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Case Report

Coracoid fracture combined with distal clavicle fracture without coracoclavicular ligament rupture: A case report

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ABSTRACT

Distal clavicle fracture accompanied by coracoid process one is a rare injury. Surgical and/or conservative treatments are proposed. We report the case of a 49-year-old woman presenting a distal clavicle fracture associated with a coracoid process one due to a fall on the left shoulder. Both injuries are treated surgically. Per operatively, and through an anterior “strap” approach, the coracoclavicular ligament was seen intact. The distal clavicle fracture was fixed with K-wires and cerclage and the coracoid process was secured by a screw. Active-assisted rehabilitation of the shoulder was initiated 3 weeks after surgery. At the last follow-up of twelve months, the patient had painless full shoulder functions and X-rays show bony union. Early recovery to normal life is possible with surgical treatment in patients with distal clavicle fracture combined with coracoid fracture.

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1. Introduction

A coracoid process fracture associated with a distal clavicle fracture has been rarely reported in the literature. Therefore, only small patient series using various surgical techniques have been published. This report adds another unusual case to the literature to reemphasize the importance of this lesion to be recognized.

2. Case report

A 49-year-old woman was injured by a direct fall on her left shoulder. On physical examination, a significant tenderness

of the left distal clavicle and a painful restricted range of the shoulder motion were noticed. Initial anteroposterior shoulder radiograph showed a displaced fracture of the lateral clavicle end associated with a fracture of the coracoid process base (Fig. 1).

Under general anaesthesia, an anterior and superior “strap” approach of the left shoulder was done. After splitting of the deltoid fascia, a subperiosteal exposure clavicle was performed. The coracoclavicular ligament was seen intact. The clavicle fracture was reduced and fixed using K-wires and cerclage. Through the same approach, the coracoid process was secured with a 4.5 mm screw. The immediate post-operative X-ray films showed good reduction of both fractures (Fig. 2). Postoperative course was uneventful.

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Fig. 1 – Anteroposterior radiograph of the left shoulder showing a displaced fracture of the lateral end of the clavicle associated with a fracture of the base of the coracoids.

Passive and active motion of the left shoulder was started three weeks after surgery. Three months later, K-wires and cerclage were removed. At the last follow-up of twelve months, patient had full and painless range of motion of the left shoulder (Fig. 3), and constant score was 86/100 (mobility: 34 points, pain: 15, level of daily activities: 7, working level with the hand: 10, muscle strength: 20). Radiographs showed bony union of the coracoid and restoration of the clavicle length (Fig. 4).

3. Discussion

Fractures of coracoid process are uncommon, occurring in 2–5% of all scapular fractures.¹ Most of them have been

reported to occur in association with acromioclavicular or anterior shoulder dislocations.^{2,3} According to the literature, three separate mechanisms appear to be responsible for coracoid fracture:

- Fractures of the coracoid process base are the most common and they are generally associated with acromioclavicular joint disruption or distal clavicle fracture. In this case, the strong coracoclavicular ligament, rather than rupture, avulsed the coracoid process near its base.⁴
- Fracture of horizontal portion generally associated with anterior gleno-humeral dislocation.⁵
- Apical avulsion due to contraction of coracobrachialis muscle.⁶

Fractures of the clavicle constitute approximately 4–15% of all fractures and 44% of the shoulder region ones. Distal third clavicle fractures occur approximately in 10% of all clavicle fractures.^{7,8,9} Neer¹⁰ subdivided the distal clavicle fractures in two groups: In the first group, the intact coracoclavicular ligaments prevent significant displacement of medial fragments, in the second one; the coracoclavicular ligament is ruptured from medial fragment of the clavicle.

The usual mechanism of clavicle fracture is cephalad to caudal force on the acromion, such as a fall on the shoulder. It was the mechanism of our case. In fact, the coracoid process breaks instead of the usual tearing of the coracoclavicular ligaments during fracture of distal clavicle. Most coracoid process fractures occur at the base and displacement is usually minimal because ligaments tend to maintain the position of the fragments.¹¹

For most cases a conservative treatment is recommended and only the associations with acromioclavicular disorders need an internal fixation.¹²

In the case of combined injury, a fractured coracoid process is easily overlooked when the focus is directed towards the clavicle fracture. Initial radiographs should include anteroposterior and axillary views or 30-degree cephalic view of the shoulder which is useful to confirm this lesion. However the patient's pain usually precludes

Fig. 2 – A and B: Postoperative X-ray films showing good position of the fracture after osteosynthesis.

Fig. 3 – Mobility of the left shoulder.

abduction at the time of the initial examination. On anteroposterior radiograph of the shoulder, the coracoid process is foreshortened and projected over the acromion and blade of the scapula. Some authors consider the axillary lateral view essential for the diagnosis of coracoid fracture.¹³

The coracoid fractures must be distinguished from anatomical variations such as the infrascapular bone or an unfused epiphysis especially in young patients.¹⁴

Surgical management of coracoid fracture is recommended when it is associated with scapular or clavicle fracture or with acromioclavicular dislocation.^{2,15} Many technical fixations have been used, including a K-wire, screw or Dacron graft. In our case, and through the anterior “strap” approach, we have stabilized both the clavicle and the coracoid process. This approach had minimum injury on shoulder muscles.

Fig. 4 – A and B: Radiographs of the left elbow at the last follow-up showing bony union of the coracoid and restoration of the length of the clavicle.

Poigenfürst et al.¹⁶ reported 22 unstable fractures of the distal end of the clavicle associated with coracoclavicular ligaments rupture; conservative treatment was successful only in two patients. In the other cases, fractures required operation. He recommended the use of a coracoclavicular lag screw (Bosworth) for simple fractures associated and plating for comminuted fractures.

Shoulder immobilization should be as short as possible. In fact, stability of fracture after osteosynthesis autorises shoulders reeducation. In our case, shoulder rehabilitation was started at the third week after surgery.

4. Conclusion

The association of coracoid and clavicle third distal fractures is very rare. This fracture should be suspected with all distal clavicle fracture or acromioclavicular dislocation. The axillary lateral radiograph or computed tomography is often needed to detect the coracoid fracture. Conservative treatment may not lead to a good result, with unsatisfactory function and cosmetic deformity. The anterior “strap” approach provides an excellent view to treat both lesion and allows mobilization in short time. Early recovery to normal life is possible with surgical treatment in patients with distal clavicle fracture combined with coracoid fracture.

Conflicts of interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

REFERENCES

1. Wilber MC, Evans EB. Fractures of the scapula. An analysis of forty cases and a review of the literature. *J Bone Joint Surg Am.* 1977;59(3):358–362.
2. Wang KC, Hsu KY, Shih CH. Coracoid process fracture combined with acromioclavicular dislocation and coracoclavicular ligament rupture. A case report and review of the literature. *Clin Orthop Relat Res.* 1994;300:120–122.
3. Benchetrit E, Friedman B. Fracture of the coracoid process associated with subglenoid dislocation of the shoulder. A case report. *J Bone Joint Surg Am.* 1979;61(2):295–296.
4. Protass JJ, Stampfli FV, Osmer JC. Coracoid process fracture diagnosis in acromio-clavicular separation. *Radiology.* 1975;116(1):61–64.
5. Wong-Pack WK, Bobechko PE, Becker EJ. Fractured coracoid with anterior shoulder dislocation. *J Can Assoc Radiol.* 1980;31(4):278–279.
6. Féry A, Sommelet J. Fracture of the coracoid process (author's transl). *Rev Chir Orthop Reparatrice Appar Mot.* 1979;65(7):403–407.
7. Nordqvist A, Petersson C. The incidence of fractures of the clavicle. *Clin Orthop Relat Res.* 1994;300:127–132.
8. Postacchini F, Gumina S, De Santis P, Albo F. Epidemiology of clavicle fractures. *J Shoulder Elbow Surg.* 2002;11:452–456.
9. Robinson CM. Fractures of the clavicle in the adult. Epidemiology and classification. *J Bone Joint Surg Br.* 1998;80:476–484.
10. Neer 2nd CS. Fracture of the distal clavicle with detachment of the coracoclavicular ligaments in adults. *J Trauma.* 1963;3:99–110.
11. Ogawa K, Yoshida A, Takahashi M, Ui M. Fractures of the coracoid process. *J Bone Joint Surg Br.* 1997;79(1):17–19.
12. Güneş T, Demirhan M, Atalar A, Soyhan O. A case of acromioclavicular dislocation without coracoclavicular ligament rupture accompanied by coracoid process fracture. *Acta Orthop Traumatol Turc.* 2006;40(4):334–337.
13. Sandrock AR. Another sports fatigue fracture. Stress fracture of the coracoid process of the scapula. *Radiology.* 1975;117(2):274.
14. Montgomery SP, Loyd RD. Avulsion fracture of the coracoid epiphysis with acromioclavicular separation. Report of two cases in adolescents and review of the literature. *J Bone Joint Surg Am.* 1977;59(7):963–965.
15. Eyres KS, Brooks A, Stanley D. Fractures of the coracoid process. *J Bone Joint Surg Br.* 1995;77(3):425–428.
16. Poigenfürst J, Baumgarten-Hofmann U, Hofmann J. Unstable fractures of the lateral end of the clavicle and principles of their treatment. *Unfallchirurgie.* 1991;17(3):131–139.