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SURGICAL TREATMENT OF TRAUMATIC POSTERIOR STERNOCLAVICULAR JOINT DISLOCATION: A CASE REPORT

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ABSTRACT

Posterior sternoclavicular joint dislocation is a rare condition. In this paper, we present a 51-year-old male patient who was admitted to the emergency department in our hospital after he was hit by a mining railway wagon in the chest. A diagnosis of posterior sternoclavicular dislocation was confirmed after performing a CT scan. Following necessary preparations, the sternoclavicular joint was stabilized with two wire cerclage techniques during open reduction. During control at the postoperative 4th week, the range of motion at the shoulder was satisfactory, but the patient had mild pain at the joint level and was sent to physical therapy to improve the range of motion and to minimize the pain.

Keywords: posterior sternoclavicular joint dislocation, 3D CT scan, surgical treatment, cerclage technique

INTRODUCTION

Posterior sternoclavicular dislocations are rare but potentially life-threatening injuries. Sternoclavicular dislocations account for 3% of shoulder girdle injuries and of those approximately 5% are posterior dislocations [1, 2, 3]. Possible trauma to the trachea, pneumothorax, rupture of underlying blood vessels, brachial plexus injury, esophageal trauma, and laryngeal trauma are all serious consequences that can occur after a posterior dislocation [4]. Many of these complications can be fatal, therefore it is crucial that this injury is not treated as a minor injury in the emergency room.

THE CASE AND THE PROCEDURE

A 51-year-old male who worked as a miner presented to our emergency department after he was hit by a mining railway wagon straight in the chest. He was complaining of painful breathing on the left side of the chest and a painful swelling on the right side of the sternoclavicular joint. Upon arrival to the emergency department, his vital signs were normal. Blood tests returned normal with no signs of blood loss. On exam, he was noted to have swelling and significant tenderness over the right clavicle and decreased

range of motion of the right shoulder secondary to pain.

A computed tomography (CT) of the chest was completed with 3D reconstruction. This revealed a right posterior sternoclavicular dislocation (images 1, 2 and 3). The CT also revealed a fracture of the 6th and 9th left rib.

After the patient was admitted to our hospital, multiple blood tests were performed, including hemostasis, tests for blood clothing. All of them were in normal ranges, thus there were no signs of blood loss or blood clots.

The patient was declared stable, and an open reduction of the right posterior sternoclavicular dislocation was performed under general anesthesia with thoracic surgery backup. The joint was exposed by making an incision beginning at a point 2 cm away from sternoclavicular joint towards clavicle side and extending it 8 cm along the edge of the right clavicle. An intraoperative exploration was made and there were no signs of injury of the underlying blood vessels. Intra-articular hyaline cartilage appeared dislocated, the joint capsule was ruptured from both anterior and posterior sides, the clavicular component of the sternocleidomastoid muscle tendon was cut in order to obtain a better approach. Two holes were made using a 3.2 mm drill at the sternum, 1 cm away from the joint surface. And again, using a 3.2 cm drill, two holes were made at a vertical plane 1 cm away from the medial end of clavicle, as to cross both cortices. The reduction was completed with two wire cerclages. (image 4) Cartilage and the joint capsule were repaired as far as possible using a nonabsorbable suture, and the two parts of the sternocleidomastoid muscle tendon were sutured using a nonabsorbable suture. Sternoclavicular joint reduction was evaluated by X-ray images after surgery (image 5). The patient was postoperatively immobilized by a clavicle immobilizer (image 6) and was kept for 4 weeks. During control at the postoperative 4th week, the range of motion at the shoulder was satisfactory, but the patient had mild pain at the joint level and was sent to physical therapy to improve the range of motion and to minimize the pain.

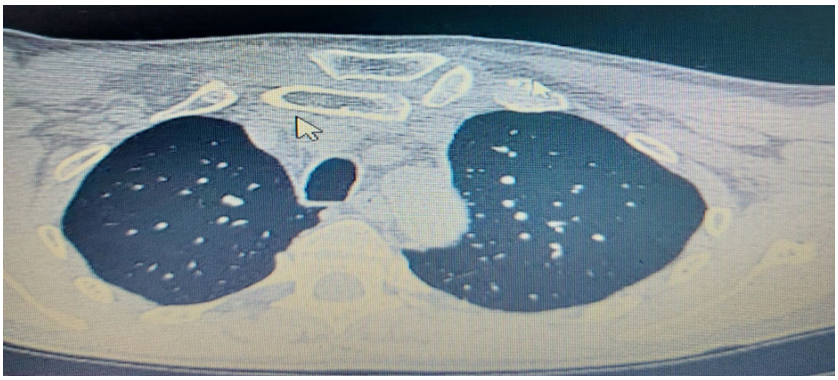


Image 1. *Right posterior sternoclavicular dislocation - chest CT scan axial view*

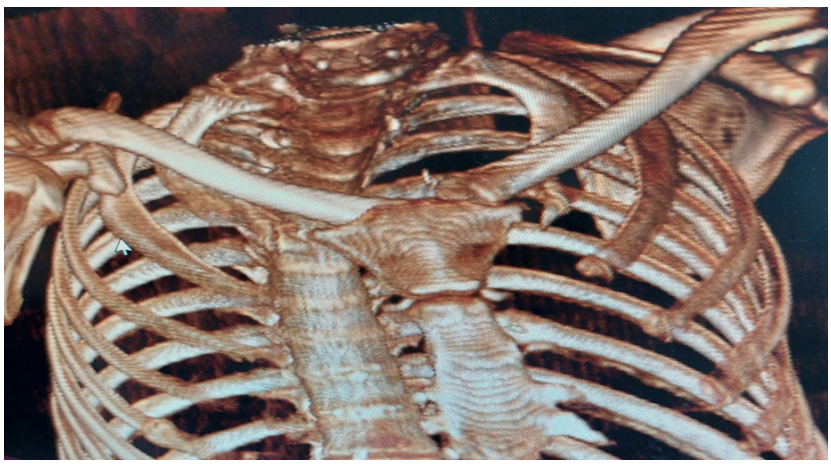


Image 2. *Right posterior sternoclavicular dislocation – chest CT scan 3D reconstruction*

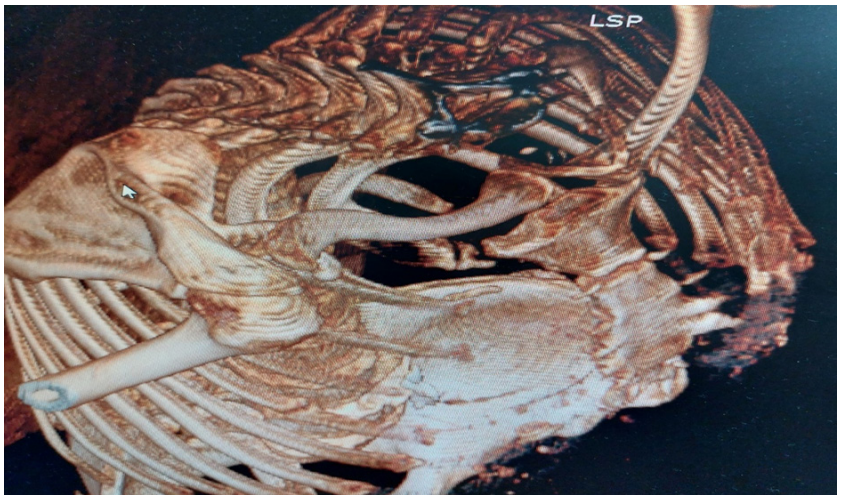


Image 3. *Right posterior sternoclavicular dislocation – chest CT scan 3D reconstruction*

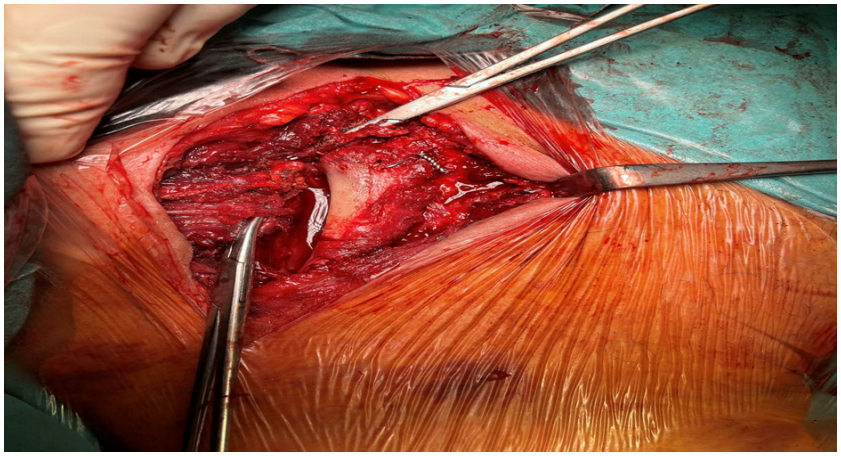


Image 4. *Open reduction of sternoclavicular joint dislocation*

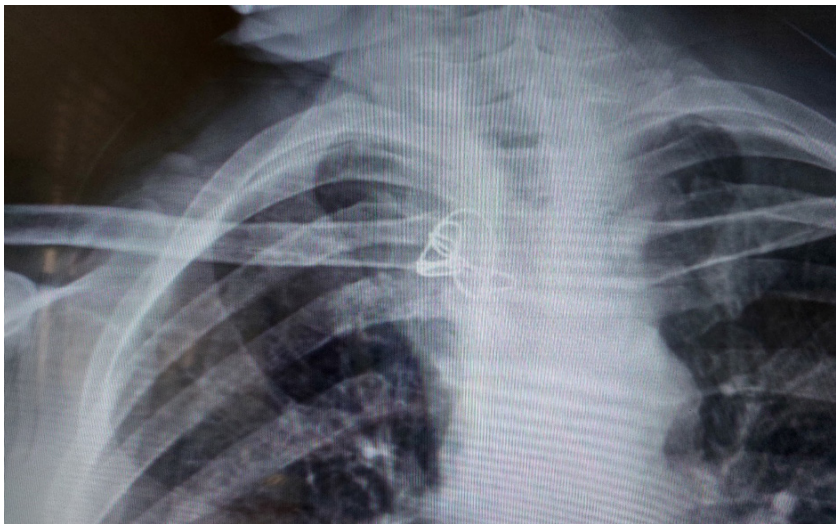


Image 5. *Postoperative radiographs*



Image 6. *Postoperative immobilization*

DISCUSSION

Posterior sternoclavicular dislocations are very rare and pose an immediate threat to mediastinal structures, should a patient sustain this type of injury [5]. Computed tomography (CT) is the gold standard for diagnosis [6, 7]. Clinically, it may be manifested with intense pain, difficulty with deep breathing, and dysphagia. Considering its proximity to important structures in this area, reduction should be performed as soon as possible. Although some authors have previously recommended percutaneous Kirschner wire fixation after closed reduction, it is now certainly not recommended because of the possibility of wire migration and penetration to major vessels [7]. Because posterior sternoclavicular joint dislocation is not a ball-socket type, joint stabilization is provided by an intra-articular disk and capsular ligaments. After dislocation, these ligaments are seriously injured. In their meta-analysis, Tepolt et al. stated that chances of successful closed reduction are low if it is not performed within the first 48 hours [8]. Ngom et al. reported that reduction could be facilitated during closed reduction by pulling the clavicle anteriorly with the help of a hooked clamp [9]. Surgery is indicated when closed reduction is unsuccessful and when reduction is lost in the early period [9]. Until today, several open reduction and repair methods have been described with successful outcomes. Stabilization with local tissue transfer was defined by Burrows in 1951 [10]. Since then, several stabilization techniques have been described, including nonabsorbable tape suture and tension band technique[13], cannulated screw fixation, bridge plate, wire fixation, and repair with allograft or autograft tendon [11]. In our case, two wire cerclages were used. Shuler and Pappas obtained good clinical outcomes after bridge plate application; however, they reported sternoclavicular joint failure and early joint arthrosis after plate removal due to insufficient tissue healing. The plate should not be removed for at least 3 months [12].

CONCLUSIONS

Open reduction of posterior sternoclavicular joint dislocation (PSCJD) with two wire cerclages through drill holes in the manubrium and clavicle has good results.

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Резиме

ХИРУРШКИ ТРЕТМАН НА ТРАУМАТСКА ПОСТЕРИОРНА ЛУКСАЦИЈА НА СТЕРНОКЛАВИКУЛАРНИОТ ЗГЛОБ: ПРИКАЗ НА СЛУЧАЈ

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Постериорната луксација на стерноклавикуларниот зглоб е ретка состојба. Во овој труд претставуваме 51-годишен машки пациент, кој бил примен во ургентниот центар на нашата болница откако бил удрен од рударски железнички вагон во градите. Дијагнозата на постериорната луксација на стерноклавикуларниот зглоб беше потврдена по извршување на КТ (компјутеризирана томографија). Следејќи ги потребните подготовки, стерноклавикуларниот зглоб беше стабилизиран со техника на два жичени серклажи при отворена репозиција. За време на контролниот преглед во 4-тата недела постоперативно, опсегот на движењата на рамото беше задоволителен, но пациентот имаше блага болка во рамениот зглоб и беше испратен на физикална терапија за да се подобри опсегот на движења и да се минимизира болката.

Клучни зборови: постериорна луксација, стерноклавикуларен зглоб, 3Д компјутерска томографија, хируршки третман, серклаж