CASE REPORT

Recognising compartment syndrome in the upper limbs of a patient with central cord syndrome: getting out of pitfalls

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SUMMARY

This is a case where limb threatening compartment syndrome of the hand was masked by co-existing central cord syndrome following trauma.

BACKGROUND

This case is important for junior doctors working in accident and emergency department and orthopaedics as the early features of compartment syndrome were not easily detectable because of the neurological deficit in the patients' upper limbs as a result of the presence of central cord syndrome, complicating the clinical picture.

CASE PRESENTATION

A 75-year-old man was brought to accident and emergency (A&E) department via ambulance after having fallen at home while taking his coat off after an evening at the pub. He fell forward down a few steps and landed on folded arms and was unable to get himself up off the floor. He was found about 10 h later by the warden in his building. The patient was unsure if he had lost consciousness. The patient was unable to move his arms and could not roll over. He was stuck in this position for nearly 10 h with his arms folded under his body.

On presentation to A&E he was dehydrated, had grazing to his face, blistering of thenar eminence and dorsum of the left hand with both hands and forearms grossly swollen (figures 1 and 2). The patient also had reduced power (3/5) and global loss of sensation in both upper limbs most notable in his left hand. The hands were swollen and erythematous (figure 1). The patient was alert,

Figure 2 Ventral appearance of hand.

Figure 1 Dorsal appearance of hand with compartment syndrome.

conscious and rational on presentation and complained that he did not feel his hands. He also complained that he could not move the wrists and fingers of both hands and by the time the patient was assessed in the orthopaedic unit the sensation of the right hand was improving. The patient had a grazed abrasion in his forehead. Since the patient was unsure as to whether he lost consciousness a CT scan of the head was done which later showed no evidence of an intracranial haemorrhage. The power, tone and reflexes of the lower limbs were normal and there was no sensory impairment. The anal tone was normal and perianal sensation was preserved. He passed urine without a catheter.

On clinical examination of the hand the thenar eminence was found to be very tight (figure 2), the capillary refill of the fingers was reduced and a decision was made to decompress it on clinical grounds. Other signs of compartment syndrome were overlapping with the signs of central cord syndrome, such as paralysis and loss of sensation. So the decision for a fasciotomy was made on the above grounds. The consultant involved was informed and the anaesthetist assessed the patient. It was his decision to do it under local anaesthesia. The relatives were informed of the diagnoses and

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they were kept informed during the whole process of treatment at our hospital and also when the patient was transferred out.

The patient had an emergency fasciotomy under local anaesthetic for compartment syndrome which was performed in the theatre within an hour of admission. The thenar compartment was decompressed with a carpal tunnel decompression. There was immediate improvement of circulation of the fingers. The thenar muscles were swollen but viable.

He was then transferred to a specialist spinal unit for further investigation of his neurological deficit.

PMH: Ischaemic heart disease, myocardial infarction, hypertension, coronary artery bypass graft, insertion of pacemaker.

FH: None noted.

SH: Lived alone in a warden-controlled flat.

DH: Aspirin 75 mg/bisoprolol 1.25 mg/co-amlofruse 5/40/indomethacin 25 mg/lansoprazole 15 mg/perindril 4 mg/simvastatin 40 mg.

INVESTIGATIONS

Blood on admission

Creatine kinase—5882 U/l, white cell count— 13.3×10^9 g/dl, sodium—128 mmol/l, haemoglobin— 13.4×10^9 g/dl, potassium—5.2 mmol/l, platelets— 215×10^9 g/dl, urea—5.1 mmol/l, creatine—82 mmol/l, alkaline phosphatase—108 U/l, eGFR—86.1 ml/min

Imaging

Cervical spine x-ray: Marked degenerative changes in the upper and mid cervical region, no loss of joint space at C3–4 C5–6, a marginal osteophyte is noted.

C2–C3 retrolisthesis noted.

CT head: No space occupying lesion, no infarct or haematoma, no skull fractures seen.

CT of cervical spine:

Evidence of central canal stenosis and left lateral recess stenosis at the C3/C4 level. This is contributed mainly by posterior osteophytes and grade 1 retrolisthesis at C2/C3. The left lateral recess was narrowed which was causing impingement of the left exiting nerves.

MRI spine: Not performed due to pacemaker.

DIFFERENTIAL DIAGNOSIS

Central cord syndrome

Compartment syndrome of the left hand

Brachial plexus injury

Head injury with intracranial haemorrhage

Cerebrovascular accident.

TREATMENT

1. Rehydration with intravenous fluids, intravenous antibiotics.
2. Immobilisation of cervical spine with a Philadelphia Collar and complete bed rest.
3. Emergency fasciotomy of the left hand under local anaesthetic.

OUTCOME AND FOLLOW-UP

The compartment syndrome of the left hand was averted and 6 days after the fasciotomy the patient was taken back to theatre for closure of the wounds.

The patient was transferred to a specialist spinal injury unit for further investigation of his neurological deficit as CT imaging of the spine was not adequate to make a full diagnosis from.

DISCUSSION

The readership is well aware of compartment syndromes developing in limbs following fractures and soft tissue injuries.¹ It is a limb-threatening condition and an orthopaedic surgical emergency. If missed patients can even end up in amputations due to ischaemic necrosis.

The case report in discussion where the classical signs and symptoms of compartment syndrome can be masked by a neurological condition where there was loss of sensation due to central cord syndrome. The neurological condition itself causes loss of sensation leading to the loss of appreciation of pain and par aesthesia, which are clinical features of compartment syndrome which will alert the clinician treating the patient.

In central cord syndrome there is an incomplete spinal cord injury which classically affects the upper limbs more than the lower limbs, with motor deficit greater than sensory deficit.¹ Paralysis is a sign of advanced compartment syndrome and the presence of coexisting central cord syndrome causes confusion in a clinical setting.

It is therefore important that when there is any significant mechanism of injury in a patient with a spinal cord injury we remain vigilant for signs of compartment syndrome, such as oedema of a specific compartment or if on palpation the affected area is tense to touch.^{2 3}

When possible it would be useful to measure the compartment pressures on admission to the emergency department in any limb one suspect's compartment syndrome, to give an objective and quantifiable measurement. This has been shown to be useful when detecting compartment syndrome in the emergency department posttrauma¹ and during spinal surgery.^{3 4}

Learning point

Be aware of the altered clinical signs of compartment syndrome in patients with spinal cord injuries.

Competing interests None.

Patient consent Obtained.

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