

Case Report



Dr. Shikhar Yadav



Dr. Renjit John Mathew



Dr. Dileep Sasi



Dr. John Thayyil John

Address of Correspondence

Dr. Shikhar Yadav,
Department of Orthopaedics, Lourdes Hospital,
Kochi, Kerala, India.
E-mail: dr.shikhar.yadav@gmail.com

¹Department of Orthopaedics, Lourdes Hospital,
Postgraduate Institute of Medical Science and Research
Kochi, Kerala, India.

Posterior Dislocation of Sternoclavicular Joint

Shikhar Yadav¹ DNB(Orth), Renjit John Mathew¹ MS(Orth),
Dileep Sasi¹ DNB (Orth), John Thayyil John¹ FRCS(Orth)

Abstract

Background: Traumatic sternoclavicular joint dislocation is a very rare occurrence worldwide and is seen in only 0.5-3% of all injuries to the shoulder girdle. It is seen in high-velocity injuries resulting mostly from road traffic accidents or usually in contact sports such as rugby which is a game not played in our country. The sternoclavicular joint has a lot of important structures belonging to the cardiovascular, nervous, respiratory, and digestive system posterior to it and hence it creates a major challenge to the orthopedic surgeon while dealing with the same. With the lack of incidence and experience on this subject, the surgeon might often miss the diagnosis by not suspecting it or struggle to manage the patient after its diagnosis.

Case Report: A case report of a 12 year old male who has history trauma to the chest which resulted in a posterior dislocation of left sternoclavicular joint and the same was reduced successfully using a closed technique without any complications. A one year follow up of the patient shows complete range of left shoulder with no pain and no history of subsequent instability of the sternoclavicular joint.

Keywords: Posterior dislocation; Sternoclavicular joint; Closed reduction.

Introduction

Traumatic sternoclavicular joint dislocation is a very rare occurrence worldwide and is seen in only 0.5-3% of all injuries to the shoulder girdle [1]. It is seen in high-velocity injuries resulting mostly from road traffic accidents [2] or usually in contact sports such as rugby which is a game not played in our country [3]. The sternoclavicular joint has a lot of important structures belonging to the cardiovascular, nervous, respiratory, and digestive system posterior to it and hence it creates a major challenge to the orthopedic surgeon while dealing with the same. With the lack of incidence and experience on this subject, the surgeon might often miss the diagnosis by not suspecting it or struggle to manage the patient after its diagnosis.

Anatomy

The sternoclavicular joint is a saddle type of joint with articulations between the manubrium sterni and the medial end of clavicle. The clavicle is the only horizontally placed long bone in the body and helps in the transmission of the weight from the upper limb to the axial skeleton. The joint is a closed synovial joint with an interarticular disc separating it into two compartments [4]. Stability of the joint is provided by ligaments placed around it. Anteriorly is the anterior sternoclavicular ligament and posteriorly is the posterior sternoclavicular ligament. The posterior sternoclavicular ligament is stronger and more vital of the two as it provides most of the anterior-posterior stability. There is an interclavicular ligament which connects the two medial ends of the clavicle and provides medial traction to both the clavicles. Costoclavicular ligament attaches the medial end of clavicle to the first rib and helps provide stability to the same [5].

The movements possible at the sternoclavicular joint are as follows: (1) Elevation: 30-35°; (2) translation: Combined anterior and posterior translation of 30-35° [6]; and (3) rotation: Lack of osseous constraints allow a rotation of 45-50° [7]. It is important to note that with every 10° forward flexion of the arm, the clavicle elevates approximately 4° [4].

Mechanism of injury

Sternoclavicular joint dislocation occurs when all the ligaments surrounding the joint are disrupted and require significant force which is seen in road traffic accident, fall from height and contact sports [8]. There are two mechanisms given in the literature; first, a direct injury to medial end of clavicle pushing it posteriorly or the second, which is the more common one being posterolateral force on the shoulder displacing the medial end of clavicle posteriorly [9].

Case presentation

A 12-year-old male student presented to the outpatient department with complaints of pain at the base of the neck and markedly reduced movement of the left shoulder for 1 day. On asking the history, he had an injury while playing where his friend directly fell over his chest with his elbow making direct contact with the upper part of the chest toward the midline. He had no history of difficulty in breathing or swallowing. On examination, he had a swelling over the left sternoclavicular joint with tenderness. Range of motion of the left shoulder was markedly reduced due to pain. Radial and ulnar pulses were present and were equal bilaterally. Neurological examination of the upper limb was normal with no sensory blunting, paresthesia, or motor weakness.

The patient was advised a plain radiograph of both clavicles with shoulder anteroposterior view (Fig. 1). The X-ray revealed a dislocation of the sternoclavicular joint and a CT of the thorax showing both the clavicles with a 3-D reconstruction was taken (Fig. 2 and 3). In the CT scan, the posterior dislocation of the left sternoclavicular joint was clearly seen and was not associated with physal injury. The nature of the injury was explained to the parents and management discussed.

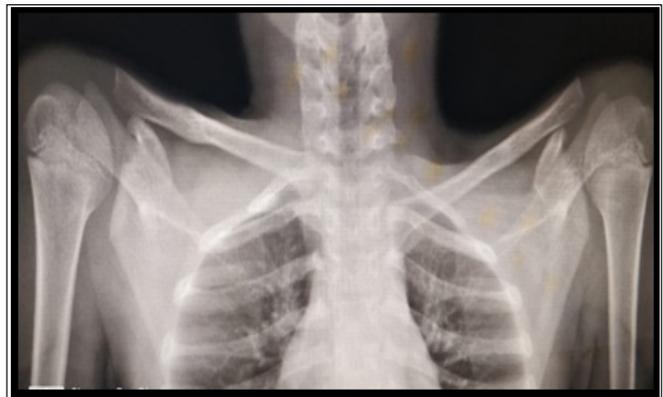


Figure 1: Plain radiography showing dislocation of left sternoclavicular joint



Figure 2: CT scan showing posterior dislocation of sternoclavicular joint



Figure 3: CT scan with 3-D Reconstruction showing posterior dislocation of sternoclavicular joint

The patient was planned for a closed reduction of posteriorly displaced left sternoclavicular joint and consent was taken for an open reduction if closed reduction failed. Anesthesiology fitness was obtained and the patient was taken to the operation theater.

The patient was placed supine with the left shoulder by the edge of the table and a roll of sheet was kept in the interscapular region to extend the shoulder. The shoulder was abducted to 90°, longitudinal traction was applied to the limb while simultaneously extending the shoulder joint (Fig. 4 and 5). The reduction was accompanied with an audible snap and the same was confirmed under the C-arm (Fig. 6). The patient was given a figure of eight bandage and an arm sling to support the weight of the limb.

Post-reduction an arm sling was continued for 3 weeks after which gradual mobilization of the left shoulder was started with pendulum exercises and gradually reaching full abduction by 6 weeks. At 1 year follow-up, the patient had no recurrent episode of dislocation of the sternoclavicular joint and has a painless full range of motion of the left shoulder (Fig 7).

Discussion

Identification of a sternoclavicular joint dislocation should be done at the earliest and vital care shoulder be given to assess the important structures surrounding it. A thorough clinical examination should be done to check for signs of compression of the brachiocephalic trunk, common

carotid artery, internal jugular vein, brachial plexus, dysphagia, dyspnea and hoarseness [10, 11, 12, 13]. After a thorough clinical examination, the patient should be immediately sent for radiology to obtain chest X-ray postero-anterior view. Computed Tomography is the investigation of choice which can be supplemented with a contrast material to rule out vascular compromise. Further which the patient can be managed accordingly. An attempt to closed reduction should be undertaken first and immediately as Bicos and Nicholson have reported failed reduction in injuries older than 48 hours [14].

Closed reduction techniques

The technique used in this case was described by Rockwood where he advised to abduct the shoulder to 90° followed by traction and an extension force. The extension force is transmitted to the clavicle converting it to an anteriorly directed force causing the joint to reduce. He also suggested the use of a towel clip with which the medial end of the clavicle could be held and pulled anteriorly [15]. Another method was described by Buckerfield et al. in 1984. His technique often resulted in reduction of the joint which could not be reduced by other methods and used adduction of the shoulder instead of abduction. He suggested to place the patient supine with a bolster in the interscapular region. A caudal traction was applied on the adducted arm would result in the reduction 6 out of 7 times [16].



Figure 4: Attempting closed reduction with shoulder abducted to 90° and extension of shoulder



Figure 5: Post closed reduction of left sternoclavicular joint



Figure 6: Post closed reduction of left sternoclavicular joint



Figure 7: One year follow up with complete abduction

Open reduction techniques

Open reduction techniques are advocated in cases where closed reduction fails or in chronic dislocation of the sternoclavicular joint. Various methods have been reported in the literature.

Lehmann W et al. advised the use of a Polydioxanone cord around the clavicle and the first rib to provide vertical stability. Fixation to the medial side was provided by using a suture anchor placed on the manubrium sterni [17]. In another study done by Abiddin et al., sternoclavicular joint was reduced using suture anchors over a period of 8 years. At a mean of 4.5 year follow up only one person had poor result [18].

Franck WM et al. advised the use of a Balser plate stabilization system. The design and principle of the plate is similar to acromion hook plate and achieved excellent results [19].

The other operative option is the use of autografts to reconstruct the ligaments around the sternoclavicular joint. Burrows H J advised tenodesis of the subclavius for the management [20]. Castropil et al. advised the use of semitendinosis autograft in a figure of eight shape for reconstruction of the sternoclavicular joint [21]. Spencer et al. did a biomechanical comparison of 1. Intramedullary ligament reconstruction 2. Subclavius tendon reconstruction and 3. Reconstruction using semitendinosis graft in figure of eight and found that semitendinosis graft in figure of eight pattern has superior initial biomechanical properties than the other grafts and may produce better clinical outcomes in patients [22].

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