Traumatic cervical spinal epidural haematoma: radiological findings in a paediatric patient

Case History:

The patient suffered a bicycle-related cervical trauma. Twenty-four hours later the patient complained of sudden onset of severe posterior neck pain.

Imaging Findings:

The patient suffered a bicycle-related trauma. Emergency personnel placed him in a cervical collar. On admission the patient showed erosions and oedema of the face with significant lip swelling, and complained of headache. The patient was alert and oriented to his surroundings. Vital signs were correct and physical examination showed a child in obvious discomfort, but neurologic examination of the cranial nerves and cerebellar examination did not reveal abnormal findings. Funduscopic exploration did not show papilloedema. Pulmonary and cardiac examination findings were unremarkable. Cervical plain radiography did not reveal subluxation or fracture. Cranial CT showed no evidence of intracranial pathology or stem compression.

Twenty-four hours later, the patient complained of sudden onset of severe posterior neck pain, in spite of the cervical collar. Neck CT revealed increased density (15 x 22 mm) over the posterior aspect of the body from C3, diagnosed as spinal epidural haematoma (SEH) (Figure 1). To prevent further complications, the patient was referred to the neurosurgery department. MRI was performed 24 hours later, and the study determined a sub-acute SEH. MRI findings revealed increased signal intensity over the posterior aspect of the neck from C3, without evidence of spinal compression (Figures 2 and 3).

The patient was seen by a neurosurgeon and put under observation. Analgesic and anti-inflammatory treatment was administered, and 7 days later the patient was discharged with normal neurologic function. Follow-up CT 1 month later showed the haematoma to have completely resolved (Figure 4). Cervical collar immobilisation was continued for 12 weeks.

Discussion:

Spinal epidural haematoma (SEH) is a rare cause of acute neck pain, but can cause permanent neurologic dysfunction or death. Most cases can be classified into three categories: those due to trauma, those associated with a haematological disorder or systemic disease, and those occurring spontaneously. Prompt diagnosis and treatment are essential for survival and for decreasing morbidity.
The most common presentation of SEH is acute posterior neck pain followed by a neurologic deficit below the lesion. Bleeding in SEH is generally believed to originate from the venous plexus of the epidural space. It is known that the veins in this plexus do not have valves and are vulnerable to rupture with abrupt changes in venous pressure. In children blunt trauma can cause this to occur.

It is reported that sports injuries and falls account for 73% of cases of SEH. Vehicle accidents are the most common cause of SEH in children younger than 8 years, whereas older children are increasing involved in competitive sports. When paediatric spine radiographs are normal in the presence of SEH, it is known as spinal cord injury without radiographic abnormality. This is unique to children and relates to a transient ligamentous deformation of the cervical spinal column, because the child's spine is elastic compared to the relatively inelastic spinal cord, which tolerates little stretch.

Diagnosis of SEH is usually made with CT or MRI. MRI has been suggested as the procedure of choice because of its superior tissue differentiation, mainly in identifying cord lesions in patients with spinal cord injury without radiographic abnormality. However CT also offers acceptable results and is more widely available. Most haematomas are visible on CT immediately after trauma, measuring from 50 to 100 Hounsfield units. In this case diagnosis was made on the basis of CT examination.

MR imaging allows follow-up of the various metabolised forms of extravasated haemoglobin. Oxidation of intracellular deoxyhaemoglobin to methaemoglobin (MHB) begins to occur after approximately 3 days. MHB is hyperintense on short TR images, but hypointense on long TR images, whereas extracellular MHB appears hyperintense on both short and long TR images. Macrophages that carry off blood breakdown products produce haemosiderin, giving the rim of the haematoma cavity a hypointense signal intensity on long TR images (see Figure 2b).

Spontaneous resolution of epidural haematoma is rare. The usual treatment is immediate surgical decompression with laminectomy, but this patient presented a small lesion without neurologic deficits that allowed spontaneous resolution without surgery. A correct diagnosis with CT or MRI is very useful because at the first sign of neurologic dysfunction surgical therapy is mandatory.

SEH is a rare lesion in spinal cord injury without radiographic abnormality, but physicians should consider this cervical lesion in children who present with severe neck pain after trauma without radiographic abnormality. CT and MRI are sensitive imaging modalities for detecting this extra-axial haemorrhage.

**Differential Diagnosis List:** Cervical spinal epidural haematoma

**Final Diagnosis:** Cervical spinal epidural haematoma

**References:**


Description: Cervical spinal CT shows a density increase over the posterior aspect from C3. Origin:
Description: Peripheral hypointense rim on T2-weighted imaging is due to haemosiderin. Origin:
Description: T1-weighted sagittal MRI of the cervical spine revealing a collection of high signal intensity. MHB appears hyperintense on both short and long TR images. Origin:
Description: Cervical spinal CT one month later. The haematoma is completely resolved. Origin: