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**Surgical Management of undiagnosed laceration of superior vena cava due to blunt  
trauma**

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## **Abstract**

Intrapericardial rupture of the superior vena cava resulting from blunt thoracic trauma is a rare and life-threatening condition that has to be ruled out in the presence of signs of cardiac tamponade and history of blunt thoracic trauma. We report the case of undiagnosed superior vena cava laceration caused by a high speed road traffic accident in a 25-years old patient revealed by cardiac tamponade. We highlight the need of urgent surgical exploration in all unstable patients in the setting of blunt thoracic trauma regardless of imaging conclusions.

## **Introduction**

Great vessels injuries are frequently associated with severe blunt trauma to chest, mostly in high-speed deceleration. Traumatic laceration of the superior vena cava (SVC) is rare and often fatal. It is a challenging diagnosis that has to be ruled out in deceleration trauma. Surgical exploration is urgent in unstable patients.

## **Case report**

A 25-year-old female patient was admitted to our emergency room complaining from severe chest pain after a head on collision at 80 Km/h responsible for blunt thoracic trauma. At admission, Glasgow Coma Score was 15, systolic blood pressure 110 mm Hg and pulse rate 100 bpm. Initial CT-scan evaluation displayed multiple trauma including contained isthmic aortic rupture, left clavicle fracture, nasal pyramid fracture and pericardial effusion first described as insignificant (Figure 1A). As the patient was hemodynamically stable, endovascular treatment was first proposed for the ruptured aortic isthmus. Unfortunately, she rapidly deteriorated. Bedside echocardiography showed massive pericardial effusion. Rescue median sternotomy was performed. Upon opening the tensed pericardium, 500 cc of venous blood was quickly evacuated with prompt hemodynamic stabilization. Surgical inspection revealed the source of hemorrhage as a misdiagnosed 2-cm laceration of the superior vena cava (SVC) at the atriocaval junction (Figure 1B). Hemorrhage was immediately controlled

by digital pressure and the injury rapidly repaired (Figure 1C). No cardiopulmonary bypass was required. Adequate hemostasis was achieved and the sternum was closed. Uncomplicated endovascular treatment of traumatic thoracic aortic injury was secondly performed. Postoperative course was uneventful. The patient was discharged on day 10. She is doing well at one-year follow-up.

### **Comment**

We present here in the case of a patient with two major intrathoracic vascular injuries complicating blunt chest trauma: partial rupture of the intrapericardial SVC and isthmic aortic rupture. Deceleration and traction are the usual mechanisms proposed to explain the occurrence of these injuries at the level of vulnerable sites *i.e.* the aortic arch - descending aorta junction (explaining the aortic isthmus rupture) and the superior vena cava - right atrial junction (explaining the SVC rupture)<sup>1, 2</sup>. Aortic isthmus rupture has catastrophic outcome as it rapidly leads to death in the great majority of patients. Without surgery, almost one third of survivors will die within few hours and more than one half will die within one week<sup>3</sup>. Even if unusual, multiple life-threatening vascular lesions after blunt chest trauma may occur and focus on the ascending aorta is unwise.

Chest CT-scan is key in the diagnosis of traumatic great vessels injury. Nevertheless, surgical exploration must always be the rule in unstable patients admitted for chest trauma with severe deceleration and no further diagnostic testing is needed<sup>2</sup>.

Great vessels injuries are usually repaired without circulatory support because of frequent favourable anterior location of the lesions<sup>3</sup>.

### **Conclusion**

Traumatic laceration of the superior vena cava is rare and often fatal. It is a challenging diagnosis that has to be ruled out in the setting of cardiac tamponade complicating chest

trauma with severe deceleration. Preoperative work up is often limited by hemodynamic compromise. Surgical exploration is urgent in unstable patients.

**Conflict of interest:** none

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## References

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## Legends

**Figure 1A:** Initial CT-scan displaying insignificant pericardial effusion (white arrow).

**Figure 1B:** Surgical view focusing on great vessels showing a misdiagnosed 2-cm laceration of the superior vena cava at the atriocaval junction as the source of hemorrhage (**black arrow**).

**Figure 1C:** Surgical view focusing on great vessels showing surgical repair of the superior vena cava laceration (**black arrow**).

