Old unreduced posterior sternoclavicular dislocation and coracoid impingement

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Sternoclavicular joint (SCJ) dislocations are rare injuries, accounting for <1% of all traumatic joint dislocations (1–6). Posterior dislocations are less common than anterior dislocations (1–6). Although such dislocations are infrequent, prompt diagnosis and treatment are necessary to avoid complications, including thoracic outlet syndrome, which involves compression of major vessels, the trachea, and the esophagus within the superior mediastinum. Patients may die if the great vessels are ruptured by the end of the dislocated clavicle. Rupture may also cause breathing difficulties, dyspnea, a choking sensation, dysphagia, or a tight feeling in the throat (1, 2, 7). Although chest and sternal radiographs in different projections can diagnose SCJ dislocations (1, 3, 8, 9), computed tomography (CT) examination is required to define the dislocation fully (1, 3, 4, 6, 8, 10, 11).

When dislocation does occur, early diagnosis is important because closed reduction is seldom successful more than 7 to 10 days after injury (1, 9). Closed reduction can be performed by placing towels or a small pillow between the patient's shoulders and applying lateral traction to the abducted arm, which is then gradually brought back in to extension (1, 3, 4, 12). When the closed reduction fails or diagnosis is late, open reduction can be performed (1–3, 13–17).

Subacromial impingement syndrome is a common cause of shoulder pain. A less frequently recognized cause is coracoid or subcoracoid impingement (2, 18, 19). Patients with this disorder usually have localized pain anteriorly, especially with forward elevation, internal rotation, and cross-arm adduction. Symptoms are presumed to result from impingement of the subscapularis tendon between the coracoid process and the lesser tuberosity (2, 18–20). We report a patient who had an old unreduced posterior SCJ dislocation and coracoid impingement syndrome.

The patient was a 22-year-old woman with right-hand dominance who was a professional basketball player. She had been in a traffic accident 4 months earlier and had sustained blunt trauma on the posterior right shoulder. She complained of pain and paresthesia in her right shoulder and arm and restriction of shoulder movements. The pain prevented her from using her right arm and writing. She had pain on palpation of her right SCJ and coracoid process; the pain was aggravated by shoulder movements, especially horizontal adduction with internal rotation (i.e., the coracoid impingement sign). Findings of the modified Adson maneuver were positive. The medial end of the right clavicle was

Figure 1. CT scan of right sternoclavicular dislocation.

Figure 2. CT scan of the right sternoclavicular joint after operative reduction of the medial end of the clavicle.

less prominent and visible than that of the uninjured side. The Constant shoulder evaluation score was 43 points. Plain radiographs of the clavicle and lateral sternum were not diagnostic. CT scan of the right SCJ showed a posterior dislocation of the medial end of the clavicle (Figure 1). The coracoid index was 12 mm.

Closed reduction was tried under general anesthesia but failed. Subsequently, the patient underwent surgical reduction. The medial 1 cm of the clavicle was excised, the residual clavicle

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Figure 3. Fifteen months after open reduction, the patient had (a) full forward flexion, (b) full external rotation, and (c) full internal rotation.

was secured to the first rib with 1-mm Dacron tape, and the intra-articular disc ligament was transferred in to the clavicular medulla (1, 16). Following the operation, the SCJ was immobilized in a figure-8 splint for 6 weeks. The patient began range-of-motion exercises at the end of the first postoperative week and by the 10th postoperative week had full range of motion of the shoulder and no tenderness. However, the pain and tenderness persisted on the coracoid process, and the coracoid impingement sign was still positive. A combination of local anesthetic and corticosteroid was injected into the coracoid process. Treatment also included nonsteroidal anti-inflammatory medications, avoidance of provocative positions, and physical therapy to strengthen the rotator cuff muscles and stabilize the scapula.

Postoperative CT scan showed reduction of the SCJ joint (Figure 2). At the most recent follow-up examination, in the 15th month after the operation, the patient had full range of motion of the shoulder without pain (Figure 3). The shoulders did not differ significantly in strength, and the patient resumed professional play. The Constant shoulder evaluation score was 92 points.

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The preferred treatment of an acute posterior SCJ dislocation, in the absence of mediastinal injury, is closed reduction (1–4). Rockwood and Wirth (1) suggested that closed reduction is most successful if performed within 7 to 10 days of injury. In various studies, the success rate of closed reduction has been reported as 50% to 68% (1, 4, 11, 13). A variety of methods have been described to treat cases in which closed reduction is not successful (1, 2, 4, 7). These techniques include open reduction and stabilization with the use of suture, soft tissues (such as subclavius tendon or fascia lata graft), or metallic wires. Wire fixation of SCJ should be used only for provisional fixation because of the risk of catastrophic mediastinal injury caused by wire migration (1, 9, 13).

Coracoid impingement is characterized by compression of the subscapularis tendon between the coracoid process and the lesser tuberosity of the humerus, resulting in tendinosis and pain in these soft tissues. Gerber et al have divided the causes of coracoid impingement into idiopathic, traumatic, and iatrogenic (20). The syndrome is most common after a history of chronic overuse, with multiple episodes of microtrauma. Malunion of a

coracoid process, anterior instability of a humeral head, or glenoid fracture can lead to altered anatomic relationships, resulting in subcoracoid impingement (19, 21). Iatrogenic impingement from anterior shoulder surgery, such as a Bristow or Trillat procedure or glenoid osteotomy, has also been implicated (2, 18, 20, 21). These procedures produce a change in the anatomic relationship between the coracoid process and the humeral head. Patients with this condition typically complain of a dull pain in the anterior aspect of the shoulder. Such pain is exacerbated by activities performed with the shoulder in a forward-flexed, internally rotated position (18).

In this patient, the constant pain in the coracoid process at the first examination and after the operation and the positive coracoid impingement sign suggested coracoid impingement syndrome. Patte emphasized the possibility that anterior instability of the humeral head may cause secondary impingement (21). However, this patient had the history of blunt trauma on the posterior right shoulder, and the resulting posterior capsular looseness allowed a change in the relative position of the humeral head and coracoid process, which in turn allowed coracoid impingement to develop. Nonoperative measures were successful in relieving coracoid impingement in this patient.

In conclusion, undiagnosed posterior sternoclavicular dislocation was treated successfully in a young woman athlete by open reduction, clavicular resection, and costa-clavicular ligament tenodesis with capsular ligament transfer into the clavicular medullary channel. SCJ dislocation was apparently caused by posterior trauma to this shoulder during a motor vehicle accident. This trauma also led to damage of the coracoid process and laxity in the posterior glenohumeral capsule. The resulting coracoid impingement syndrome responded to conservative treatment.

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