Fatal intratumoral hemorrhage in posterior fossa tumors following ventriculoperitoneal shunt

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Abstract

We report on two patients with rare major intratumoral hemorrhage following ventriculoperitoneal shunt in posterior fossa tumors. A 28-year-old woman with a midline posterior fossa lesion, whose imaging features suggested a fourth ventricular ependymoma with obstructive hydrocephalus, was subjected to a right ventriculoperitoneal shunt. Her consciousness deteriorated, and she experienced massive intratumoral hemorrhage and later died. An eight-year-old girl presented with raised intracranial pressure and ataxia caused by vermian astrocytoma with obstructive hydrocephalus. She also developed a massive tumor bleed following a ventriculoperitoneal shunt and was subjected to emergency decompression of the tumor with the bleeding. She remained vegetative at discharge and died 18 months later. Intratumoral hemorrhage is a rare but important cause of morbidity and mortality in patients with posterior fossa tumors who undergo ventriculoperitoneal shunt.

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Keywords: Intratumoral hemorrhage; Ventriculoperitoneal shunt; Shunt complications; Posterior fossa tumors

1. Introduction

Massive intratumoral bleeding following cerebrospinal fluid (CSF) diversion for a posterior fossa tumor with hydrocephalus is rare. We report our experience with two patients and reviewed the literature.

2. Case reports

2.1. Patient 1

A 28-year-old woman presented with a 3-month history of headache, vomiting and visual blurring. She had papilledema with bilateral terminal 6th nerve paresis, subtle bilateral cerebellar signs and gait ataxia. CT scans and MRI showed a well-rounded lesion in the fourth ventricle causing obstructive hydrocephalus with minimal enhancement on contrast (Fig. 1A and B). The patient underwent ventriculoperitoneal shunt surgery, following which she deteriorated to a deeply comatose state with absent brainstem reflexes. An immediate post-operative CT scan showed a massive intratumoral bleed with brainstem compression and upward herniation (Fig. 1C). As she was in a poor neurological state with absent brainstem reflexes, decompressive surgery was not contemplated and she later died.

2.2. Patient 2

An eight-year-old girl presented with a 2-month history of neck pain, headache, vomiting and swaying while walking. On examination she was drowsy and had bilateral visual loss due to secondary optic atrophy. A CT scan showed a vermian lesion with heterogeneous contrast enhancement and gross hydrocephalus (Fig. 2A). The patient was subjected to a ventriculoperitoneal shunt, after which she became more alert. One day later, her consciousness deteriorated and she had abnormal flexor response to pain. A CT scan showed a massive intratumoral hemorrhage with an intraventricular extension (Fig. 2B). The patient was subjected to emergency decompression of the lesion with the bleeding and was managed intensively with ventilatory support. A delayed CT scan showed that the compression on the brainstem had been relieved (Fig. 2C). The histopathological report was pilocytic astrocytoma. The patient remained vegetative at discharge and died about 18 months later.

3. Discussion

Posterior fossa tumors are often associated with hydrocephalus. Although 80% of patients have hydrocephalus associated with the tumor, only about 30% require a permanent CSF diversion post-operatively.² Younger age at diagnosis and midline location of the tumor are among the few factors that were predictive of the need for post-operative shunts.³ The advantages of CSF diversion prior

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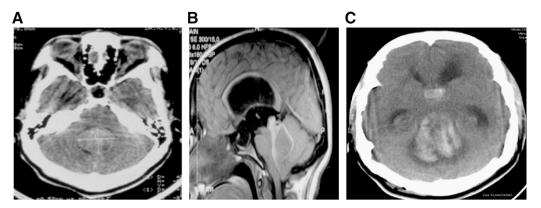


Fig. 1. Case 1.(A) Contrast-enhanced axial CT scan and (B) Sagittal T1-weighted contrast-enhanced MRI showing a fourth ventricular tumor (C) Axial CT scan showing massive intratumoral bleed extending into the third and the lateral ventricles with brainstem compression.

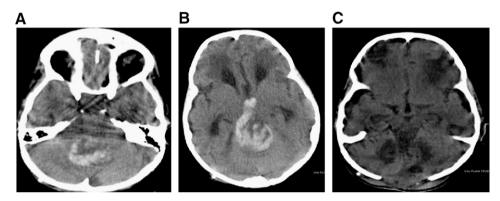


Fig. 2. Case 2. (A) Axial contrast-enhanced CT scan showing a heterogeneously enhancing tumor in the vermis. (B) Axial CT scan showing intratumoral bleeding with extension into the third ventricle. (C) Delayed post-operative axial CT scan shows decompression of the tumor and the hematoma and open cisternal spaces.

to tumor decompression are the early relief of raised intracranial pressure, lax brain at surgery and likely avoidance of a post-operative CSF leak. The options for CSF diversion are ventriculoperitoneal shunting, endoscopic third ventriculostomy and external ventricular drainage. Each procedure has its own disadvantages and controversies surrounding the need for CSF diversion as against direct tumor decompression.²

Ventriculoperitoneal shunts have a malfunction rate of 20% in the first year and 5% every following year. External ventricular drainage has a high risk of infection that is increases over time. Endoscopic third ventriculostomy is an option wherever it is feasible, but it is especially risky if the prepontine space is obliterated by the tumor mass. 5

Spontaneous intratumoral hemorrhage occurs in about 6% to 10% of intracranial tumors. Malignant tumors like glioblastomas, metastatic tumors, malignant meningiomas, and medulloblastomas bleed most commonly, although the non-malignant tumors like oligodendrogliomas, pituitary adenomas, ependymomas, choroid plexus papillomas and hemangioblastomas also bleed occasionally. 6

Hemorrhage into the tumor following CSF diversion is very rarely reported. To date only two cases of medulloblastomas, one case of ependymoma, two cases of cerebellar astrocytomas, and a few thalamic and pineal tumors are reported to have bled massively following CSF diversion. $^{1,7-9}$

The paucity of these reports suggests that these fatal hemorrhages are rare. Also, such fatal hemorrhages have occurred even in benign tumors, including the pilocytic astrocytoma and ependymoma reported here, which otherwise have excellent prognoses.

Different mechanisms are postulated to cause intratumoral hemorrhages. The sudden change in the pressures between the supra and infratentorial compartments may be the most likely cause for bleeding. The fragile vessels within the neoplastic tissue may also predispose to bleeding. Although upward herniation cannot be considered as the primary cause for the hemorrhage, it definitely worsens the clinical status of the patient and contributes to morbidity and mortality.

When a patient with a posterior fossa tumor deteriorates following CSF diversion, the possibility of tumor bleed should be considered and prompt decompression should be attempted. However, the decision regarding CSF diversion should be made in a more judicious manner. Patients who are morbid pre-operatively might require CSF diversion. Whenever feasible, endoscopic third ventriculostomy may be safer, as the pressure differences between the supra

and the infratentorial compartments change gradually, reducing the risk of hemorrhage.⁵ With sterile technique and good antibiotic coverage, controlled CSF release from a peri-operative external ventricular drain is another good option and a shunt can be avoided.

4. Conclusion

Major intratumoral hemorrhage following CSF diversion for posterior fossa tumors is an important cause of immediate deterioration and contributes to morbidity and mortality, even for benign tumors.

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Spontaneous epidural hematoma due to skull metastasis of hepatocellular carcinoma

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Abstract

Although "spontaneous" epidural hematomas are rare, they can occur in patients with metastatic skull tumors. We describe a case caused by skull metastasis of hepatocellular carcinoma (HCC), and review the relevant literature. In patients with HCC, potential skull metastasis should be kept in mind, since skull metastases from HCC seem to often cause devastating epidural hematoma. © 2008 Elsevier Ltd. All rights reserved.

Keywords: Spontaneous epidural hematoma; Acute epidural hematoma; Skull tumor; Hepatocellular carcinoma; Metastatic tumor

1. Introduction

Epidural hematoma occurs most often in the presence of preceding head trauma. However, non-traumatic, "spontaneous" epidural hematomas are not infrequently reported in various clinical scenarios.^{1–3} They can occur even in patients with neoplasms, especially those with metastatic skull tumors. This is a case report of a male office worker who presented with acutely deteriorating consciousness. An emergency evacuation of the epidural hematoma with total removal of the skull tumor was performed, and the tumor was found to be metastatic HCC. This metastatic tumor was the first clinical manifestation of HCC in this patient.

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