Successful evacuation of a pontine hematoma secondary to rupture of a pathologically diagnosed "cryptic" vascular malformation

Case report

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A posterior fossa exploration was performed on a child thought initially to have an inoperable brain stem lesion. A pontine hematoma was discovered and evacuated. The pathological specimen was designated as a "cryptic" arteriovenous malformation. All preoperative neurological deficits disappeared except for a minimal left seventh nerve palsy.

KEY WORDS • microangioma • arteriovenous malformation • pontine hemorrhage

In a report on a series of 37 patients, Lassiter, et al., have recently suggested a more aggressive surgical approach to brain stem glioma. Four of five patients with cystic tumor components were considered long-term survivors following aspiration and radiation therapy. We are describing the successful treatment of a patient who had a "cryptic" vascular malformation that hemorrhaged into the pons.

Case Report

A 17-month-old boy was admitted to University Hospital on November 11, 1971, because of rapidly progressive clumsiness for 3 days. On the day of admission he developed vomiting, paraparesis, lethargy, and a left sixth nerve palsy.

Examination. There was anisocoria with the right pupil larger than the left. Rather rapidly he developed a left supranuclear seventh nerve palsy, an impaired gag reflex, and difficulty with swallowing. There was no papilledema or spreading of the cranial sutures. The diagnoses considered were brain stem glioma and viral meningitis, because of 1 week of respiratory infection just prior to the onset of symptoms. Four-vessel selective angiography with subtraction technique revealed no signs of hydrocephalus but suggested an expanding mass within the brain stem centered at the lower pons (Fig. 1). There was no evidence of
Pontine hematoma secondary to "cryptic" vascular malformation

Fig. 1. Left: Left vertebral arteriogram. Note the posterior displacement of the choroidal point of the left posterior inferior cerebellar artery (arrow). Right: Right vertebral arteriogram. There is similar though slightly less posterior displacement of the right posterior inferior cerebellar artery (arrow).

Fig. 2. Left: Pneumoencephalogram, anteroposterior view. Arrowheads point to a mass bulging into the floor of the fourth ventricle, greater on the left side than on the right. Right: Lateral view. Note the relatively normal position of the back of the pons on the right (large arrowheads), and the localized bulging of the back of the pons into the fourth ventricle on the left (small arrowheads).
abnormal vascularity. A pneumoencephalogram performed 4 days later confirmed the expansion in this region and suggested an even further increase in the size of the lesion with bulging into the fourth ventricle, more on the left than on the right side (Fig. 2). An operation was decided upon, although the most likely diagnosis was considered to be a brain stem glioma.

**Operation.** The cerebellar tonsils were found to be at the level of C-1. The lowermost portion of the vermis was split for full visualization of the lesion. The floor of the fourth ventricle was discolored and elevated by a mass most prominent on the left side. The blue-brown bulging lesion ruptured spontaneously during retraction, exuding 8 cc of dark brown blood. A small fragment of tissue was sent to the laboratory for study. The cavity was merely irrigated without further removal of tissue because of the precarious location of the lesion. The pons assumed a more normal position, and no acute hemorrhage was encountered.

Postoperatively the left sixth and seventh nerve palsies and the truncal ataxia persisted but to a lesser degree. These signs gradually cleared so that at examination 6 months after operation his only neurological deficit was minimal left seventh nerve palsy. The pathological specimen was reported as an arteriovenous malformation (Fig. 3).

**Discussion**

This successfully evacuated intrapontine hemorrhage lends support to Lassiter and his colleagues, who recommend more frequent exploration of suspected pontine lesions. Six other cases of successful evacuation of a brain stem hematoma have been reported, but in no other case has a “cryptic” arteriovenous malformation been confirmed pathologically.

Virchow originally described a vascular tumor of the pons in 1851. Since that time there have been numerous case reports and literature reviews concerning “cryptic vascular malformations” as preferred by Russell, or “microangiomas” as preferred by Gerlach. Gerlach defined a microangioma as a malformation 2 cm or less in diameter which is difficult to recognize angiographically because of its small size. Many such lesions are only identifiable microscopically. Rarely are pontine angiomas operated on because of the rapidity of the course leading to death following the onset of symptoms. In our patient the intrapontine microangioma had probably separated the pontine fibers rather than destroying them, a phenomenon noted by Courville.

Preoperative diagnosis of a pontine hemorrhage due to a microangioma is difficult. In our patient the angioma was not identifiable even by retrospective review of the angiographic studies. Di Chiro has indicated the difficulty in distinguishing radiologically the difference between pontine
gliomas and intrapontine hemorrhage. A significant factor in the diagnosis in our patient was the rapid progression of the pontine and cerebellar signs. A patient operated on by Murphy\textsuperscript{14} developed symptoms over a 24-hour period. It is of some interest that our patient first developed unilateral sixth and seventh nerve palsies as in the majority of the cases reported by Lassiter, et al.\textsuperscript{11}

McCormick and Nofzinger\textsuperscript{13} reported a series of 48 arteriovenous malformations, eight of which were located in the pons. They stated that the "cryptic" vascular malformations were much more common than the classical arteriovenous malformations. White, et al.,\textsuperscript{21} reported a group of 50 intracranial vascular lesions found incidentally at autopsy and not diagnosed clinically; 17 of these were pontine. Gerlach,\textsuperscript{5} in reviewing related reports, noted the common age range to be 29 to 39 years with a low of 6 years and a high of 62. Grotts\textsuperscript{7} reported a case of fatal pontine hemorrhage in a 2-year-old girl.

Conclusions

This is the youngest reported case of a pontine hemorrhage due to a microangioma and the only one in which there has been pathological confirmation during life. The patient has had good functional recovery but the prognosis must continue to be guarded, for only 9 months have elapsed since operation. We suggest that, in the past, comparable lesions have been missed because they were diagnosed as brain stem gliomas and were submitted to irradiation without exploration.

References

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