Manubriosternal Joint Dislocation- A Treatment Dilemma
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Citation

Abstract
Manubriosternal joint dislocation is extremely rare and yet there is no definite standard for treating such injury. The reported results of conservative or surgical approach vary between patients. We report a case where different methods of treatment were tried. However, controlling symptoms could only be established by stabilizing the joint using a plate fixation.

CASE REPORT
A 33 year-old man was involved in moderate speed road traffic accident. His primary injuries were right clavicle fracture, whiplash injury and disruption of his 2nd right sterno-chondral junction.

After his recovery, he had persistent dull sternal pain exacerbating on activity and radiating to the upper limbs. On examination, a tender prominence was noted above the second costal cartilage and clicking above the manubriosternal joint.

A CT scan showed disruption of the first costochondral cartilage and manubrial junction. The 3 Dimensional modeling showed the manubrium tilted anteriorly on the right side and there was also a linear undisplaced fracture of the second cartilage. (Fig 1)

Unfortunately, the conservative management with rest and analgesia failed to control his symptoms. Therefore, the patient underwent excision of the manubriosternal joint cartilage and stabilising the joint with 2 interrupted sternal wires, and then the right second costal cartilage was reattached to the sternum using 2 interrupted Ethibond sutures. Two months after the operation, we reviewed the patient in the clinic as he still had increasing pain. On clinical examination there was obvious instability in the manubriosternal junction suggestive of pseudoarthrosis formation.

Figure 1
Fig 1: 3D CT chest showed the disruption of the manubriosternal Junction.
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There are no real simple techniques for achieving bony union in this joint. Thus, we decided to stabilize the junction using bone graft and titanium plate. A partial midline sternal incision was performed and the previously inserted steel wires were removed. The fibrous tissue in the manubriosternal joint was excised. The osseous defect was filled with chronOS Beta-Tricalcium Phosphate Granules and dematerialized bone matrix allograft. Then, a T-shaped plate was screwed between the body of the sternum and the manubrium. (Fig 2)

**Figure 2**
Fig 2: T-shaped Plate screwed to stabilize to junction

Post operatively, the patient made an uneventful recovery. Over one-year follow up, the patient has been symptoms free with stable manubriosternal junction. X-Ray revealed a good position of the plate and the joint. (Fig 3)

**Figure 3**
Fig 3: Lateral chest X Ray reveals the good position and lining of both the sternum and manubrium

DISCUSSION

Manubriosternal joint dislocation is an extremely rare injury resulted from either direct or indirect compression of the sternum. THIRUPATHI & HUSTED classified dislocations of the manubriostrnal dislocation into 2 major types. In type I, the body of the sternum is displaced posteriorly. This type of dislocation results from a direct compression injury to the anterior chest. Conversely, in type II, the body of the sternum is moved anteriorly (1). This is more frequent and caused by hyperflexion injury of the torso, occurring together with deceleration. Rheumatoid arthritis and kyphosis are predisposing factors for such injury.

The diagnosis is based on the clinical examination revealing instability and severe pain over the sterno-manubrial junction. A simple lateral chest X-ray confirms the diagnosis. CT chest is very important to document the exact extent of the displacement and to exclude associated injuries such as intrathoracic lesions, rib fractures or spinal injuries (2).

Controversy remains about the optimal treatment method which varies depending on factors such as the age of the patient, severity of symptoms, extent of displacement and
associated injuries.

Wada et al. and Watanabe et al. reported successful conservative treatment of sternal segment dislocation in children. In the four patients they treated, remodelling of the dislocation occurred (3).

Nonoperative treatments after reduction, e.g. correction tape or plaster bandage, symptomatic pain treatment, application of ice, and several weeks without sports increase the risk of atelectasis and pneumonia post injury. Moreover the subluxations or reluxations and pseudoarthrosis rate is not inconsiderable due to insufficient patient compliance (4).

Open reduction and fixation is frequently required. However, another controversy arises regarding the used materials. Most authors would use wire loops or Kirschner wires to stabilize the manubriosternal junction (5). Lemaitre et al reported successful stabilizing technique using simple suturing with PDS (polydioxanone) ropes. They believe that this material is advantageous because it is more elastic than sternal wires, and does not break as easily while being tied (4).

Nikas et al described in 1995 a new technique for repair of type II manubriosternal disruption (6), based on a V-shaped resection associated with bone grafts and osteosynthesis by 4-hole plates. Since, few case reports have been reported using this method successfully.

In Our Opinion, going into bony union and preventing pseudoarthrosis could be best achieved when we restrict any movement in the junction. Giving the structure of the joint and the pressure applied during chest and upper limbs movement, plate fixation of the joint is an ideal method to achieve the best result. Using bone grafts alongside the plate enhances the healing and improves the outcome.

**CONCLUSION**

Manubriosternal joint dislocation is an extremely rare occurrence. Unfortunately, it has not been possible to establish an optimal, standardized operative procedure so far because of the small number of cases. Plate fixation gives the best result where other methods have failed to treat such injury.

**References**

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