Double Trouble: A Rare Case of Bilateral Internal Mammary Arteries Injury

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Abstract

Blunt trauma is the most common type of trauma in Saudi Arabia. Road traffic accidents result in majority of blunt trauma, and second to that is work related trauma. Blunt thoracic trauma is commonly associated with blunt polytrauma. Rib fractures, hemo-pneumothoraces and lung contusions are dealt with on daily basis. Saying that, rare presentations of sternal fractures, intrathoracic vascular injury and diaphragmatic injury are encountered from time to time. In this paper, we describe a case of blunt chest trauma resulting in sternal fracture, which was complicated by hemothorax and a very rare injury of bilateral internal mammary arteries. We will describe key points in diagnosis and management and possible complications.

Keywords

Blunt Chest Trauma; Sternal Fracture; Bilateral Internal Mammary Arteries Injury; Chylothorax

Introduction

Internal mammary artery (IMA) injury in blunt thoracic trauma is rare, diagnosis of such injury and management is always a challenge. Anatomical and physiological characteristics of IMA makes it one of the most hidden injury which result in bleeding and sometimes may present as a complication long after. Sternal fractures can result in disruption of IMAs, due to anatomical proximity and the fact that high energetic force that result in a sternal fracture can present with rare injuries; IMAs injury is one of them. Here, we demonstrate a case of blunt polytrauma that resulted in not only unilateral IMA injury but on both sides; the injury was managed operatively and was complicated by chylothorax.

Case report

A thirty-four years old male, an unrestrained victim of a motor vehicle accident was with frontal impact. The exact details of the accident were limited but negative history of ejection and rollover were assured. The patient was brought to emergency department in pain with Glasgow coma scale of 12/15 and was hemodynamically stable. Vitals were recorded accordingly; systolic blood pressure 110 mmHg, pulse rate of 88 beats/minutes and respiratory rate were 22 with Oxygen saturation of 91% on room air. He was managed according to the Advanced Trauma Life Support protocol under the hospital policies of Trauma Code. Upon initial examination; head and neck were normal, chest was inspected and showed no contusion or deformity. Yet, chest wall was very tender upon palpation with obvious gap and loss of bone continuity over the sternum (figure-1). Nevertheless, the abdominal examination showed neither bruises nor traumatic lesions. During the examination, the patient

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became hemodynamically unstable and the patient was
electively intimated to protect the airway. and due high
suspicion of blunt thoracic injury and vascular injury.
Resuscitative measures were taken until the condition was
stabilized.

Figure 1: No Signs of External Injury to Chest, although there is Palpable Depression in the Sternal Body

Primary chest radiograph showed bilateral haziness suggestive of hemothorax (figure-2). Trauma protocol computed tomography (CT) scan revealed bilateral lung contusion, bilateral hemothorax that was significant on the right side, a transverse mid-sternal body fracture and pneumomedistinum. The lung herniated through the defect with no major vessels injury. The status of the internal mammary arteries was not clear at that time (figure-3). As a result, surgical exploration was mandated to insure that the mediastinal structures are not injured and to reduce and fix the sternum. Intraoperatively, no mediastinal injury was noted, the internal mammary artery (IMA) was found transected and in a spastic state at both proximal and distal parts on the right and left side (photo). The two IMAs were ligated at the both ends. Sternum body was fixed by stainless steel wire. Postoperatively, the patient did well until the 3rd day. During the 3rd day, the right chest tube showed extra drainage of 800 mL/day, examination of the fluid confirmed the presence of chylothorax, which was managed conservatively with holding oral feed, total parental nutrition and medium chain triglyceride and octreotide. Two weeks following the conservative treatment, a diagnostic lymphogram was done with no obvious leak. The patient recovered uneventfully and was followed-up up to one year post-injury with no complications.

Discussion
The IMAs are branches of the first part of the subclavian artery and they run in a parallel direction down to the level of 6th intercostal space where they run parallel to the sternum and subdivide into the superior
epigastric and musclophrenic arteries. The blood flow average velocity in each IMA is 150 ml/min. For IMAs injury presentation, diagnosis and management; the anatomical and physiological properties must be taken into consideration. IMA injury is rare and 29 cases were described completely in the literature in the past 37 years with male predominance, mainly on the left side [1]. Seven cases were reported to have bilateral IMAs injury [2-5].

Internal mammary arteries traumatic injury can be present in any blunt thoracic trauma with anterior mediastinal hematoma or hemothorax. Some presentations can be difficult to interpret in acute setting but they should raise high suspicion of IMA injury, pseudoaneurysm, extrapleural hematoma and arteriovenous fistula, can present acutely or later as shock. Usually sternal fractures, rib fractures, and clavicular fractures are concomitant injuries. Patients with blunt thoracic injury whom in shock and with suspicion of IMA injury should receive aggressive resuscitation by a multidisciplinary team approach. Emergency trauma CT protocol can be initiated if the patient is hemodynamically stable. Unstable patients with rapid deterioration despite aggressive resuscitation can be shifted to operation room for surgical repair. If obstructive shock ensued due to tension hemothorax resulting in cardiac arrest, resuscitative thoracotomy can alienate IMA injury and manage it [6].

In stable patients whom underwent CT of the chest, anterior mediastinal hematoma of any size, with or without contrast extravasation should raise suspicion of IMA injury and prompt management of such injury can prevent pressure effect on the heart and major vessels [7]. In case of CT evidence of active bleeding, angiography should be attempted before surgical approach. Embolization is a valid modality for management of IMAs injury with good results and its role is well described in the literature [8, 9]. Surgical management is the choice if there is clear indication as in unstable patients or complete sternal fracture with lung herniation as in our case.

Blunt thoracic trauma can result in rare injuries that can be a diagnostic challenge. IMAs injury is quiet rare with severe complications. Prompt multidisciplinary team approach (trauma team, thoracic and cardiac surgeons and an experienced interventional radiologist) can diagnose these type of injuries immediately and provide management which can range from lifesaving procedures (i.e.; resuscitative thoracotomy) to highly selective therapy (i.e.; super selective embolization).

Conclusion
In spite of the rare incidence of a bilateral IMAs injury, unilateral injury shall be suspected with any blunt chest trauma, especially if combined with sternal fractures. A multidisciplinary team plays a vital role in immediate management. Proper diagnostic imaging can detect IMA injury. Surgical exploration can be deferred in cases where endovascular coiling can be achieved or with minimal sternal disruption. An appropriate follow up of these cases is essential for possible complication.

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Conflicts of Interest
There are none.

References


