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Clinical profile of patients with displaced mid shaft clavicle fractures at a tertiary care hospital

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Abstract

Fracture of middle third of the clavicle is greatly underrated with respect to pain and disability they produce especially during the first three weeks of treatment. It is also impossible to support and immobilize a fracture of middle third of clavicle in an adult by external means with figure -of- eight bandages. General information like name, age, sex, occupation and address were noted. Then a detailed history was elicited regarding mode of injury like fall on the shoulder, Road traffic accident, direct injury to shoulder and fall on outstretched hand. Enquiry was made to note site of pain and swelling over the affected clavicle. Past medical illness and family history were also recorded. In type-2 middle third fracture type-2 B1 (displaced with simple or single butterfly fragment) occurred in 18 patients (90%) and type-2 B2 (displaced with comminuted or segmental) fracture occurred in 2 patients (10%).

Keywords: Middle third of the clavicle, clinical profile, comminuted fractures

Introduction

Clavicle fractures are common injuries in young, active individuals, especially those who participate in activities or sports where high-speed falls (e.g. bicycling, motor cycle or violent collisions like football hockey are frequent and they account for approximately. 2.6% of all fractures^[1]

Many methods of treatment for fractures of the clavicle had been described even though a sling consistently gave good functional results. The author asked why then have clavicular fractures been the target of so much surgical virtuosity. "It is known that all that is necessary is to support the elbow and brace the shoulders. He then went on to remark that fractured clavicle cannot really be immobilized.

Fracture of middle third of the clavicle are greatly underrated with respect to pain and disability they produce especially during the first three weeks of treatment. It is also impossible to support and immobilize a fracture of middle third of clavicle in an adult by external means with figure -of- eight bandages^[1, 2]

Midshaft clavicle fractures (MSCFs) in adults have traditionally been treated non-operatively. However, displaced or comminuted fractures carry a risk of symptomatic malunion, nonunion and poor functional outcome with cosmetic deformity^[3]

In a landmark 1960 study, Neer reported nonunion in only 3 of 2235 patients with middle-third fractures of the clavicle treated by a sling or figure - of-eight bandage. Rowe showed an overall incidence of nonunion of 0.8% in 566 clavicle fractures treated in a similar fashion. Thus, what was thought to be the most serious complication following clavicular fracture-nonunion-appeared to be extremely rare. Treatment guidelines were based on Neer and Rowe's two large series that showed nonunion rates of less than 1% in conservatively managed fractures compared with nearly 4% in operatively treated fractures. These results established the concept that union rates and function were excellent with conservative treatment of clavicular fractures and were better than those after operative treatment^[1, 2, 4].

In a meta-analysis of the literature from 1975 to 2005, Zlowodzki *et al.* found that the non union rate for non operatively treated displaced mid shaft clavicle fractures was 15.1% exponentially higher than previously described^[1, 4, 5]

Treating conservatively, Hill *et al.* reported a non union rate of 15% in correlation with initial shortening greater than 2 cms. 31% of patients who were reviewed in the study of Hill *et al.* were not satisfied with treatment results^[1, 4]

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Good results with high union rates and low complication rates have been reported from a variety of techniques for primary fixation of displaced fractures of clavicle [1]

Early surgical intervention of MSCFs has resulted in improved outcomes and a decreased rate of nonunion and symptomatic malunion compared with nonunion and symptomatic malunion compared with non-operative treatment [3].

Operative treatment of displaced MSCFs can be achieved successfully using plates or intramedullary implants like Rush pins, Kirschner wires, or nails.³Intramedullary nailing of clavicle fractures has been done for over 50 years, with a variety of devices including Rockwood pin, Kirschner wires and rush nails. Recently, Titanium Elastic Intramedullary Nails have been used with good results reported in a number of studies [2].

The technique of elastic stable intramedullary nailing of midshaft clavicle fractures is based on the operative principle described by Ligier *et al.* (1988) for femoral shaft fractures in childrens [7].

Due to high complication rate with plate fixation such as soft tissue infection, non union, implant failure and poor cosmetic appearance of incision, it is advisable to use intramedullary nails [5].

Methodology

General information like name, age, sex, occupation and address were noted. Then a detailed history was elicited regarding mode of injury like fall on the shoulder, Road traffic accident, direct injury to shoulder and fall on outstretched hand. Enquiry was made to note site of pain and swelling over the affected clavicle. Past medical illness and family history were also recorded.

General condition of the patients was examined for pallor, pulse rate and blood pressure. Respiratory and cardio vascular system were examined for any abnormalities.

Inclusion criteria

- All patients within the age group of 16 -60 years
- All the displaced middle third clavicle fractures (>2cm displacement)
- Fractures within the last 4 weeks with no cortical bone contact
- Shortening of over 15 mm or >2cm
- If fracture fragments are tenting or compromising skin with an axial malalignment of over 30 degree

Exclusion Criteria

- Age <16yrs
- Fractures with marked comminution
- Fractures older than 4 weeks
- Pathological fractures

Table 2: Mode of Injury

	Mode of Injury	No. of Middle third clavicle fracture	%
1.	Road traffic accident	16	80
2.	Simple fall on shoulder(direct)	02	10
3.	Fall on outstretched hand (Indirect)	02	10
	Total	20	100

In Middle third clavicle fractures direct injury occurred in 18 patients (90%) among them 16 patients (80%) were due to road traffic accident, 02 patients (10%) were due to fall on the shoulder after slipping. Indirect injury occurred in 2 patients (10%) due to fall on outstretched hand.

- Open fractures
- Congenital anomaly or bone disease

Local examination were done in the following steps

1. On inspection the following points were noted

Patients with fracture clavicle often supports the flexed elbow of the injured side with the other hand. Abnormal swelling was present in the middle third for middle third clavicle fracture and in the lateral third for lateral third clavicle fracture. The condition of the skin over the clavicle was noted for any abrasion, laceration and contusion.

2. On palpation the following points were noted

Palpation of the entire length of the affected clavicle for tenderness in the middle third or in the lateral third fracture. The fractured clavicle was also palpated for any abnormal mobility and crepitus.

3. Movements

The movements of the affected side shoulder was restricted due to pain. The distal neurovascular status of the affected upper limb was examined and also the associated injuries along with fractured clavicle were noted.

Plain radiograph of clavicle with shoulder in anteroposterior view was taken to assess the site of fracture and the fracture type (displacement and comminution). The fracture were classified according to Robinson's classification.

The affected upper limb was immobilized in an arm pouch.

Routine investigation like Hb%, Total count, Differential count, ESR, Blood urea, Sugar, Serum creatinine and ECG were done. HBsAg and HIV test were done before surgery on all patients .

All patients were operated as early as possible once the general condition of the patients were stable and the patients were fit for surgery as assessed by the physician.

Results

Table 1: Site of Fracture

Site of Clavicle fracture	Number of Cases	Percentage
Middle third	20	100%
Lateral third	-	-
Medial third	-	-

In this present study there were 20 patients (100%) of middle third clavicle fracture and no lateral third clavicle fracture or medial third clavicle fracture included.

All the patients with middle third clavicle fracture were closed type.

Table 3: Age Incidence

Age in Years	No. of middle Third clavicle fracture	Percentage
19-29	08	40
30-39	07	35
40-49	04	20
50-59	01	05
Total	20	100

Majority of the patients with middle third clavicle fracture i.e. 8 patients (40%) were in the age group of 19-29 years. The youngest patient was 20 years and oldest patient was 55 years. The average patient age was 32 years.

Table 4: Sex Incidence

Sex	No. of Middle third clavicle fracture	%
Male	13	65
Female	7	35
Total	20	100

In middle third clavicle fracture the majority were males, 13 patients (65%) and females were 7 patients (35%).

Table 5: Side Affected

Side	No. of Middle third clavicle fracture	%
Right	12	60
Left	08	40
Total	20	100

In this study for middle third clavicle fractures there were 08 patients (40%) of Left sided fracture and 12 patients (60%) of Right sided fracture.

In this study with fresh displaced mid shaft clavicle fractures there were no associated injuries.

All the Patients were immobilized in an arm pouch.

Plain radiograph of clavicle with shoulder is taken in anteroposterior view to assess the site of fracture and the type of fracture (like Displacement, Angulation, Comminution). In this study Robinson classification was followed.

Table 6: Robinson Fracture Classification

	Type	No. of cases
Type -1 Medial third		0
Type -2 Middle third	B1	18 (90%)
	B2	2(10%)
Type -3 Lateral third	B1	0
	B2	0

In type-2 middle third fracture type-2 B1 (displaced with simple or single butterfly fragment) occurred in 18 patients (90%) and type-2 B2 (displaced with comminuted or segmental) fracture occurred in 2 patients (10%).

Discussion

In a meta analysis of the literature from 1975 to 2005, Zlowodzki *et al.* found that the non union rate for non operatively treated displaced midshaft clavicle fractures was 15.1%, exponentially higher than previously described [1, 4, 5] Good results with high union rates and low complication rates have been reported from a variety of techniques for primary fixation of displaced fractures of clavicle [1, 11] So there are specific indication like displacement, with or without comminution for middle third clavicle fracture (Robinson Type-2B1,2B2) for which operative treatment is needed.

The present study of patients with middle third clavicle fractures is compared with Jamal E.H Assobhi study which treated only middle third clavicle fractures were 19 patients were treated with early open reduction and internal fixation with titanium elastic nail [3].

In our study Middle third clavicle fractures direct injury occurred in 18 patients (90%) among them 16 patients (80%) were due to road traffic accident, 02 patients (10%) were due to fall on the

shoulder after slipping. Indirect injury occurred in 2 patients (10%) due to fall on outstretched hand.

In Jamal E.H Assobhi study the mechanism of injury was due to vehicle accidents in 9 patients, in 5 patients injury was due to sporting activities and in 5 patients injury was due to fall from height. This shows direct injury to the shoulder is the common cause of this fracture [3].

In our study majority of the patients with middle third clavicle fracture i.e. 8 patients (40%) were in the age group of 19 -29 years. The youngest patient was 20 years and oldest patient was 55 years. The average patient age was 32 years.

In Jamal E.H Assobhi study patients average age was 30.3 years and the youngest patient age was 24 years and oldest patient age was 45 years [3].

In this study middle third clavicle fracture the majority were males, 13 patients (65%) and females were 7 patients (35%).

In Jamal E.H Assobhi study majority were males 16 patients and females were 3 patients [3].

In our study with mid shaft clavicle fracture there were no associated injury.

In Jamal E.H. Assobhi study there was no associated injuries.³

In our study with mid shaft clavicle fractures all were of closed type.

This is comparable to Jamal E.H. Assobhi study which also showed all their patients were closed fractures [3]. The study results were comparable with other studies [6, 7-9]

Conclusion

- Clavicle fractures are usually treated conservatively but there are specific indications for which operative treatment is needed like comminution, displaced middle third clavicle fractures and displaced lateral third clavicle fracture.
- Due to high complication rate with plate fixation such as soft tissue infection, non union, implant failure and poor cosmetic appearance of incision, it is advisable to use intramedullary nails.

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