CASE REPORT
The importance of re-evaluation of the trauma patient

Jill Rutherford-Davies\textsuperscript{a,*}, B. Decadt\textsuperscript{b}, D.S. Johnson\textsuperscript{a}

\textsuperscript{a} Department of Trauma and Orthopaedics, Stockport NHS Foundation Trust, Stepping Hill Hospital, Stockport SK2 7JE, UK
\textsuperscript{b} Department of General Surgery, Stockport NHS Foundation Trust, Stepping Hill Hospital, Stockport SK2 7JE, UK

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Introduction

It is accepted that the Advanced Trauma Life Support\textsuperscript{1} (ATLS\textsuperscript{1}) method, published by the American College of Surgeons, should be used in the initial assessment and management of the injured patient.\textsuperscript{1} It is recognised that mortality secondary to trauma follows a trimodal distribution.\textsuperscript{9} Catastrophic internal injuries cause death in seconds to minutes after injury, with other severe injuries often associated with significant blood loss, resulting in death minutes to hours later. The third peak is days to weeks later and is usually due to multi-organ failure. The quality of the management of the trauma patient in the first few hours following injury markedly affects the outcome.

The ATLS\textsuperscript{1} protocol contains a primary and secondary survey, which provides a systematic way of identifying and treating injuries sustained. However there are circumstances when a potential threat to life may not easily be recognised. Most commonly errors occur in polytrauma patients when the secondary survey cannot be completed, due to primary survey findings requiring immediate intervention. Other factors that contribute to diagnostic errors are distracting injuries, where pain from one injury disguises another, or where the history is misleading or incomplete.\textsuperscript{7}

The following case reports a child who sustained two injuries following blunt trauma, the mechanism of which was unclear.

Case report

A 14-year-old boy was brought into the Accident and Emergency Department following a pushbike accident.

He was immobilised and assessed in accordance with the ATLS\textsuperscript{1} protocol. In the primary survey the airway was patent and chest was clear with good air entry bilaterally. He had normal vital signs; the abdomen was soft and non-tender. His Glasgow Coma Scale (GCS) score was 15.

He complained of pain in the left shoulder and upper arm but denied any other symptoms. He reported falling off his pushbike after cycling into a lamppost; the incident was not witnessed. The secondary survey revealed a deformity to the left shoulder and a superficial abrasion over the left olecranon, with no distal neurovascular deficit. His haemoglobin level was 142 g/l and there was no other abnormality on blood investigations. Morphine was administered as pain relief for the upper limb pain.

X-rays revealed an off ended fracture through the surgical neck of the left humerus (Fig. 1) and a chest X-ray was unremarkable. On review his observations remained normal and the pain was significantly reduced. A collar and cuff was applied and he was admitted for open reduction and internal fixation (ORIF) of the humeral fracture.

In the hours following admission he became distressed, complaining of severe left shoulder pain out of proportion to
that expected. The patient was re-evaluated; his airway was patent and chest remained clear. His oxygen saturation was normal. He had a sinus tachycardia of 120 bpm, with a normal blood pressure and pulse pressure. His abdomen was difficult to assess as the pain in his left shoulder made him reluctant to move his left arm, which lay in a collar and cuff across the left upper quadrant. However, there was tenderness and guarding in the left upper quadrant, with normal bowel sounds. An intravenous fluid infusion was started. His haemoglobin on rechecking had fallen to 120 g/l. A splenic injury was suspected and urgent ultrasonography organised.

He now reported that a car had knocked him off his pushbike, but he would not elaborate further about the circumstances of the injury.

Ultrasonography revealed a trace of fluid in the subhepatic space (Morrison’s pouch) and between the spleen and kidney. There was a moderate amount of free fluid in the pelvis and a splenic contusion was noted with hypoechoic areas in the lower third. The liver and kidneys were normal and there was no pleural fluid. The splenic injury was classified as Grade 1 using the American Association for the Surgery of Trauma organ injury scale.5

The blunt splenic injury was treated conservatively. His observations and haemoglobin remained stable for 72 h, after this period it was felt safe to proceed with ORIF of the humeral fracture, following which he was discharged home. At follow up three months later he was recovering well with no sequelae from either injury.

Discussion

The spleen is the most vascular organ in the body and splenic injuries represent approximately 25% of all blunt injuries to abdominal viscera.4 Children can often be managed conservatively due to an increased proportion being of low-grade injury with fewer multiple injuries5; however complications can occur.2 There needs to be a high index of suspicion to identify these injuries.

Our case illustrates the difficulty in diagnosing such trauma in the presence of another distracting injury. The only symptoms present were of referred pain into the site of the humeral fracture. The systemic and abdominal signs only developed a few hours after admission. Finally, the unclear history meant that the degree of trauma was initially underestimated. It is fortuitous that he required admission, as the majority of proximal humeral fractures in children do not need operative intervention, and he could easily have been discharged following the initial assessment. This case demonstrates the need to carefully re-evaluate patients following trauma with ongoing problems, whether it is in the primary or secondary care setting.

The clinical features of splenic trauma depend on the degree of hypovolaemia and the presence of associated injuries. These range from left upper quadrant pain to shock and peritonitis. Following blunt trauma the patient often denies abdominal pain or tenderness and examination is normal, which does not exclude intraabdominal injury.3 Hours after the initial injury left shoulder pain can be attributed to the haematoma stretching and irritating the splenic capsule, as well as from delayed diaphragmatic irritation,6 secondary to splenic rupture and subsequent extravasation of blood (Kehr’s sign). In this case the patient felt that the pain was due to the fractured humerus and was, therefore, reluctant to move his arm. In addition, his left forearm was resting in a collar and cuff across the splenic territory, making assessment difficult.

This unusual combination of injuries is a good example of how a distracting limb injury can mask the referred pain from an abdominal injury. The delayed development of signs along with the change in the history of the injury reinforces the importance of clinical re-evaluation.

Distracting injuries, referred pain and delayed signs reinforce the need to re-evaluate the trauma patient.

References