



Case Report

Characteristics of complaints and functional outcomes of conservatively treated clavicle fractures in Dr. Soetomo general hospital: A case series

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ABSTRACT

Shoulder pain is a major complaint of patients with clavicle fractures as a result of trauma. At present most clavicle fracture treatments are performed surgery, although conservative therapy can produce the same results. This report aimed to show whether there were complaints of shoulder pain or disability in patients who have suffered clavicle fractures treated conservatively. There were fifteen patients with clavicle fractures at Dr. Soetomo Surabaya from January to July 2015, consisting of 14 male and one female patient. Data was taken from medical records, patient clinical records, home visits, physical examinations, SPADI questionnaires, and Quick DASH for patients. The results of SPADI questionnaire were varied; there were eight patients (53%) with an output of 0%, one patient (7%) each with a score of 0.63%, 1.25%, 5.90%, 7.13%, 8.50%, 9.90%, and a score of 10.50%. The results of calculating the Quick DASH questionnaire score also varied. There were ten patients (67%) with a score of 0, three patients (20%) with a score of 2.27, one patient (7%) with a score of 13.6, and one patient (6%) with a score of 6.81. In conclusion: (1) From the evaluation of 15 patients, there were no complaints of pain and disability in the shoulder joint. (2) From the evaluation of the results of the calculation of the SPADI questionnaire and Quick DASH, there were no significant complaints of shoulder joint pain and disability. (3) The conservative treatment of closed fractures on the clavicle can still be a reliable choice of treatment.



INTRODUCTION

Shoulder pain is the third most common cause of musculoskeletal pain after Low Back Pain and Cervical Pain. In Europe, cumulative indications were estimated to be 7% -25% with peak indications at the age of 42-46 years. The most common cause of shoulder pain is a disruption in the rotator cuff. Most rotator cuff diseases can be cured with good results using conservative therapy (Factor, 2014).

The shoulder complex is the most mobile part of the human body, with various movements that cover almost 65% of the overall movement. The high level of complex mobility of the shoulder allows one to adopt a variety of postures and facilitate the application of the force of various magnitudes in almost all directions. So, for high flexibility, the shoulder uses the stability contained in it, namely static and dynamic stability as above (Cutlip, Nimbarte, Chowdhury, & Jaridi, 2015).

The exertion of the arm performed, such as excessive use of the joint area and extreme movements, will interfere with the joint complex's intrinsic balance. These activities can change the compressive strength and translation that works in the glenohumeral joint. The exertion, especially the push and pull, can potentially destabilize the glenohumeral joint with high translational strength and put the shoulder at increased risk for injury that eventually causes pain (Cutlip, Nimbarte, Chowdhury, & Jaridi, 2015).

Two symptoms of shoulder pain are found in the community, attacking approximately 15 to 30 percent of the adult population. There are several causes of shoulder pain, for example, degenerative diseases affecting the glenohumeral joint, acromioclavicular and supporting tissues as well as inflammatory diseases such as rheumatoid arthritis, and injuries or fractures of the collarbone (clavicle). The etiology of multifactorial

causes of shoulder pain management becomes difficult and often unsatisfactory. This pain and loss of function make disability level high in the community, especially at the age of 40 and above (Artus, Holt, & Rees, 2014).

Some literature states that clavicle fracture is one of the causes of shoulder pain. Clavicle fractures are common fractures, comprising 5% to 10% of all fractures. They occur due to falls on the shoulder's lateral aspect, the outstretched hand, or due to high-energy direct impact over the bone. Fractures of the middle third (or midshaft) account for approximately 80% of all clavicular fractures, and they have traditionally been treated nonoperatively, even when substantially displaced. (Hoogervorst & Schie, 2018; Society, 2007)

This treatment strategy was based on early reports that suggested that clavicular nonunion was extremely rare, with a prevalence of four nonunions in 566 patients in one series and three nonunions in 2235 patients in another. There are not many references that discuss the clavicle fracture with the emergence of complaints of pain in the shoulder later on after reaching the bone healing process (Society, 2007).

The purpose of this case report was to display the presence or absence of complaints of shoulder pain in patients who have recovered from clavicle fractures. Another purpose was to measure the level of pain and disability in the shoulder using a questionnaire method with a chart of the Shoulder Pain and Disability Index (SPADI) and Quick Disability of Arm Shoulder and Hand (DASH).

METHODS

This study was a retrospective study and conducted from January to July 2015. The data were collected from medical records, patient clinical records, home visits, and physical examinations, and also SPADI questionnaires and Quick DASH for patients. The SPADI



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contains 13 items that assess two domains; a 5-item subscale that measures pain and an 8-item subscale that measures disability. In this study, the data were obtained from 15 patients that presented to the emergency room of Dr. Soetomo General Hospital Surabaya. The inclusion criteria were 1) all patients who were presented to the emergency room of Dr. Soetomo General Hospital with any clavicle fracture, 2) all patients who were treated with non-surgical therapy, 3) the patient had signed written informed consent. The exclusion criteria were 1) patients with a bilateral clavicle fracture, 2) patients with neurovascular injury, 3) patients with open clavicle fracture.

RESULTS

In this study, we collected the data from 15 patients. The data contained the patient's identity, such as age and sex, complaints experienced by the patient, previous clinical examination, the development of the patient's condition after clinical examination. The data obtained in 15 patients consist of 14 men and one woman, as shown in table 1. There was one patient aged 8 years, 9 patients in the productive age category between 20 and 40 years, and 5 patients in the age category for more than 40 years old.

Table 1. Data on case presentation of patients with a history of clavicle fracture in Dr. Soetomo General Hospital period January - July 2015

No	Name	Age (Years)	Sex	MOI	Comorb id Factor	Diagnosis	Treatment	SPADI Score	Quick DASH
1.	Case I	40	Male	Falling from motorbike	No	Middle-third left clavicle closed fracture without neurovascular Allman group I	Conservative Arm sling	0%	0
2.	Case II	36	Male	Falling from a ladder	No	Middle-third left clavicle closed fracture without neurovascular Allman group I	Conservative arm sling	8,5%	6,81
3.	Case III	59	Male	Traffic accident	No	Middle-third right clavicle closed fracture without neurovascular Allman group I	Conservative arm sling	7,125%	13,6
4.	Case IV	50	Male	Falling from motorbike	No	Middle-third right clavicle closed fracture without neurovascular Allman group I	Conservative clavicle bandage	9,9%	2,27
5.	Case V	34	Male	Falling from motorbike	No	Middle-third left clavicle closed fracture without neurovascular Allman group I	Conservative clavicle bandage	0%	0
6.	Case VI	43	Male	Traffic accident	No	Middle-third right clavicle closed fracture without neurovascular Allman group I	Conservative arm sling	0%	0
7.	Case VII	55	Male	Falling from motorbike	No	Middle-third left clavicle closed fracture without neurovascular Allman group I	Conservative arm sling	0,625%	2,27
8.	Case VIII	8	Female	Falling while playing	No	Middle-third left clavicle closed fracture without neurovascular Allman group I	Conservative arm sling	0%	0

9.	Case IX	22	Male	Traffic accident	No	Middle-third left clavicle closed fracture without neurovascular Allman group I	Conservative arm sling	0%	0
10.	Case X	25	Male	Falling from motorbike	No	Middle-third left clavicle closed fracture without neurovascular Allman group I	Conservative clavicle bandage	5,9%	0
11.	Case XI	20	Male	Traffic accident	No	Middle-third right clavicle closed fracture without neurovascular Allman group I	Conservative clavicle bandage	10,5%	2,27
12.	Case XII	38	Male	Falling from motorbike	No	Middle-third left clavicle closed fracture without neurovascular Allman group I	Conservative arm sling	0%	0
13.	Case XIII	74	Male	Falling from motorbike	No	Middle-third right clavicle closed fracture without neurovascular Allman group II	Conservative arm sling	1,25%	0
14.	Case XIV	38	Male	Traffic accident	No	Middle-third right clavicle closed fracture without neurovascular Allman group I	Conservative arm sling	0%	0
15.	Case XV	20	Male	Slipping while walking	No	Middle-third right clavicle closed fracture without neurovascular Allman group I	Conservative clavicle bandage	0%	0

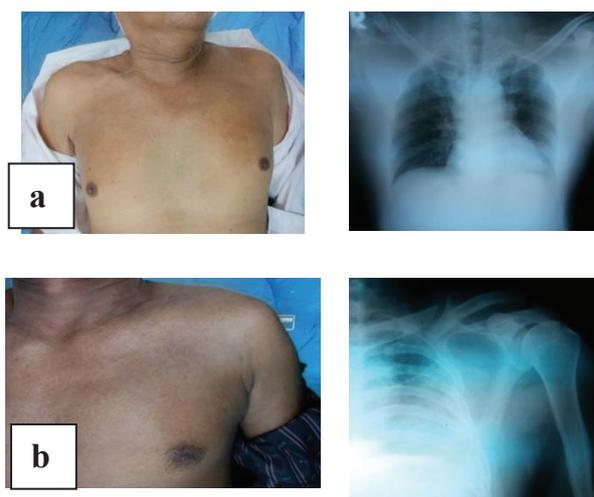


Figure 1. (a) clinical and radiological photos of patients with lateral third-clavicle fractures, (b) clinical and radiological photos of patients with middle third clavicle fractures



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The causes of clavicle fractures that occurred were differed. There were 12 patients (80%) caused by traffic accidents, falling from motorbikes, one patient (7%) caused by falling from a ladder with shoulders on the ground first, one patient (7%) falling while playing, and one patient (6%) caused by slipping while walking. In the case presentation data, eight patients (53%) had right-sided clavicle fracture, and seven patients (47%) had clavicle fractures on the left side. There were 14 patients who had clavicle fractures in the middle third of Allman Group I, and one patient had clavicle fractures in the third lateral part of the Allman Group II.

Figure 1a shows the clinical and radiologic images of a patient with a clavicle fracture in the third lateral part and figure 1b, showing the clinical and radiologic images of a patient with a third middle part clavicle fracture.

Of the 12 patients, there were no comorbid factors such as diabetes mellitus, hypertension,

or other abnormalities that could inhibit the healing process or bone healing. Table 1 described that all patients received conservative therapy options. Ten patients (67%) received conservative therapy in arm-sling, and 5 patients (33%) received conservative therapy in the form of backpack-velban installation.

The results of the SPADI questionnaire showed varied results; there were 8 patients (53%) with a result of 0%. The eight patients did not feel any complaints of pain or decreased function of joint motion after getting conservative treatment due to clavicle fracture. Inconsistent results in other patients were found; one patient (7%) had score of 0.63%, 1.25%, 5.90%, 7.13%, 8.50%, 9.90%, and 10.50%. From these varied results, patients, on average, complained of mild pain (VAS 1). Even though the results did not show a 0% score, patients tended not to feel complaints of pain or decreased joint function and could carry out daily activities.

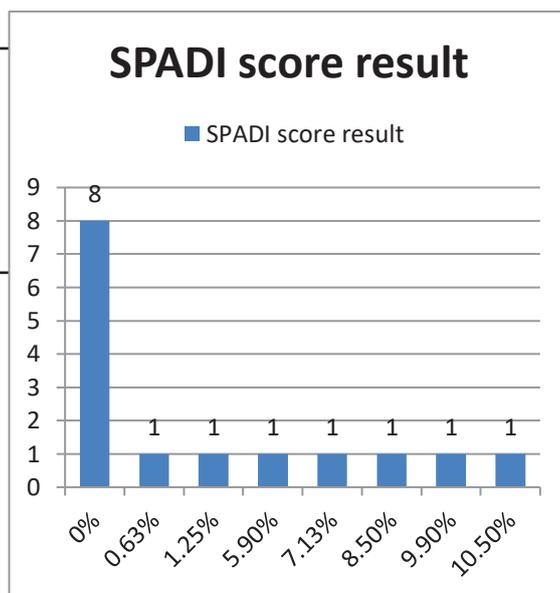


Figure 2 Distribution of SPADI questionnaire score results in case presentation

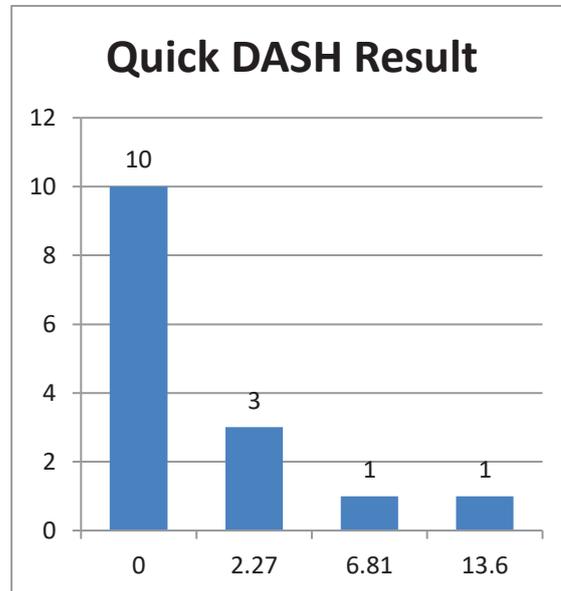


Figure 3 Distribution of the results of the Quick DASH questionnaire scores on case presentations

In addition to calculating the SPADI questionnaire score, a Quick DASH questionnaire score was also calculated. The Quick DASH questionnaire result also had a varied score, as illustrated in Figure 3. There were ten patients (67%) with a score of 0, three patients (20%) with a score of 2.27, one patient (7%) with a score of 13.6, and one patient (6%) with a score of 6.81. Similar to the SPADI score calculation, the varied results indicated that patients tend not to feel complaints of pain or decreased function of joint motion. They could also perform daily activities.

DISCUSSION

There were not many references that discuss the relationship between shoulder pain and decreased shoulder joint function in post fracture of the clavicle. Nevertheless, the clavicle functions are to maintain the shoulder's width to provide strength and stability of the shoulder joint (Phadnis & Bain, 2015).

Non-operative therapeutic options for clavicle fracture can be either arm sling or with a figure-

of-eight bandage technique. According to Ersen et al., patients were more likely to choose arm sling because of the ease of application. As for the cure rates both clinically and radiologically, it did not show a significant difference (Ersen, Atalar, Birisik, Saglam, & Demirhan, 2015)

Until now, the use of a figure-of-eight bandage is not recommended. Research from the 1980s and a recent study from 2015 compared conservative treatment with a sling and figure-of-eight bandage. They showed that both techniques have similar outcomes, but in the figure-of-eight bandage patient group had pain complaints. It happened because figure-of-eight bandage caused pressure sores in the axillae. (Hoogervorst & Schie, 2018).

Lenza et al. 2016 reported that three studies (296 participants) comparing the figure-of-eight bandage versus an arm sling showed similar shoulder function in the two groups at the end of follow-up. Although data from two studies did not show a difference in pain at two weeks after injury, the third study reported more pain and discomfort in people in the figure-of-eight bandage group. One participant was recorded as having surgery for a complication. None of



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the three studies found differences in time for fracture healing, adverse outcomes, or time to return to school or work activities. Another study compared therapeutic ultrasound with sham treatment in 120 people with clavicle fractures. It found no difference in the outcome, including the time for fracture healing between the two groups (Lenza & Faloppa, 2016).

The advantages of operative therapy of clavicle fracture are reducing the incidence of nonunion, malunion, and neurological complications compared to conservative treatment. On the other hand, the disadvantage of operative therapy is higher costs (Liu et al., 2013). One study reported that operative treatment also had disadvantages, such as surgical site infection, hypertrophic scar, hardware prominence, and repeat surgery for implant removal at times. Other studies also reported that plating has some disadvantages like large scar, nonunion, and difficult application and removal of the plate (Naveen B.M, 2017; Shettar, Bhasme, & Battur, 2018).

Jha et al. 2018 also reported the disadvantages of plate fixation, including the necessity for increased exposure and soft-tissue stripping, potentially damaging the supraclavicular nerves, which cross through the surgical field. It also slightly increased infection rates and the risk of refracture after plate removal (Jha, Timsina, Yadav, Lamichhane, & Jha, 2018).

In the shoulder joint biomechanical study showed that the clavicle fracture that often occurs in the third middle region of the clavicle causes the shoulder to protrude forward and medially, this causes a reduction in shoulder strength in the arm-trunk mechanism (Duncan & Flowers, 2015; Lenich & Imhoff, 2015). After a clavicle fracture occurs in the acute phase of trauma, the shoulder joint will also experience interference. Whereas in the chronic phase (post-traumatic phase), malunion or nonunion event can

cause disturbances in the form of pain and decreased shoulder joint function (Liu et al., 2013; Simon, 2009).

The risk of conservative action on clavicle fracture is nonunion or malunion due to the absence of rigid fixation in the clavicle bone. Nonunion or malunion can affect the function of the movement of the shoulder joint and causing chronic pain. The clavicle function as a stretch in the movement of the shoulder joint. Pain and dysfunction can affect daily activities and decreasing quality of life. The malunion in the future can also cause complaints in terms of esthetic such as a lump.

The Shoulder Pain and Disability Index (SPADI) was developed to measure current shoulder pain and disability in an outpatient setting, which contains 13 items. SPADI assesses two domains; a 5-item subscale that measures pain and an 8-item subscale that measures disability. Also, the quick DASH (Disabilities of the arm, shoulder, and hand) questionnaire has 11 items to measure patient-reported outcomes regarding symptoms/disabilities. In this case report, the results from SPADI and quick DASH were varied. But most patients tend not to feel complaints of pain or decreased function of joint motion. Moreover, there was no nonunion or malunion clavicle fracture in patients who had undergone conservative therapy. They also can carry out daily activities, both light and heavy activities.

The description in the serial case above differs from some literature. Lenich stated, in terms of function, conservative treatment of closed clavicle fractures has no significant difference compared to operative treatment. Still, Simon explained in his case report that complaints of shoulder joint pain and disability in patients with a history of clavicle fracture who underwent conservative therapy due to malunion or



nonunion. This report also in line with a study from Qvist et al., which showed that shoulder function in patients who had fractured clavicle was equivalent after six months and one year both given conservatively and operatively (Qvist, Væsel, Jensen, & Jensen, 2018).

There were limitations in this report, such as the number of research samples that were too small to be generalized from the patient population of Dr. Soetomo Hospital and lack of samples with clavicle fractures for other classifications. Further evaluation with a larger number of cases and long-term evaluation is needed to assess the effectiveness and impact of clavicle fractures' conservative treatment.

CONCLUSIONS

The SPADI and Quick DASH questionnaire results did not show any complaints of pain or disability of the shoulder joint in patients with closed clavicle fractures in Dr. Soetomo general hospital who had undergone conservative therapy. So, conservative treatment of closed clavicle fracture in the form of mounting arm-slings or backpacks works as a modality for treatment options other than surgery.

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