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Research Article

Results of Surgical treatment for Clavicle Fractures in Vietnamese Adults

Abstract

Objectives: To describe the pattern of clavicle fractures and to evaluate the results of surgical treatment for clavicle fractures.

Patients and methods: This retrospective study included 38 cases of clavicle fractures who were treated by open reduction internal fixation at Hanoi Medical University Hospital between January 2008 and June 2013.

Results: The ratio of male to female was 1.5/1. Average age was 42.0 years. Simple fractures (no intermediate fragments) are most common with 65.8% of patients. Middle third fractures accounted for 92.1% of patients. Bone union rate was 100%. The surgical results were excellent in 94.7% and good in 5.3% of cases according to Constant Score.

Conclusion: Open reduction internal fixation of clavicle fractures had good results. All patients were satisfied with the results.

Introduction

Clavicle fractures are common injuries, accounting for about 5% of all fractures in adults, and 44 – 66% of all shoulder fractures [1]. Clavicle fractures have little effect on patient's quality of life. Therefore, in the past, most cases of clavicle fractures were treated non-operatively [1-3]. Recent studies showed that the high rate of nonunion for clavicle fractures treated non-operatively [4]. In addition, the demand of patients became higher. They require more cosmetic scars via minimally invasive techniques and quick recovery of their shoulder function to return earlier to their normal daily activities. So nowadays, surgical treatment for clavicle fractures is becoming more common [5].

The technique of clavicle fracture fixation surgery is not too difficult to perform. However, recent studies have shown that the complication rates of operative treatment of clavicle fractures, such as infection, nonunion, hardware irritation, are relatively high.

At Hanoi Medical University Hospital, during the period from January 2008 to June 2013, we performed clavicle fracture surgery on 38 patients. This study aims to describe the pattern of clavicle fractures and evaluate the surgical outcomes of these fractures.

Material and Methods

This retrospective study included 38 cases of clavicle fractures who were treated by open reduction internal fixation (ORIF) at Hanoi Medical University Hospital between January 2008 and June 2013. All fractures were classified according to the Allman classification [2] and the pattern of fractures (simple or complex). The minimum follow-up time was 3 months. We evaluated the rates of wound infection, union, and the shoulder function was evaluated using the Constant Score [6].

Results

Of the 38 patients in this study, there were 23 (60.5%) men and 15 (39.5%) women. The average age of the patients was 42.0 (age range 18–56). The average follow-up time was 12.2 months (Table 1).

Fractures of the medial, middle and lateral third occurred in 1 (2.6%), 35 (92.1%) and 2 (5.3%) of cases, respectively. Simple fractures (no intermediate fragments), one intermediate fragment fractures and two intermediate fragment fractures accounted for 25 (65.8%), 10 (26.8%) and 3 (7.9%) of cases, respectively (Table 2).

Twenty patients (52.6%) were surgically treated using plate and screws. The remaining 18 cases (47.4%) were operated using intramedullary nail. Cerclage wiring was used in 25 (65.7%) of cases (Table 3).

There was a 100% union rate in these 38 patients. There is only one (2.6%) case of superficial incisional surgical site infection (SSSI). The surgical outcome was excellent in 36 (94.7%) and good in 2 (5.3%) of cases. There were no cases of moderate and poor results in the study (Table 4).

Discussion

The male-to-female ratio was 1.5/1. The mean age of the patients was 42 (age range 18–56). The majority of other authors also reported similar results in age and gender [1–3,7,8]. Clavicle fractures commonly found in occupational accidents, traffic accidents and home accidents. Patients often fall on their shoulder and the bending force cause fractures [3]. Thus, fractures can occur at any age and gender.

In this study, fractures of the middle third of the clavicle were most common, accounted for 92.1% of cases (Table 2). According to Andermahr [9], mean cortical thickness was only

2.05 mm at the midpoint of the clavicle. In addition, the clavicle is curved at the middle third. Therefore, the middle third of clavicle is particularly weak and easy to fracture [10]. The medial and lateral third of clavicle are held by the ligaments and joints, so they are stronger than the middle third. Our results were similar to those of other authors, such as Chalidis [8], who studied 171 patients and found that 65.4% of them had middle third fractures.

The incidences of simple fractures (no intermediate fragments) and one intermediate fragment fractures were highest (65.8% and 26.3%, respectively). Some authors reported results of surgery with higher rates of complex fractures (two or more intermediate fragments) [7,11]. This difference may be due to the expansion of surgical indications for clavicle fractures.

In this study, we performed two surgical techniques: intramedullary nailing and plate-screw fixation (with or without cerclage wire). For intramedullary nailing, we used a modified Kirschner wire with a diameter of 2.2–2.6 mm. The choice of surgical method depended on the patient assessments during the surgery such as the location and the pattern of the fractures. There were 20 cases of plate-screw fixation and 18 cases of intramedullary nailing. There were 13 cases where additional cerclage was required to fix small fragments.

Other authors have reported the surgical results of intramedullary nailing and plate-screw fixation are similar [3,7,11,12]. In our study, the union rate was 100%, there were no cases of nonunion. There was only one case (2.6%) of superficial incisional SSI. This patient was completely treated by antibiotics. These good results may be due to the fact that 100% of the fractures are closed and almost are simple fractures.

At the last follow-up, according to Constant Score, all patients (100%) were assessed excellent or good results. Among them, 36 patients (94.7%) achieved excellent results. Two patients (5.3%) who achieved good results were those with a lateral third clavicle fracture.

Conclusion

Through this study on 38 patients with clavicle fractures who were treated by ORIF at Hanoi Medical University Hospital, we found that: The ratio of male to female was 1.5/1. The average age was 42.0 years. Middle third fractures accounted for 92.1% of cases. The union rate was 100%. Surgical treatment resulted in 100% union rate with excellent functional results in 94.7% according to Constant Score.

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Table 1: Patient demographic and follow-up time.

Parameter		N	%
Gender	Male	23	60.5
	Female	15	39.5
Average age, range (yr)		42.0 (18–56) years	
Average follow-up time, range (mo)		12.2 (3–24) months	

Table 2: Fracture characteristics.

Parameter		N	%
Location of fractures	Lateral third	2	5.3
	Middle third	35	92.1
	Medial third	1	2.6
Fracture pattern	No intermediate frags	25	65.8
	1 intermediate frag	10	26.3
	2 intermediate frags	3	7.9

Table 3: Method of surgery.

Method		N	%
Plate-screw fixation		20	52.6
Intramedullary nailing		18	47.4
Using cerclage wire	Yes	13	34.2
	No	25	65.7

Table 4: Results of surgical treatment.

Parameter			
Bone union	Union	38	100
	Nonunion	0	0
Superficial incisional SSI	Yes	1	2.6
	No	37	97.4
Surgical results according to Constant Score	Excellent	36	94.7
	Good	2	5.3
	Medium and poor	0	0

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