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Dr. Purushotham
Professor & HOD, Department of Orthopaedics, Dr. B.R Ambedkar Medical College and Hospital, Kadugondanahalli, Bangalore, Karnataka, India

Dr. Krishnamurthy
Assistant Professor, Department of Orthopaedics, Dr. B.R Ambedkar Medical College and Hospital, Kadugondanahalli, Bangalore, Karnataka, India

Dr. Dhanunjaya Reddy
Senior Resident, Department of Orthopaedics, Dr. B.R Ambedkar Medical College and Hospital, Kadugondanahalli, Bangalore, Karnataka, India

Dr. Adithya
Post Graduate, Department of Orthopaedics, Dr. B.R Ambedkar Medical College and Hospital, Kadugondanahalli, Bangalore, Karnataka, India

Corresponding Author:
Dr. Purushotham
Professor & HOD, Department of Orthopaedics, Dr. B.R Ambedkar Medical College and Hospital, Kadugondanahalli, Bangalore, Karnataka, India

A prospective comparative study of surgical management verses conservative management of clavicle fracture

Dr. Purushotham, Dr. Krishnamurthy, Dr. Dhanunjaya Reddy and Dr. Adithya

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Abstract
Background: Fracture of the clavicle accounts for 5 to 10% of all fractures and almost half of the shoulder girdle injuries and70- 80% of clavicular fractures are mid clavicular fractures. Most clavicular fractures are benign. Non operative treatment has been a mainstay of a modality of treatment, and irrespective of the type of fracture and amount of comminution, all these fractures were treated non-operatively.
Different surgical methods for clavicle midshaft fractures have been described and these are locking compression plate fixation, intramedullary K-wires, Steinmann pin fixation, and intramedullary nailing with TENS.
Therefore in this study we have compared the functional outcome of displaced clavicle fractures treated by non-surgical management with that of surgical management by TENS and by open reduction and internal fixation with clavicular locking compression plate.
Methodology: 30 Patients of age above 18 years having closed clavicular fracture who are admitted in DR. B.R. Ambedkar Medical College and Hospital, meeting the inclusion criteria are taken for study after obtaining their written informed consent. Patients were followed up for a period of 6 months at 1,6 and 24 weeks after surgery. In total 15 patients were operated and 15 patients were treated conservatively. Outcome was analysed in terms of radiological union and functional outcome of the patient.
Results: Among 30 patients with clavicle fractures, majority of the injury occurred in male patients- 21 cases (70%), whereas a total of 9 cases (30%) were seen in females. The functional outcome at the end of 6 months in 15 conservatively managed cases showed, 2 cases (13.3%) with excellent outcome, 3 cases (20%) had good outcome, 8 cases (53.3%) had fair and 2 cases (13.3%) had poor outcome. While in surgically managed 15 cases, the functional outcome at the end of 6months showed a total of 11(73.3%) cases with excellent outcome, 2 cases (13.3%) had good outcome, 1 cases (6.6%) had a fair, and 1case (6.67%) had poor outcome. At the end of 6 months, functional outcome of both the groups were compared and in our study operative group had fewer complications, early bony union and better functional outcome as compared to the conservative group.
Conclusion: This study concludes that irrespective of surgical modalities of management used, surgically treated cases have better functional outcome, fewer complications, early bony union and better overall patient satisfaction.

Keywords: midshaft clavicle fracture, conservative management of clavicle fracture, titanium elastic nailing system, closed reduction, internal fixators, open reduction, clavicle LCP fixation

Introduction
The clavicle is the only long bone which lies horizontally and is subcutaneous in its whole extent [1]. Clavicle is present at the root of the neck and it helps to transfer the weight of upper limb to the axial skeleton. Clavicle also contributes to movements of shoulder girdle [1].
Clavicle fractures are common injuries in young, active individuals, especially those who participate in activities or sports where high-speed falls (bicycling, motorcycles) or violent collisions (football, hockey) are frequent, and they account for approximately 2.6% of all fractures [4]. These fractures are often associated with shoulder girdle injuries in approximately 44% of cases [2]. Attributed to its S shape and thinner bone at the middle curvature, clavicle

most commonly gets fractured at its middle third and hence is the most common site of fracture in approximately 70% to 80% of cases; while approximately 12% to 15% of fractures occur at lateral 1/3 rd and 5% to 8% occur at medial third 1/3rd of clavicle [2].

After non-operative treatment, particularly in displaced fractures with some amount of shortening, will have some degree of disability at shoulder girdle. Therefore there is increasing trend to operate all displaced clavicle fracture [2].

In this study we have compared the functional outcome of displaced midshaft clavicle fractures treated by non-surgical management with shoulder arm pouch and clavicular brace, to that of surgical management by closed or open reduction and internal fixation with TENS and by open reduction and internal fixation with clavicular locking compression plate.

Material and Methods

The study was conducted at DR. B.R. Ambedkar medical college and hospital. A total of 30 cases satisfying inclusion and exclusion criteria were included in the study. Alternate patients were allocated to operative and conservation groups. In total 15 patients were operated operatively and 15 patients were treated conservatively.

All 15 patients were evaluated for shoulder and thoracic injuries. Systemic and local examinations of the injured extremity were done. On examination the swelling, deformity were checked on inspection and tenderness, abnormal mobility, crepitus were checked on palpation. Skin status evaluation was carried out and examination around the shoulder for associated other injuries/soft tissue injury was done. Then relevant X-rays were taken. Fracture patterns were classified based on the AO/OTA classification. The limb was then immobilised in arm-pouch till definitive mode of management was decided. For surgical group, all the routine laboratory investigations like CBC,serology, RBS, Serum electrolyte, RFT, LFT, PT-INR and ECG, Chest X Rays were done.

Inclusion Criteria

1. Patients of either Sex.
2. Patients of age above 18years
3. X ray shows shaft of clavicle fractures.
4. Patients who are medically fit for surgery

Exclusion Criteria

1. Open compound fractures type 2, type 3 of the clavicle .
2. Patients medically unfit for surgery.
3. Congenital anomaly or bone disease
4. High anesthetic risk

All patients were divided into two groups. Alternate patients irrespective of age, sex and fractures pattern were allocated for conservative and operative treatment. Conservative treatment given was in form of Figure of eight brace or Clavicular brace with arm pouch. The limb was immobilised in such a brace for 6 weeks. Repeated radiographs were taken at 1 week, 6week and 24 weeks.

Fig 1: Conservative management of patient

In operative treatment group patients a standard surgical protocol was used. Informed consent of patient was taken. All patients were operated in General Anaesthesia. Cases in the surgical group were managed either with intra medullery device like TENS or extramedullary device like plate and screw. Patient was given Intra Venous antibiotics for 5 days after surgery. Rehabilitation of the affected arm was started on first post- operative day. Gentle pendulum exercises to the shoulder were allowed. At 3 to 4 days gentle active assisted range of motion of the shoulder was allowed but abduction in limited to 80 degrees. At 6 to 8 days active range of motion in all planes were allowed. Wound inspection was done at 3rd day, sutures removed at 2 weeks. Patients were followed up at 4 weeks, 6 weeks and 12 weeks. Cases were assessed at follow up clinically and radiologically and final results designated as Excellent, Good, Fair and Poor. The functional outcomes were assessed by Constant and Murley score.[3]

Results and Observations

In this series, 30 patients with mid shaft clavicle fracture were included. Out of total 30 cases, 15 were treated non-operatively and remaining 15 cases were treated with surgical management.

All 30 patients followed up for 6months. The observations are as given below:

Table 1: Distribution of cases according to sex

Sex	Number of cases	Percent
Male	21	70
Female	9	30
Total	30	100

Table 2: Distribution of cases according to age group

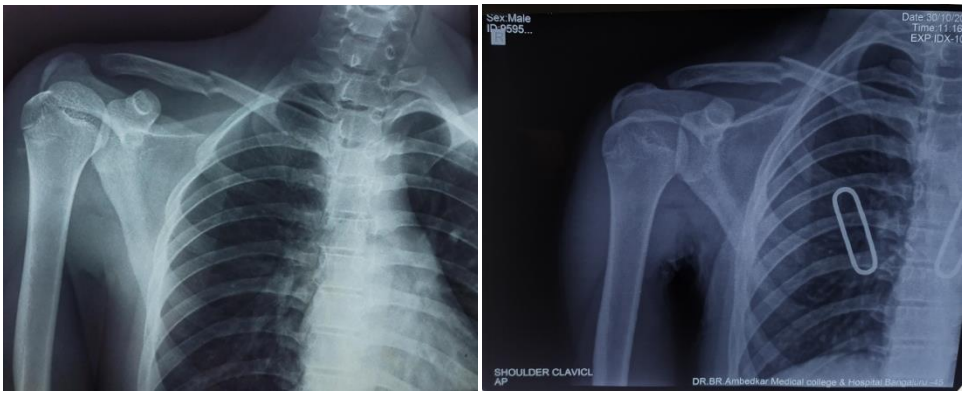
Age group (in years)	Number of cases	Percentage
Upto 20	1	3.33%
21-30	11	36.67%
31-40	6	20%
41-50	5	16.67%
51-60	4	13.33%
>60	3	10%

Table 3: Distribution of cases according to Robinson classification

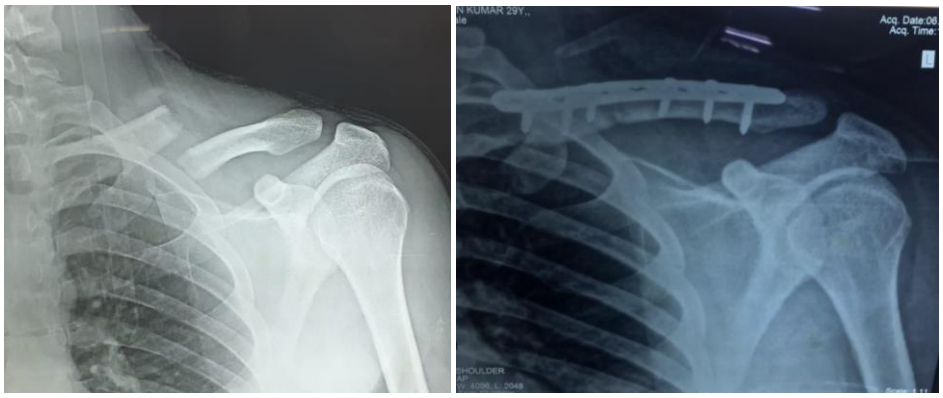
Robinson Classification	Frequency	Percentages
2B1	23	76.67%
2B2	7	23.33%

Table 4: comparison of complication between group (n=60)

Complication		Group
	Conservative (N=15)	Surgical (N=15)
Delayed Union	4 (26.67%)	1(6.67%)
Distal Nail Migration	0 (0%)	0 (0%)
Hypertrophic Scar	0 (0%)	1 (6.67%)
Implant Failure	0 (0%)	1 (6.67%)
Implant Prominence	0 (0%)	1(6.67%)
Malunion And Shortening	6 (40%)	0 (0%)
Non Union	2(13.33%)	0 (0%)
Proximal Nail Migration	0 (0%)	0(0%)
Shoulder Stiffness	1(6.67%)	0 (0%)
Nil	2(13.33%)	11(73.33%)



X Ray no 1 and 2 Conservative treatment



Xray 3 and 4 Operative treatment

Table 5: Comparison of final outcome at 6 months between group (n=60)

Final Outcome At 6 Month	Group	
	Conservative (N=15)	Surgical (N=15)
Excellent	2(13.33%)	11(73.33%)
Good	3(20%)	2(13.33%)
Fair	8(53.33%)	1(6.67%)
Poor	2(13.33%)	1(6.67%)

Discussion

Considering the excellent remodeling of clavicle, irrespective of displacement, amount of comminution, in the past, every fracture clavicle was treated non-operatively. The surgical treatment was only reserved for cases with neurological deficits, open fractures, clavicle fractures causing skin tenting. Many recent studies have showed increased incidence of nonunion, residual pain, malunion, decreased shoulder endurance, shoulder weakness, inferior patient and surgeon-oriented outcome scores, and lower overall patient satisfaction rate following conservative treatment [5].

In our study, we have calculated the functional outcome of all the 30 cases with Constant score. The functional outcome at the end of 6 months in 15 conservatively managed cases, 2 cases (13.3%) showed excellent outcome, 3 cases (20%) showed good outcome, 8 cases (53.3%) showed fair outcome and 2 cases (13.3%) showed poor outcome. While in surgically managed 15 cases, showed a total of 11(73.33%) with excellent outcome, 2cases (13.3%) had good outcome, 1 cases (6.6%) had a fair outcome, and 1 case (6.67%) had poor outcome.

Conclusion

Based on the results obtained during the study period and also even considering the functional outcomes of both the groups of this prospective comparative study following conclusions were made.

The majority of complications in this study, were in conservative group. These complications were mainly because of difficulty in maintaining fracture in anatomical alignment. Presence of these many complications had a final effect on the functional outcome. Majority of patients had good to fair outcome as compared to excellent outcome in the operative group. The number of mal-union reported in the conservatively treated group was more with that in the operative group. The average union time observed in the non-operative group was also more as compared to that in the operative group. Non union rates were significantly high in the non-operative group as compared to operative group. All these complications ultimately lead to patient dissatisfaction to the treatment, prolonged period of absence from work, prolonged intake of analgesics and its subsequent complications. Hence this study proves that, surgically managed displaced clavicle fractures have better functional outcome, fewer complications and early bony union when compared to non-operative treatment of clavicle fracture.

References

1. Standring S, Gray H. Gray's anatomy. 40th ed. Churchill Livingstone Elsevier 2008;61:799-811.
2. Craig EV, Basamania CJ, Rockwood CA. Fractures of the clavicle. The shoulder. 3rd edition Philadelphia: Saunders 2004, 455-519.
3. Hulsmans MHJ. Operative treatment of displaced clavicle fractures: optimising implant choice: 509895-L-bw-Drukbedrijf 2017.
4. Constant CR, Murley AHG. A clinical method of functional assessment of the shoulder. Clinical Orthopaedics and Related Research 1987;214:160-4.
5. Pearson AM, Tosteson AN, Koval KJ, McKee MD, Cantu RV, Bell JE et al. Is surgery for displaced, midshaft clavicle fractures in adults cost-effective. Results based on a multicenter randomized, controlled trial. J Orthop Trauma 2010;24: 426-33.
6. Stanley D, Trowbridge EA, Norris SH. The mechanism of clavicular fracture. A clinical and biomechanical analysis. J Bone Joint Surg. Br 1988;70(3):461-464.
7. NEER CS. Nonunion of the clavicle. J Am Med Assoc 1960;172:1006-1011.
8. Rowe CR. An atlas of anatomy and treatment of midclavicular fractures. Clin Orthop Relat Res. 1968;58:29-42. 102
9. Thyagarajan DS, Day M, Dent C, Williams R, Evans R. Treatment of mid-shaft clavicle fractures: A comparative study. Int. J Shoulder Surg 2009;3:23-7.
10. Jørgensen A, Troelsen A, Ban I. Predictors associated with nonunion and symptomatic malunion following non-operative treatment of displaced midshaft clavicle fractures--A systematic review of the literature. Int. Orthop 2014;38(12):2543-9.