Unusual presentation of more common disease/injury

Traumatic right ventricular rupture following a horse kick

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Summary

Cardiac tamponade is a life-threatening and time-critical emergency that requires early recognition and prompt management often alongside other resuscitation considerations. The use of ultrasound in the primary survey greatly assists in the early diagnosis allowing preparations for early definitive management to be made. An unusual case of right ventricular rupture following blunt trauma to the chest from a horse kick is discussed.

BACKGROUND

Cardiac tamponade in the context of trauma is usually the result of penetrating chest injury; however, it can also occur secondary to blunt chest injury.

The diagnosis of cardiac tamponade is difficult in the initial primary survey and requires a high degree of clinical suspicion.

The use of ultrasound in the primary survey of trauma patients provides valuable extra information to support the diagnosis, allowing early life-saving definitive management.

CASE PRESENTATION

A 43-year-old woman was transferred by the Yorkshire Air Ambulance to the Leeds General Infirmary following an isolated horse kick injury to the anterior chest wall. During transfer the main problems were hypoxia and fluid-resistant hypotension. Bilateral needle thoracocentesis improved the oxygenation however the non-invasive blood pressure remained low at 75/45 mm Hg.

Primary survey by the receiving trauma team revealed a fully conscious patient with a self-maintained airway and adequate breathing and ventilation. The non-invasive blood pressure was 71/43 mm Hg and peripheral capillary shutdown was noted. Focused assessment with sonography for trauma (FAST) was used as an adjunct to the primary survey. This was positive for pericardial fluid with no evidence of haemoperitoneum. Extended FAST revealed the bilateral pneumothoraces which were converted to chest drains and invasive arterial and central venous access were also gained.

TREATMENT

The decision was made for immediate transfer to theatre under the cardiac surgeons for evacuation of the pericardial blood. In theatre, 750 ml of pericardial blood was evacuated under transoesophageal guidance, through a subxiphoid window. A partial right ventricular rupture was identified and, since spontaneous closure had presumed to have already occurred, surgical closure was deemed unnecessary. The patient remained hypotensive and so intravenous epinephrine was used, with immediate effect, to stimulate the directly observed poor myocardial contraction.

OUTCOME AND FOLLOW-UP

Transfer for polytrauma CT was arranged which revealed the partial right ventricle rupture and associated pulmonary contusions. There were no other injuries. The patient made a full recovery on the cardiac intensive care unit and was discharged home 17 days later.

DISCUSSION

Mothers will not allow their sons to ride motorcycles but will let their daughters ride horses. Horse-related injuries are more common than motorcycle injuries.¹ The severity of injuries sustained by equestrians is dependent on the mechanism. The force from a horse kick has been estimated to be around 10 000 N.² Horse kicks to equestrians are less common than falls or crush-related injuries but should be treated as a high-impact mechanism of injury, particularly considering that protective equipment is less likely to be worn when unmounted.³

Traumatic blunt cardiac rupture is a rare cause of cardiac tamponade and carries a high mortality. In one review, the reported mortality in those who were still alive in the emergency department was 89%.⁴

In the context of trauma, cardiac tamponade occurs when blood builds up within the pericardial sac. The resulting pressure on the ventricle reduces ventricular filling during diastole and, if not recognised and treated early, causes rapid death from cardiogenic shock.⁵ Typically this results from penetrating trauma to the chest; however, as this case highlights this can also occur following blunt chest wall trauma.⁶

The signs of cardiac tamponade are often subtle and can mimic other life-threatening conditions in trauma patients. Beck's triad of elevated jugular venous pressure, reduced arterial pressure and muffled heart sounds, as well as Kussmaul's sign are not practical or reliable in the primary survey of trauma patients.⁷ Dilated neck veins will not manifest in the hypovolaemic patient and Kussmaul's sign is abolished in the intubated patient. The difficulty of diagnosis is often compounded by the presence of other life-threatening injuries such as bleeding sources or, as in this case, tension pneumothoraces.

A diagnosis of cardiac tamponade should be considered early within the primary survey of trauma patients. The use of FAST allows quick identification of pericardial fluid which when combined with the primary survey findings and a supporting mechanism of injury allows the diagnosis of cardiac tamponade to be made. It is worth considering that false-negative rates of up to 10% have been reported with FAST and therefore an over reliance on FAST alone should be avoided.⁶

The management of cardiac tamponade is surgical intervention; ideally under the cardiothoracic team with dedicated operative and postoperative intensive care facilities. For many emergency departments this would involve the hazardous transfer of an unstable patient with a time-critical and life-threatening condition. A decision must be made then between the transfer for definitive management or performing a temporising pericardiocentesis prior to transfer. This supports the early transfer to trauma centres with a full range of on-site trauma specialities.

Learning points

- ▶ A diagnosis of cardiac tamponade should be considered early within the primary survey of trauma patients. This is a difficult diagnosis in the emergency department and requires a high index of suspicion. The use of focused assessment with sonography for trauma as an adjunct in the primary survey greatly improves diagnostic ability in these cases.
- ▶ Isolated horse kicks are a dangerous mechanism of injury and life-threatening injuries should be recognised early in these cases.
- ▶ Early transfer to trauma centres for dangerous mechanisms of injury or with predictors known to require trauma centres should be encouraged.

Competing interests None.

Patient consent Obtained.

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