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Manubriosternal Distruption– A Rare Traumatic Entity

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Authors' contributions

This work was carried out in collaboration between both authors. Author NS designed the study and wrote the first draft of the manuscript. Author MVPA managed the analyses of the study and literature searches. Both authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Despite an increased frequency of chest trauma encountered, manubriosternal joint (MSJ) disruption from blunt injury without associated spine or rib injuries are a rare occurrence and are often outside the focus of acute care surgeons. However, being a marker lesion for severe trauma, here we report the case of a 32 year old male who suffered MSJ disruption following a motor vehicle collision managed non-operatively and also review the mechanism and management of these injuries.

Keywords: Sternal angle; hyper flexion; thoracic trauma; cost-benefit ratio.

1. INTRODUCTION

The manubriosternal join is a symphysis with a fibro cartilaginous disc between the two ends of hyaline cartilage. In 90%, there is a synchondrosis formation by the second rib articulation [1]. The powerful anterior and posterior sternocostal ligaments and the splinting by the second rib makes manubriosternal joint (MSJ) dislocation an uncommon event. In the

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view of rarity of these injuries, and limited reporting in literature, the optimal management of these cases and the indications of surgical intervention is still under debate. Here we report a conservatively managed case of manubriosternal disruption and also highlight on the various treatment modalities.

2. CASE REPORT

A 32 year old male, riding a heavy vehicle at a speed of 40km per hour was involved in a head-on-collision with a four-wheeler and sustained a hit against the steering wheel. In addition to a momentary loss of consciousness, patient complained of chest pain on deep inspiration. On examination, he was hemodynamically stable with localized tenderness and an abrasion of 2x1cm over the sternum. Past medical and surgical history was insignificant. Computed tomography (CT) of the chest revealed MSJ disruption with mild anterior subluxation of the manubrium. Patient was further evaluated with 12 lead electrocardiogram and 2Dimensional - transthoracic echocardiography which revealed no abnormalities. There were no other associated spine, rib or lung parenchymal injuries. As the patient had isolated MSJ disruption with a pain score on visual scale of 4/10, we chose conservative line of management. Patient was followed up monthly with radiographs. Now at 6 months of follow-up, the patient is symptom-free and has no limitation on the activities of daily living.

Fig. 1. Computed tomography chest with 3 dimensional reconstruction showing post-traumatic type 1 manubriosternal dislocation

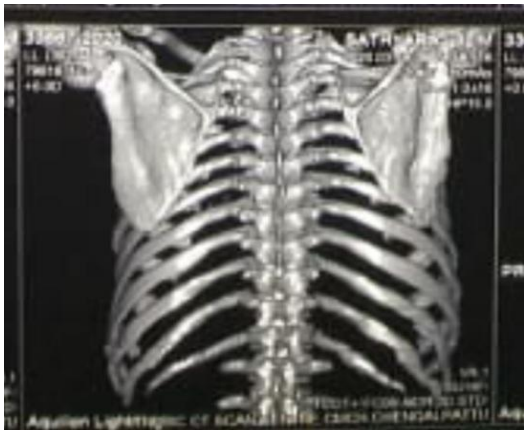

Fig. 2. Computed tomography chest with 3 dimensional reconstruction showing intact thoracic spine

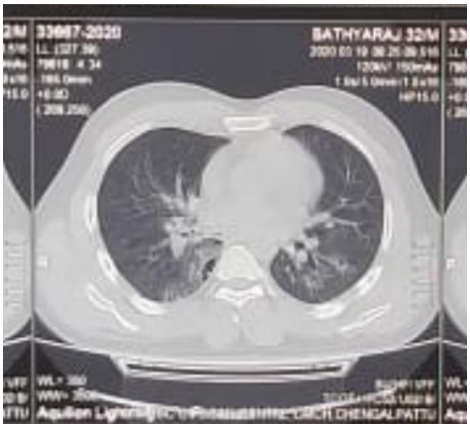

Fig. 3. Computed tomography chest (axial cuts) showing normal lung parenchyma and mediastinum

3. DISCUSSION

The angle of Louis was first described in the nineteenth century by a Frenchman named Alexandre Louis, and it more commonly goes by the anatomical terms Sternal angle or the

Manubriosternal joint.[2] MSJ dislocation are rare injuries, representing 0.64% of all traumatic injuries as stated by Knobloch et al. [3]. Thirupathi and Husted classification of Manubriosternal dislocations are of two types based on the dislocation of the sternal body in sagittal plane : Type I – Body of the sternum is displaced dorsally; Type II - Body of the sternum is displaced ventrally over the manubrium [4]. While direct injury as road traffic accident can cause both type I and II injuries. Here the impact is transmitted directly to the sternum. Type II injury can also result from injuries causing hyper flexion of upper thoracic spine and is often seen in patients with osteoporosis, rheumatoid arthritis, vertebral injuries, when a great proportion of the force is transmitted to the sternum by the clavicle, ribs with distal and dorsal traction [5-6] Keeping the thoracic cage theory in mind, in patients with hyper flexion injury, whole spine and sternal injuries are to be ruled out.

Conservative management is the main modality in uncomplicated cases and involves pain management, manual reduction and ensuring secure reduction with plaster tapes, ice application, chest physiotherapy to ensure effective cough and breathing, restriction of movements with special emphasis on avoidance of contact sports for several weeks [7] Non-operative management can result in bronchopneumonia, chronic pain, calcification with ankylosis, malunion, pseudo arthrosis sterni [1]. The various indications for operative intervention are: unstable disruptions with associated mediastinal injury, respiratory distress, severe persistent pain despite adequate analgesia limiting ventilation, cosmetic disfigurement from deformity [8]. Open reduction and fixation can be done by polydioxanone suture repair, kirschner wire, steel wire cerclage, steel plating, titanium plating with demineralized bone matrix. K-wires are risky to apply, tend to break easily and impairs wound healing due to inadequate soft tissue cover [9]. Cerclage can still result in deformity and restrictive lung pathology from the loss of tension of steel wire due to constant work of breathing. The titanium plate application has lesser operating time, reduced duration of drain output, lesser duration of hospitalisation and an improved cost-benefit ratio compared with steel plating [8]. Though in our case, the patient has been successfully managed by non-operative management, considering the joint anatomy and various force transmission, plate fixation with or without bone grafting is expected to produce optimal outcomes even when other methods have failed.

4. CONCLUSION

MSJ disruptions are less frequently encountered thoracic trauma entity, and often missed due to other dramatic associated injuries. There is no clear consensus between conservative and surgical options; hence the economic sustainability of intervention along with the type and severity of injury is to be considered to decide on the treatment plan, having agreed that

better results are obtained with surgical intervention in complicated cases.

CONSENT

Informed consent was obtained from patient's and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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