Subdural haematoma after dural puncture headache treated by epidural blood patch

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Subdural haematoma is a well-documented complication of accidental dural puncture, and is thought to be preventable by prompt treatment with an epidural blood patch. An accidental dural puncture occurred in a 39-yr-old primagravida during the sitting of an epidural catheter for pain relief in labour. Twenty hours after the puncture, the mother developed a typical post-dural puncture headache, which increased in severity over the subsequent 24 h. An epidural blood patch was performed at 48 h, and this initially relieved the headache. After discharge from hospital, and 14 days after the dural puncture, the headache recurred, together with...
expressive dysphasia, poor co-ordination and sensory loss in the right arm. A magnetic resonance imaging scan demonstrated a left sided subdural haematoma, which was drained successfully with complete recovery.

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Subdural haematoma is a serious but rare complication of dural puncture. Cases have been reported following accidental dural puncture with an epidural needle, and also after spinal anaesthesia, myelography, discography, and diagnostic lumbar puncture. The diagnosis is complicated by the fact that the symptoms are similar to those of a post-dural puncture headache, which in the puerperium has several differential diagnoses, including pregnancy-induced hypertension, meningitis, and cortical vein thrombosis. We describe a case that illustrates the importance of informing general practitioners and patients of the significance of recurrent symptoms after apparently successful treatment of a post-dural puncture headache with a blood patch.

Case report

A previously healthy 39-yr-old Spanish primigravida with well-controlled gestational diabetes had labour induced at 40 weeks of pregnancy. She was 1.60 m tall and weighed 72 kg. She requested epidural analgesia when she could no longer cope with the contraction pains. Before epidural insertion, the anaesthetist explained the procedure and its possible complications, including the risk of dural puncture. The mother was placed in the left lateral position and, under sterile conditions using a loss of resistance to saline technique, a 16-gauge Tuohy needle, with the bevel cephalad, was used to locate the epidural space. The mother was distressed and anxious and found it difficult to remain still, and in the course of the procedure, an accidental dural puncture occurred at the L1/2 interspace. A second attempt at L2/3 was successful and an initial bolus of 15 ml of 0.1% bupivacaine containing fentanyl 2 μg ml⁻¹ was injected slowly through the epidural catheter to induce analgesia. There was no evidence of subarachnoid spread of local anaesthetic and subsequently a 10 ml h⁻¹ infusion of 0.1% bupivacaine containing fentanyl 2 μg ml⁻¹ produced a consistent bilateral sensory block to T8, with minimal motor block. The epidural was managed throughout by the anaesthetist (JMD).

Fig 1 MRI scan, T2 (water white) weighted spin echo; coronal (A) and sagittal (B) views showing left sided subdural haematoma with midline shift.
Seven hours after the epidural had been sited, a top-up was required for perineal pain, by which time 70 ml of the local anaesthetic and opioid mixture had been infused. With the patient sitting upright, 8 ml of 0.75% ropivacaine with fentanyl 100 μg was injected incrementally. When an emergency Caesarean section for fetal distress was carried out 30 min later, the resulting dense bilateral block to T3 provided adequate analgesia. Immediately after delivery, 10 units of i.v. syntocinon was given followed by an infusion of 40 units in 500 ml Hartmann’s solution over 4 h. The anaesthetist who had sited the epidural reviewed the patient 2 h after delivery, at which time, on direct questioning, she did not complain of headache.

Twenty hours after the dural puncture and 12 h after the Caesarean section the mother complained to the midwives of a mild fronto-occipital headache. The severity of the headache increased over the subsequent 24 h and, as is typical of a post-dural puncture headache, was relieved by lying flat and deteriorated when the patient mobilized. Oral diclofenac and coproxamol provided some relief. Thirty-six hours after the onset of the headache, an epidural blood patch was performed at L2/3 under aseptic conditions using 20 ml of autologous blood. The mother remained in bed for 6 h after the procedure and was discharged home 48 h later with total resolution of the headache.

The day after discharge, the patient developed abdominal pain and severe vomiting which persisted for 2 days. Her general practitioner administered an antiemetic after which she gradually improved. One week later, 14 days after her dural puncture, the patient developed a mild frontal headache with expressive dysphasia and was noted to be rather lethargic. Her headache, which was not relieved by either coproxamol or diclofenac, was described as being a ‘tight band’ around her head. Her general practitioner diagnosed a ‘stress headache’ and prescribed diazepam. However, within 2 days she was experiencing occasional numbness of her right hand and forearm, poor co-ordination, clumsiness, and the expressive dysphasia had deteriorated. She was seen by a different general practitioner who found no abnormality on neurological examination, but nevertheless, was sufficiently concerned to refer the mother to a neurologist. Before seeing the neurologist, and over the subsequent 2 days, the symptoms worsened, and the general practitioner referred her to the Accident and Emergency Department, where a mild right-handed dysdiadochokinesia was noted. On the basis of the worrying history, a magnetic resonance imaging (MRI) scan was performed and demonstrated a left hemisphere subdural haematoma, with mild midline shift and compression of the lateral ventricle. Subsequent review of the MRI by a neuroradiologist suggested that the haematoma was up to 3 weeks old (Fig. 1). The patient was transferred to a neurosurgical unit where a craniotomy was performed and the clot was evacuated. She was discharged home 5 days later after an uneventful recovery and with full resolution of her symptoms. A follow-up MRI scan and MR angiogram were normal and the mother remains fit and well.

Discussion

Chronic subdural haematoma is a rare but well-documented complication of dural puncture. It often presents with symptoms similar to those of post-dural puncture headache, for example headache, nausea, and photophobia but without neurological features.

In 1898, Bier subjected himself to spinal anaesthesia and suffered a severe headache, which resolved over the ensuing 9 days. He proposed that the escape of a considerable amount of cerebrospinal fluid (CSF) could bring about such effects. Based on this idea, in 1943, Kunkle and colleagues suggested that the leak of CSF through a dural puncture caused a decrease in CSF pressure within the subarachnoid space, allowing the brain and the meninges to sag. The resulting traction on pain-sensitive vascular structures, which anchor the brain to the cranium, causes headache, particularly in the upright position. It is thought that the traction on the bridging veins combined with compensatory vasodilatation of these vessels as a result of the low CSF pressure, can occasionally result in tearing of the veins and, hence, unilateral or bilateral subdural haematoma. Other causes of subdural haematoma in young people, such as arteriovenous malformations, head injury, and rupture of cerebral aneurysms should be excluded using angiography.

The most effective treatment of severe or persistent post-dural puncture headache is an epidural blood patch, first introduced in 1960 by Gormley. Because the postulated pathogenesis of subdural haematoma in these circumstances is reduced CSF pressure, it has been suggested that failure to treat post-dural puncture headache with a prompt epidural blood patch may be a factor in haematoma formation. Our case report and another recent publication suggest that one cannot rely on an epidural blood patch to prevent the development of a subdural haematoma when the patch is performed after the onset of the symptoms of a CSF leak. It was the opinion of the radiologist that the haematoma had developed at or near the time of the original puncture suggesting perhaps that a prophylactic blood patch might be a more appropriate method of prophylaxis against the complications of dural puncture. The efficacy and benefit of prophylactic versus therapeutic blood patch in obstetric patients is speculative and a prospective, randomized comparative study would be needed to address this question.

In our obstetric unit, all dural punctures are audited and there is a procedure for the management of accidental dural puncture and post-dural puncture headache. If a dural puncture is known to have occurred during epidural insertion, the anaesthetist throughout labour manages the epidural but the type of delivery is not dictated. A consultant obstetric anaesthetist is informed and the mother is followed up on the postnatal ward. In the event of persistent post-dural puncture headache an epidural blood patch is...
performed within 24 h of the onset of the headache. The mother is reviewed daily until discharge and is advised, that if she experiences any further headaches or unexplained symptoms, to return to the Obstetric Day Assessment Unit or the Labour Ward where she will be seen by a consultant anaesthetist. A copy of the patient’s discharge summary is sent to the general practitioner and community midwife, who visits daily for 10 days. Subsequent to this patient, the consultant anaesthetist now writes a discharge letter to the general practitioner providing information about the dural puncture and its management, and advising that the mother be referred back to the Obstetric Day Assessment Unit in the event of further complications. A recent study, which highlighted the poor understanding of post-dural puncture headache amongst general practitioners, prompted the authors’ to design pamphlets for general practitioners and patients with the intention of improving the early recognition and management of post-dural puncture headache.8

Failure to recognize these rare cases of subdural haematoma can have permanent and fatal consequences.9 10 Therefore, in the puerperium, it is crucial to investigate persistent or recurrent headache, particularly those associated with neurological signs, and a CT or MRI scan should be performed as appropriate.

Whilst an epidural blood patch usually provides almost instantaneous relief for a post-dural puncture headache, its longer-term efficacy is probably only 60–70%.11 12 This case suggests that an epidural blood patch, contrary to popular belief, may not provide protection against the more devastating complications of a dural puncture and in addition highlights the ongoing responsibility anaesthetists have to mothers who suffer an accidental dural puncture.

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