CASE REPORT

Intrathoracic dislocation of the humeral head accompanied by polytrauma: How to treat it?

Jinming Chen, M.D.,[1] Jin Yan, M.D.,[2] Shenhua Wang, M.D.,[1] Huiming Zhong, M.D.,[1] Haibo Zhou, M.D.[1]

[1]Department of Emergency Medicine, the Second Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou, China;

[2]Department of Emergency Medicine, Zhejiang Hospital, Hangzhou, China

ABSTRACT

High-energy trauma to the shoulder is associated with multiple injuries and is often difficult to evaluate. One of these complex traumas is the displacement of the humeral head into the thoracic cavity. This study aimed to report a patient who presented after falling three floors. Initially, the patient underwent chest drainage and thoracoscopy to remove the displaced humeral head and, subsequently, underwent delayed artificial humeral head replacement. Hemodynamic stability, systematic evaluation, removal of the humeral head, and individual shoulder reconstruction are recommended for these patients.

Key words: High-energy trauma; humeral head; intrathoracic dislocation.

INTRODUCTION

Fracture-dislocation of the humeral head with displacement into the chest is an extremely rare injury. It is associated with high-energy trauma to an abducted and externally rotated shoulder, and there are no uniform guidelines for its treatment. There are few cases reported in the literature involving dramatically different treatments. This study reported a case of a 51-year-old woman who suffered an intrathoracic fracture-dislocation of the proximal humerus after falling three floors.. The humeral head fragment was retrieved through a thoracoscopic approach and, subsequently, the patient was treated with artificial humeral head replacement.

CASE REPORT

A 51-year-old woman presented after falling three floors. She reported severe pain in her left chest, shoulder and hip, and complained of severe respiratory discomfort. Her Glasgow Coma Scale score was 15. She was haemodynamically unstable with a heart rate of 110 beats/min, a respiratory rate of 18 breaths/min, and a blood pressure of 76/48 mmHg.

There was extensive subcutaneous emphysema on the left neck and chest, and the posterior aspects of her left ribs were tender to palpation. Her trachea was deviated to the right, and respiratory sounds were diminished on the left side. Additionally, her left shoulder and upper hemithorax were swollen. Vascular examination and sensation of the left upper limb were fully intact.

Radiography and computed tomography of the chest, pelvis, left shoulder, and left elbow revealed multiple fractures of the left ribs, contusion of the bilateral lungs, fracture-dislocation of the proximal humerus, intrathoracic displacement of the humeral head (Fig. 1a, b), massive left hemopneumothorax, comminuted fracture-dislocation of the elbow, and multiple fractures of the pelvis.

A thoracic drainage tube was inserted for the drainage of the left hemopneumothorax, and the patient was transfused with six units of packed red cells. Subsequently, the patient was transferred to the intensive care unit of our hospital despite being clinically and haemodynamically stable. On day three after admission, the displaced humeral head was found lying loosely in the apex of the aortic arch and retrieved from the chest cavity through thoracoscopy by a chest surgeon. Secondary survey failed to reveal the esophagus, aorta, or adjacent vital structure injuries.

Address for correspondence: Jinming Chen, M.D.
Haibo Zhou, M.D., Department of Emergency Medicine, the Second Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou, China
Tel: +86 571-8778 3777 E-mail: zhouhaibohz@163.com

Qucik Response Code

Ulus Travma Acil Cerrahi Derg
2015;21(2):149-151
doi: 10.5505/tjtes.2015.72566

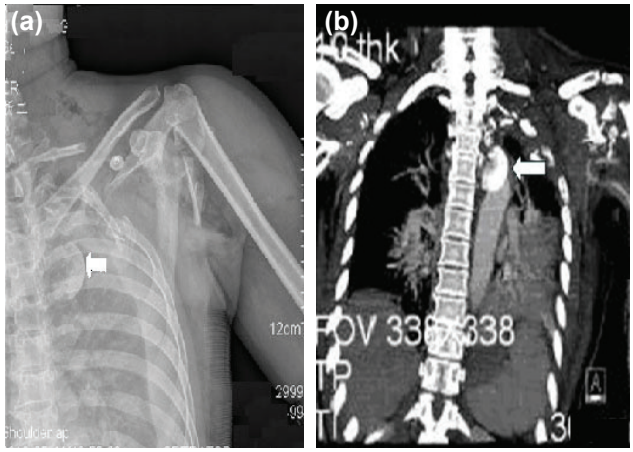

Figure 1. (a) Radiography of the chest showing a proximal humerus fracture and displacement of the humeral head into the left lung field (arrow). **(b)** Coronal computerized tomography demonstrating the intrathoracic position of the humeral head fragment (arrow), as well as the hemopneumothorax.

Due to a concern about avascular necrosis of the humeral head, the patient did not undergo open reduction and internal fixation for this particular injury. Artificial humeral head replacement and internal fixation of the elbow were performed by an orthopedic surgeon three weeks after presentation. The postoperative course of the patient was uneventful, and the patient maintained full sensory function of the involved upper limb. In one-year follow-up, the patient demonstrated 105 degrees of forward flexion, internal rotation up to the L1 level, and external rotation of 35 degrees.

DISCUSSION

Displacement of the humeral head into the thoracic cavity is a very rare injury. The cause of injury is often high-level falls or traffic accidents.[1,2] In addition to reports of dislocation of the humeral head into the ipsilateral hemithorax, there are two case reports of displacement into the contralateral hemithorax, and one case report of displacement into the retroperitoneal space.[3-5] Regarding the mechanism of dislocation, it is postulated that a sudden high-energy force was tremendous enough to both fracture the humerus and drive the dislocated humerus head to pierce the chest wall, mediastinum, and diaphragm. In addition, it might be associated with multiple rib fractures as well.

There are no uniform guidelines for the treatment of this injury, and each case must be appropriately managed according to its specific features. Abellan et al.[6] presented a case of a 70-year-old woman who underwent hemiarthroplasty of the right shoulder; however, the humeral head fragment could not be removed. At the 27-month follow-up, the patient had limited mobility of her right shoulder due to axillary nerve palsy, but no pain or intrathoracic complications. Thus, the removal of the humeral head may not be necessary. Kaar et al.[7] also reported a case in which the humeral head fragment was not removed from the intrathoracic space. However, some authors recommend that the humeral head should always be removed.[8,9] We suggest that the humeral head fragment should be removed. Later removal of the humeral head at six weeks was associated with extensive adhesions, and it was found to be embedded in the lung parenchyma.[10]

High-energy trauma to the shoulder can lead to complex fractures and dislocations that challenge even the most experienced orthopedic surgeon's reconstructive capabilities.[11] Anderson et al.[12] reported the case of a 27-year-old man following a motorcycle crash. The humeral head fragment was retrieved from the chest cavity through an extended deltopectoral approach, and then, an open reduction and internal fixation were performed. The patient achieved clinical and radiographic union of his fracture with no evidence of loss of reduction or avascular necrosis in one-year follow-up. Reattachment of the humeral head to the shaft utilizing a plate was also reported in three other patients.[13-15] Two of the patients subsequently developed avascular necrosis of the humeral head.[13,14] The remaining patient showed no evidence of avascular necrosis at the 18-month follow-up.[15] Shoulder hemiarthroplasty is the treatment of choice for shoulder fracture.[6,2,8,9] Maroney et al.[11] first presented a case of a 67-year-old woman after a fall down one flight of stairs. After emergent extrication of the intrathoracic humeral head and proximal medial shaft, the patient underwent delayed shoulder reconstruction with a reverse total shoulder arthroplasty and allograft augmentation. The reverse total shoulder arthroplasty is a viable option to treat complicated proximal humerus trauma in appropriately selected patients. Conservative management is associated with a poor outcome although it might be considered in the elderly and high-risk patients.[2]

Fracture-dislocation of the humeral head with displacement into the thoracic cavity is an extremely serious injury. Patients who are hemodynamically unstable often require immediate operative intervention when the injury involves vital structures. Stable patients are systematically evaluated to reconfirm whether or not important structures are injured. Ideally, the humeral head should be removed via a minimally invasive method as soon as possible. Following the removal, the subsequent technique for shoulder reconstruction will depend on individual patient specifics.

Conflict of interest: None declared.

REFERENCES

1. Patel MR, Pardee ML, Singerman RC. Intrathoracic dislocation of the head of the humerus. J Bone Joint Surg Am 1963;45:1712-4.
2. Salhiyyah K, Potter D, Sarkar PK. Fracture-dislocation of humeral head with intrathoracic displacement. Asian Cardiovasc Thorac Ann 2012;20:196-8. CrossRef
3. Eberson CP, Ng T, Green A. Contralateral intrathoracic displacement of the humeral head. A case report. J Bone Joint Surg Am 2000;82:105-8.

4. Abbott GF, Gaissert H, Faberman RS. Contralateral intrathoracic migration of humeral head fracture dislocation. AJR Am J Roentgenol 1999;172:1403-4. CrossRef
5. Wirth MA, Jensen KL, Agarwal A, Curtis RJ, Rockwood CA Jr. Fracture-dislocation of the proximal part of the humerus with retroperitoneal displacement of the humeral head: A case report. J Bone Joint Surg Am 1997;79:763-6.
6. Abellan JF, Melendreras E, Gimenez DJ, Carrillo FJ, Ruano L, Rivkin J. Intrathoracic fracture-dislocation of the humeral head: A case report. J Orthop Surg (Hong Kong) 2010;18:254-7.
7. Kaar TK, Rice JJ, Mullan GB. Fracture-dislocation of the shoulder with intrathoracic displacement of the humeral head. Injury 1995;26:638-9.
8. Harman BD, Miller NG, Probe RA. Intrathoracic humeral head fracture-dislocation. J Orthop Trauma 2004;18:112-5. CrossRef
9. Kocer B, Gulbahar G, Aktekin CN, Gunal N, Birinci B, Dural K, et al. Intrathoracic humeral head fracture-dislocation: Is removal of the humeral head necessary? Ann Thorac Surg 2007;84:1371-2. CrossRef
10. Griffin NC, Temes RT, Gill IS, Rice TW. Intrathoracic displacement of a fractured humeral head. Ann Thorac Surg 2007;84:1400. CrossRef
11. Maroney SS, Devinney DS. Intrathoracic fracture-dislocation of the proximal humerus treated with reverse total shoulder arthroplasty. Orthopedics 2009;32:924. CrossRef
12. Anderson M, Rose P, Jacofsky DJ, Torchia ME, Dahm DL.Intrathoracic fracture- dislocation of the proximal humerus: A case report and report of a new surgical technique. J Trauma 2007;63:920-3.
13. Hardcastle PH, Fisher TR. Intrathoracic displacement of the humeral head with fracture of the surgical neck. Injury 1981;12:313-5. CrossRef
14. Wirth MA, Jensen KL, Agarwal A, Curtis RJ, Rockwood CA Jr. Fracture-dislocation of the proximal part of the humerus with retroperitoneal displacement of the humeral head: A case report. J Bone Joint Surg Am 1997;79:763-6.
15. Argekar HG , Dharap S, Kale A, Ghag G. Intrathoracic dislocation of humeral head: A case report. J Maharashtra Orthopaedic Association 2012;7:18-21.

OLGU SUNUMU - *ÖZET*

Politravmanın eşlik ettiği humerus başının intratorasik dislokasyonu: Nasıl tedavi edilir?

Dr. Jinming Chen,[1] Dr. Jin Yan,[2] Dr. Shenhua Wang,[1] Dr. Huiming Zhong,[1] Dr. Haibo Zhou[1]

[1]Zhejiang Üniversitesi Tıp Fakültesi, İkinci Bağlı Hastanesi, Acil Tıp Kliniği, Hangzhou, Çin;
[2]Zhejiang Hastanesi, Acil Tıp Kliniği, Hangzhou, Çin

Omuzun yüksek enerjili travmaları çoklu yaralanmalarla ilişkili olduğundan değerlendirmesi sıklıkla zordur. Bu kompleks travmalardan biri de humerus başının toraks boşluğu içine deplasmanıdır. Üçüncü kattan düştükten sonra başvuran bir hastayı tanımlamaktayız. İlk önce deplase olmuş humerus başını çıkartmak için kadın hastaya toraks drenajı ve torakoskopi yapılmış, daha sonra hastaya geç dönemde yapay humerus başı replasmanı uygulanmıştır. Bu hastalar için hemodinamik stabilite, sistematik değerlendirme, humerus başının çıkartılması ve bireye uygun omuz rekonstrüksiyonu önerilmektedir.

Anahtar sözcükler: Humerus başı; intratorasik dislokasyon; yüksek enerjili travma.

Ulus Travma Acil Cerrahi Derg 2015;21(2):149-151 doi: 10.5505/tjtes.2015.72566