Clinical Report

Exacerbation of post-dural puncture headache after epidural blood patch

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The purpose of this report is to describe a new complication of epidural blood patch for inadvertent dural puncture. A dural tap in an obstetric patient was managed initially with a prophylactic blood patch via the epidural catheter. Despite this, 48 hr later, she developed post-dural puncture headache, neck, and shoulder pain, and was given a second epidural blood patch. This was followed by an immediate and severe exacerbation of her symptoms, which later resolved after the administration of diclofenac. There were no further sequelae. Although severe complications of epidural blood patch are rare, they are alarming. Exacerbation of the original symptoms of post-dural puncture headache caused by, or following, epidural blood patching has not previously been reported.

Cette observation décrit une nouvelle complication du blood patch épidural réalisé après une ponction accidentelle de la dure-mère. Chez une patiente obstétricale, une ponction accidentelle de la dure-mère est initialement traitée par un blood patch prophylactique administré par le cathéter épidural. Quarante-huit heures plus tard, parce qu'elle se plaint encore d'une céphalée post-dure-mérienne, et d'une douleur au cou et aux épaules, on répète le blood patch. Cette manoeuvre est suivie immédiatement par une aggravation aiguë des symptômes qui disparaissent plus tard avec l'administration de diclofénac. Il n'y a pas de séquelles. Malgré leur rareté, les complications du blood patch épidural sont inquiétantes. L'aggravation des symptômes d'une céphalée post-durale causée ou consécutive au blood patch épidural n'a pas été rapportée jusqu'à maintenant.

Key words

ANAESTHESIA: obstetric;

ANAESTHETIC TECHNIQUES: regional, epidural;

COMPLICATIONS: headache.

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While the value of epidural blood patch (EBP) in the management of post-dural puncture headache (PDPH) has been acknowledged for many years, various complications have been described. Dominant among these are transient back pain at the site of the blood patch, (which occurred in 37% of subjects in one review¹), and radicular pain. In recent months, transient bradycardia,² lumbovertebral syndrome,³ and facial palsy⁴ have all been reported, and the mass effect of blood injected into the epidural space has now been visualised using magnetic resonance imaging.^{5,6} We present the case of a patient who suffered a severe acute exacerbation of her post-dural puncture symptoms immediately after receiving an EBP.

Case history

A 28-yr-old primigravida (weight 70 kg, height 162 cm) requested epidural analgesia following induction of labour at 42 wk gestation in a normal pregnancy.

Using a standard aseptic technique, a 16-gauge Tuohy needle was inserted at the L₁/L₂ interspace. On removal of the syringe at the point of loss of resistance to saline, free flow of CSF from the needle confirmed that the subarachnoid space had been inadvertently entered. An epidural catheter was inserted at the same level through the Tuohy needle after withdrawing it approximately 1 cm. Having demonstrated that CSF could not be aspirated via the catheter, epidural analgesia was established with a total dose of 5 ml isobaric bupivacaine 0.5% which produced sensory blockade from S₄ to T₉ bilaterally. Four top-ups were performed carefully by the anaesthetist at two- to three-hour intervals, no more than 5 ml of bupivacaine 0.5% being required each time to produce ef-

fective analgesia. No hypotension or other adverse events occurred during labour, and the patient underwent low forceps delivery of a healthy female infant.

One hour after delivery – ten hours after the dural tap – when the local anaesthetic block had worn off, prophylactic EBP was performed with 15 ml, autologous blood injected via the epidural catheter, which was then removed. Over the next 24 hr, the patient remained well, mobilised normally, and had no complaints. However, 48 hr post-partum, she began to complain of increasing headache and neck-stiffness which was worse on sitting and standing. When seen by the anaesthetist, she complained of global headache, worst in the occipital region, with severe pain in her neck and right shoulder. The symptoms were initially posturally related, but then continued to intensify despite her returning to bed and being placed in a supine head-down position to minimise the presumed CSF leak. There was no photophobia, nausea, or vomiting; no objective neck stiffness or other neurological signs were elicited. She was afebrile, and all other clinical variables were normal.

Since the patient was in considerable distress, and had been unable to breastfeed her baby that morning, a second EBP was performed immediately. Using a 16-gauge Tuohy needle and loss of resistance to saline (<2 ml was required) the epidural space was identified at 2.5 cm from skin, at the same level as the original injection. Twenty ml of the patient's blood were then drawn aseptically, and injected slowly, pausing at 5, 10 and 15 ml. No complaints were voiced, and the Tuohy needle was withdrawn.

After one minute, the patient became very distressed and complained of severe worsening of her neck and shoulder pain. A neurological examination was performed immediately, and was normal. She remained curled up and immobile in the left-lateral position and no improvement occurred over the next half-hour. She was reassured that, although she was experiencing an unexpected adverse reaction to the procedure, there was no evidence of any physical damage. She was given diamorphine 10 mg *im* and returned to bed where she was monitored closely.

Although the diamorphine reduced her anxiety, she reported no improvement in the pain, which was concentrated in the occipital, neck and right shoulder regions. The original global headache for which the EBP was performed seemed to have been eclipsed by these other symptoms which nevertheless had been present initially. After four hours, she was prescribed diclofenac 100 mg *pr*. Less than one hour later, she was sitting up and almost completely pain-free. She continued to improve, and was out of bed and able to breastfeed again shortly afterwards. She was discharged from hospital on the seventh day

post-partum, and remained completely well with no residual symptoms when contacted one month later.

Discussion

The severe and almost immediate exacerbation of this patient's symptoms was a source of considerable alarm for patient and anaesthetist alike, and a number of possible causes was explored.

First, the presenting headache was not PDPH. Postural exacerbation may be a feature of headache resulting from other causes.¹⁵ It was felt on clinical grounds that a more sinister cause, for example, subarachnoid haemorrhage, was unlikely. It is possible, however, that breakdown products of blood leaking into the CSF from the first (prophylactic) EBP had caused meningeal irritation,^{5,18} with delayed onset of symptoms among which neck-stiffness was dominant. The second EBP would, therefore, not only have been ineffective in relieving the pain, but by producing a relatively acute rise in CSF pressure,⁷ could have exacerbated it. The presence of blood in the cerebrospinal fluid is well recognized in neurosurgical practice as a cause of aseptic (chemical) meningitis, and is considered to contribute to the neck stiffness and meningismus following subarachnoid haemorrhage.¹⁹ The rapid and almost complete resolution of our patient's symptoms in response to diclofenac would support such an inflammatory mechanism as a cause of her presenting complaint. Gregg and Gravenstein, describing a patient suffering severe low back pain after blood patching, report a dramatic improvement in symptoms following the administration of aspirin.¹⁸

Notwithstanding the above, pain and stiffness in the cervical region are common features of PDPH, and indeed have been reported to occur, and be relieved by EBP, in the absence of headache.^{20,21} A discriminatory test described by Gutsche,¹⁵ in which firm manual pressure exerted on the abdomen of the seated patient produces transient relief of a low-pressure headache, may have been useful in confirming the diagnosis, but was not performed.

Second, negative pressure in the epidural space, generated by the insertion of the Tuohy needle,^{8,9} may have caused air to be drawn in while the autologous blood sample was being taken, when the end of the needle was open to atmosphere. This epidural air bubble, being compressed by the injection of the EBP, could have provoked an exacerbation of neck-stiffness and pain.^{22,23}

Third, the pain may have been mechanical, secondary to traction on the dura produced by injection of the EBP, although this would be expected to cause symptoms *during* the injection and in a different (lumbosacral) distribution.^{10,12} The patient showed no evidence of lumbosacral meningismus or radiculopathy when examined. The

radicular back pain occasionally reported as a complication of EBP is typically delayed in onset by several hours¹⁹ or even days.³ In only one case report has back pain been described to occur immediately after EBP.²⁴

Insertion of the epidural catheter at the same space at which inadvertent breach of the subarachnoid space has occurred is an appropriate technique provided that caution is taken to avoid the use of a volume of local anaesthetic appropriate for an uncomplicated epidural.¹⁵ Alternatively, the technique may be converted to continuous spinal blockade by the deliberate advancement of the catheter through the dural puncture.¹⁷

The place of prophylactic EBP given via the epidural catheter has been questioned by some^{10,14} but reaffirmed by others,^{13,15} and debated in detail recently.¹⁶ Its effectiveness depends on the proximity of the catheter tip to the dural rent, on the certainty that the catheter is not sited within the subarachnoid space, and possibly on the volume of blood injected. Development of postural headache as long as 48 hr after dural puncture, with or without prophylactic EBP has been described.¹⁴ Although it has been suggested that EBP should only be performed after conservative treatment has failed,^{10,12} we felt it justified to expedite the procedure on this occasion in view of the patient's distress and functional incapacity.

This is the first time, to our knowledge, that performance of EBP has produced an exacerbation of the presenting systems of PDPH immediately after completion of the procedure. While the minor complications of EBP, including transient back pain and stiffness, are relatively common, reports of severe low back and radicular pain occasionally running a course of weeks or months are rare,^{3,11,12,26} and permanent sequelae are as yet unreported.²⁵ Mechanisms implicating a mass effect of injected blood in the cause of these complications have recently been proposed following magnetic resonance imaging of blood patches,⁵ and this may help to explain both radicular pain and backache.⁶ Had MRI been available in our hospital, it may have proved a revelatory investigation.

Despite the initial severity of the reaction in this case, the benign outcome reinforces the message of the literature that the patient may be confidently reassured. It is, however, appropriate to reaffirm Shantha's statement of twenty years ago, that epidural injection of autologous blood for post-dural puncture headache is "not without complications."²⁶

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