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CASE REPORT

Isolated apophyseal avulsion of the coracoid process : Case report and review of literature

Michiel LEIJNEN, Pascal STEENVOORDE, Andy DA COSTA, Santosh ADHIN

From the Department of Surgery, Rijnland Hospital, Leiderdorp, The Netherlands

Apophyseal fractures occur due to direct trauma or avulsion due to a sudden and violent contraction of muscles. In this case report an isolated apophyseal fracture of the coracoid process is described, which has not been described before in English literature, together with a review of current literature.

Keywords : coracoid process ; avulsion ; fracture ; shoulder ; apophysis.

INTRODUCTION

Isolated fractures of the coracoid process of the scapula are uncommon, occuring in about 2-5% of all scapular fractures *(1)*. The aetiology of these fractures is mainly associated with direct trauma, violent contraction of the attached muscles or avulsion by the coraco-clavicular ligaments during an acromioclavicular dislocation *(3,4)*. Fractures of the base of the coracoid process are most common, however fractures of the distal part and epiphysis have been described in literature as well *(4,9)*. Avulsion of the apophysis of the coracoid process as described here, does not appear to have been reported in the English literature before. We present a case report and review the literature.

CASE REPORT

A 16-year-old male was brought to our emergency department after falling off his motorcycle. He fell on his right side and complained of pain in the neck, right shoulder and right knee. On examination he had stable vital signs ; tenderness was noted when pressing the sixth and seventh vertebra. His right knee was swollen. His right shoulder was painful on palpation with maximum tenderness around the acromioclavicular joint.

Computed tomographic scans of the brain and cervical vertebrae were normal. X-ray examination of the thorax and right knee revealed no traumatic injuries. However, the radiograph of the right shoulder showed an apophyseal fracture of the coracoid process (fig 1). He was admitted to our hospital for observation and could be discharged the very next day. Three weeks after the accident he had normal function of the shoulder without any pain or limitation in range of motion.

■ Michiel Leijnen, MD, MSc, Surgery Resident.
■ Pascal Steenvoorde, MD, PhD, Surgeon.
■ Andy da Costa, MD, PhD, Surgeon.
■ Santosh Adhin, MD, Surgeon.
Department of Surgery, Rijnland Hospital, Leiderdorp, The Netherlands.
Correspondence : Michiel Leijnen, Department of Surgery, Rijnland Hospital, Postbus 4220, 2350 CC Leiderdorp, The Netherlands. E-mail : m.leijnen@rijnland.nl or leijnen@hotmail.com

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Fig. 1. — Radiograph showing the apophyseal avulsion of the coracoid process (arrow).

DISCUSSION

Fractures of the coracoid process are rare. They are most common at the base of the coracoid, although fractures to the distal part have been described as well (*4,9*). These reports describe fractures of the coracoid process proximal to the epiphysis, or epiphyseal fractures with or without acromioclavicular dislocation (*2-5,9*). Non-apophyseal fractures of the coracoid appear through either direct trauma or through avulsion due to a sudden and violent contraction of the short head of the biceps, coracobrachialis and pectoralis minor muscles (*3*). The origins of the coracobrachialis muscle and the short head of the biceps brachii muscle are at the tip of the coracoid process. Therefore, it seems likely that a contraction of one of these muscles caused avulsion of the apophysis in this 16-year-old adolescent.

An apophysis is a primary ossification centre and is made of cartilage. It is located distal to the epiphysis. It contributes to the growth of the bone and functions as origin for muscles. Unlike the epiphysis, the apophysis does not contribute to the linear growth of the bone. During puberty secondary ossification commences where the cartilage is replaced by bone. During the ossification process the apophysis is extremely vulnerable to traction. When a sudden contraction or interruption of normal movement appears, the apophysis can be torn from the underlying bone, which causes avulsion of the apophysis (*11-13*). In the adult a rupture of the muscle or tendon is most likely to occur, as ossification has been completed (*12*). Cartilage can withstand great forces when compressed, due to its mechanical properties ; however, it is sensitive to traction. This is the biomechanical cause for avulsions of the apophysis when trauma through traction occurs (*6,7*). Additionally, the muscle power that adolescents generate growths exponentially during puberty, while the apophysis is not completely ossified yet (*10*). Our patient recovered without persisting discomfort, however, there is a possibility that pain will persist due to painful nonunion or exostosis formation, although these complications have not yet been described for apophyseal avulsions of the coracoid to our knowledge. In our opinion excision or re-attachement of tendons is a difficult procedure due to the small size of the avulsed part in the case of an avulsion of the apophysis of the coracoid, unlike apophyseal avulsions of the pelvis and hip where operative fixation is recommended in the case of painful nonunion (*8*). We would recommend to treat a patient with persisting symptoms after an apophyseal avulsion with physical therapy and local analgesic and corticosteroid injection.

CONCLUSION

The avulsion fracture described in this case report seems extremely rare, as it has not been described in literature to our knowledge. Apophyseal avulsions are described in many parts of the body, however, no reports can be found on avulsion of the apophysis at the shoulder. In this case, no surgical intervention was required and the prognosis was good. However, it remains a rare fracture that could generate significant discomfort for the patient when remaining unnoticed.

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