Case Report **OPEN ACCESS**

Report of two cases of non-union of clavicle treated with nonsurgical management

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Abstract

Context: Fractures of the clavicle usually occur at the junction of the medial two third with the lateral one third and usually heal by nonsurgical measures. Radiographs and MRI of the shoulder provide helpful investigations for diagnosis and treatment. In the following cases, an anterior-posterior view revealed non-union of the clavicle on the right side, which is atypical in children. **Case Report**: Non-union of a clavicular fracture is an extremely rare condition, especially in children. We are reporting two cases in this paper; in the first case; an 8-year-old male child visited the hospital with a history of fracture of the right clavicle one year ago. In the second case, a 26-year-old male patient presented with a history of fracture of the right clavicle six years ago. **Conclusion**: Careful attention should be paid when obtaining a detailed history and physical examinations, as traumatic arthritis at either clavicular joint may mimic non-union. The explicable evidence of osseous non-union on radiographs may be minor and may not correlate with the clinical symptoms.

Keywords: Clavicular fracture, post-traumatic, conservative management

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Introduction

Ununited fractures of clavicle are occasionally seen in adults, but are rarely found in children [1, 2]. Post-traumatic non-union of the clavicle is a rare complication in adulthood with a frequency of about 1%. This condition is also exceptional in children, despite the frequency of clavicular fracture at any given age [3, 4].

Clavicular fractures usually occur at the junction of the medial two third with the lateral one third of the bone and usually heal by conservative treatment within three weeks. Surgery is required in about one in 100 cases in which there is remaining deformity.

Case Report

Patient one

An 8-year-old male child presented with a right-sided clavicular fracture for one year. There was a history of fall while playing and the patient sustained injury to the right shoulder, which led to the fracture of the clavicle. Both swelling and severe pain were present. The patient had received treatment from an orthopedic surgeon with a figure 8 bandage for three weeks; however, the pain was not relieved.

At one-year follow-up, the upper part of the chest, the bony prominence in the clavicular region and the overlying skin appeared normal. On palpation, there was bony protuberance at the site of the injury. There were no signs or symptoms of neurological deficit. All of the arterial pulses were present in the affected limb (i.e., axillary, brachial and radial). Movements of the shoulder were within normal range. On auscultation, no bruit was heard at the site of injury.

Diagnosis was made following a radiograph of the right shoulder, which showed old, non-union of the clavicle at the junction of the medial two third with the outer one third. There was rounding of both ends without any callus formation (Fig. 1). The patient was treated conservatively with analgesics and shoulder exercise as the movements of the shoulder were within normal range. At one-year follow-up, the child was doing well.

Fig. 1 X-ray of right shoulder revealed old, non union of clavicle at the junction of medial two 3rd with outer one 3rd and here was roundening of both ends with no callous formation.

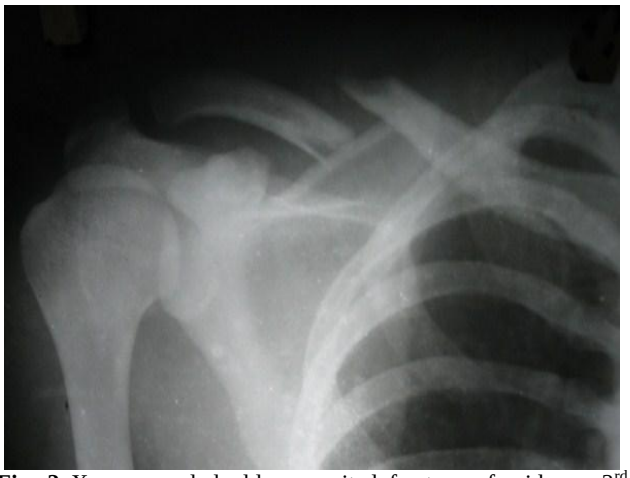

Fig. 2 X-ray revealed old non-united fracture of mid one 3rd clavicle of right side and there was no callous formation.

Patient two

A 26-year-old male patient presented with a history of fracture of the right clavicle six years ago. He received treatment from an orthopedic surgeon in Patna with figure 8 bandages and a shoulder sling for three weeks. The patient now complained of pain in the right shoulder with limitation of movement for one year. On local examination, there was no swelling or deformity and shoulder joint movements were within normal limits, up to 90%. There had been restriction of the movements of the shoulder joint, up to 10 degrees on internal and external rotation. All pulses were felt normally.

A radiograph of the shoulder joint revealed an old, non-united fracture of the mid one third of the clavicle on the right side with no callus formation (Fig. 2). The patient was treated conservatively with analgesics and physiotherapy exercises. At a six-month follow-up visit, the patient was asymptomatic.

Discussion

Ununited fractures of the clavicle are rare [1, 2]. The non-union rate has been reported to be between 0.1% and 15% [5, 6]. Clavicular non-union is rarely asymptomatic and often results in disability from pain at the site of non-union, altered shoulder mechanics, or a compression lesion involving the underlying brachial plexus or vascular structures [5]. Fractures of the clavicle are usually in the medial two third of the bone, which may result from a fall and subsequent outstretched hand during the fall. The lateral fragment is displaced forward and downward by the weight of the limb, while the medial fragment is held at a higher level by the sternocleidomastoid muscle. The essential treatment is to support the weight of the limb by a sling tied over the opposite shoulder. The fractures are almost always clinically united within three weeks.

About one in 100 fractures of the clavicle require primary surgical treatment. Rarely, a fragment may be displaced backward and endanger the subclavian vessels. Sir Robert Peel, who established the police force of Great Britain, died of a fractured clavicle which ruptured the subclavian vein. Peel was attended by Sir Benjamin Brodie who wrote, "The hemorrhage itself was the consequence of the subclavian vein having been lacerated by splinters of the fractured bone" [3]. Cosmetically, it is best to treat clavicular fractures conservatively. If deformity persists at the bony ends of the clavicle after several months, surgical smoothening of these ends is indicated by a short incision in the line of the skin creases. This causes less deformity than the scarring resulting from more extensive operative procedures that may be required for primary open reduction with internal fixation. In addition, major surgical procedures may carry the risk of additional surgery for non-union [4].

The majority of clavicular fractures can be effectively treated non-surgically [7]. The non-union rate of fractures of the lateral end of the clavicle can rise to 37% when a nonsurgical treatment protocol is initially adopted. Reported results for the nonsurgical treatment of fractures of the clavicle have been uniformly positive; a combined series of over 3000 fractures showed a rate of non-union of 0.4%.

Occult fracture has been well documented in the hip and the scaphoid and failure to recognize this type of fracture could lead to serious consequences. While clavicular fracture is often viewed as benign, it is important for patients to be aware that any fracture may impact expected time of recovery. In addition, complications such as non-union do occur and inadequate initial immobilization is a common cause [5,8].

Patients who have suffered a clavicular fracture often

recover well in spite of the risk of non-union; fatal complications that may occur following vascular injuries are extremely rare. Fracture location and the type of immobilization have little effect on the final result or prognosis. Functional outcome is mainly determined by associated systemic and critical trauma.

Conclusion

Careful attention should be paid when obtaining a detailed history and physical examinations, as traumatic arthritis at either clavicular joint may mimic the symptoms of non-union. The explicable evidence of osseous non-union on radiographs may be minor and may not correlate with the clinical symptoms. A patient with an atrophic pattern of non-union may become asymptomatic with time. Surgeons should be cautious when operating on the non-union merely due to its presence, although asymptomatic. If a surgical procedure is planned, possible outcomes should be communicated to the patient, including the possibility of additional surgery, if required.

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