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Case report

Posterior sternoclavicular epiphyseal fracture-dislocation: Case report and review of literature

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ABSTRACT

Posteriorly displaced physeal fractures of the medial clavicle are relatively rare injuries in the growing skeleton and are often confused with the posterior dislocations of the sternoclavicular joint (SCJ). Frequently, these initially undiagnosed due to variable clinical presentation and inadequate visualisation of the joint on plain radiographs. This failure of diagnosis or delayed treatment may lead to serious complications though secondary injuries of mediastinal structures.

We present a case report of a 16-year-old male with posterior sternoclavicular epiphyseal fracture-dislocation without vasculonervous injury that occurred in basketball training. The correct diagnosis required multiple modalities over two emergency department visits. Computed tomography with intravenous contrast was the imaging modality of choice for diagnosis. Treatment consisted of attempts at closed reduction, which was not successful. Open reduction was performed with relocation of the clavicle into the periosteal sleeve followed by strong suture material. We have reviewed the literature to provide an insight with regards to correct diagnosis and management of this injury.

1. Introduction

Posterior sternoclavicular dislocation (PSCD) is an uncommon injury that occurs generally during high-energy trauma [1,2] or sporting activities [3–13]. On account of late closure of the medial clavicular epiphysis, posterior epiphyseal disruption must be taken into consideration in every patient younger than 25 years [3–5,8,9,14–18]. While true PSCD can occur in skeletally immature patients [8,19], the majority of the injuries are posteriorly displaced fracture of the medial clavicular physis [16,18,20–22]. Often these injuries go unrecognised at the time of presentation due to their relative infrequency, paucity of physical examination findings, and difficulty in interpreting plain radiographs [2,5,6,8,10,11,16,18,23,24]. This failure of diagnosis or delayed treatment may lead to serious complications though secondary injuries of mediastinal structures [2,3,8,23,25–34]. We present a rare case of posterior sternoclavicular epiphyseal fracture-dislocation that occurred in a young basketball player, which was not recognised at his initial presentation in emergency department. The purpose of this article is to share our experience and to review the literature with regards to correct diagnosis and management of this injury.

2. Case

A 16-year-old right hand-dominant boy was admitted in our emergency department with a shoulder injury during basketball training. After attempting to block a shot, he fell onto his right posterolateral shoulder.

He described immediate pain in his shoulder and inability to move it without significant anterior chest discomfort. He denied any paresthesia, weakness, dyspnoea, dysphagia, or dysphonia.

His initial vital signs were: temperature 36.7 °C, heart rate 48 breaths/min, blood pressure 133/67 mmHg and respiratory rate 16 breaths/min. On physical examination, he presented with severe shoulder pain, holding his arm in an internally rotated and adduction position. There was no palpable deformity over the shoulder but tenderness was localised at the distal sternocleidomastoid muscle. He could externally and internally rotate his arm but could not tolerate minimal passive abduction of the shoulder. His neurovascular examination result of the distal extremity was normal.

A 3-view shoulder X-ray was ordered (Fig. 1) and revealed no bony injuries or articular dislocations.

The patient was discharged in a broad-arm sling with a diagnosis of shoulder sprain and sternocleidomastoid muscle haematoma. He was referred to the orthopaedics clinic in one week.

He returned to the same emergency department 48 h later complaining of persistent right shoulder pain. On examination, he had tenderness to palpation over the medial end of his right clavicle. When viewed from the side, the right sternoclavicular

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Fig. 1. Anteroposterior radiograph of the right shoulder from the first admission.

Fig. 2. Anteroposterior radiograph of the right clavicle. Note the markedly displaced medial end of clavicle (arrow) compared to the sternum (S).

joint (SCJ) was swelling and less prominent than the contralateral side, giving rise to the suspicion of PSCD.

Plain radiographs of the right clavicle (Fig. 2) revealed a slight superior displacement of the medial end suggesting a sternoclavicular dislocation.

CT scan of the upper chest with intravenous contrast confirmed posterior displacement of the medial end of the right clavicle with an epiphyseal fracture. Meticulous attention revealed, a small bony fragment just anterior to the medial right clavicular end corresponding to avulsed fragment of metaphysis attached to the undisplaced anterior periosteum (Fig. 3A and B). There was no evidence of secondary injuries of the mediastinal structures however clavicular head abutted but did not penetrate the brachiocephalic artery (Fig. 4A and B).

After obtaining parental informed consent, the patient was taken to operating room for reduction under general anaesthesia with a thoracic surgeon on standby notification.

In first time, closed reduction technique was attempted with the patient in supine position with a sandbag placed between the scapulae. Longitudinal traction was applied to the right arm against countertraction in an abducted and slightly extended position, and the medial end of the clavicle was pulled in the anterior direction manually. Combined manoeuvres could not affect a reduction and open procedure was realised in a second time.

A transverse incision centred over the SCJ was used. The dissection was carried out through the plastysma to the level of the periosteum. Periosteal elevation was performed in a lateral to medial direction over the clavicle, carefully exposing the medial end of the clavicle and SCJ. With this exposure, posterior epiphyseal disruption of the medial clavicle with metaphyseal fragment (Salter-Harris type II injury) was clearly identified. The clavicle had not adhered to the great vessels, and the reduction was performed without complications using a towel clip. The stabilisation was obtained using No.1 polyester suture passed from the manubrium/epiphyseal piece into the medial clavicle through bone tunnels. The periosteal sleeve was then repair with

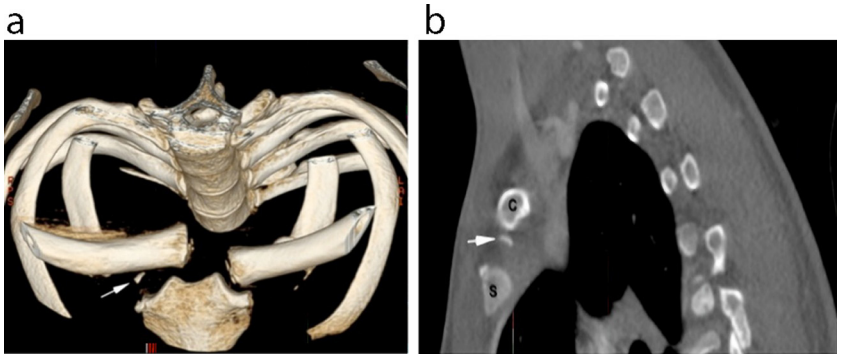

Fig. 3. (A) Three-dimensional computer tomographic reconstruction showing complete posterior dislocation of right sternoclavicular joint with evidence of a tiny bony fragment (arrow) near the clavicle head suggesting an epiphyseal fracture. (B) Sagittal view of superior chest computed tomography (CT) scan showing posteriorly displacement of the right clavicle (C) with metaphyseal fragment (arrow). Also shown is the sternum (S).

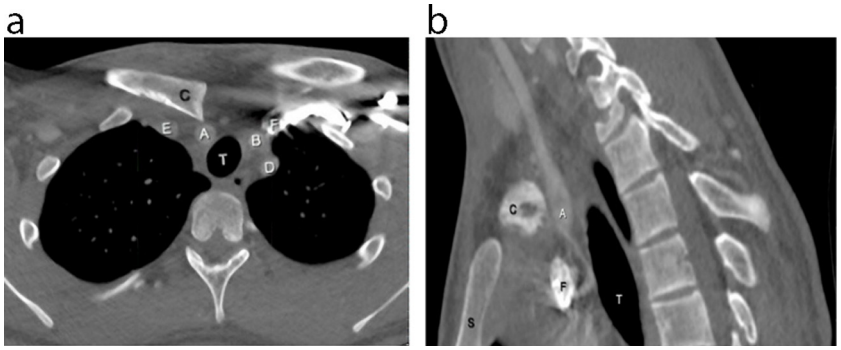

Fig. 4. (A) Axial view of the superior chest CT scan showing medial clavicle (C) abutting the brachiocephalic artery (A). Also are shown the trachea (T), left common carotid artery (B), left subclavian artery (D), right and left brachiocephalic vein (E and F). (B) Sagittal view of superior chest CT scan showing the medial end of the right clavicle (C) in contact with the brachiocephalic artery (A). Are also represented the trachea (T), sternum (S) and the left brachiocephalic vein (F).