Successful stereotaxic evacuation of an acute pontomedullary hematoma

Case report

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A healthy young woman developed a rapidly progressive pontomedullary lesion 24 hours after delivery of her first child. The lesion was shown on computerized tomography (CT) to be a primary hematoma. Stereotaxic aspiration was carried out, and the patient recovered. Angiography and CT scanning demonstrated a vascular lesion compatible with an arteriovenous malformation.

Keywords: pontine hematoma, stereotaxic aspiration, brain stem, cerebral angiography, cerebral hemorrhage, arteriovenous malformation

Acute pontine hematomas represent 10% of all primary intracerebral hemorrhages. With conservative treatment, the mortality rate is high in patients with primary pontine hematomas: 76% of 25 cases has been reported in one series and 80% of 15 cases in another. An 80% recovery rate has been achieved with surgical treatment, according to the review of Mattos Pimenta, et al., who described 24 surgical patients.

Until now, evacuation of the hematoma has been performed by classical surgical techniques; however, Beatty and Zervas have recently reported the stereotaxic aspiration of a hematoma. We present a similar case with an excellent outcome.

Case Report

This 25-year-old woman was admitted to a local hospital on August 30, 1983, because of headache, vertigo, drowsiness, and a mild right-sided sensorimotor dysfunction. She had given birth to her first child 24 hours before; pregnancy and delivery had been normal. There was no history of hypertension. On examination, the neurologist found a slightly obtunded woman with normal pulse and blood pressure. Her pupils were normal and the fundi clear. She could not abduct the left eye. The right side of her face was hypalgesic and paretic. There was diminished corneal response and loss of hearing on the right. The soft palate was paretic on the right, and there was diminished gag reflex. Speech was dysarthric with normal tongue movements. The body and extremities revealed a marked right-sided motor weakness with exaggerated tendon reflexes and an extensor plantar response. Sensory functions were diminished for all modalities on the right side. Cerebrospinal fluid (CSF) was clear and colorless, and without cells. An electroencephalogram showed minimal brainstem dysfunction and increased slow alpha and theta activity in the right temporal area.

Over the next 24 hours, the patient developed a bilateral facial palsy with complete right-sided hemiplegia and horizontal gaze paralysis to the left. Dysarthria became worse and, as she was fully conscious and aware of her condition, she was very apprehensive. In view of her rapid deterioration and the absence of red cells in the CSF, a thromboembolic process was suspected and heparin treatment was instituted. She was sent to another hospital with computerized tomography (CT) scanning facilities on August 31, 1983. A CT scan revealed a hyperdense lesion in the left pontomedullary junction, indicating the presence of a primary hematoma (Fig. 1 left). Heparin was reversed and the patient was immediately transferred to our department for surgical treatment.

Examination. On admission, her level of consciousness was rapidly deteriorating. Emergency angiography of the vertebrobasilar system with magnification and subtraction techniques revealed bleeding from a perfo-
Left: Computerized tomography scan demonstrating a hyperdense lesion in the left pontomedullary junction, suggestive of a primary hematoma. Right: Vertebrobasilar arteriogram revealing bleeding from a perforating branch of the left posterior inferior cerebellar artery.

rating branch of the left posterior inferior cerebellar artery (Fig. 1 right). No vascular malformation was detected, although a branch of this size and in this location would suggest some abnormality. During angiography, she became comatose and was brought to the operating theater for emergency stereotaxic surgery.

Operation. After calculation of the coordinates with Leksell’s stereotaxic apparatus, a left-sided frontal burr hole was made, and a puncture needle was introduced and aimed toward the target (Fig. 2 left). There was no spontaneous drainage of fluid but, with aspiration, 3 cc of dark blood was collected (Fig. 2 right). A control CT scan 1 hour after aspiration revealed air at the target area (Fig. 3).

Postoperative Course. The patient was treated with artificial ventilation for the first 12 hours. She showed a transient anisocoria, with widening of the left pupil. Consciousness returned shortly after surgery. Slight voluntary movements of her right arm were noted, and during the following days there was impressive improvement of functions: the ability to swallow and to communicate verbally returned, and the facial paralysis slowly disappeared. An intensive rehabilitation program was started, and after 6 weeks she was discharged and sent for further training to a rehabilitation center. After 4 months she was discharged home, completely self-supporting. She was able to take care of her child. Follow-up examination 6 months after surgery included
angiography and CT scanning, which were both normal. Neurological examination revealed persistent partial loss of sensation in the right hand and foot, right-sided hyperreflexia with extensor plantar response, and a slight spastic-ataxic gait. Abduction of the left eye was still impossible, whereas facial sensation and motor function, as well as hearing, had returned to normal. Speech was accurate, although a bit slow and monotonous.

Discussion

Primary acute hematoma of the brain stem has no connection with hypertension. Causative factors include small vascular malformations and venous angiomas. Seldom can a cause be detected in such cases: in a review of 24 cases, a definite etiology could be traced in only three. Computerized tomography scanning is required for rapid diagnosis, but angiography should also be performed to evaluate any vascular abnormality before surgery is planned. Our patient came relatively late to our attention, and treatment by craniotomy was not an option available to us because opening the posterior fossa would have been too time-consuming. On the other hand, stereotaxic evacuation of hematomas is known to be a good, and sometimes better, alternative. Backlund and von Holst presented the first report on the successful removal of an intracerebral hematoma with a stereotaxic instrument. Higgins, et al., described a modification of the Backlund type of hematoma screw and also presented indications for stereotaxic hematoma removal. These indications included the requirements that the hematoma be primary and deep seated, and causing depressed consciousness.

Our patient fulfilled their criteria, and is of special interest because of the small size of the hematoma (3 cc) combined with its life-threatening symptoms. This was due to its very dangerous position in the medullary region and makes surgical intervention mandatory. The use of the stereotaxic hematoma screw (4 mm in diameter), however, could not be considered in this vital area. Aspiration with the needle, which is 1.5 mm in diameter, proved to be successful, because the hematoma contents were still liquid.

Whenever possible, pontomedullary region should be reached by a posterior approach, both in classical surgery and stereotaxy. When using Leksell’s instrument for the posterior approach, preparation is relatively cumbersome, however, and suboccipital trephination takes more time compared with a frontal burr hole. In an emergency, the frontal route may be justified, as in our case. The trajectory of penetration was through the mesencephalic and pontine structures. From studies of functional stereotaxic procedures, including mesencephalotomy and pontine tractotomy, it is well known that little harm is done to these structures by penetrating electrodes. The postoperative anisocoria seen in our patient is explained by the use of this route. The lesion itself was thought to be an arteriovenous malformation which, after the hemorrhage, was occluded by spontaneous thrombosis.

References

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