

Case report

Spontaneous spinal epidural haematoma during pregnancy: case report and review of the literature

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Abstract. Spontaneous epidural haematoma is rare in pregnancy and only five cases have been reported. We present a case of a 31-year-old female G2P1 who at 32 weeks of gestation developed progressive ascending paralysis and numbness to a level of approximately T4. An urgent MRI of the spine was performed, which demonstrated a posterior epidural lesion at T1–T4 level. The lesion showed signal changes consistent with an epidural haematoma in the hyperacute stage. An emergency cesarean section was performed followed by spinal decompression and removal of an epidural haematoma. The patient's neurological function subsequently improved. The diagnosis and management of spontaneous epidural haematoma in pregnancy is presented with a review of the literature.

Spontaneous spinal epidural haematoma (SSEH) is uncommon. To our knowledge there are only five reports of such haemorrhage occurring during pregnancy. We describe a patient who developed SSEH at 32 weeks of gestation and required surgical treatment. The diagnosis and management of this condition in pregnancy is presented, with a review of the literature.

Case report

A 31-year-old G2P1 female, with a previously uneventful pregnancy, presented at 32 weeks 2 days of pregnancy with progressive ascending paralysis. Patient presented with a sudden onset of a severe pain between her shoulder blades, radiating to neck and head. The patient then developed numbness and tingling in her feet, and ascending paralysis and numbness to a level of approximately T4.

Examination revealed flaccid paralysis in both legs, and patchy sensory changes up to approximately T4. The rest of her physical examination was unremarkable. Laboratory investigations were normal. She was not on any medication.

An urgent MRI of the spine was performed, which demonstrated an elliptiform non-enhancing epidural mass located within the posterior spinal canal at T1–T4 level. The mass showed isointense signal to the spinal cord on T_1 weighted images and was hyperintense and slightly heterogeneous on T_2 weighted images, consistent with an epidural haematoma in the hyperacute stage (Figure 1). There was compression of the adjacent spinal cord caused by haematoma but without obvious signal changes within the spinal cord.

The patient proceeded to emergency cesarean section, followed by an emergency spinal decompression (T2–T4 laminectomy), which demonstrated an epidural haematoma. Spinal decompression was performed 7 h after the onset of symptoms. Histopathological examination of the

surgical specimen did not reveal any neoplastic process or vascular malformation.

18 days following surgery the patient underwent spinal angiography to assess for possible underlying arteriovenous malformation. Spinal angiogram consisted of selective catheterization of intercostal (up to T12 level), both subclavian, costocervical, thyrocervical, vertebral and common carotid arteries as well as bronchial arteries and no abnormality was detected.

In follow-up at 10 months post surgery, the patient had shown relatively good recovery. She still has impaired sensation below T4 but is able to walk without assistance.

Discussion

SSEH represents a rare spinal emergency, with a frequency of less than 1% of spinal space-occupying lesions [1]. Pregnancy related epidural haematoma is an even more rare entity and only five documented cases have been reported [2–5]. Two of these reports pre-date routine use of MRI [2, 3].

The first symptom of SSEH is usually severe localized back pain, often with a radicular component [6, 7]. The onset of pain is occasionally related to minor straining such as defecation, lifting, coughing or sneezing, but in majority of cases the onset of pain is spontaneous [8–10]. Signs of spinal cord and nerve root dysfunction appear rapidly and may progress to paraparesis or tetraparesis, depending on the level of the lesion [11]. Cases of Brown-Sequard syndrome have been described [4, 9, 11, 12]. In the lumbar spine, the epidural haematoma may mimic an acute disc herniation. There have been reports of concomitant lumbar disc herniation and epidural haematoma [7, 13].

The most important aetiologies of SSEH are clotting disorders, which may be acquired (anticoagulant therapy, haematological malignancies) or congenital (haemophilia) [8, 9, 14, 15]. Vascular malformations are rarely responsible for SSEH (4% in a series of 158 cases and 6.5% of cases in a series of 199 cases) [16–18]. Other less common

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(a)



(b)



(c)

Figure 1. (a) Sagittal T_1 weighted image (repetition time (TR) 622/echo time (TE) 13), reveals posterior epidural lesion that is isointense to the spinal cord. (b) Sagittal T_2 weighted image (TR 2840/TE 106) shows that the lesion is hyperintense to the spinal cord and slightly heterogeneous. (c) Enhanced sagittal T_1 weighted image with fat suppression (TR 437/TE 13) shows no evidence of enhancement.

predisposing factors for SSEH include: systemic lupus erythematosus, ankylosing spondylitis, rheumatoid arthritis, Paget's disease, disc herniation and hypertension [7, 8, 10, 19]. In about 40–50% of cases, however, no underlying cause can be identified [16–18].

The most widely accepted hypothesis is that of venous bleeding. Epidural veins are valveless and are situated in the low pressure epidural space. These veins are unprotected from sudden increases in intra-abdominal or intrathoracic pressure (as in the Valsalva manoeuvre),

leading to rupture and haemorrhage [11, 16, 20]. It has been proposed that an increase in venous pressure in the epidural space, in association with the haemodynamic changes of pregnancy, may predispose to rupture of a pre-existing pathological venous wall [2, 3, 5].

The epidural venous plexus is mostly prominent in the thoracic spine [20]. The SSEH most often is located in the thoracic and cervicothoracic region followed by the thoracolumbar location and extends over a few vertebral body levels [1, 7, 8, 21]. The SSEH is usually posterior or posterolateral to the thecal sac [1, 7, 8, 21].

Rapid diagnostic evaluation is essential to minimize delay in treatment of spinal epidural haematoma.

Currently, MRI is the diagnostic method of choice for spinal emergencies because it allows rapid, non-invasive evaluation of large parts of the vertebral column and the spinal cord in all planes [7, 10, 13, 22–25]. MRI will provide information about location, extent of the haematoma, as well as the degree of cord compression. MRI is also helpful in determining the age of the haematoma [10, 23–25].

The chronological characteristics of an MRI of a spinal epidural haematoma are similar to those seen with intracranial haemorrhage [10, 23, 24]. In the hyperacute stage (first 6 h), the spinal epidural haematoma appears as isointense to the spinal cord on T_1 weighted images, and mildly hyperintense and heterogeneous on T_2 weighted images, as a result of the presence of intracellular oxyhaemoglobin. In an acute stage (7–72 h) the haematoma is still isointense on T_1 weighted images, and becomes hypointense on T_2 weighted images, due to presence of intracellular deoxyhaemoglobin (which causes T_2 shortening). As the concentration of methaemoglobin increases, the haematoma becomes hyperintense and homogeneous on T_1 and T_2 weighted images [7, 10, 24–26]. A T_2 weighted gradient-echo sequence, which shows hypointensity of the blood products, may be added to the standard MR sequences [7, 10, 25]. MRI may show enlarged serpiginous areas of low signal corresponding to flow voids in abnormal vessels seen in vascular malformations, however those vessels may be compressed by the haematoma itself [24]. Spinal angiography is routinely performed in some centres when an epidural haematoma is found. Others reserve spinal angiography for cases in which MRI or myelography indicates presence of a vascular malformation [10, 11, 22].

Conventional myelography, and later CT, used to be the main diagnostic modalities for diagnosing epidural haematomas [9, 11, 18]. Myelography and CT myelography may show an epidural lesion with partial or complete spinal block but is not specific, invasive, and may worsen the clinical status. Conventional CT may diagnose an epidural haematoma, but may give false negative results if the haematoma is isodense to the thecal sack or the spinal cord, and if the image quality is affected by artefacts (often seen in upper thoracic region) [1, 23, 25]. Urgent surgical decompression is the treatment of choice for SSEH causing acute compromise of cord function. There have been a number of reports in which SSEH was treated non-operatively with good outcome, mainly haematomas localized at the cauda equina level and with mild neurological deficit [6, 14, 23, 27]. In the case of SSEH in full term pregnancy, the fetus should be delivered first by cesarean section, with urgent spinal decompression to

follow. Since venous pressure increases with uterine contractions, the haemodynamic changes of labour may result in further haemorrhage [5]. The critical factors for recovery after SSEH are the level of pre-operative neurological deficit and the operative interval [18, 21, 22]. In complete pre-operative sensorimotor loss, surgery within 36 h of onset of symptoms correlates with favourable outcome [22].

Conclusion

Although SSEH is a rare cause of spinal cord compression, it is essential that the diagnosis is made as early as possible to enable full recovery. MRI plays an especially important diagnostic role. Surgery needs to be performed as rapidly as possible, because the interval between onset of symptoms and surgery, together with the pre-operative clinical status, determine the clinical outcome.

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