The case:

A 13-year-old boy presented to the emergency department with chest pain after sustaining an injury to the chest when a football player’s helmet “speared” him.

Your diagnosis?

For answer see page 554
Diagnosis:  
Posterior Sternoclavicular Dislocation

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A posterior sternoclavicular dislocation occurs when the medial end of the clavicle loses its proper articulation with the sternum and is displaced posteriorly. Sternoclavicular dislocations are uncommon among all shoulder dislocations, accounting for only 2% to 3% of all cases.1

Classically, anterior sternoclavicular dislocation is seen much more frequently, with a 20:1 ratio.2 This is, in part, due to a greater strength of the posterior sternoclavicular ligament compared with the anterior ligament. Four strong ligaments (intra-articular disk and costoclavicular, interclavicular, and capsular ligaments) anchor the clavicle to the sternum in a saddle-type joint that allows for both articulation and stability of the clavicle. A posterior sternoclavicular dislocation requires all 4 of these ligaments to be torn, which is another reason that it is less frequent than anterior dislocations.3

Although rare, a posterior sternoclavicular dislocation is considered a medical emergency and requires immediate attention due to the vital structures and organs that lie immediately posterior to the joint. The innominate artery and vein lie posterior to the right sternoclavicular joint, and the trachea and esophagus lie posteromedially. On the left side, the common carotid artery and left subclavian vein are located directly posterior to the sternoclavicular joint. Compression or damage to the great vessels, trachea, esophagus, or lungs that arise from sternoclavicular dislocations could result in significant morbidity and mortality, if not properly managed.3,4

MECHANISM OF INJURY

Dislocation of the sternoclavicular joint involves tearing of the 4 main ligaments and displacement of the clavicle behind the manubrium. This is often implemented by acute trauma. The main mechanism that contributes to the dislocation involves a direct anteroposterior (AP) force applied to the medial aspect of the clavicle. A secondary mechanism that may cause a posterior sternoclavicular dislocation requires a great amount of direct or indirect force applied posterolaterally to the shoulder and arm.4

CLINICAL FINDINGS

Patients typically present to the emergency department with shoulder pain, chest pain, and possible complaints...
of dyspnea, dysphagia, or dysphonia. Patients with posterior sternoclavicular dislocations sometimes tilt their head unknowingly toward the side of dislocation in an attempt to lessen the pain.5,6 Localized soft tissue swelling is also common, accompanied by a marked decreased range of motion in the shoulder.7 On questioning, patients will report a history of trauma resulting in a significant impact on the chest. Posterior sternoclavicular dislocations are most commonly the result of a sports injury or motor vehicle accident.4,6

**DIAGNOSTIC IMAGING**

A complete and accurate evaluation of a sternoclavicular dislocation is necessary to determine its treatment method.5 Standard chest radiographs are often ordered for patients presenting with acute chest pain. However, the presence of a posterior sternoclavicular dislocation may not always be detected on AP views if there is no associated superior or inferior displacement of the clavicular head or if the sternoclavicular articulation is obscured by the superimposed ribs or mediastinal structures (Figure 1).2,5 Asymmetry of the 2 clavicles and manubrium usually indicates a sternoclavicular dislocation, although this may not be well visualized in subtle dislocations.7 A serendipity view (40° cephalic tilt) better visualizes a possible posterior sternoclavicular dislocation.

Since findings on radiographs are not always indicative of an apparent dislocation, computed tomography (CT) is the next imaging modality to confirm any suspicion of a sternoclavicular dislocation and evaluate concomitant injuries to nearby structures (Figure 2). Computed tomography scanning allows for better characterization of a posterior sternoclavicular dislocation and can detect fractures that may not be appreciated on radiographs. Computed tomography angiography is recommended for the evaluation of vascular injuries in the setting of a sternoclavicular dislocation.
of any acute vascular injuries that may accompany a posterior sternoclavicular dislocation, and magnetic resonance imaging (MRI) can assess for neurovascular injuries if symptoms after reduction or complicated cases (Figure 3).

**MANAGEMENT**

Treatment methods aim to restore proper articulation of the sternoclavicular joint and are most commonly assessed by proximity of the dislocated clavicle to vital structures. However, reports in the literature differ on preferential treatment methods for posterior sternoclavicular dislocation. If there is no associated vascular compression or disruption demonstrated on CT angiography, then closed reduction within 48 hours of the injury is typically performed. With the patient under general anesthesia, a towel clip or sterile clamp is inserted percutaneously to pull the medial clavicle anteriorly back to its normal location. An audible click may be heard with successful reduction. Subsequently, the patient is immobilized in a figure-8 cast for 6 to 8 weeks to ensure proper healing. If attempts at closed reduction are unsuccessful in properly relocating the joint, then open reduction is performed. Various surgical techniques have been well documented in the literature. Suture fixation through the joint or the first rib and locking plate osteosynthesis with double-threaded screws are the 2 most popular methods of treatment, both with high success rates. Kirschner wire fixation is generally not recommended due to known cases of wire migration that have led to serious complications or deaths. Experimental fixation methods include basilar plates with blades inserted into the sternum and screws on the opposite end inserted into the clavicle. While some authors note excellent results using this technique, others criticize the bulkiness and complicated surgery required for hardware removal. Most authors, however, agree that each case is dependent on its unique circumstances.

**REFERENCES**