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CASE REPORT

Delayed Intracranial Subdural Hematoma Following Removal of an Intraspinal Tumor: A Case Report and Review of the Literature

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A 55-year-old male underwent complete resection of a T12 intraspinal tumor and subsequently developed dizziness and loss of consciousness on postoperative day 2. A subdural hematoma (SDH) of the left frontotemporoparietal space with uncal herniation was seen on computed tomography. This unusual case of acute intracranial SDH after spinal surgery is discussed, and literature review is performed. We aim to discuss the possible mechanism by which this complication occurred.

Key words: Intracranial subdural hematoma, intraspinal tumor, spinal surgery

INTRODUCTION

Complications of spinal surgery, such as dural tear, cerebral spinal fluid (CSF) leakage, nerve root injury, spinal cord injury, and deep wound infection are common.[1,2] The incidence of complications in terms of location ranged from 14.8% of those treated at the thoracic spine, 12% of those treated at the cervical spine, and 10.1% of those treated at the lumbar spine.[1] The highest incidence of complication in one study was dural tear (2.1%), followed by neurological complication (1.4%), deep wound infection (1.1%), spinal epidural hematoma (0.9%), and CSF leakage (0.5%); CSF leak may induce intracranial hypotension (IH), which manifests as orthostatic headaches, neck stiffness, nausea, vomiting, visual and auditory disturbances, changes in mental status, and seizures.[2] Another rare complication of CSF leakage is intracranial hemorrhage including epidural hematoma, cerebellar hemorrhage, and subdural hematoma (SDH). We present a case of delayed SDH following a thoracic intraspinal surgery, which has seldom been reported in the published literature. After literature review, only 18 cases (including our case) were reported. Our case became unconsciousness two days after the operation. The other cases were developed after the operation.

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CASE REPORT

A 53-year-old male experienced a burning sensation in his lower back for 2 months before the presentation. Magnetic resonance imaging of the spine revealed an enhancing intraspinal mass at T12 [Figure 1]. The patient underwent a partial laminectomy of T12 with total resection of the intradural-extramedullary tumor, which was later diagnosed histopathologically as a schwannoma. The dural layer was primarily closed with 4-0 vicryl suture (Ethicon US, LLC.). The operative time was approximately 3 h and 40 min, and the estimated blood loss was 150 ml. The patient reported an improvement of radicular pain on postoperative day 1. Two days after the operation, the patient experienced severe dizziness when standing up from his bed, followed by a loss of consciousness with bilateral pupil dilation. Brain computed tomography revealed the left frontotemporoparietal acute SDH with uncal herniation [Figure 2]. Emergent decompressive craniectomy with evacuation of the hematoma was performed. Intraoperatively, active venous oozing from the temporal base near the sigmoid sinus was noted. The patient regained consciousness 8 days after the craniectomy with very mild right hemiparesis.

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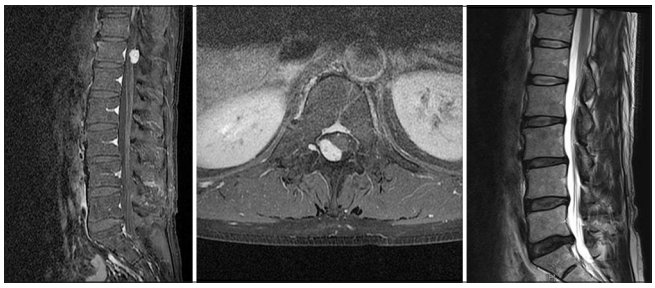

Figure 1: A contrast-enhanced intradural-extramedullary tumor was identified at the T12 level on sagittal (left), axial (middle) T1-weighted images, and postoperative T2 sagittal image (right)

DISCUSSION

Iatrogenic CSF leakage, a potential complication of various spinal procedures, may lead to low CSF pressure and volume. Secondary IH has been reported as a probable source of intracranial hemorrhage, a rare but serious complication of spinal surgeries.[3] IH is difficult to diagnose in an asymptomatic patient. Clinically, IH presents with orthostatic headaches, neck stiffness, nausea, vomiting, visual and auditory disturbances, changes in mental status, and seizures.[2] IH commonly occurs after lumbar puncture, spinal surgery, and trauma. In our patient, no symptoms or signs of IH were identified on the first postoperative day, and the amount of fluid drained from the operative wound was acceptable without any signs of CSF leak. After review of the literature, we found that the incidence of intracranial SDH after spinal surgery is rare, and most cases of IH can be treated conservatively.[4,5] Most cases of SDH in this context were managed successfully with conservative treatment, such as bed rest, fluid replacement, and anti-edema therapy (dexamethasone).[2,5-10] Several reported cases required hematoma evacuation.[2,10] The mechanism of IH and subsequent SDH is currently considered to be due to continuous CSF leak after dural tear; subsequent cerebral hypotension with caudal displacement of the shifting brain structures then results in subdural drainage veins to stretch and tear.[2,5-10] Head-down positioning during dural opening and completeness of dural repair through Valsalva maneuver confirmation is suggested to prevent these complications.

The etiology of acute spontaneous SDH includes arterial, idiopathic, coagulopathic, and oncological origin as well as IH.[3] Coagulation tests and the blood pressure at the time the patient became unconsciousness were normal. In most reported cases, deterioration of consciousness was noticed immediately following spinal surgery or as a delayed phenomenon up to 4 weeks postoperatively.[6] Our patient did not present with any of the milder preceding symptoms of IH but rather suffered severe neurological deterioration and SDH following surgery.

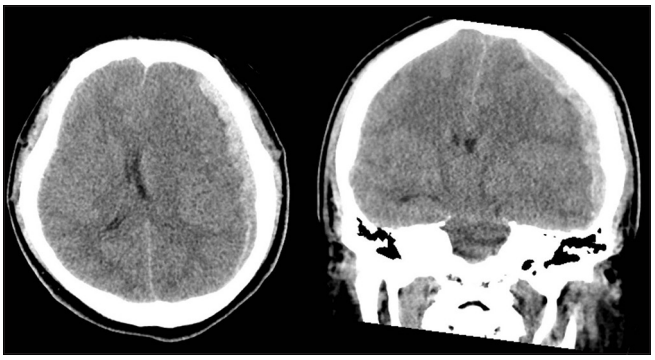

Figure 2: Axial computed tomography showing a subdural hematoma of the left cerebral hemisphere causing the left lateral ventricle compression and midline shift to the right (left). Coronal view showing the left subdural hematoma with uncal herniation is shown on the right

A likely mechanism of SDH development in our patient is a drainage vein tear caused by a sudden head-up position and profound IH while the patient ambulated; insufficient fluid supplementation after surgery might have played a secondary role. This supposed mechanism is compatible with the operative findings, as marked venous oozing from the temporal base close to the sigmoid sinus was noted. Most cases with SDH following spinal surgery had good neurological recovery in the literature. Morimoto *et al*.[8] presented 17 cases with SDH following spinal surgery, and no neurologic deficit was identified. In our case, only mild right hemiparesis continued to exist at discharge 4 weeks postcraniectomy.

CONCLUSION

Patients who undergo intraspinal surgery should be counselled on potential postoperative symptoms, such as dizziness, neck stiffness, and postural headache, as these may be indicators of IH. Fluid replacement and bed rest are advised to reduce the risk of intracranial SDH. Clinicians must be especially alert to intracranial bleeding if a CSF wound leak is observed or suspected. Furthermore, any patient with declining mental status or atypical headache with cranial nerve deficits after spinal surgery should immediately undergo neuroimaging to exclude the possibility of intracranial hemorrhage. If the intracranial hemorrhage is life-threatening, emergent evacuation of the hematoma is mandatory.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published

and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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