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Epidural Blood Patch Can Cause Acute Neurologic Deterioration

Richard J. Sperry, M.D.,* Alan Gartrell, M.D.,† Joel O. Johnson, M.D., Ph.D.‡

EPIDURAL blood patch is a widely used technique to treat spinal headache and persistent leak of cerebrospinal fluid (CSF) from the subarachnoid space. Most of the patients who receive this treatment are presumed to have normal intracranial elastance. However, some patients who have a persistent CSF leak after a subarachnoid puncture also have neurologic disease and may have decreased intracranial elastance. These patients may be at risk for developing increased intracranial pressure (ICP) when a mass effect is produced in the spinal epidural space during epidural blood patch. We report a case of acute neurologic deterioration associated with the administration of an epidural blood patch.

Case Report

The patient is a 12-yr-old, 40.1-kg boy whose presenting complaint was decreased vision in the left eye. Subsequent examination including computed tomography and magnetic resonance imaging revealed an intracranial tumor in the midline. He had no other known medical problems and had developed normally. He subsequently underwent an uneventful bifrontal craniotomy for resection of a suprasellar pituitary adenoma followed 8 days later by transsphenoidal surgery for resection of residual tumor. During the second surgery, a lumbar drain was placed to facilitate surgery. After the second procedure, computed tomography and magnetic resonance imaging scans

demonstrated excellent tumor resection. He recovered from the second procedure without incident except for a mildly increased urine output, which did not require treatment. He was discharged to home 5 days after the second operative procedure. At that time, his lumbar drain site showed no sign of leakage, and he had no rhinorrhea or otorrhea. His only discharge medication was 20 mg oral hydrocortisone twice daily.

After discharge from the hospital, he experienced persistent headache but no other neurologic symptoms. Five days after discharge, he had a severe headache, which prompted his family to seek medical attention. In the emergency department, he was noted to have a CSF leak from his lumbar drain site and stated that his headache improved when he was recumbent. He was thought to be suffering from a postdural puncture headache. The drainage site was closed with a stitch, and he was admitted to the hospital.

Because his headache persisted to the next day, an anesthesiologist was consulted and requested to perform an epidural blood patch. After the incremental administration of intravenous midazolam to a total of 2.5 mg, the patient was placed in the left lateral decubitus position and, using strict asepsis, an 18-G Crawford needle was placed through the L2-L3 interspace into the epidural space using the loss-of-resistance technique. Autologous blood was placed into the epidural space at a rate of approximately 0.5 ml per minute with a brief pause every 5 ml to assess back discomfort. After 20 ml of blood had been administered, the patient became unconscious, and his heart rate decreased from 65 to 55 beats/min. His respirations remained spontaneous. Oxygen was administered immediately along with 0.3 mg intravenous atropine and 0.25 mg intravenous flumazenil. The patient awakened over the next 10-15 min but still complained of headache.

The headache worsened over the following hours, he became more somnolent, and he developed a clear CSF rhinorrhea. An emergent computed tomography scan obtained approximately 4 h after the administration of the blood patch (fig. 1) showed a significant increase in the size of the cerebral ventricles, including the third ventricle. The patient was transferred to the pediatric intensive care unit, where an external ventricular drain was placed and the ICP, although not specifically measured, was assessed as increased.

Attempts to eliminate the need for the external ventricular drain persistently failed over the next 2 days. Therefore, a ventriculoperitoneal shunt was placed, which improved the drainage of CSF. He was discharged to home without any apparent neurologic compromise 5 days after his admission through the emergency department.

Discussion

Intraoperative drainage of CSF by means of a lumbar subarachnoid drain relaxes intracranial contents, re-

* Associate Professor, Department of Anesthesiology, University of Utah Medical Center, Salt Lake City, Utah.

† Attending Anesthesiologist, Primary Children's Medical Center, Salt Lake City, Utah.

‡ Assistant Professor, Department of Anesthesiology, University of Utah Medical Center, Salt Lake City, Utah.

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Address correspondence to: Richard Sperry, M.D., Department of Anesthesiology, University of Utah Medical Center, 50 North Medical Drive, Salt Lake City, Utah 84132.

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Fig. 1. A computed tomography scan obtained 4 h after the administration of an epidural blood patch demonstrating hydrocephalus.

ducing the need for brain retraction. Occasionally, the spinal drain produces a persistent CSF leak, which can be treated with epidural blood patch.¹

The patient in this report had an obvious CSF leak from the spinal drain site and an associated headache, which was worse when he was erect. Both of these features support the diagnosis of postdural puncture headache. Curative treatment for the CSF leak and postdural puncture headache frequently is accomplished with an epidural blood patch. The technique of epidural blood patch has been described elsewhere.² Blood volumes for epidural blood patch of from 10 to 20 ml have been reported, with an optimal volume of approximately 15 ml.^{3,4}

Neurologic complications related to epidural blood patch include those occurring at the time of the pro-

cedure and symptoms predominately happening after epidural blood patch. This latter group includes paresthesias, neck ache, facial nerve palsy, and lumbosacral syndrome.^{5,6} Neck and backache, seizure, severe headache secondary to pneumocephalus, and transient bradycardia have been reported during and immediately after the procedure.^{5,7-9}

Increased CSF pressure may play a role in the rapid resolution of a postdural puncture headache after epidural blood patch and suggests an etiology for some of the reported immediate complications.¹⁰ In addition, because the mass effect of the clotted blood has been reported for up to 7 h, it has been proposed that the increase in CSF pressure also may be prolonged.¹¹ This case report is the first to demonstrate that the increased CSF pressure associated with epidural blood patch can have acute neurologic sequelae.

In our patient, communicating hydrocephalus was a consequence of his operative procedure.¹² The CSF leak from his lumbar drainage site served to decompress his increased ICP. His headache likely was also secondary to increased ICP, even though it had a postural component. We propose the following mechanism for the observed sequence of events: The mass effect from the injection of a large amount of epidural blood acutely increased ICP, and the patient lost consciousness. He gradually awakened after the effect of the benzodiazepine that had been administered was antagonized, but the seal of the dural defect resulted in a gradual further increase in ICP as new CSF was produced.

Two issues particular to this case must be considered along with any conclusion. First, our patient had received midazolam, which could have produced a relative hypercarbia and contributed to an initial ICP increase. Secondly, the administration of 20 ml of epidural blood is certainly generous and likely contributed to the resultant ICP increase. Whether the outcome would have been the same with a smaller dose of epidural blood is uncertain.

We conclude that, under appropriate circumstances, the administration of an epidural blood patch to a patient with increased ICP can be associated with neurologic deterioration. This possibility should be considered when epidural blood is administered to these patients.

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Parkinsonian Symptoms during Emergence from General Anesthesia

Stanley Muravchick, M.D., Ph.D.,* David S. Smith, M.D., Ph.D.†

THE fundamental neurochemical lesion that causes idiopathic or primary Parkinson's disease (Paralysis agitans) is well established, but the anesthetic implications of dopaminergic deficiency within the basal ganglia remain unknown. The literature relevant to anesthetic practice simply cautions against the perioperative use of adjuvant drugs that are thought to have dopaminergic blocking or cholinomimetic properties.^{1,2} It remains unclear whether general anesthesia is associated with significant changes in dopaminergic

activity. We present a report of severe and prolonged dystonic muscle rigidity during emergence from otherwise routine general anesthesia in a patient who was subsequently found to have classic Parkinson's disease.

Case Report

An apparently healthy white man, 54 yr old, 178 cm, 80 kg, was scheduled for open cholecystectomy after 4 days of hospitalization for intravenous antibiotic therapy (mezlocillin, gentamycin) instituted for severe right upper-quadrant abdominal pain, nausea and vomiting, and recurrent shaking chills. All laboratory data were within normal limits except for a slightly increased gamma-glutamyltransferase, suggesting a diagnosis of chronic cholecystitis or hydrops of the gallbladder. The patient's prior annual physical examinations had revealed no objective abnormalities in any screening studies but made passing mention of complaints of persistent anxiety, a lack of a general sense of well being, and recurrent constipation. The patient also had experienced skeletal muscle spasms after taking prochlorperazine (Compazine) to treat attacks of nausea. The attending anesthesiologist who visited the patient the afternoon before surgery described a preanesthetic evaluation of ASA physical status 1. Nursing notes revealed that the patient again experienced muscle spasms of his torso and jaw within 1-2 h after he asked for and received 10 mg oral prochlorperazine for nausea. These symptoms resolved after subsequent treatment with 100 mg oral diphenhydramine (Benadryl).

* Professor of Anesthesia.

† Associate Professor of Anesthesia.

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Address reprint requests to Dr. Muravchick: Department of Anesthesia, Courtyard 402, Hospital of the University of Pennsylvania, 3400 Spruce Street, Philadelphia, Pennsylvania 19104-4283.

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