Intratumoral hemorrhage in posterior fossa tumors after ventricular drainage

Report of two cases

JESÚS VAQUERO, M.D., JOSÉ M. CABEZUDO, M.D., RAFAEL G. DE SOLA, M.D., AND LUIS NOMBELA, M.D.

Neurosurgical Service and Neuroradiological Section, Puerta de Hierro Clinic, Autonomous University, Madrid, Spain

Severe intratumoral hemorrhage in posterior fossa tumors is reported in two children, one with a Grade I astrocytoma, and the other with a medulloblastoma. Fatal bleeding occurred a few hours after insertion of ventricular drainage for preoperative management of obstructive hydrocephalus.

KEY WORDS • hydrocephalus • tumor hemorrhage • posterior fossa tumor • ventricular drainage

VENTRICULAR drainage is instituted in many neurosurgical services before a direct approach to posterior fossa tumors in patients with obstructive hydrocephalus. It has been accepted as a useful procedure that facilitates surgery and lowers mortality.1,2,6,10-12,17 This paper reports two cases of fatal intratumoral hemorrhage in posterior fossa tumors after insertion of external ventricular drainage.

Case Reports

Case 1

This 7-year-old boy was admitted to the neurosurgical pediatric unit on December 9, 1977. He had experienced headache and vomiting during the last 6 months and diplopia in the last week before admission. Neurological examination showed a slightly obtunded boy, with bilateral papilledema, right abducens palsy, and truncal ataxia. Computerized tomography showed a large hypodense vermian mass producing marked obstructive hydrocephalus. The tumor enhanced after contrast administration (Fig. 1A and B).

On December 10, 1977, external right lateral ventricular drainage was carried out. Opening ventricular pressure was high, and it was decided to maintain the collecting bag at a height of 15 cm above the head. The patient’s clinical condition improved almost immediately and, although he was in bed, he could read and play with his parents.

Eight hours later, he suddenly became comatose with respiratory difficulty and had to be intubated. Simultaneous to his clinical deterioration, the draining cerebrospinal fluid (CSF), which had been clear, became blood-stained. About 4 cc of air was injected through the ventricular cannula, and radiography revealed no shift in the ventricular system. Computerized tomography showed massive intratumoral hemorrhage (Fig. 1C and D). Steroids were administered and, 3 hours later, craniectomy was performed. The hematoma was totally evacuated, and the tumor, which was located mainly in the vermis and left cerebellar hemisphere and occupied the fourth ventricle, was subtotally removed. Pathological study showed a Grade I microcystic cerebellar astrocytoma.

The patient’s clinical condition improved slightly during the 3 postoperative days and, although he never regained consciousness, he was able to breathe by himself. On the 5th postoperative day, he deteriorated progressively and required controlled ventilation. On the 10th day, a tracheostomy was performed and a ventriculoperitoneal shunt was inserted. He died on the 13th postoperative day.
Tumor hemorrhage after ventriculostomy

Fig. 1. Case 1. A and B: Computerized tomography scans, before (A) and after (B) contrast administration, of a cerebellar astrocytoma producing marked obstructive hydrocephalus. C and D: Scans showing intratumoral hemorrhage. In D, air can be seen in the right lateral ventricle.

Case 2

This 11-year-old girl was admitted on July 8, 1980, for treatment of a posterior fossa tumor. She was in perfect health until 15 days before admission, when she started vomiting, which was thought to be related to gastrointestinal disease. Six days later she complained of intermittent diplopia. She was seen by a neurologist, and CT showed a solid hyperdense vermian tumor that enhanced after contrast administration; the tumor was causing obstructive hydrocephalus (Fig. 2A and B).

On admission, neurological examination showed an alert, cooperative, and oriented girl. Her head was tilted to the right; she had diplopia when looking straight ahead but which disappeared when she looked to either side. Bilateral papilledema was present, more marked in the left eye. There was defective convergence of the eyes and paresis of the left abducens nerve. She exhibited cerebellar ataxia.

On July 15, 1980, she became slightly obtunded and dysarthric. That morning, an external ventricular drainage tube was inserted, and the tumor operation was scheduled for the next day. Opening pressure of the right lateral ventricle was 33 cm H₂O. Decompression was performed gradually, with the drainage bag at a height of 20 cm above the head. Immediately after the procedure, the girl improved greatly, but 7 hours later, while playing cards in bed with other children, she suddenly became apneic and comatose with fixed and dilated pupils. The CSF, clear until that moment, became blood-stained. She was intubated and anti-edema measures were undertaken. Emergency CT showed a massive intratumoral hemorrhage (Fig. 2C and D). She died a few hours later. Autopsy showed the tumor to be a medulloblastoma with a massive intratumoral hemorrhage.

Discussion

Spontaneous intratumoral bleeding is a rare event in primary tumors of the central nervous system. Most of the reported cases have occurred in pituitary adenomas or glioblastomas. In 1967, McCormick and Ugajin reported a case of spontaneous fatal hemorrhage in a previously asymptomatic medulloblastoma, occurring in a 12-year-old girl. On reviewing the literature, they could collect only three
other cases of spontaneous intratumoral hemorrhage in medulloblastomas.

Our two patients had tumors in which the possibility of spontaneous tumor bleeding is considered exceptional. The very sudden clinical deterioration in both children is evidence against a progressive upward tentorial herniation due to the tumor being the cause of the hemorrhage. It is logical to consider that ventricular decompression was the causative factor of the intratumoral bleeding although in both cases the collecting bag was kept over 15 cm high in order to avoid rapid drainage.

There is some controversy about the advantages and disadvantages of temporary external drainage or a permanent valvular shunt for ventricular drainage in the preoperative management of posterior fossa tumors. Proponents of external ventricular drainage usually cite the possible obstruction of a permanent shunting device by tissue debris after operation, the fact that it might not be necessary after operation, and the more difficult assessment of its patency. On the other hand, the risk of infection, generally accepted to be between 4% and 10%, is an important argument for those who propose the use of a permanent shunt. It is possible that in our cases the insertion of an external ventricular drainage tube without a valvular system resulted in a too rapid imbalance between the pressures in the supra- and infratentorial compartments, facilitating the occurrence of the intratumoral hemorrhage.

In any case, the possibility of hemorrhage into a posterior fossa tumor must be suspected when a patient deteriorates suddenly a few hours after institution of ventricular drainage. The possibility of this fatal complication must be taken into account in planning the preoperative management of obstructive hydrocephalus in posterior fossa tumors.

References


Address reprint requests to: Jesús Vaquero, M.D., Servicio de Neurocirugía, Clínica Puerta de Hierro, San Martín de Porres 4, Madrid-35, Spain.