with neurovascular injury

The patients with 3-part and 4 -part proximal humerus fracture was immobilized the affected upper limb in a U-slab for a period of 4 weeks. Followed by gradual mobilisation of affected limb as tolerated by the patient. At the beginning pendulum exercises were initiated and progressive ROM as per patient's tolerance were started.

Patients were followed up at regular interval of 1 month, 3 months and 6 months period. During each visit they were evaluated using constant scoring system. Fractures were also assessed radiologically at each visit. The functional assessment was done using Constant Scoring System. It has four basic parameters. 1) Pain -15 points, 2) Activities of daily living -20 points, 3) Range of motion - 40 points, 4) Power -25 points. Total score is 100 for each shoulder. Higher the score better the outcome.

Data analysis:

Collected data was analysed frequency, percentage, mean, standard deviation, and by tests such as analysis of variance (ANOVA) for repeated measures' test and chi square test

Results

Age distribution:

A total of 30 patients were included in the study. A majority of the patients were between the age of 51-60 years (53.3 %), the next common age group was between 61 to 70 years (26.7%).

Table1: Age distribution

AGE	FREQUENCY	PERCENTAGE
51-60	16	53.3
61-70	8	26.7
71-80	4	13.3
>80	2	6.7
Total	30	100

In our study most commonly, females are involved in proximal humerus fracture (60%).

Table 2: Gender distribution

GENDER	FREQUENCY	PERCENTAGE
Male	12	40
Female	18	60
Total	30	100

Mode of injury:

Slip and fall was the most common mode of injury with 23 patients and remaining 7patients had history of rad traffic accident.

Table 3: Mode of injury

MODE OF INJURY	FREQUENCY	PERCENTAGE
RTA	7	23.3
SLIP AND FALL	23	76.7
TOTAL	30	100

Type of fracture

The fractures were classified using Neer’s classification of proximal humerus fractures. 3-part proximal humerus fracture was most common type compared to 4-part fracture in our study. Sixteen patients had 3 -part fracture (53.3 %) and fourteen patients had 4-part fracture (46.7%) constituted in our study population.

Table 4:Fracture type

NEER’S TYPE	FREQUENCY	PERCENTAGE
3 PART	16	53.3
4 PART	14	46.7
TOTAL	30	100

Functional outcome

A total of 16 patients with 3-part proximal humerus fracture were included in the study. The average Constant score for patients with 3-part fracture at 1-month follow-up was 26.7, at 3 months was 57.8 and at 6 month follow up was 79.2. A total of 14patients with 4part proximal humerus fracture was managed conservatively and had average Constant score at 1 month follow up was 23.6, at 3 months was 54.1 and at final follow up was 76.7. The average Constant score for combined 3part and 4part proximal humerus fracture managed conservatively at 1 month follow-up was 25.2, at 3 months was 55.9 and at final follow up was 77.9. Patients had highly significant and better score with respect to pain, daily activity, range of movement and shoulder strength at the final follow up with p value of <0.001.

Table 5: Functional outcome

FUNCTIONAL OUTCOME	3 PART FRACTURE	4 PART FRACTURE	COMBINED OUTCOME
1 MONTH	26.7	23.6	25.2
3 MONTHS	57.8	54.1	55.9
6 MONTHS	79.2	76.7	77.9

Discussion

Proximal humerus fracture is the third most common fracture in the elderly population due to osteoporosis and in young patients due to high energy trauma. It accounts for about 4-5% of all fractures and 22% of the upper limb fractures. Studies show that more than 70% of the patients who present to the emergency room with proximal humerus fractures are usually in the elderly age group (>50year) and three-fourth of them are women

Age and gender distribution

Zyto et al in their study included a total of 40 patients among which, 35 (87.5%) were women and 5 (12.5%) were men with a mean age of 74 years.⁵ Hintermann et al in their study had 42 patients with 9 male and 33 female patients with a mean age of 72 years.⁶

In our study we had a total of 30 patients out of which 12 were men and 18 were women. The average age of our study population is 58.35 years. This shows that proximal humerus fracture is most commonly seen in elderly osteoporotic female patients.

Mode of injury

Canbora et al in their study found 77% of fractures were due to domestic fall, 13% were due to RTA and 10% of fall from height.⁷ Francesco et al in his study found that 90% of proximal humerus fractures were sustained because of slip and fall, 5% due to RTA and 5% due to fall from height.⁸ Aggarwal et al in their series concluded that 51% of the proximal humerus fractures were result of domestic fall whereas 49% were following RTA.⁹

In our study 76.7 % of the proximal humerus fractures in the elderly were due to slip and fall at their residence and 23.3 % were due to RTA.

Type of fracture

Among the 104 patients with proximal humerus fracture, 48 were 2-part fracture, 38 were 3-part fractures and 18 were 4-part fractures in the study done by Solberg et al.¹⁰ Study done by Canbora et al, found a total of 29 patients of which 9 were 2-part fracture, 15 were 3-part fractures and 5 were 4-part fractures.⁷ Hintermann et al in their series documented a total of 42 patients with proximal humerus fractures among which 34 were 3-part fractures and 8 were 4-part fractures.⁶

In our study, out of 30 patients, 16 patients had 3-part fracture and 14 had 4-part fracture.

Functional outcome

Yuksel et al in their study on Non-Operative Treatment for Three- and Four-Part Fractures of the Proximal Humerus in Low-Demand Patients with total of 18 patients found results of mean Constant score 61.3, constant score of 3-part fracture on final follow-up was 60.5 and 4-part fracture was 53.55.¹¹ Osteonecrosis was seen in 5 patients. Zyto et al in their study on management of displaced proximal humerus fracture in the elderly had a total of 40 patients who were randomised to receive either surgical or conservative management. The mean Constant score on final follow-up was 60 in surgical group and 65 in the conservative group. He concluded that surgical management did not

have any better outcomes with respect to pain and range of motion compared to conservative treatment.¹²In contrast to these studies, Hauschild O et al in their series of 164 patients with 2-part proximal humerus fractures, 133 patients underwent operative fixation and 31 patients were managed non-operatively, he observed that operative treatment resulted in a more effective reduction of pain at 3 months.¹³

In our study, 3-part proximal humerus fracture had functional outcome of 79.2 and 4-part fractures having 76.7 scores. There was a significant improvement in average constant score of 25.2 at 1 month follow up to 77.9 at the final 6 month follow up.

COMPLICATIONS

Fjalestad et al in his study, 2 patients had non-union who underwent conservative treatment, 2 patients developed avascular necrosis.¹⁴No complication observed in our study till 6 months follow up. There was no incidence of avascular necrosis or any neurovascular deficit.

Conclusion

In our study we have observed that patients with 3-part fracture and 4-part proximal humerus fractures in the elderly population were more common in female population and had a significant improvement and better functional outcome with conservative management.

Acknowledgements

We thank our colleagues, senior staff, Department of Orthopedics, Koppal Institute of Medical Sciences for their assistance and for comments that greatly improved the manuscript.

Declarations

Funding: none

Conflict of interest: none

Ethical approval: Approved by ethical committee

References

1. Mauro C. Proximal humeral fractures. *Current Reviews in Musculoskeletal Medicine*. 2011;4(4):214-220.
2. Jabran A, Peach C, Ren L. Biomechanical analysis of plate systems for proximal humerus fractures: a systematic literature review. *BioMedical Engineering OnLine*. 2018;17:47. doi:10.1186/s12938-018-0479-3.
3. Schumaier A, Grawe B. Proximal Humerus Fractures: Evaluation and Management in the Elderly Patient. *Geriatric Orthopaedic Surgery & Rehabilitation*. 2018;9:2151458517750516. doi:10.1177/2151458517750516.
4. Court-Brown Caesar B. Epidemiology of adult fractures: A review. *Injury*. 2006;37(8):691-697.
5. Zyto K, Ahrengart L, Sperber A, Törnkvist H. Treatment of displaced proximal humeral fractures in elderly patients. *Journal of bone and joint surgery-American volume-* 1997 May 1;79:412-7.
6. Hintermann B, Trouillier HH, Schäfer D. Rigid internal fixation of fractures of the proximal humerus in older patients. *Bone & Joint Journal*. 2000 Nov 1;82(8):1107-12.
7. Canbora MK, Kose O, Polat A, Konukoglu L, Gorgec M. Relationship between the functional outcomes and radiological results of conservatively treated displaced proximal humerus

- fractures in the elderly: A prospective study. *International journal of shoulder surgery*. 2013 Jul;7(3):105.
8. Francesco Muncibi, Diana Chicon Paez, Fabrizio Matassi, Christian Carulli, Lorenzo Nistri, and Massimo Innocenti :Long term results of percutaneous fixation of proximal humerus fractures, *Indian J Orthop*. 2012 Nov-Dec; 46(6): 664-667.
 9. Aggarwal S et al. Displaced proximal humeral fractures: an Indian experience with locking plates. *J Orthop Surg Res*. 2010; 5: 60. PMID: PMC2933712.
 10. Solberg BD, Moon CN, Fraznco DP, Paiement GD. Surgical treatment of three and four-part proximal humeral fractures. *J Bone Joint Surg Am*. 2009 Jul;91(7):1689-97.
 11. Yüksel HY, Yimaz S, Aksahin E, Çelebi L, Muratli HH, Biçimoglu A. The results of nonoperative treatment for three-and four-part fractures of the proximal humerus in low-demand patients. *Journal of orthopaedic trauma*. 2011 Oct 1;25(10):588-95.
 12. Zyto K, Ahrengart L, Sperber A, Törnkvist H. Treatment of displaced proximal humeral fractures in elderly patients. *Journal of bone and joint surgery-American volume*- 1997 May 1;79:412-7.
 13. Hauschild O, Konrad G, Audige L, De Boer P, Lambert SM, Hertel R, Südkamp NP. Operative versus non-operative treatment for two-part surgical neck fractures of the proximal humerus. *Archives of orthopaedic and trauma surgery*. 2013 Oct 1;133(10):1385-93.
 14. Fjalestad T, Hole MØ, Hovden IA, Blücher J, Strømsøe K. Surgical treatment with an angular stable plate for complex displaced proximal humeral fractures in elderly patients: a randomized controlled trial. *Journal of orthopaedic trauma*. 2012 Feb 1;26(2):98-106.