

Benign Brainstem Hemorrhage

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ABSTRACT: Most patients with brainstem hemorrhage have a poor prognosis. There are occasional reports of a favorable outcome with hematomas restricted to the mid-brain region. We report two patients with hematomas within the lower brainstem (pons and medulla) who made a good recovery. Diagnosis was unsuspected until the cranial CT scan was done. Angiography was normal in both cases. Recovery was excellent in one and fair in the second patient. Patients with medullary hemorrhage are at risk for aspiration and may suddenly develop respiratory arrest and therefore should be carefully observed. Our review of the literature suggests that with some small brain-stem hemorrhages recovery is good to excellent and recurrences are rare.

RÉSUMÉ: Hémorragie bénigne du tronc cérébral. La plupart des patients qui subissent une hémorragie du tronc cérébral ont un pronostic sombre. Il y a quelques publications faisant état d'une issue favorable lorsque l'hématome est limité au mésencéphale. Nous rapportons les cas de deux patients avec hématome localisé dans la région inférieure du tronc cérébral (pont et bulbe rachidien) qui ont eu une bonne récupération. Le diagnostic n'avait pas été soupçonné avant le CT scan. L'angiographie était normale dans les deux cas. La récupération a été excellente dans un cas et passable dans l'autre. Les patients présentant une hémorragie au niveau du bulbe rachidien sont à risque d'aspiration bronchique et peuvent présenter un arrêt respiratoire. Ils doivent donc faire l'objet d'une surveillance étroite. Notre revue de la littérature suggère que, pour certaines petites hémorragies du tronc cérébral, la récupération est de bonne à excellente et que les récurrences sont rares.

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Brainstem hemorrhage has for a long time been considered to carry a uniformly poor prognosis.¹⁻³ Some recent publications have shown that brainstem hemorrhage, especially if it occurs in the midbrain, can present with minimal focal signs.⁴ If no underlying neoplasm or arteriovenous malformation is found, prognosis for recovery in such patients is excellent.⁵⁻⁷ Similar reports of hemorrhages within the pons and medulla are rare.⁸⁻¹¹

In this communication we present two patients with hemorrhage in the pons and medulla who had a good outcome.

CASE REPORTS

Patient 1

A 32-year-old female presented with a mild generalized headache and within minutes developed left arm and leg weakness. The headache was described as pounding and was associated with some nausea. There was no previous history of migraine. Weakness was more marked in the left arm. Examination showed moderate weakness in the left arm and mild weakness in the left leg, with an upper motor neuron distribution. Reflexes were slightly increased on the left side and sensory examination was normal. Cranial CT scan showed a small pontine basal tegmental hemorrhage (Figure 1). Cerebral angiography was normal.

Recovery was rapid within the first week. A repeated CT scan 10 days later showed complete resolution of the hemorrhage. No new symptoms have developed during a three-year follow-up.

Patient 2

A 64-year-old man developed a 20 second episode of loss of consciousness on the day of admission. Upon awakening, the patient was severely dysarthric, dysphagic and complained of almost continuous vertigo. He was also vomiting and felt very nauseated. There was no

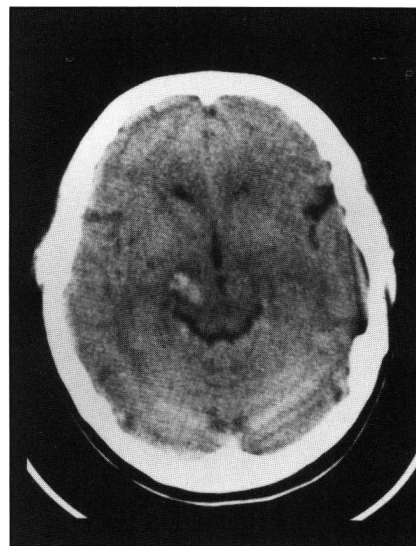


Figure 1 — This CT scan of patient 1, without contrast, shows an area of hyperdensity in the right lateral tegmentum. Repeat CT scan 10 days later showed the hematoma to have resolved completely.

history of hypertension and the patient was on no medications. Except for occasional alcohol abuse, the past history was unremarkable. Cranial nerve examination showed paralysis of conjugate gaze to the left, decreased sensation in the left trigeminal nerve distribution, and absent gag and cough reflex. Motor examination showed a mild left

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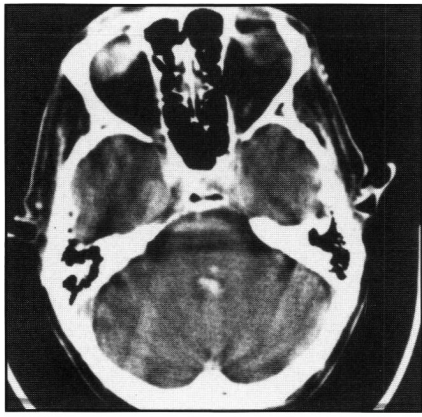


Figure 2 — This CT scan of patient 2, without contrast, at the level of the medulla shows a small hyperdensity with the medullary parenchyma and the fourth ventricle. Repeat CT scan two weeks later showed complete resolution of the hematoma.

sided upper motor neuron type weakness and sensory examination showed loss of temperature and pain sensation involving the right arm and leg. Two days after admission he developed acute respiratory arrest and required intubation and assisted ventilation. For the next four weeks the patient could not breathe spontaneously. During this time attempts at extubation failed as the patient would not breathe unless constantly reminded to do so. Gradually respiratory control was re-established and the patient was extubated. Ten weeks after admission, the only significant remaining neurological abnormality was severe dysphagia and he required a gastrostomy for feeding and protection of the upper airway. The initial CT scan showed a hematoma in the medulla with some extension into the pons and the fourth ventricle (Figure 2). A repeat CT scan 14 days later was normal. A cerebral angiogram was also normal.

DISCUSSION

In both patients the brainstem hematomas were unsuspected until after the CT scans. The level of consciousness on examination was normal and both patients had minimal neurological deficits. Subsequent recovery after admission was very rapid in one patient but somewhat slower in the patient with the medullary hemorrhage. No etiology was found in either patient. These observations are similar to most other reports of "benign brainstem hematomas" published in the literature.³⁻⁷

In the majority of patients with benign brainstem hemorrhage, the hematoma developed in the mid-brain. Such cases can be sub-classified into two categories. In patients with no underlying arteriovenous malformation prognosis is excellent and there are no reports of recurrence.⁴ Patients with cavernous venous malformations on the other hand may have frequent recurrences.^{4-7,11} Most patients with hemorrhage in the midbrain present with neuro-ophthalmological symptoms. Complete and incomplete third nerve palsy, vertical gaze abnormalities, Parinaud syndrome and fourth nerve palsies have all been reported with benign brainstem hemorrhages. With hematomas extending beyond the ocular nerve nuclei, long tract symptoms with involvement of the corticospinal, ascending sensory and cerebellar outflow tracts may occur.⁹ As with our two patients, recovery is rapid and frequently complete. In patients with cavernous hemangiomas, radiation therapy may decrease recurrences. Autopsy reports are rare.

Pontine hemorrhages with benign outcome are rare. Single case reports describe small hematomas located in the basal region and the lateral tegmentum.⁸ In the basal region, patients

present with symptoms identical to lacunar infarction such as dysarthria-clumsy hand syndrome, hemisensory deficit, ataxia-hemiparesis and pure motor weakness.¹⁰ Hemorrhages located in the lateral tegmental region cause cranial nerve dysfunction with sixth and fifth nerve palsies.^{2,12} Spinthalamic tract involvement may also be seen. Investigations other than CT scan are usually normal and recovery is rapid and sometimes complete.

Medullary hematomas are very uncommon. In the seven reported cases vertigo and lower cranial nerve dysfunction were the prominent symptoms. Because of the close proximity to the respiratory and cardiac centers, cardiac and respiratory dysfunction may develop suddenly and without warning. Additionally, because of the lower cranial nerve dysfunction the upper airway is unprotected and the patient is at risk for aspiration. Unlike lateral medullary infarction, where recovery from respiratory dysfunction may not occur, patients with hematomas in the medullary region usually show good recovery of respiratory function as the hematoma reabsorbs.

The diagnosis of "benign brain stem hematomas" is usually unsuspected until the cranial CT scan is reviewed. There are no diagnostic clinical findings that will make the diagnosis easy. There are over 50 reported cases of small hematomas in the brainstem. Recovery in most cases has been rapid and recurrences rare, especially if no arteriovenous malformation or hemangiomas were found on further investigations. In occasional cases surgical evacuation has been attempted. The underlying etiology is not known in most cases. Recurrences in such cases is very uncommon. In cases where an arteriovenous malformation is found, recurrences may occur and may be fatal. Based on the cases reported in the literature and our limited experience with hemorrhage in the midbrain, pons and medulla, recovery is rapid and no intervention is needed in most patients.

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