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Case Report

Unrecognized Durotomy Resulting in High Volume Cerebrospinal Fluid Diversion Through a Hemovac®

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INTRODUCTION

Incidental durotomy has an incidence rate of approximately 3.5-14%,[1,2] while unrecognized durotomy can occur in up to 26.7% of malignant spinal tumor surgeries.[3] When identified intraoperatively and repaired primarily with sutures or dural sealant, durotomies typically result in minimal postoperative sequelae.[4] However, if unrecognized or inadequately repaired, they can lead to complications such as intracranial hypotension, subdural hematoma (SDH), pseudomeningocele, cerebrospinal fluid (CSF) fistula, meningitis, and arachnoiditis.[2] We present a case illustrating the morbidity of an unrecognized incidental durotomy following spinal surgery, further complicated by Hemovac® placement that caused high-volume CSF diversion, resulting in severe intracranial hypotension and cerebral hemorrhages. Written informed consent was obtained from the patient for presentation and publication..

CASE REPORT

A 76-year-old man with a past medical history of hypertension, coronary artery disease, and prior myocardial infarction status post-stenting and coronary artery bypass grafting presented to an outpatient surgery center for lumbar laminectomy, facetectomy, and transforaminal lumbar interbody fusion. The procedure was completed without any apparent complications, and a Hemovac® drain was placed, as is routine, to prevent infection and hematoma formation. The patient was successfully extubated and transferred to the post-anesthesia care unit (PACU). On arrival, he exhibited spontaneous movement in all extremities but remained somnolent. Over time, his neurological status declined, and he lost spontaneous extremity movement. Approximately 500 mL of predominantly clear fluid was noted in the Hemovac®. A head computed tomography (CT) scan revealed bilateral SDH secondary to intracranial hypotension caused by an unrecognized durotomy, leading to CSF diversion through the Hemovac®. The patient was transferred to a tertiary hospital for a higher level of care.

En route, he experienced a 40-second tonic-clonic seizure that resolved without intervention. Upon arrival, his Glasgow Coma Scale score was 6, and his pupils were equal but nonreactive; he was emergently intubated for airway protection. Repeat CT imaging demonstrated a 9 mm left-sided SDH extending the length of the hemisphere, a smaller posterior right-sided SDH, subarachnoid blood in the interhemispheric fissures and basilar cisterns, a small intraventricular hemorrhage, cerebral edema, effacement of the basilar cisterns, and a 4 mm left-to-right midline shift (Figure 1). The patient was loaded with 2 g of levetiracetam, then continued 500 mg twice daily. He was placed in the Trendelenburg position and monitored with electroencephalography, which showed no further seizure activity.

On postoperative day (POD) 2, he underwent lumbar wound exploration with dural repair. Postoperatively, he was maintained flat for 24 hours per neurosurgery recommendations. His neurological status gradually improved; he became responsive, opened his eyes, and followed commands. After a successful spontaneous breathing trial, he was extubated on POD 3. By POD 5, he had returned to his neurological baseline and was transferred to the general floor. On POD 10, he was discharged to inpatient rehabilitation, where he made a full recovery and was eventually sent home on antiepileptic therapy without residual neurological or physical deficits.

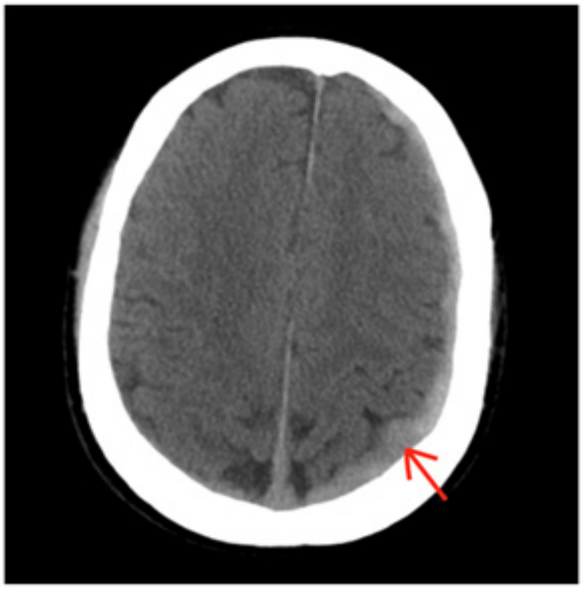

Figure 1. A head computed tomography (CT) showing a 9mm left-sided subdural hematoma extending the length of the hemisphere (red arrow) with a smaller posterior right-sided subdural hematoma (SDH).

DISCUSSION

Durotomy risk factors include revision surgery, advanced age, and obesity.[1-5] Associated complications include intracranial hypotension, pseudomeningocele, CSF fistula formation, meningitis, and arachnoiditis.[2] Prompt recognition and repair of a dural tear, using sutures or sealant, greatly reduce these risks. Even with repair, durotomy may prolong hospitalization and decrease patient satisfaction.[6]

This case was unusual because the dural tear went unrecognized, and Hemovac® placement resulted in high-volume CSF diversion. CSF is distributed between the subarachnoid spaces of the brain and spinal cord, with about 20% in the cerebral ventricles. The average adult has 150 mL of CSF (range: 90-200 mL) and produces roughly 20 mL per hour.[7] In our patient, approximately 500 mL of clear fluid drained into the Hemovac®, suggesting significant CSF loss despite the expected lower total volume. Imaging findings (Figure 1) were consistent with severe

intracranial hypotension secondary to this diversion.

Intracranial hypotension most commonly results from a dural leak, spinal nerve root diverticulum, or CSF-venous fistula.[8] Typical symptoms include orthostatic headache, nausea, neck stiffness, tinnitus, and dizziness, while severe cases may present with ataxia, parkinsonism, quadriplegia, or coma.[9-12] Imaging may reveal SDH, cerebellar hemorrhage, or effacement of the basilar cisterns due to traction on bridging veins caused by loss of CSF buoyancy.

Conservative management options for spontaneous intracranial hypotension include bed rest, caffeine, and epidural blood patch, but durotomy-related cases require primary closure.[4] Most dural tears effectively are managed with sutures, sealant, or both.[13] When promptly recognized and repaired, incidental durotomies rarely cause long-term sequelae. This case demonstrates the potential morbidity of an unrecognized durotomy, which can result in severe intracranial hypotension, cerebral hemorrhage, and seizures. Although our patient made a full recovery, the case underscores the need for vigilance in detecting and repairing durotomies to prevent serious complications.

ARTICLE INFORMATION

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