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Bilateral clavicle fractures: A case report and review of literature's

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Abstract

Clavicle fracture is one of common injury in young adult and fracture in the middle third is the most common injury cases in clavicle fractures. Although clavicle fractures are often seen, in some circumstances bilateral clavicle fractures can occur due to high-energy impact injury, but this is an extremely rare and seldom reported on. Clavicle fracture is not commonly mentioned as an indication for operative intervention, but in cases of bilateral clavicle fracture surgical intervention managed to limit the duration of functional disability and allowing for an earlier functional recovery.



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Background

Bilateral clavicle fracture account for 0.43% of all clavicle fractures, with incidence rate between 0.011 to 0.017% [10]. As it injury is still rarely found, there is no general guidelines to treat this injury surgically or non-surgically. Therefore, the consideration can be made by looking at the advantages and disadvantages of each treatment option, the clinical condition of the patient, and also patient's participations in understanding and choosing the treatment [1-8].

Bilateral clavicle fractures are caused either by high-energy transfer of compression forces across both shoulder girdles or by a direct trauma to one clavicle followed by that to the other clavicle. Due to high-energy trauma, patients usually present with multiple injuries [10]. If a patient is treated surgically, there are several options including anatomical locking plate, S-plate, and intramedullary K-wire [11]. We share our experience of a patient with bilateral clavicle fracture whom we treated by placing S-plates on both clavicles.

Case Report

Mr. Y, a 22-year old student, allegedly involved in a motorcycle accident, was admitted to our ER. He was thrown from his motorcycle. There was no history of loss consciousness. He complained shortness of breath and pain on his right chest. He was able to move all fingers, both wrists and elbows, and no other injuries were noted. On examination, both clavicles were tender and he was unable to raise both shoulders due to severe pain. There were also excoriation wound on the right and left arms without any active bleeding.

His chest and shoulder radiographs showed bilateral clavicle fractures and multiple rib fractures (costae III – VII) (Fig. 01a-c). He was offered surgical intervention. However, due to his

unstable condition, he was treated in the ICU to improve his general condition for surgery. After he was stabilized, he underwent bilateral clavicle plating simultaneously under general anaesthesia. Incisions were made in the superior left and right clavicles, then the operator was directly identified, repositioned, fixed and stabilized the fracture fragments. Surgical wound was washed with normal saline and gentamicin. The wound were closed by absorbable suture layer by layer. Post-operatively, patient was immobilized by using an arm sling. Post-operation radiograph was also taken (Fig 02).

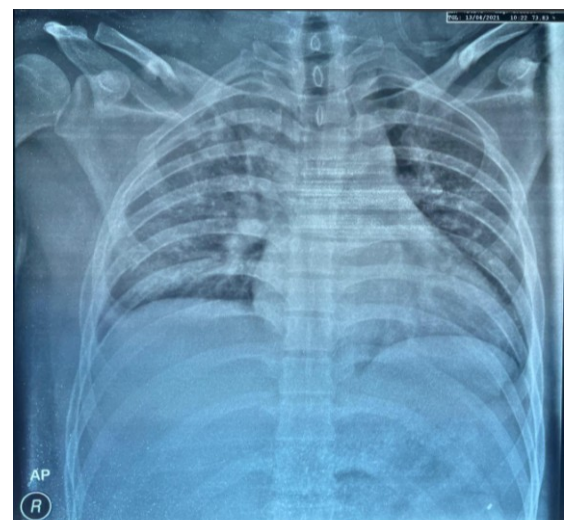


Fig 01a: Bilateral Clavicle Fracture with multiple rib fractures on right chest

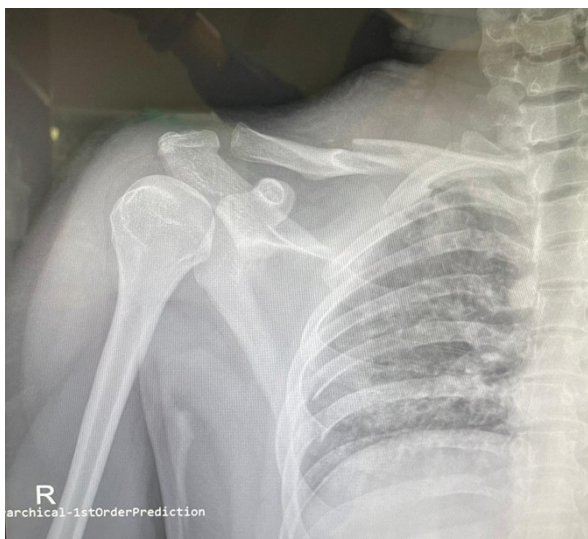


Fig 01b: Closed Fracture Right Clavicle



Fig 01c: Closed Fracture Left Clavicle

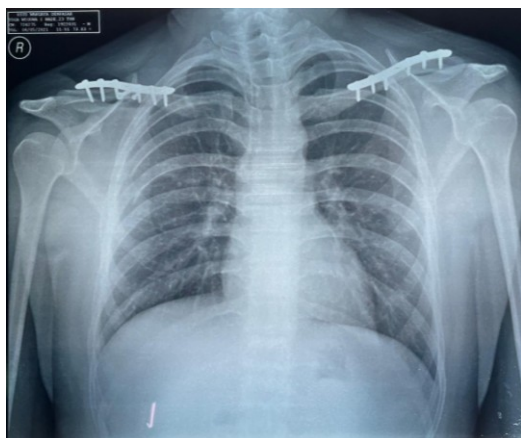


Fig 02: Radiograph immediate post-operation showed S-plate used to fix the

Post-operation, patient was in stable condition and immobilized by using an arm sling. Patient had no specific complain and no infection sign was found on operative site during post-operative management. He was discharged from hospital at 4th day post-operation and was informed about the follow-up treatment, and also the movements that can and should not be done at home to achieve full union of the fractures.

Literature Review

Clavicle fracture is one of common injuries, but bilateral clavicle fracture is rare or seldom reported on. In some research, by Nordqvist in 1994 showed that among 2,035 cases of clavicle fractures, none of them was bilateral clavicle fracture. Malgaigne reported there was only one case of bilateral clavicle fracture among 2,000 cases. Based on some studies, the incidence of bilateral clavicle fracture account for 0.43% of all clavicle fractures [10]. Regarding the mechanism of injury in bilateral clavicle fracture include a high-energy transfer of compression forces across both shoulder girdles, a direct trauma to both clavicles, or direct trauma on one side and indirect violence to the other clavicle. In some cases,

bilateral clavicle fracture can also be caused by birth or delivery process, mainly caused by shoulder dystocia deliveries and breech presentation in macrosomia baby [11]. Bilateral clavicle fractures are usually caused by a high-energy impact incident such as vehicle accidents, motorcycle accidents, fall from a height, and railway accidents [8,9,21,22,23,24]. Due to this mechanism patients usually present with poly injuries. In some cases associated injuries reported includes severe head injuries, severe chest injuries (multiple rib fractures, flail chest, haemopneumothorax, lung contusion, aortic dissection). In case we reported herein, our patient was presented with multiple rib fractures on right chest. Bilateral fractures of the middle third of the clavicles are most commonly associated with multisystem trauma and have a high associated mortality rate. In Throckmorton's study reported two patients with bilateral medial clavicle fractures was passed away [18]. The principle of management of bilateral clavicle fractures is similar to other fractures from conservative to operative measures. Conservative or non-surgical management can be done in several measures include bed rest, application of broad arm sling, figure-of-eight, or collar-and-cuff sling. Bilateral clavicle fractures can be treated surgically by internal or external fixation. Internal fixation can be done by using plate or intramedullary device. In case of bilateral clavicle fractures with suspicion of infection, external fixation uses until the infection process can be resolved [10]. In our case, S-plate was placed in both fractures. Similar to other fractures, the healing process of clavicle fractures depend on the age, gender, fracture configuration, and displacement of fracture fragment [4,19].

Discussion

Bilateral clavicle fracture is a quite rare case and has a little difference mechanism of injury compared to unilateral clavicle fracture. Unilateral fractures are usually caused by direct injury to one side of shoulder, however a high-energy impact incident may cause bilateral clavicle fractures followed by several injury to other organs.

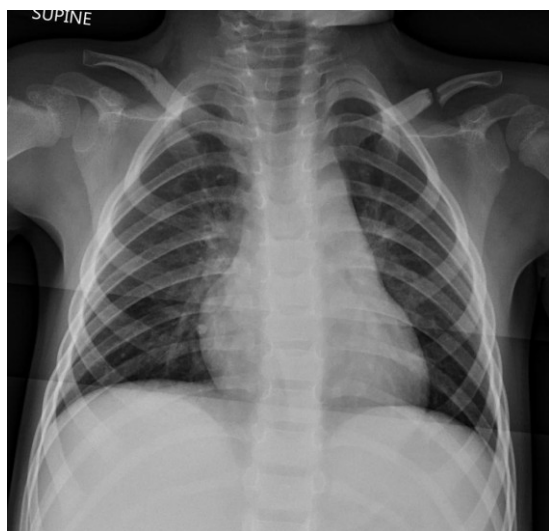


Fig 03: Radiograph showed bilateral clavicle fractures

As in the case we discussed, our patient was a motorcyclist who had a single accident which ultimately resulted in patient experiencing multiple injury. Patient had bilateral clavicle fractures, in addition, he also had multiple rib fractures on right chest and multiple excoriation wounds. Based on fracture fragments configuration, patient was categorized into Allmand classification type I and type 2A1 based on Robinson classification [4,10]. Referring to the mechanism of injury in this case, this injury is commonly associated with multisystem trauma and have a high associated mortality rate, thus a thorough examination is very important including examination of the spine area, sensory nerve function and other motor functions.

In the absence of infection in the fracture area, open reduction and internal fixation (ORIF) are the recommended options. The main goal in the treatment of this fracture is to reposition, fixation and stabilization to restore normal function of the limb to the maximum extent possible. Before deciding to do surgery, especially in patient with multiple injury, improving patient's general condition to a stable state is very important. In our case, we decided to do ORIF by placing S-plates on both clavicles. After placing this plate, the patient is expected to get maximum recovery in both clavicles. In addition, regular follow-up process and adequate nutrition also play important roles in the healing process.

Conclusion

Clavicle fracture is one of common injuries, but bilateral clavicle fracture is rare or seldom reported on. This case is most often caused by high energy trauma that directly or indirectly affects both clavicles. In patients with this case, it would be better if a thorough evaluation is carried out, this is to see if there are injuries in other locations which might complicate the management of the fracture. The choice of therapy in this case, can be non-operative or operative, there is no standard for this. In choosing the treatment, it must be seen from the patient's clinical condition and the patient's participation in determining the treatment. In non-operative treatment (using arms), it can be chosen with the assurance

that there is no injury to the nerves or blood vessels in the affected clavicle area. If there is an open wound, nerve or blood vessel injury clinically, by looking at the patient's overall condition without any contraindications to surgery, ORIF is the best choice. For ORIF itself, there are several options that can be used, such as T-Plate locking, S Shaped Plate, Intramedullary K Nail. In some cases, due to lack of attention to the cleanliness of the surgical wound, patient follow-up, it is not uncommon to find cases of infection in the area of surgery that can inhibit bone healing.

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The Authors are responsible for this study and also reports there is conflicts interest in this work.

Declarations

Conflict of interest

The Author reports no conflict of interest in this work

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Author Contribution

All author contribute in concepting, designing, conduct study, prepare the manuscript and agree for this final version of manuscript to be submitted to this journal.

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