

## Epidural Blood Patch for the Treatment of Chronic Post-lumbar-puncture Cephalgia

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Since Gormley (1960) used epidural blood patch for treatment of post-lumbar-puncture cephalgia,<sup>1</sup> various reports have confirmed its value.<sup>2-12</sup> However, epidural blood patch has been used in only two cases of prolonged post-lumbar-puncture cephalgia, one postmyelogram<sup>13</sup> and the other postpartum.<sup>14</sup> In the last two years, we have used it in three cases of post-lumbar-puncture cephalgia of 32 to 180 days' duration. All three patients were obstetric patients. None of them had had a prior history of chronic cephalgia. The first two were referred to us, while the third delivered her infant in our institution. The three patients were followed until November 1977.

## REPORT OF THREE CASES

*Patient 1.* A 26-year-old white woman had cesarean section with spinal anesthesia. Two attempts at lumbar puncture were made using a 22-gauge spinal needle. The level of puncture could not be determined exactly. Two days post partum, the patient experienced headache associated with nausea and vomiting, which was exacerbated by upright posture and relieved by lying down. Therapy consisted of analgesics, oral fluids, and iv infusion of 4 l of 0.9 per cent saline solution. However, headache persisted, and caudal injection of saline solution relieved the symptoms for only a few hours. The patient was discharged from the hospital on the seventh postpartum day, still complaining of headache. The cephalgia, though persistent, waxed and waned from day to day. The patient walked only semierect to minimize the headache.

Seventy-one days post partum, the headache was still present, and epidural blood patch was considered. The patient was afebrile, with blood pressure 130/80 torr and a pulse rate of 88/min. Physical examination revealed no abnormal neurologic sign. There was no local sign of infection in the lumbar area. Under aseptic conditions, with the patient in the lateral position, the epidural space was entered at L4-5 using a 17-gauge Tuohy needle. A 10-ml volume of blood was aspirated from the patient's arm and injected epidurally at a slow rate (0.5 ml/sec). The patient was turned on her back and remained in the supine position for an hour. When she stood, all of her symptoms had disappeared. Follow-up examination of the patient revealed no recurrence of cephalgia.

*Patient 2.* A 25-year-old white woman had elective cesarean section with spinal anesthesia using a 25-gauge needle. Only one attempt at lumbar puncture was necessary at L3-4 interspace. Forty-four hours later, the patient experienced post-lumbar-puncture cephalgia, which continued for months following dis-

charge and prevented her from resuming her job as a nurse. Neurologic examination revealed no abnormality, and other investigations, including lumbar puncture, were considered. Epidural blood patch, using 10 ml blood, was performed at L3-4 189 days after onset of headache. The headache was relieved in an hour, and did not recur. The patient has gone back to work without complaints or signs suggestive of neurologic disease.

*Patient 3.* A 24-year-old white woman had vaginal delivery with spinal analgesia. The lumbar puncture was successful after two attempts, using a 26-gauge needle at the L3-4 and L4-5 interspaces. Twelve hours later, post-lumbar-puncture cephalgia, associated with neckache, backache, dizziness, tinnitus, and blurring of vision on standing, developed. The headache was reduced by increased oral fluid intake, abdominal binder, and analgesics. On the fourth postpartum day, the patient was discharged, complaining of moderate headache. A month later she still had headache. Neurologic examination was noncontributory, and the patient was afebrile. Epidural blood patch was performed. An hour later, the patient was asymptomatic. Follow-up examination of the patient revealed that she had had dizziness for only one day. There was no recurrence of headache or associated symptoms.

## DISCUSSION

Although there is a correlation between the size of the spinal needle and the incidence and severity of post-lumbar-puncture cephalgia, the use of fine needles, such as 25- or 26-gauge, is not a guarantee against severe post-lumbar-puncture cephalgia, as shown in the second and third cases. Current concepts of spinal headache implicate the dural puncture, which creates a fistula between the subarachnoid and epidural spaces. This leads to leakage of cerebrospinal fluid (CSF). When the seepage is excessive, the formation of CSF is depressed, or the patient is susceptible, headache, which can become chronic, develops.

Fortunately, skin and ligamentous tissues heal quickly, preventing leakage of CSF to the exterior and precluding the possibility of meningitis. Only rarely, when corticosteroids have been injected into the epidural space and inadvertently into the tissues of the back, is a subarachnoid-cutaneous fistula created.<sup>15</sup>

Usually the subarachnoid-epidural fistula is closed rapidly by fibrin deposition and the dural rent is repaired in a short time.<sup>3</sup> In 72 per cent of cases, even without treatment, headache abates within a week of onset; 24 per cent are gone within two days; 29 per cent within two to four days; 19 per cent within five to seven days.<sup>16</sup> If the edges of the torn arachnoid overgrow the dural rent into the epidural space, the fistula between the two spaces can remain patent permanently. The resulting

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continuous leakage of CSF, when not compensated for by increased production, can lead to post-lumbar-puncture cephalgia lasting as long as several weeks or even months.<sup>12-14,17,18</sup> Such chronic headache can wax and wane, and becomes complicated by psychological, vascular, and muscular factors.

The possibility that post-lumbar-puncture cephalgia may develop should always be considered in any case of headache in which the patient has had a dural puncture. A long interval from lumbar puncture to the patient's request for medical help does not preclude that possibility. Owing to the low pressure in the subarachnoid space in these cases, a sample of CSF may be difficult to obtain.<sup>14</sup> Consequently, repeated attempts at lumbar puncture resulting in two or more tears of the dura can occur. This has been reported to lead to further traction on the brain and tearing of an intracranial blood vessel, producing a subdural hematoma.<sup>19</sup>

Attempts to close subarachnoid-epidural fistulas by laminectomy and suturing the dural rent have been reported.<sup>17,20</sup> Epidural blood patch is an easier, more economic, and safer procedure. A long-term follow-up study of 118 patients for two years proved the safety of epidural blood patch.<sup>10,11</sup> Within 36 hours of epidural blood patch, there is an 8 per cent recurrence of cephalgia necessitating a second epidural blood patch.<sup>10</sup> The overall success rate of epidural blood patch in relieving post-lumbar-puncture cephalgia is 96.5 per cent.<sup>21</sup> However, before performing epidural blood patch, the anesthesiologist should be familiar with the technique, contraindications, and possible complications, such as backache, fever, and neckache.<sup>9,10,21,22</sup> Also, when bleeding develops during the epidural puncture, it is recommended that no blood be injected in the epidural space before re-evaluation of the patient's condition 24 hours later. This is because the epidural bleeding may by itself cure the headache. The added injection of blood not only may be unnecessary, but may cause complications.<sup>23</sup>

In our institution, epidural blood patch can be performed as an outpatient procedure. The patient is seen three days following the "patch" and instructed to call if any unusual symptom is experienced or if headache recurs.

In conclusion, epidural blood patch should be considered as a therapeutic test in cases of chronic post-lumbar-puncture cephalgia. Neurologic investigations or surgical closure of the dural rent should be postponed until epidural blood patch proves unsuccessful.

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