Combined brachial plexus and vascular injury in the absence of bony injury

A F MacNamara, A Ismail

Abstract

Neurovascular injury to the axillary vessels is well described in association with fracture or dislocation involving the shoulder joint or the humerus. Such injury however can also occur in the absence of bony injury. A case is presented of damage to the axillary artery and brachial plexus following blunt trauma. This case demonstrates that complex neurovascular damage can occur in the absence of fracture or dislocation. The importance of a thorough clinical assessment is highlighted and priorities with regard to diagnosis and management are discussed.

(*J Accid Emerg Med* 2000;17:378–379)

Keywords: vascular injury; axilla; brachial plexus

Case report

A 75 year old woman was admitted to the accident and emergency (A&E) department after a history of a fall on the outstretched right hand. This had resulted from her being “blown over” by a strong gust of wind. On arrival to A&E she complained of pain in the right shoulder. Clinical examination revealed swelling and tenderness in the area of the right axilla and shoulder. On further examination her radial pulse was present but was noted to be somewhat weaker than that on the left side. The right arm was also felt to be colder than the left. Neurological examination revealed a complete motor and sensory deficit affecting the right arm. Radiography was urgently carried out which showed no evidence of fracture or dislocation to the shoulder or humerus.

The swelling in the axilla continued to increase and the lady became hypotensive. Despite the presence of a radial pulse a clinical diagnosis of a vascular injury to the axillary artery was made in addition to a presumed injury to the brachial plexus. After successful resuscitation by volume replacement angiography was carried out, which showed leaking of contrast material from a branch of the axillary artery (fig 1).

At formal exploration in the operating theatre a side branch of the axillary artery was found to be avulsed from the axillary artery itself. Haemostasis was readily secured. No evidence of injury to the exposed parts of the brachial plexus was apparent at operation. Postoperatively the neurological deficit persisted. Nerve conduction studies were carried out that confirmed avulsion of the roots of the brachial plexus that was not amenable to surgical treatment.

Figure 1 Angiogram showing contrast material leaking from the axillary artery.

Discussion

Damage to the axillary artery after blunt injury usually occurs as a consequence of severe trauma. Arterial injury is well described in association with fracture of the upper humerus^{1 2} or dislocation of the shoulder.^{3 4} Our case shows that arterial injury in the axilla can occur with low impact as well as high impact injuries and that severe vascular and neurological injury can occur in the absence of fracture or dislocation. This case also confirms the close association between arterial injury to the axillary artery and damage to the brachial plexus.

BRACHIAL PLEXUS INJURY

Neurological injury to the brachial plexus is usually caused by severe traction to the nerve roots that occurs at the time of injury. As in our case these injuries are most often not amenable to surgical treatment. Volume loss into the axilla as a result of associated arterial injury can be considerable in these cases and was sufficient to cause hypotension in the case described. The tamponade effect of the haematoma being contained in the axilla delays exsanguination. We have identified only one case in the medical literature where damage to the axillary artery itself was the cause of death in the absence of associated injury.⁵ The high axillary pressures caused by the tamponade effect can, however, cause a compression neuropathy to the brachial plexus. Prompt evacuation of the haematoma may significantly reduce the subsequent neurological deficit in such cases. The long term outcome of neurovascular injury to the axillary structures is not dependent on the vascular injury, which can

Accident and Emergency Department, Birmingham Heartlands Hospital, Bordesley Green East, Birmingham B9 5SS

Correspondence to: Mr MacNamara, Consultant in Accident and Emergency Medicine (amacnamara@msn.com)

Accepted 15 January 2000

usually be successfully managed, but upon the recognition, treatment, and outcome of the associated nerve injuries.⁶

Conclusion

This case highlights the importance of performing a full, detailed neurovascular examination in all patients with an upper limb injury. This case also confirms that a significant vascular injury can be present even when the distal pulse is present and that vascular injury can occur in the elderly with lesser degrees of force because of atherosclerotic rigidity of the artery. In cases where a vascular injury is suspected and the patient is stable angiography should be rapidly carried out to delineate the anatomy of the injury allowing surgical access to be planned. Although a coordinated vascular and orthopaedic approach and prompt surgical treatment will optimise post-injury upper limb function the long term results of these complex

injuries are usually determined by the presence and severity of associated nerve injuries.

Contributors

Ahmed Ismail contributed the original idea for this paper and contributed to the writing of the paper. Aidan MacNamara was responsible for reviewing the literature and writing the paper. The guarantor of the paper is Aidan MacNamara.

Funding: none.

Conflicts of interest: none.

- 1 Byrd RG, Byrd RP, Roy TM. Axillary artery injuries after proximal fracture of the humerus. *Am J Emerg Med* 1998;16:154–6.
- 2 Hayes JM, VanWinkle G. Axillary artery injury with minimally displaced fracture of the neck of humerus. *J Trauma* 1983;23:431–3.
- 3 Adovasio R, Visintin E, Sgarbi G. Arterial injury of the axilla: an unusual case after blunt trauma of the shoulder. *J Trauma* 1996;41:754–6.
- 4 Gates J, Knox J.B. Axillary artery injuries secondary to anterior dislocation of the shoulder. *J Trauma* 1995;39:581–3.
- 5 Lodding P, Angeras U. Fatal axillary artery injury following anterior dislocation of the shoulder. *Ann Chir Gynaecol* 1998;77:125–7.
- 6 Shaw A, Milne A, Christie J, et al. Vascular trauma of the upper limb and associated nerve injuries. *Injury* 1995;26:515–18.

Acute cerebrovascular accident after minor trauma in a 1 year old

W Matthews, R Freij, K Hashemi

Abstract

Acute cerebrovascular accident in an otherwise well child is a rare presentation. A case is described where the diagnosis was delayed because of association with minor trauma and a misleading diagnosis of soft tissue injury.

(*J Accid Emerg Med* 2000;17:379–380)

Keywords: cerebrovascular accident; minor trauma

Case report

A 1 year old girl presented to the accident and emergency (A&E) department one hour after a witnessed fall from a sofa. She landed on her left side hitting her head, and afterwards was reluctant to use her left arm and leg. She cried immediately after the fall, had sustained no loss of consciousness and had not vomited or slept since the incident. Her past medical history was unremarkable with a normal delivery and developmental milestones. There was no relevant family history.

On examination she was distressed, crying when moved. There was no obvious limb deformity. There was no spontaneous left arm movement but she could be encouraged to withdraw the limb. She was able to weight bear on both lower limbs but had minimal spontaneous movement of her left leg. She was fully alert with no cranial nerve abnormality detected. After analgesia she settled and full passive movement was achieved in both hips. Radiographs of left shoulder, elbow and wrist

Figure 1 The area of low attenuation (standard orientation) is demonstrated.

were normal. She was discharged home that night to be reviewed the following day at which time there was no change in her condition. On second review her mother described her to be continuously irritable, she had deteriorated in that she was now unable to weight bear, had decreased tone on the left side, flaccid reflexes, an upgoing left plantar and facial asymmetry on crying.

Computed tomography of the head was performed under sedation and showed a low attenuation area in the posterior aspect of the

Mayday University
Hospital, London
Road, Croydon
CR7 7YE
W Matthews
R Freij
K Hashemi

Correspondence to:
Mr Freij, Consultant in
Accident and Emergency
(ramzi.freij@mhc-tr.
sthames.nhs.uk)

Accepted 15 January 2000