On-line Case Report

Scapular fracture after electric shock

M RANA, R BANERJEE

Wrexham Maelor Hospital, Wrexham, Clwyd, Wales

Scapular fracture as a direct result of electric shock is a rare injury. We present a case report and review of the literature.

Keywords: Scapular fracture – Electric shock

Case report

A 33-year-old farmer attended casualty with a painful right shoulder following a mains electric shock sustained whilst wiring the kitchen. He gave a history of touching some live wires with his right hand and then complained of severe pain up his right arm and into his right shoulder and upper back. He was in contact with the wiring for no longer than 5–10 s. He had no chest pain or palpitations. There was no direct injury to the scapula.

On examination, there were three small entry wounds at the tip of the thumb and on the radial side of the index

and middle fingers, all were less than 5 mm in diameter. No exit wounds were noted. There was no neurovascular deficit; he was in sinus rhythm with a normal ECG. He had a painful right shoulder with very minimal movement. Radiographs revealed a fracture to the blade of the right scapular (Fig. 1a,b). There were no associated fractures of the shoulder, which was in joint. He was admitted for cardiac monitoring and analgesia. Computerised tomography was performed to assess the extent of the fracture and to rule out extension into the glenoid. He was discharged 24 h later with a broad arm sling and physiotherapy exercises to mobilise the shoulder as pain allowed.

Review in fracture clinic at 10 days revealed a substantial periscapular haematoma but his range of movements had greatly improved. Clinically, at 3-month review, the scapula was fully healed with no residual tenderness and a return to normal function.

Discussion

Scapular fractures are uncommon injuries and usually associated with direct high-energy trauma. They can be associated with other life-threatening injuries in up to 20% of cases. There have been reports following cardiopulmonary resuscitation, seizures and electroconvulsive therapy. Fractures from electrical shocks

Figure 1 Radiographs showing a fracture to the blade of the right scapular.

Correspondence to: Mr M Rana. E: radishrana@hotmail.com

usually occur when the victim falls after the accident.² Scapula fractures as a direct result of electrical shock are very rare with only few reported cases in the literature in the last century;¹⁻³ all are associated with a low frequency current (less than 60 cycles per second). We have reviewed all the available literature on the mechanism of injury, investigations, treatment options and outcome with a view to highlighting this rare injury and proposing a treatment regimen.

The most common injury after electrocution is posterior fracture/dislocation of the shoulder due to massive contraction of the infraspinatus and teres minor with deltoid, latissimus dorsi and teres major forcing the humeral head superiorly and posteriorly against the acromion, and medially against the glenoid fossa causing the humeral head to lodge behind the glenoid rim. Other fractures associated with electrocution usually result from a fall at the time of injury.^{2,3}

In electrical injury, the current flow through tissue causes damage by heat production, which is directly proportional to the current squared, resistance (of the tissues) and current duration. This is known as the Joule effect. The resistance of various tissues to current flow increases in the following order: nerve, blood, muscle, skin, tendon, fat and bone. In this case, the scapula was not directly damaged by heat; it was damaged by forceful muscle contraction. Alternating current is known to cause tetany, which leads to cardiac arrest, but at lower frequencies it causes only sustained muscular contraction

and ventricular arrhythmias,² which would account for the fact that the patients suffered scapular fractures but not one of them suffered a myocardial infarction or any other soft organ damage.

Conclusions

Scapular fracture as a result of electrical injury is uncommon but should be suspected in a patient with shoulder pain without a posterior dislocation. Full assessment and treatment of associated life-threatening injuries should take priority. We suggest the patient should be admitted for cardiac monitoring and computerised tomography of the scapula to rule out extension into the glenoid. Given the mechanism of injury, it is unlikely that the glenoid will be involved; if it is, surgical intervention may be indicated. The vast majority of patients can be treated with a sling and physiotherapy, with a very good prognosis and little need for long-term follow-up.

References

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