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Case report; the posttraumatic regeneration of the clavicle

Christiaan J. Nanninga*, Rutger G. Zuurmond

Department of Orthopaedics, Isala, Dokter van Heesweg 2, 8025, AB, Zwolle, the Netherlands

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ABSTRACT

Fractures of the lateral part account for 25% of all the clavicle fractures. In rare cases, especially with late presentation, the highly osteogenic periosteal sleeve will form bone from the distal epiphysis towards the medial part of the clavicle. In patients with trapezius muscle involvement, we suggest excision of the regenerated limb with a subsequent lock-down procedure of the posterior located clavicle in the periosteal sleeve.

1. Introduction

The incidence of clavicle fractures is around 29–64 per 100.000 person-years and clavicle fractures are common in children, accounting for approximately 10% of all fractures. Fractures of the lateral part account for 25% of all clavicle fractures. The optimal treatment of lateral clavicle fractures depends on the patient age, the displacement and stability of the fracture segments.[1]

Complications after conservative treatment include mal- and non-union with pain, movement restriction, cosmetic discomfort and reported neurovascular symptoms including thoracic-outlet syndrome and subclavian vein compression.[1] This case report presents a rare complication after distal clavicle fracture in a young adult involving post-traumatic regeneration of the clavicle.

2. Case

An 18-year-old male visited the emergency room after a car accident. As a passenger, he had sustained a high-energy trauma while being under the influence of speed and ecstasy and experienced pain surrounding the shoulder region, thoracic spine and pelvis. He suffered from polytrauma with a distal clavicle fracture mimicking an acromioclavicular joint dislocation, a thoracic spine fracture type B1 and thoracic transverse process fracture Fig. 1. The skin was swollen above the distal clavicle but not compromised.

The patient was admitted and operated on his spine. A 3-point sling was used for his clavicle fracture. He mobilized without complications and was dismissed after 9 days.

After a month, the patient visited the traumatology department. The patient still experienced pain in the muscle trapezius region and the shoulder was cosmetically deformed. The skin was not compromised. An X-ray showed elevation of the lateral part of the medial clavicle and revealed calcification ventral and inferior of the clavicle Fig. 1.

A CT-scan confirmed regeneration of a limb from the distal part of the clavicle to the ventral midshaft of the clavicle, indicating a duplicated clavicle Fig. 2.

Surgical intervention was proposed for the disrupted anatomical position and the subsequent pain and movement restriction experienced by the patient. The regenerated limb was excised and

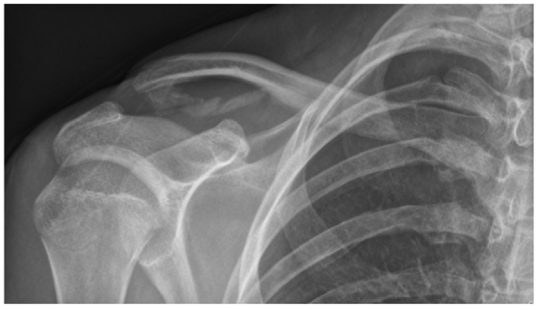

Fig. 1. X-ray showing distal clavicle fracture with calcification.

* Correponding author. Regentesselaan 5, 3851RR, Ermelo, the Netherlands.
E-mail address: c.j.nanninga@student.rug.nl (C.J. Nanninga).

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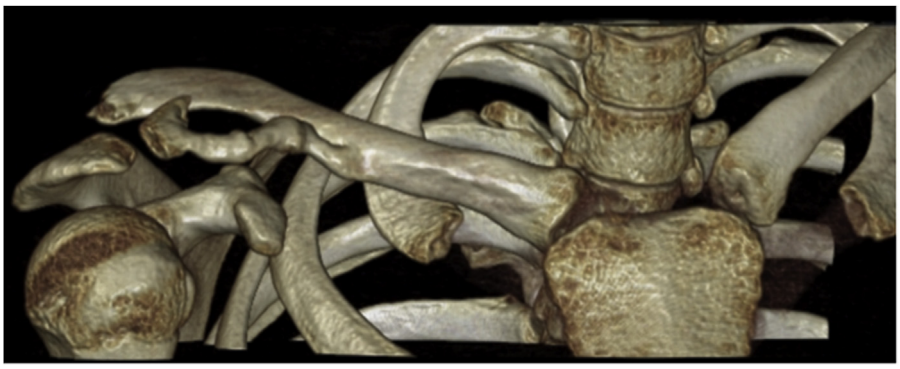

Fig. 2. CT-scan showing a duplicated clavicle.

the posterior located clavicle was repositioned with the surgical lockdown procedure[2] Figs. 3 and 4. During the operation, the lateral clavicle was mobilized, released from the trapezius muscle and alignment was restored. The patient mobilized as tolerated after the intervention and regained full shoulder movement after two months. Follow up at 6 months showed complete clinical recovery.

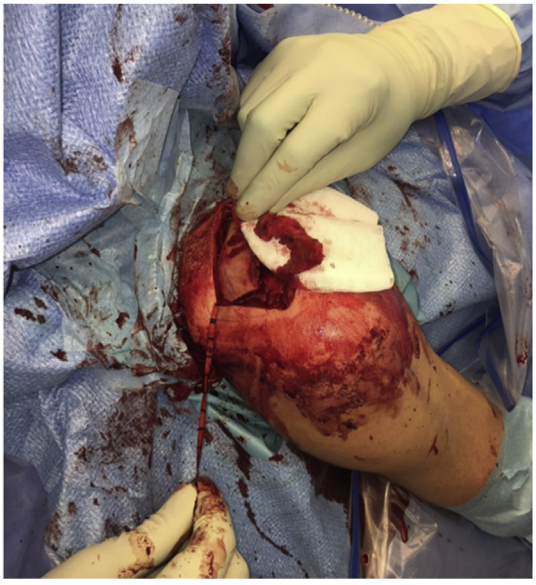

Fig. 3. Duplicated clavicle during surgery.

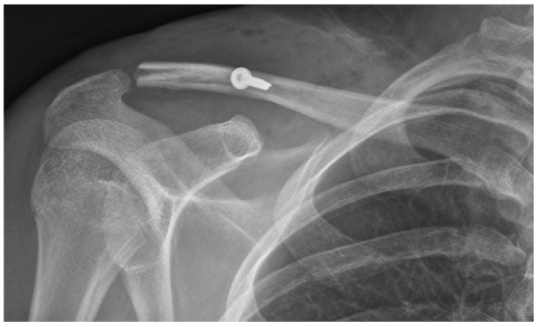

Fig. 4. X-ray showing reposition after lock-down procedure.

3. Discussion

A number of articles that describe a form of duplicated clavicle have been published in the literature.[3–10] In most cases, these involve a congenitally form without clinical significance and were discovered incidentally.[3–5] One case describes the occurrence of a thoracic outlet syndrome due to a congenital duplicated clavicle.[6] Some reports describe a posttraumatic cause for a duplicated clavicle, suggesting not all cases have a congenital origin[7–9]. In these cases, the patient age varies from 5 to 16 years.

A thick periosteal sleeve surrounds the distal part of the clavicle and its epiphysis provides a strong attachment for the acromioclavicular and coracoclavicular ligaments.[10] Therefore, trauma to an immature clavicle affects more often the epiphysis rather than the acromioclavicular joint.

Before the age of 25 years, fusion of the epiphysis is rarely seen. The result of this type of fracture is a posterior and superior displaced medial clavicle fragment and an intact inferior periosteal sleeve. Prompt detection of the displacement is recommended, and subsequent early reduction and fixation can provide anatomical repair.

In rare cases, especially with late presentation, the highly osteogenic periosteal sleeve will form bone from the distal epiphysis towards the medial part of the clavicle. The treatment of a neoclavicle remains controversial. In two previously described cases the prominent posterior limb was excised and the newly formed anterior limb retained.[7,8] Conservative treatment without surgical intervention has been described as well.[9] In patients with trapezius muscle involvement, we suggest excision of the regenerated limb with a subsequent lock-down procedure of the posterior located clavicle in the periosteal sleeve improving movement and reducing pain.

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