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(CASE REPORT)

Management of sternoclavicular pseudo-dislocation: A physeal fracture-separation of the medial clavicle

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Abstract

Proximal clavicular physeal fracture-separation is an extremely rare injury in adolescents and young adults. It involves a fracture-disruption between the clavicle and its ossification center, often mimicking a sternoclavicular dislocation. The authors report a case of proximal clavicular physeal fracture-separation in a 17-year-old male, with no associated neurovascular injury. A CT scan was essential for accurate diagnosis. Surgical management consisted of open reduction of the fracture-separation followed by stabilization using two Kirschner wires (K-wires).The clinical and radiological outcome was excellent at the 6-month follow-up.

Keywords: Sternoclavicular Dislocation; Epiphyseal Separation; Medial Clavicular Epiphysis

1. Introduction

Traumatic injuries of the sternoclavicular joint remain rare (1; 2), accounting for only 1% to 3% of all shoulder girdle injuries (1). This clinical entity encompasses sprains, sternoclavicular dislocations, fractures of the medial third of the clavicle, and physeal fracture-separation of the medial clavicular epiphysis. The latter is frequently misdiagnosed as a sternoclavicular dislocation, leading to its common designation as a "pseudodislocation" (3) ..

2. Case Report

2.1. Clinical Findings

A 17-year-old male presented after a high-energy fall from a bicycle, landing directly on his left shoulder. The patient complained of localized pain in the left parasternal region and the shoulder, accompanied by functional impairment of the left upper limb.

Upon admission, physical examination revealed significant pain exacerbated by pressure on the clavicle. There was a prominent, abnormal protrusion in the left parasternal region with associated edema over the sternoclavicular joint. There were no signs of skin lesions, and a distal neurovascular assessment was unremarkable.

2.2. Imaging

The initial anteroposterior chest X-ray showed no mediastinal or pulmonary abnormalities. A musculoskeletal CT scan with 3D reconstructions and intravenous contrast administration revealed a Salter-Harris Type I physeal fracture-separation of the proximal left clavicle (Fig. 1).

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Figure 1 Chest X-ray and 3D CT reconstructions demonstrating a medial (proximal) clavicular physeal fracture-separation of the left side

2.3. Treatment

Figure 2 Postoperative imaging: Anteroposterior (AP) and lateral radiographs at day 1 (POD 1) showing the two sternoclavicular K-wires in the correct position

Due to the significant displacement and to prevent long-term sequelae, surgical intervention was planned. The procedure was performed under general anesthesia with the patient in the beach-chair position. A skin incision was centered over the sternoclavicular joint.

Upon exposure of the injury, the proximal clavicle was found to be completely stripped of its periosteum. The costoclavicular ligament remained attached to the periosteum of the inferior surface of the clavicle. The fracture was reduced and then stabilized using two 1.8 mm Kirschner wires (K-wires) passed from the clavicle into the sternal manubrium. The distal ends of the wires were subsequently bent to prevent migration (Fig. 2).

2.4. Follow-up

Postoperatively, the limb was immobilized in an orthopedic sling. Passive and active mobilization was restricted to the elbow and wrist only. Sports activities were suspended for three months.

The two K-wires were removed at six weeks under brief general anesthesia. Following removal, shoulder rehabilitation was initiated, involving gentle and progressive mobilization without range-of-motion restrictions, alongside muscle strengthening and physiotherapy.

At the 6-month follow-up, clinical examination revealed no pain upon palpation of the injured area or during mobilization of the left upper limb in all planes of motion. The patient successfully returned to a level of physical activity strictly identical to his pre-injury status.

Throughout the follow-up period, standard radiographs showed no secondary displacement of the physeal fracture-separation, no delayed union, and no sternoclavicular instability.

3. Discussion

From an epidemiological perspective, our patient fits the typical profile—regarding age, sex, and mechanism of injury (high-energy trauma)—associated with physeal fracture-separations of the proximal clavicle (4). However, due to the very late ossification of the medial clavicular epiphysis and its proximity to the joint, distinguishing between a true sternoclavicular dislocation and a physeal fracture-separation is often challenging (5). This diagnosis must be systematically considered in any adolescent or young adult presenting with high-energy indirect shoulder trauma (6).

Clinically, an isolated injury is suspected when there is post-traumatic painful depression at the sternoclavicular joint (posterior or retrosternal form) or a prominent swelling (anterior form). Standard radiography does not allow for a detailed analysis; therefore, Computed Tomography (CT) is essential (7). CT imaging also enables the assessment of the relationship between the clavicular end and the underlying great vessels, establishing the exact position of the fragment to facilitate reduction and surgical planning (8;9).

Surgical treatment for these injuries is not systematic (10). In cases of pure physeal separation, the periosteal sleeve often remains intact, and the stability of the reduction is excellent. Once reduction is achieved, non-operative (orthopedic) management is generally the rule. Closed reduction is typically straightforward, combining shoulder retropulsion with direct pressure on the anterior aspect of the medial clavicle (11;12).

In our case, there was an avulsion of both the periosteal sleeve and the costoclavicular ligament—crucial elements for sternoclavicular stability—associated with the physeal fracture-separation. Given the significant displacement of the proximal fragment, stabilization was deemed necessary. We performed sternoclavicular fixation using two K-wires passed between the clavicle and the sternal manubrium, with the ends bent to prevent migration. While the use of K-wires is proscribed by many authors due to the risk of migration (13), our experience suggests that properly bending the wires and removing them early prevents such complications.

Stabilization techniques vary widely. Some authors emphasize anatomical restoration, often combined with stabilization methods (14). These include capsuloligamentous repair via ligamentoplasty using natural or synthetic grafts (Achilles tendon, subclavius, fascia lata, palmaris longus, or Dacron tape), with the Jackson Burrows technique using the subclavius tendon being the most common. Alternatively, temporary internal fixation can be achieved using osteosutures, cerclage, or cannulated screws (14; 15; 16).

4. Conclusion

Sternoclavicular dislocations and physeal fracture-separations of the proximal clavicle are uncommon entities due to the robust ligamentous support of the sternoclavicular joint. These injuries are frequently physeal fracture-separations, occurring because of the late fusion of the medial clavicular ossification center, which typically takes place between the ages of 22 and 25. Computed Tomography (CT) is indispensable for an accurate diagnosis. For anterior-type dislocations and proximal clavicular physeal fracture-separations, management is often non-operative (orthopedic). However, in cases of significant displacement posing a risk to skin integrity, surgical intervention is mandatory.

Compliance with ethical standards

Disclosure of conflict of interest

There are no conflicts of interest.

Statement of informed consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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