EXTRADURAL BLOOD PATCH – WHY DELAY?

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The use of a blood patch in the management of headache following dural puncture is established practice (Gormley, 1960; Crawford, 1979). Nevertheless, the question remains, at what point should the patch be applied?

We report on seven patients in whom a blood patch was applied prophylactically—immediately after the puncture of the dura.

Of the cases reported, three (patients 3, 5 and 6) were inpatients and were followed up for 1 week. Of the four other patients, Nos 1, 4 and 7 were admitted originally for “day-case” surgery, and patient 2 was a “short-stay” case. This group was asked to report any untoward symptoms or headache occurring during the first week after discharge.

CASE REPORTS

Patient No. 1

A 37-year-old female received lumbar extradural anaesthesia for a varicose vein operation. The extradural puncture was performed in the lateral position at L4–5 with a 17-gauge Tuohy needle. Dural tap occurred at this level. Successful puncture was established at L3–4 and 20 ml of 2% mepivacaine with adrenaline injected. The needle was allowed to remain in position, and 16 ml of sterile autologous blood was injected to the extradural space 7 min later. Blood was also sent for bacterial culture.

The intensity of analgesia to pinprick was assessed at 20 min, and anaesthesia was demonstrated from T10 to S2. The operation proceeded uneventfully. The patient was discharged on the second day after operation without any untoward symptoms.

Patient No. 2

A 33-year-old male underwent extradural blockade for arthroscopy and meniscectomy. An 18-gauge Tuohy needle was used at the L3–4 space with a saline-loaded syringe. The dura was punctured accidentally. A successful extradural block was performed at the L2–3 space, and 20 ml of 2% mepivacaine with adrenaline was injected. Seventeen millilitre of sterile autologous blood was injected through the Tuohy needle at the L3–4 space, and 3 ml of blood sent for culture. At 20 min blockade was complete from T9 downwards. The patient lay flat for the next 18 h, and did not experience any headache. He was discharged on the second day after operation.

Patient No. 3

A 61-year-old female, weighing 55 kg, was scheduled for a total hip replacement. Spinal anaesthesia was performed at the L3–4 space with a 22-gauge needle, using “heavy” amethocaine 12.5 mg with adrenaline 200 µg. Extradural blockade had been planned so as to extend the anaesthesia into the period after operation. Using a 16-gauge Tuohy

SUMMARY

Seven patients are described in whom a prophylactic blood patch was instituted within 15 min of accidental dural puncture. Five of the patients received extradural anaesthesia before the blood patch, and one after the blood patch had been performed. In three of these patients further “top-up” doses of local anaesthetic were performed through the extradural catheter. The quality of analgesia obtained was satisfactory. No symptoms of spinal headache occurred in any of the patients.


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needle, the dura was punctured accidentally. A catheter was placed successfully via the space above. With the patient still in the lateral position, a blood patch was performed at L3-4, using autologous blood 15 ml under sterile conditions.

When further analgesia was required 2.5 h after the first spinal injection, 0.5% bupivacaine 17 ml was given through the extradural catheter before the conclusion of the operation. This produced adequate analgesia during the remainder of the operation and for the subsequent 6 h. The patient then received morphine 4 mg in saline 10 ml, which produced analgesia lasting another 8 h. The following morning she received 0.25% bupivacaine 12 ml through the extradural catheter, which produced analgesia lasting 4 h. The catheter was then removed. Spinal headache did not occur.

Patient No. 4

A 44-year-old male patient was admitted as a "day-case" for arthroscopy under extradural anaesthesia. Accidental dural puncture occurred at the L3-4 space when using a 16-gauge Tuohy needle. Six millilitre of 0.5% bupivacaine was placed in the subarachnoid space. An extradural blood patch was performed at L2-3 with 17 ml of sterile autologous blood. After 16 h bed rest, the patient was allowed up and was discharged the same day. No headache occurred.

Patient No. 5

A 52-year-old male patient underwent a thromboendarterectomy under extradural analgesia. Using a 16-gauge Tuohy needle the dura was accidentally punctured at the L3-4 space. Successful extradural placement was obtained at L2-3 and 20 ml of 2% prilocaine with adrenaline injected slowly. The Tuohy needle was allowed to remain in position at L2-3 and, 6 min after the extradural injection had been completed, 17 ml of autologous blood was injected. Anaesthesia, assessed after 20 min, showed a sensory level to pin-prick from T6 to L5, with incomplete sensory loss at S1 and S2. Likewise, there was an incomplete motor blockade at the ankles. The operation proceeded without any further analgesic. The patient was treated lying flat for 18 h and was mobilized on the day after the operation. She was discharged the same day without symptoms of spinal headache.

Patient No. 6

A 77-year-old thin, asthenic patient underwent a transvesical prostatectomy under extradural anaesthesia. Although care was taken during the procedure, the dura was inadvertently punctured at a depth of approximately 2.5 cm with a 16-gauge Tuohy needle. After a successful extradural blockade had been obtained via the space above (L2-3), 0.5% bupivacaine 17 ml was given through the Tuohy needle before a catheter was introduced to the extradural space. A blood patch was performed at the site of the dural puncture (L3-4) using 17 ml of autologous blood.

Analgesia was complete to T6 and was adequate for the operation. After the operation, 4 h after the original dose, the patient was given a bolus dose of 0.5% bupivacaine 10 ml and a continuous infusion of 0.25% bupivacaine 6 ml h⁻¹ was commenced via the extradural catheter. This was continued during the first 14 h after the operation. He required no further analgesia, and developed no symptoms of spinal headache.

Patient No. 7

A 26-year-old female underwent arthroscopy under extradural anaesthesia. Using an air-filled syringe and the midline approach, the dura was accidentally punctured at L3-4 with a 16-gauge Tuohy needle. Successful puncture was obtained at L2-3 and 20 ml of 2% prilocaine with adrenaline injected slowly. The Tuohy needle was allowed to remain in position at L2-3 and, 6 min after the extradural injection had been completed, 17 ml of autologous blood was injected. Anaesthesia, assessed after 20 min, showed a sensory level to pin-prick from T6 to L5, with incomplete sensory loss at S1 and S2. Likewise, there was an incomplete motor blockade at the ankles. The operation proceeded without any further analgesic. The patient was treated lying flat for 18 h and was mobilized on the day after the operation. She was discharged the same day without symptoms of spinal headache.

DISCUSSION

Bromage (1978) quotes an incidence of post-spinal headache of 70-80% with the use of 16-18 gauge Tuohy needle. Infusions of saline to the extradural space have been used to treat such headache. Crawford (1972) used a continuous infusion of Hartman's solution via an extradural catheter, and was able to prevent post-spinal symptoms in the majority of his patients. Such therapy attempts to maintain a high extradural pressure so as to decrease the rate of leakage of cerebrospinal fluid into the extradural space. Since the saline is absorbed rapidly, continuous infusion is necessary.

The "blood patch" attempts to seal the leak, and
the low incidence of complications in both short- and long-term follow-up of extradural blood patch (Abouleish, 1975) has prompted its widespread acceptance.

When injected through an indwelling catheter, the blood patch appears to be rather unsuccessful (Palahnuik and Cumming, 1979; Crawford, 1980). In all the patients reported by us, the blood patch was given through the extradural needle, which was placed either at or one space above or below the site of the dural puncture. This would appear to ensure that the blood is deposited at a level that is not too remote from the site of the dural opening.

One factor influencing the extent of spread of fluid within the extradural space is the volume injected. Therefore, we chose to use a volume of 15–20 ml of blood. Crawford (1980) has reported a higher failure rate when using smaller volumes of blood. Loeser and colleagues (1978), using 10 ml of autologous blood, have reported a very high failure rate (71%) when prophylactic blood patch was performed within 24 h of the dural puncture. Although they do not mention the site of injection or the precise timing of the blood patch, the efficacy of the extradural “patching” with 10 ml may be influenced by the presence of local anaesthetic in the extradural space.

Six of the reported patients received extradural anaesthesia after dural puncture had occurred. In the four patients to whom extradural anaesthesia was given through the extradural needle (patients 1, 2, 6 and 7) an initial test dose was not given before the full dose. Approximately 20 ml of anaesthetic solution was injected at a level removed from the site of the dural puncture. We felt that, with a slow rate of injection, the increase in pressure within the extradural space would be unlikely to exceed that of the subarachnoid space at the site of the dural puncture. Thus, it would be unlikely that anaesthetic solution could be “pushed” through the hole in the dura.

On the six occasions when extradural anaesthesia was performed after dural puncture, using approximately 20 ml of local anaesthetic, the onset, quality and duration of blockade did not resemble that normally associated with spinal anaesthesia, that is rapid onset, complete motor paresis, and a prolonged duration of effect.

Marx (1979) stated that the placement of an extradural blood patch through the initial needle “entails abandonment of regional anaesthesia”. In five of the cases reported, where blood patching was performed after the initial block, the analgesia was unaffected by the presence of the blood. Furthermore, in three of the patients (3, 5 and 6) extradural bupivacaine was given through the catheter after the initial blood patch, and further “top-ups” were repeated after the operation. The duration and effect of these subsequent “top-ups” were in accord with what one would expect with a normal block. This is in agreement with the case reported by Christensen and Lund (1983).

Crawford (1980) has argued against prophylactic blood patch because “continuous extradural infusion is effective in 85 per cent of cases”. However, blood patching, with its almost 100% success and its safety, would appear to be the treatment of choice, and its prophylactic use surely has its place, especially in an increasing ambulant surgical population, since the overall hospital stay is not prolonged substantially.

In conclusion, we feel that immediate blood patch through the extradural needle, using at least 15 ml of autologous blood, is a simple and effective prophylactic therapy against post-dural headache after accidental dural puncture. The quality of anaesthesia obtained does not appear to be influenced by the early administration of the blood patch, and subsequent continuous or intermittent “top-up” techniques appear to be similarly unaffected.

REFERENCES