



Case Report

Posterior dislocation of the sternoclavicular joint: report of two cases[☆]



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ABSTRACT

The authors report the cases of two young patients who had suffered a sporting accident with posterior traumatic dislocation of sternoclavicular joint. In one of the patients closed reduction was accomplished by keeping the limb in a sling. The second patient, after reduction was done, presented recurrence of the dislocation, thus requiring surgical treatment. It is important to observe the relevance of computed tomography to help diagnosing, as well as monitoring the reduction procedure. The objective of this study was to demonstrate two different types of treatment in a rare injury such as the posterior dislocation of sternoclavicular joint.

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Luxação posterior da articulação esternoclavicular: relato de dois casos

RESUMO

Relato de caso de dois jovens que se acidentaram no esporte e apresentaram luxação traumática posterior da articulação esternoclavicular. Em um paciente foi feita a redução incruenta e manutenção com tipoia. O segundo paciente, após a redução, apresentou recidiva da luxação, foi necessário o tratamento cirúrgico. Vale salientar a importância da tomografia computadorizada no auxílio do diagnóstico, assim como para monitorar a

[☆] Study conducted at Hospital Santa Teresa, Petrópolis, RJ, Brazil.

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redução. O objetivo deste estudo foi demonstrar dois tipos diferentes de tratamento em uma lesão rara como a luxação traumática posterior da articulação esternoclavicular.

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Introduction

Traumatic posterior dislocation of the sternoclavicular joint is a rare injury with less than 1% incidence among all dislocations, but which is potentially serious.¹ This injury is most frequently observed in young adults after high-energy trauma and can be difficult to diagnose, both clinically and radiographically.² Although rare, posterior sternoclavicular dislocation is associated with several complications due to the proximity to mediastinal structures. These injuries include respiratory system and brachial plexus impairment, vascular injury, pneumothorax, and dysphagia, and may even lead to death.³⁻⁵

According to the literature, traumatic posterior dislocation of the sternoclavicular joint is often associated with delayed diagnosis and may initially be clinically insignificant. It can be treated with joint stabilization through closed or open reduction.³⁻⁷

This report aimed to present two cases of traumatic posterior dislocation of the sternoclavicular joint that were treated different ways, and to draw attention to the value of CT scan in confirming the diagnosis and monitoring of the reduction.

Case report

Case 1

Eighteen-year-old male patient reported a lever-type soccer fall, having fallen on his left shoulder, his non-dominant side. He arrived at the hospital emergency room 45 min after the accident, with pain in the left shoulder girdle, especially in the sternoclavicular joint, with arm movement difficulty. He denied paresthesia or tingling in the limb, difficulty breathing, or pain in the cervical region.

Upon physical examination, the skin was normal, with a slight asymmetrical swelling on the left side. Function and strength were limited by pain. The patient had pain at palpation on the left sternoclavicular joint. Neuromuscular examination of the upper left limb was normal. Radiographic examination showed asymmetry of the left sternoclavicular joint and the patient was taken immediately to the CT scan (Fig. 1A and B).

The patient was examined two days after the injury by the trauma team, who decided to treat the dislocation with closed reduction. He was taken to the operating room and underwent general anesthesia. He was positioned supine with a cushion in the dorsal region, between the shoulders, and the reduction maneuver was made with the aid of a towel clamp inserted percutaneously. At the time of reduction, a "clunk" was felt; at both the clinical examination and fluoroscopy, the

dislocation had reduced. The patient was immobilized with a sling and taken to the radiology unit to undergo a second CT scan. The result showed that the reduction had been lost, and the treatment was rescheduled with open reduction and fixation (Fig. 2A and B).

Surgical procedure

The patient was positioned supine with a cushion between his shoulders. Under general anesthesia and following the administration of 2g of EV cephaloridine, an incision of approximately 8 cm from the manubrium to the middle third of the clavicle was made. Through careful dissection, it was noted that the sternoclavicular ligaments of the anterior region were intact, but after incising the ligament, damage to the posterior ligaments of the joint and extensive periosteal avulsion of the middle third of the clavicle, which was inferiorly deviated, were observed. The meniscus was identified and repaired. Subsequently, two holes were made with a 2 mm drill bit in the manubrium, through which an Ethibond Exel M46® No. 5 wire was passed. Two holes were made in the clavicle, using a drill bit of the same thickness, and the wire was passed. The dislocation was reduced and fixed with the wire in a cerclage manner. An additional wire was used in the upper region between the manubrium and clavicle to secure the reduction. The shoulder was tested and joint stability was observed. The wound was closed with suture of the anterior sternoclavicular ligament and subsequent tissues. The patient was immobilized with a sling (Fig. 3A and B)

Case 2

Thirty six year old male patient, aged 36 years, suffered a direct trauma on his left clavicle (non dominant side) during a soccer game (playing as goalkeeper, when he got down to make a defense, he took a knee strike directly onto his clavicle). On emergency care, he presented severe pain in the clavicle region, but without major deformities visible on physical examination. He did not show arm movement difficulty, limb numbness or tingling, difficulty breathing, or pain in the cervical region. Function and strength were limited by pain. The patient had pain at palpation on the left sternoclavicular joint and was immediately taken to the CT scan (Fig. 4A and B).

The patient was examined two days after the injury by the trauma team, who decided upon treatment with closed reduction of the dislocation. He was taken to the operating room and underwent general anesthesia. He was positioned supine with a cushion in the dorsal region between the shoulders, and a closed reduction was accomplished with the aid of a towel clamp inserted percutaneously. The patient was immobilized with a sling and taken to a second CT scan. The examination

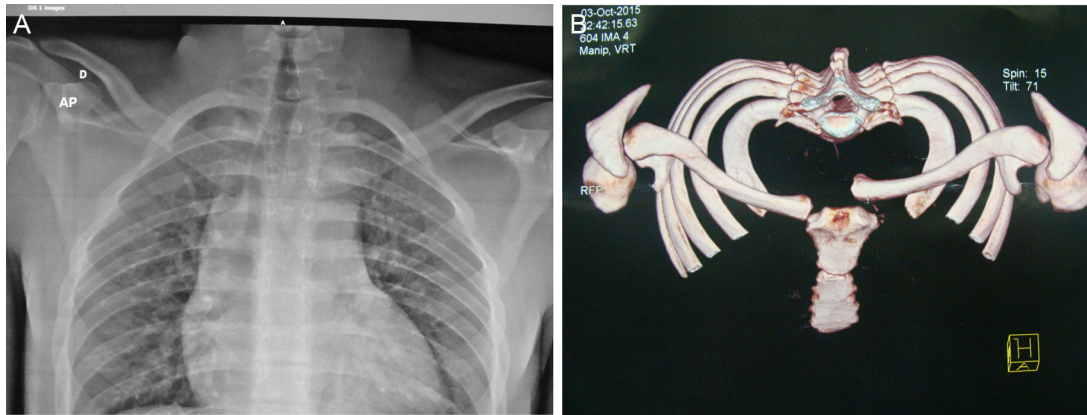


Fig. 1 – (A) Radiography showing the sternoclavicular dislocation to the left; (B) computed tomography 3-D reconstruction demonstrating the dislocation to the left.

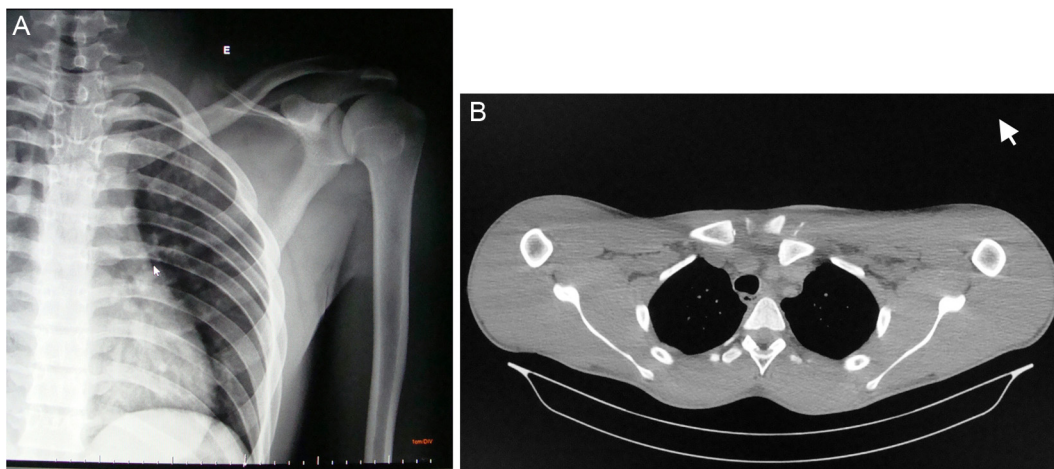


Fig. 2 – (A) Radiography after closed reduction; (B) computed tomography showing recurrent dislocation.

showed the reduced dislocation and the patient was treated with a sling and radiographic follow-up.

Discussion

Traumatic posterior dislocation of the sternoclavicular joint is a rare injury with less than 1% incidence among all

dislocations, but which is potentially serious.¹ The literature has reported that injuries with posterior displacement of the medial clavicle may be associated to trauma to the trachea, esophagus, and great vessels. However, due to the rarity of such injuries, long-term studies with large numbers of patients are not available.^{1,3-11}

The sternoclavicular joint is stabilized anteriorly and posteriorly by the joint capsule and by the sternoclavicular,

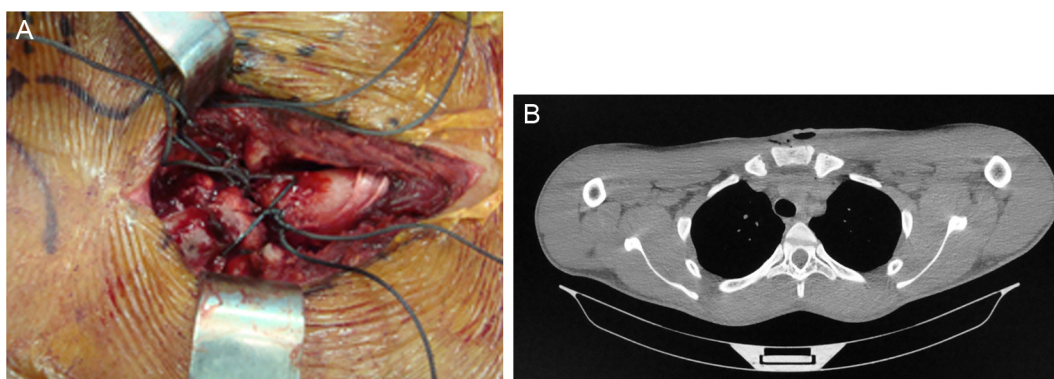


Fig. 3 – (A) Image of the sternoclavicular joint after open reduction with cerclage; (B) computed tomography showing the left sternoclavicular joint reduced.

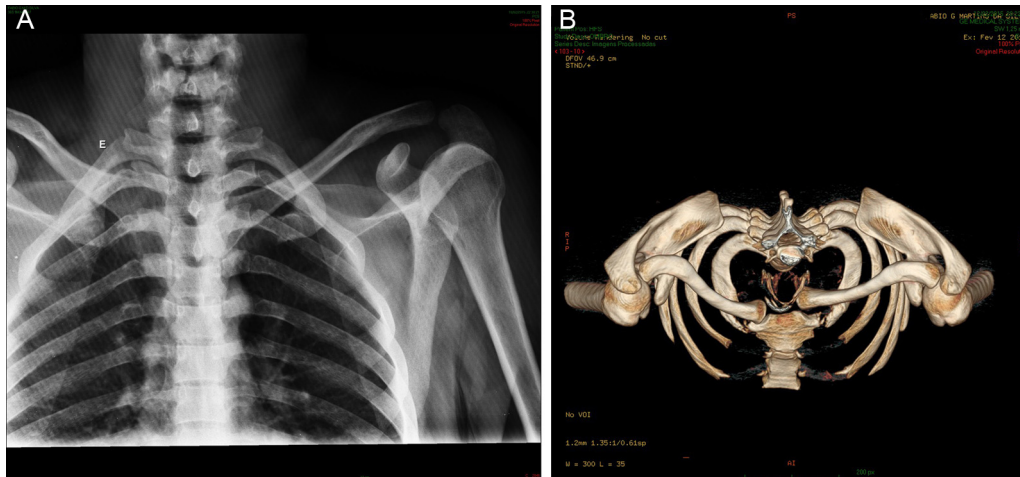


Fig. 4 – (A) Radiography showing the sternoclavicular dislocation to the left; (B) computed tomography 3-D reconstruction demonstrating the dislocation to the left.

interclavicular, and costoclavicular ligaments. The posterior ligaments are significantly more resistant, requiring 50% more force to produce a posterior dislocation than an anterior dislocation.¹² Mobility and laxity of sternoclavicular joint decrease with age, therefore this injury is more common in young adults. The clavicle is the first long bone to ossify, while the medial physis is the last to close. The medial clavicle is not ossified before 18–20 years of age and it merges with the diaphysis around the 23rd to 25th year of age.¹³ This is important because trauma in young people, especially in athletes, may not be limited to the classic sternoclavicular posterior dislocation, but rather may mask an epiphyseal deviated fracture-avulsion.

The diagnosis through conventional X-rays for posterior dislocation of the sternoclavicular joint may be difficult due to the superposition of the radiographic anatomy, which hinders an ideal image. Special views have been recommended by some authors, but they are limited.¹⁴ In the anteroposterior (AP) view, dislocation of the sternoclavicular joint is suspected when there is a difference in relation to the craniocaudal position greater than 50% of the medial clavicular epiphysis.⁷

Numerous articles have reported the advantages of the CT scan to assess the medial clavicle and the sternoclavicular joint. The images provided by CT scan help to observe not only the bone details, but also the soft tissue structures around the injury.^{6,13,15} Especially in posterior dislocation of the sternoclavicular joint, which is a more serious injury and may compromise the structures of the thoracic region, anterior and posterior mediastinum (esophagus and trachea), nerves, and great vessels (brachiocephalic vein, superior vena cava, and aorta), the CT scan has great value in the diagnosis and prognosis of the injury, despite the absorbed radiation.^{14,16} Therefore, on suspicion of posterior dislocation of the sternoclavicular joint, analysis with CT scan and 3D reconstruction are recommended, as it was particularly important in the present cases to observe the medial injury, both to confirm the diagnosis and monitor the reduction. In patients younger than 25 years, the possibility that the injury is an epiphyseal fracture-detachment rather than only dislocation of the joint should be observed on the CT scan.⁶

As previously reported, due to the rarity of injuries, long-term studies with large numbers of patients are not available. This makes it difficult to indicate the best treatment for posterior dislocations of the clavicle. There is no evidence that can guide treatment choice. However, the authors believe that if the patient does not show signs of mediastinal compression, closed reduction should be attempted, supervised by a thoracic or vascular surgeon to avoid unpleasant surprises during the reduction. Vigorous limb traction should be avoided, as nervous structures can be stretched or damaged.² The use of a reduction clamp may be a good technique, as recommended by Kayias et al.¹⁷ and Wettstein et al.¹⁸ Moreover, in patients with signs of mediastinal compression, meniscus injury, or instability with recurrent dislocation, surgical treatment should be indicated.¹⁹ Numerous surgical techniques have been proposed.^{19–25} In order to avoid functional limitation, treatment should spare the articular surface, stabilize the capsular and ligamentous structures and, in the case of young patients, reduce the epiphyseal fracture. The use of Kirschner wires to temporarily aid reduction should be avoided, as it can lead to complications such as breakage of the material or wire migration.^{13,26,27}

In the case where surgery was needed, an 8-shaped cerclage technique was used, with Ethibond Exel M46® No. 5 wire and a superior reinforcement on the joint, with the same wire, to prevent loss of reduction. The patient was kept in a sling for six to eight weeks and was recommended to avoid raising the arm $\geq 60^\circ$. After 12 weeks, he was instructed to gradually increase the use of the limb to perform activities of daily living.

Conclusion

The present study showed two cases of traumatic posterior dislocation of the sternoclavicular joint, treated in different ways. In one case, closed stable reduction was achieved; in the other, due to recurrence after reduction, surgery with sternoclavicular joint cerclage was required. The authors also emphasize the importance of CT scan in the diagnosis, as well as after the treatment to monitor the reduction.

Conflicts of interest

The authors declare no conflicts of interest.

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