# Cervical spinal traumatic epidural hematoma

see also Cervical ventral spinal traumatic epidural hematoma.

#### Epidemiology

The incidence of 2.5% is reported for post-traumatic cervical spinal epidural hematoma. Of these, 59% had associated spinal cord compression  $^{1)}$ .

Ricart et al. performed this retrospective review of prospectively collected data submitted to the state trauma registry, using ICD-9 codes, for all patients activated as a trauma with cervical spine injury, between the years 2010 and 2014. Patients with MRI available were classified based on the presence of cervical epidural hematoma (CEH) or no hematoma (NEH). For a second analysis, they classified patients with cord compression associated with an epidural hematoma (CC) and no cord compression (NCC). Potential risk factors evaluated included: INR, PTT, albumin and platelets levels, radiographic findings of Ankylosing Spondylitis (AS), and ISS.

497 out of 1810 trauma activations met the inclusion criteria. 46 patients (2.5%) were found to have a post-traumatic cervical SEH (CEH). Of the CEH cohort, 76% were male, with 72% Caucasian, and a mean age of 55 years. 27 patients (5.4%) were found to have cervical cord compression at the level of the SEH. Of the CC arm, 78% were male, with 67% Caucasian, and a mean age of 56 years<sup>2</sup>.

#### Etiology

Most cases of SEH are traumatic in nature following spinal fracture and/or dislocation <sup>3)</sup> with hematomas usually located posterior to the dural sac according to one serial image report <sup>4)</sup>

There are some reports after spinal manipulation therapy: see Cervical spinal traumatic epidural hematoma after spinal manipulation therapy

#### **Clinical features**

Epidural hematomas of the cervical spine have predominantly been described as acute lesions with progressively worsening neurological deficits, as opposed to EDH's of the lumbar spine, which may be chronic in nature <sup>5) 6)</sup>.

This difference is because the spinal cord occupies a greater percentage of the spinal canal in the cervical region than it does elsewhere, and the nerve roots of the cauda equina are relatively more tolerant of compressive mass lesions <sup>7</sup>.

## Treatment

Although surgical decompression has been generally regarded as standard management in most cases of spinal epidural haematoma, conservative management could be a reasonable alternative in those cases in which the neurological deficits are minimal and recovery is rapid <sup>8)</sup>.

For conservative management to be successful, careful observation of the patient and follow-up MRI are important <sup>9)</sup>.

Therefore, the neurosurgical management remains a clinical challenge, especially those located in the ventral spinal cord.

#### Outcome

Cervical spine traumatic epidural hematomas (CSTEH) can cause potentially devastating neurological deficits if not promptly identified.

A study of Brichko et al., aimed to determine the incidence, characteristics and outcomes for patients with CSTEH. This study shows a high incidence of CSTEH among trauma patients. CSTEH is associated with significant morbidity and mortality. High clinical vigilance is required to allow the request and acquisition of urgent magnetic resonance imaging to diagnose CSTEH as the entity is often not evident on initial cervical spine computed tomography investigations <sup>10</sup>.

This retrospective study was performed at a tertiary hospital with an adult Level 1 Trauma Centre on all consecutive patients diagnosed with CSTEH over a 4 year period. Medical record review was undertaken for all patients with the diagnoses of CSTEH to identify patient characteristics including age, mechanism of injury and co-morbid conditions. Additional data was extracted regarding radiology interpretation, surgical interventions, thromboembolic chemoprophylaxis use, discharge disposition and neurological outcomes.

A total of 27 888 patients were admitted with traumatic injuries between 1 July 2010 and 30 June 2014, of which 1916 patients sustained cervical spine injury. The incidence of CSTEH was 0.6% among all trauma patients and 9.1% among patients with any cervical spine injury. Of those with CSTEH, 89 patients (50.9%) had neurological deficits consistent with the anatomical location of the epidural haematoma. Magnetic resonance imaging diagnosed CSTEH in 132 patients (75.4%), of whom 23 patients (13.1%) had normal computed tomography cervical spine imaging. Among the patients diagnosed with CSTEH, 13 (7.4%) died and 78 (44.6%) required cervical spine surgical decompressions<sup>11</sup>.

Patients with a higher ISS and elevated INR levels are at a higher risk for a bad outcome <sup>12</sup>.

### **Case reports**

A 59-year-old male presented with a Brown-Sequard syndrome (BSS) after a motor vehicle accident. The magnetic resonance imaging (MRI) demonstrated a cervical epidural hematoma at the C7-T1 level. Following a T1 laminectomy and C6-T1 fusion, his neurological deficit markedly improved. Within six postoperative months, he regained full motor function.

For this patient and others with a traumatic cervical epidural hematoma (C7T1) resulting in a BSS, early decompression (within 48 hours) should result in marked postoperative neurological improvement <sup>13</sup>

Kleinhenz et al. outline the course of a patient who presented with cervical epidural hematoma secondary to fusion mass fracture five years after removal of spinal hardware <sup>14)</sup>.

Tarbé de Saint Hardouin et al.,present a case of traumatic cervical epidural hematoma in a 1-year-old boy, diagnosed with computed tomography scanning and magnetic resonance imaging (MRI). Management was conservative and the lesion regressed spontaneously. The presentation in childhood is often nonspecific. MRI is the imaging modality of choice for diagnosing these lesions. Conservative treatment has to be considered in cases with a benign clinical course and provided that the patient is followed up neurologically with repeated MRI<sup>15)</sup>.

2 cases of TSEH located in the ventral upper cervical spine, which presented with delayed neurologic deficits. In both cases, conservative management with steroid treatment was initiated before neurosurgical decompression, resulting in improved neurologic outcomes.

Urgent surgical decompression may not be necessary acutely in patients with TSEH who respond well to conservative therapy. Although there is currently no consensus for the initial management strategies, steroid treatment could individually tailored and applied according to the clinical condition and evolving symptoms <sup>16</sup>.

A 45-year-old man presented with weakness and radiating pain in the left arm after being injured when a heavy object was dropped on his head while at work. The neurological examination on admission revealed weakness of the left extremities: arm Grade II and leg Grade IVb. Hypoaesthesia was observed below the C3 sensory dermatome on the left side. The magnetic resonance imaging (MRI) of the cervical spine showed two epidural space-occupying lesions, which were slightly low intensity on T1-weighted images and high intensity on T2-weighted images.

The lesions were diagnosed as acute epidural haematomas. One in the high cervical region was located in the ventral epidural space, while the other, in the mid-cervical portion, was dorsal, mainly on the left side. After the first examination, we decided to perform surgical evacuation of the dorsal epidural haematoma in the mid-cervical area, but the patient refused the operation vigorously and was managed conservatively on the first day. Interestingly, on the second day the patient showed clinical improvement. The left leg motor weakness disappeared, the left arm power improved to grade IV and the radicular pain reduced. Based on the clinical improvement, we began to reconsider our original plan of surgical intervention. The first follow-up MRI on the third day showed that the majority of the dorsal haematoma had disappeared while the ventral haematoma remained

These results encouraged them to keep managing the patient conservatively. After 3 weeks, the

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patient showed good recovery with minimal radicular pain in the left arm, and the second follow-up MRI showed a complete resolution of both haematomas

A young patient developed cervical pain after experiencing cervical trauma. Computed tomography and magnetic resonance imaging demonstrated an epidural cervical hematoma. A spontaneous resolution of the clinical symptoms and the radiological abnormalities was observed.

Although surgical decompression is generally regarded as mandatory in selected patients with incomplete and nonprogressing deficits, conservative management may be possible <sup>17)</sup>.

A traumatic epidural hematoma of the cervical spine is reported in a 13-year-old girl. The patient recovered spontaneously over several days without surgical intervention. The diagnosis was made on magnetic resonance (MR) imaging, which also demonstrated subsequent resolution of the hematoma. The etiological factors of spinal epidural hematomas are reviewed and the utility of MR imaging in differentiating other causes of acute spinal cord injury is emphasized <sup>18)</sup>.

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