

Evaluating Post-Surgical Outcomes and Demographic Profiles in Patients with Mid-Shaft Clavicle Fractures

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ABSTRACT

Background: Fracture of the midshaft of a clavicle is a common fracture of human body that may be managed either conservatively or surgically. As malunion is common in conservative management in these cases, surgical management should be preferred. This study was planned to observe the outcomes of surgical management of clavicle fracture.

Methods: This descriptive cross-sectional study was conducted among 24 patients diagnosed as fracture of mid-shaft clavicle for various reasons at Enam Medical College Hospital in Dhaka from June 2023 to July 2025. Those who fulfilled the selection criteria were included in this study. Patients were treated surgically. Different parameters and scores were used to determine clinical outcomes.

Result: Respondents were between 23 to 56 years with a mean age of 39.04 ± 10.2 years. Most 16(66.7%) of them were male, and 21(87.5%) were followers of Islam. Of the patients, 15 (62.5%) were residents of an urban area, and 8 (33.3%) performed some form of exercise regularly. More than half 13(54.2%) had a simple fracture, while 15(62.5%) had a fracture on the right side, and 19(79.2%) were treated by pre-contoured plates. Regarding the causes, 13(54.2%) had fractures due to a fall, while the majority 9(37.5%) had complained about a prominent plate. Of patients, 17(70.8%) patients had no chronic illness while 3(12.5%) were suffering from Diabetes mellitus, and 4(16.7%) had Hypertension. Regarding patient satisfaction, 8(33.3%) were satisfied enough, 7(29.2%) were satisfied and 9(37.5%) were very satisfied with their treatment outcome. Constant-Murley scores were 88.5, and Modified-University of California at Los Angeles Shoulder Rating Scale (UCLA-M) scores were 33.1, while quick DASH scores were 3.6 among all patients.

Conclusion: Clavicle fractures were common among males, who are residents of urban areas and do not perform regular exercise. Fractures are usually simple in type, affecting the right side occurred because of a fall, and are mostly treated by pre-contoured plates. Prominent plate is the common complaint, but most patients are satisfied with their treatment. Successful outcomes were revealed after surgical correction of mid-shaft clavicle fracture, regardless of the type of fracture. Very minimal complications were observed after surgery.

Key words: Mid-shaft Clavicle Fractures, Outcome of Surgical Management.

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INTRODUCTION

Collarbone is one of the most common bone which get fractured due to several reasons. It constitutes around 2.6% to 4% of all fractures and 44% of shoulder girdles, while about 70% of cases were reported among males. Of clavicle fractures, mid-shaft fractures represent 80% of all, while 48% were displaced and 19% were comminuted.^{1,2,3,4} Approximately 87% of clavicle fractures were caused by falls or by direct trauma transmitted through an outstretched hand. Most commonly, it is because of a sports injury.^{5,6} Non-surgical treatments is usually recommended for clavicle fractures because of good treatment outcomes and a lower rate of complications.

Despite numerous advantages, displacement severity, shortening more than 2 cm, and a greater degree of comminution lead to dissatisfaction among those patients who were treated conservatively.^{7,8} Patients can be treated surgically if there are open fractures, fractures with neurovascular complications, several breaks in the clavicle, tenting of skin, etc. There are also some relative indications for surgery where there is a floating shoulder, poly-trauma, neuromuscular disorder.^{9,10,11} Injury to the supraclavicular nerve is a potential complication of the surgical approach. Surgical treatment through plate fixation may result in numbness in the chest and shoulder.¹² A recent study found that around 15% patients had complications due to soft tissue, 8% had failure to union, 6% had metal-related

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issues, and 2% had complications due to scar.¹³ Another study revealed that surgical treatment usually results in 96.7% union and non-surgical management may result in around 15% non-union, while there is only 0.4% to 7.8% chance of infection.¹⁴

METHODS & MATERIALS

A descriptive cross-sectional study was conducted among 24 patients who fulfilled the current study criteria in Enam Medical College Hospital of Dhaka. The duration of the study was from June 2023 to July 2025. Regarding patient selection, only those patients who had mid-shaft clavicular fractures were included. Patients with neurological and severe chronic diseases were also excluded. Data were cross-checked for completeness, consistency, and discrepancies. Data confidentiality was ensured strictly, and anonymity was maintained during data analysis. All other ethical issues and measures for data quality were taken into consideration. Data were analyzed by using the computer software SPSS version 25.0.

RESULTS

The ages of the respondents were between 23 and 56 years; of them, 10(41.6%) were below 35 years, 7(29.2%) were from 36 to 45 years, and 7(29.2%) were 46 years or older, with a mean \pm SD age of 39.04 ± 10.2 years. Of respondents, 16(66.7%) were male and only 8(33.3%) were female.

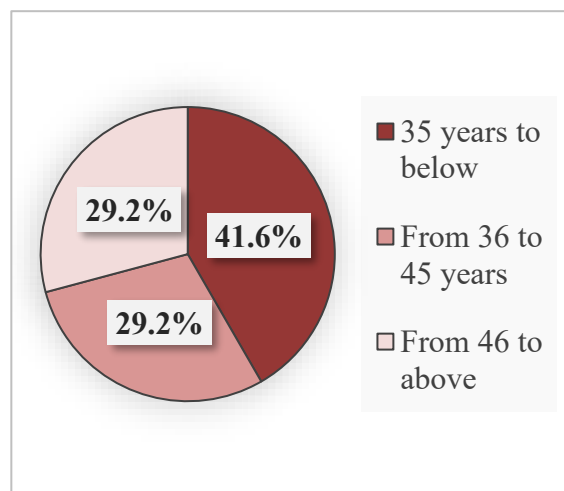


Figure 1: Distribution of respondents according to age.

More than half (13, 54.2%) had simple fractures and 11(45.8%) had comminuted fractures. Around two-thirds, 15(62.5%) had fractures on the right side and 9(37.5%) had fractures on the left side. A significant number of 19(79.2%) were treated by pre-contoured plates, and only 5(20.8%) were treated by a reconstruction plate.

Regarding the causes for fracture, it was revealed that 13(54.2%) had fractures due to falls on the ground, 5(20.8%) due to sports injury, 4(16.7%) due to road traffic accidents and only 2(8.3%) due to violence. Of patients, 6(25.0%) had no complication, 9(37.5%) suffer from prominent plate and 8(33.3%) had peri-scar paresthesia while only 1(4.2%) had re-fracture.

Majority (17, 70.8%) had no chronic diseases, while 4(16.7%) had hypertension, and 3(12.5%) were suffering from diabetes mellitus.

Regarding patients' satisfaction, more than one-third (9, 37.5%) were very satisfied, while 8(33.3%) were somewhat satisfied, and 7(29.2%) were satisfied with the hospital service and patient management.

The Constant-Murley score averaged 88.5, indicating an excellent outcome, with scores ranging from a minimum of 68 to a maximum of 96.

Modified-University of California at Los Angeles Shoulder Rating Scale (UCLA-M) scores were 33.1 among 24 patients, which shows the outcome was good and close to excellent, where the minimum was 24 and the maximum score was 35.

The quick Disabilities of Arm, Shoulder and Hand (DASH) score was 3.6, where the minimum was 0 and the maximum was 20.4 on the scale. Quick DASH score ranges from 0 to 100, while 0 represents no disability and 100 implies the most severe disability. Among all the patients, there was no case of supraclavicular nerve injury.

Table I: Respondents by socio-demographic status and patient's profile.

Variable		Frequency	Percentage
Sex	Male	16	66.7
	Female	8	33.3
Religion	Islam	21	87.5
	Hinduism	2	8.3
	Christianity	1	4.2
Residence	Urban area	15	62.5
	Village	9	37.5
Regular exercise	Yes	8	33.3
	No	16	66.7
Follow up since Procedure	6 months	12	50.0
	9 months	9	37.5
	12 months	3	12.5
Type of fracture	Simple	13	54.2
	Comminuted	11	45.8
Affected side	Right	15	62.5
	Left	9	37.5
Plate type	Pre-contoured plates	19	79.2
	Reconstruction plate	5	20.8
Causes of fracture	Fall	13	54.2
	Sports Injury	5	20.8
	Road traffic accident	4	16.7
	Violence	2	8.3
Complications	Prominent plate	9	37.5
	Peri-scar paresthesia	8	33.3
	Re-fracture	1	4.2
	No complication	6	25
Chronic diseases	Diabetes mellitus	3	12.5
	Hypertension	4	16.7
	No diseases	17	70.8
Patients' satisfaction	Enough satisfied	8	33.3
	Satisfied	7	29.2
	Very satisfied	9	37.5

Table II: Respondents by Clinical Outcome.

Scores	Mean	Minimum	Maximum	Score Evaluation	Frequency (%)
Constant-Murley score	88.5	68	96	Excellent (86-100)	16 (66.7)
				Good (71-85)	6 (25.0)
				Mediocre (56-70)	2 (8.3)
				Poor (0-55)	0 (0.0)
Modified-University of California at Los Angeles Shoulder Rating Scale (UCLA-M)	33.1	24	35	Excellent (34-35)	17 (70.8)
				Good (28-33)	4 (16.7)
				Fair (21-27)	3 (12.5)
				Poor (0-20)	0
Quick Disabilities of Arm, Shoulder and Hand (DASH)	3.6	0	20.4	Quick DASH 0 (Zero) represent no disability and 100 represents the most severe disability.	

DISCUSSION

Despite significant advancements in medical science, the optimal treatment approach for various types of clavicle fractures remains controversial. Traditionally, clavicle fractures have been managed non-surgically, with historically low rates of non-union. However, over the past few decades, an increasing number of non-union cases have been reported following conservative treatment, leading to a growing preference for surgical intervention. Mid-shaft clavicle fracture does not result in nonunion that much, but there could be malunion.^{15,16,17,18}

In the current study, respondents were between 23 to 56 years with a mean age of 39.04 years, while 16(66.7%) were male. This is supported by study findings of Wiesel B *et al.*, and Khan LA *et al.*, where the most common age of clavicle fracture is childhood and adulthood, and there is a bimodal age distribution. Comparatively younger people, around 25 years old, got clavicle fractures due to sports injuries. The Muslim preponderance (87.5%) coincides with population pattern of our country by religion. Patients of older age commonly get fractures due to falls. Nonsurgical management of displaced shaft of clavicle fractures causes a relatively higher rate of nonunion than those who are treated surgically.^{19,20}

Oberle L and team revealed that midshaft fractures were more common among all clavicle fractures. In around 87.3% of cases, the male was affected, and more than half, 54.5% were a comminuted type of fracture.²¹ This current study identified that fall is the major cause of clavicle fractures, which was supported by the study finding by Chen W *et al.*, where they revealed that falls and traffic accidents are the major causes of clavicle fractures. Herteleer M and team revealed that 35.3% clavicle fractures occurred because of bicycle injury, which were increasingly treated primarily by surgery.^{22,23} Clavicle fractures account for 2% to 5% of all fractures, while they represent 44% of the shoulder girdle fractures. The number of mid-shaft clavicular fractures reduces with increasing age.^{3,24} The majority, 15(62.5%) of the current study patients suffered from clavicle fractures on the right side. Studies conducted by Liu FP *et al.*, and Ergün T *et al.*, also support current study findings, where the majority had right-sided fracture.^{25,26}

Around 79.2% of current study respondents were treated with a pre-contoured plate, and 20.8% with a Reconstruction Plate. This is vindicated by the study conducted by Naimark M and team found that around 77% patients treated with pre-contoured plates and

23% with standard plates.²⁷ Of 24 patients in the current study, around 18(75%) had complications after surgery, where the majority of complications observed were Prominent plate and Peri-scar paresthesia. This is supported by findings of the study conducted by Li and team, where 86% of patients had post-operative complications. There, 59% had prominence or irritation of the plate site, 16% had numbness in the chest wall, 5% had wound dehiscence, and 3% had refracture.²⁸

Patients who were treated surgically had a 3.6 mean Quick DASH score. While Constant-Murley and Modified-University of California at Los Angeles Shoulder Rating Scale (UCLA-M) revealed excellent outcomes. Riiser and team found excellent Quick DASH outcomes among the patients treated by both surgical and non-surgical methods, while the non-operative group were more satisfied regarding cosmetic results. The current study also substantiated by findings of the study conducted by Hehn and team revealed that Constant-Murley and Modified-University of California at Los Angeles Shoulder Rating Scale (UCLA-M) were also found to be excellent in the majority of the cases treated surgically.^{29,30}

Conclusion

Patients with clavicle fractures are usually middle-aged males. The majority do not perform regular exercise. There is usually a right-sided simple fracture of the clavicle, caused by a fall onto the ground. Patients were treated with pre-contoured plates. Prominent plate and peri-scar paresthesia are the most common complications after surgical management. Constant-Murley and Modified-University of California at Los Angeles Shoulder Rating Scale (UCLA-M) reveal excellent results after surgery, while the Quick DASH score shows almost no disability after surgical management.

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