Angiography of Pontine Hemorrhage*

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Summary. The differentiation between cerebellar and pontine hemorrhage is important for prognostic and therapeutic reasons. Yet this distinction is often difficult to make on clinical grounds alone. Pontine hemorrhage can be located accurately by means of angiography.

Angiographie en cas d'hémorragie pontique

Résumé. La différenciation entre hémorragie cérébelleuse et pontique est importante pour le diagnostic et pour la thérapeutique. Pourtant cette différenciation est souvent difficile sur la seule base clinique. L'hémorragie pontique peut être localisée avec précision par l'angiographie.


Differentiation between pontine hemorrhage and cerebellar hemorrhage often presents a confusing clinical problem. Angiography is advocated as an important method for making this distinction. Two cases of pontine hemorrhage were diagnosed accurately by angiography. These cases and their angiographic features are presented.

Case Histories

Case 1: A 48 year old man had been in good health until the day he was admitted to the hospital, unconscious. That day he had been found slumped over the steering wheel of his truck, which was pulled over to the side of the road. Upon admission he was apneic, and an endotracheal tube was inserted. He had no doll's eyes movement or response to caloric stimulation. The patient had no previous history of hypertension but he had not seen a physician for 20 years. Blood pressure was 300/160. No spontaneous respiration was present, nor was there evidence of trauma. The pupils were 3 mm in diameter on the right, 4 mm on the left and they were unreactive. No gag response or response to painful stimuli was elicited. Corneal responses were also absent. The initial impression was: hemorrhage in the brainstem.

Bilateral carotid and vertebral angiograms were performed. These gave evidence of moderate ventricular dilatation with a space-occupying mass in the brainstem high on the left side of the pons (Fig. 1a and b). This finding was believed most likely to represent a pontine hemorrhage. Stretching and forward displacement of the interpeduncular, perforating branches of the posterior cerebral arteries indicated rostral extension of the hemorrhage into the midbrain. The patient continued to deteriorate and died 48 h after admission.

Postmortem examination revealed a massive hemorrhage replacing the pons and midbrain (Fig. 1c).

Case 2: A 46 year old man suddenly developed weakness of the right arm followed by decreasing vision. Shortly thereafter he collapsed and was brought to the hospital for emergency treatment. At that time he was unconscious, had Cheyne-Stokes respirations and pinpoint pupils which were nonreactive; no doll's eyes movement was seen. Blood pressure was 156/110. Bilateral carotid and vertebral angiograms were obtained which demonstrated moderate ventricular dilatation with evidence of a mass in the pons extending up into the hypothalamus. These findings were consistent with those for acute hemorrhage of the brainstem and midbrain (Fig. 2a and b). The patient continued to deteriorate and died 7 h after admission.

Postmortem examination revealed a large hemorrhagic clot in the pons and midbrain with extension into the hypothalamus (Fig. 2c). Massive subarachnoid hemorrhage with acute hydrocephalus was noted as well.

Angiographic Features

Catheter angiography was performed in each case. Bilateral carotid and vertebral injections were made in both patients. The angiographic findings in these 2 cases were avascular space-occupying lesions in the pons. The enlarging pons and midbrain compromised the ambient cistern, stretching and displacing the vessels surrounding the brainstem.

In both cases, the ambient and quadrigeminal portions of the superior cerebellar artery were stretched and displaced laterally (Figs. 1b and 2b). The interpeduncular perforating vessels were stretched as well, indicating rostral extension of the hemorrhage into the midbrain (Figs. 1a and 2a and b). The basilar artery and anterior pontomesencephalic veins were closely applied to the clivus. The precentral cerebellar veins were displaced posteriorly, indicating the expansion to

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be anterior to the cerebellum. In neither case was there lateral displacement of the inferior vermicul branches of the posterior inferior cerebellar artery. This would have been suggestive of a cerebellar hemispheric mass.

**Discussion**

Cerebellar and pontine hemorrhages are sometimes difficult and, at times, almost impossible to differentiate clinically [1, 3, 6–8]. Yet, the differentiation is important for prognostic and therapeutic reasons. Angiography proves to be valuable by providing accurate information as to the location of hemorrhages of the posterior fossa.

It is well-recognized that surgical treatment must be considered in cerebellar hemorrhage; so, early diagnosis is essential. In fact, it has been stated that surgical evacuation of a cerebellar hematoma is as strongly indicated as is evacuation of an extradural or subdural hematoma [2]. According to McKissock, Richardson and Walsh, 80% of spontaneous cerebellar hemorrhages may be considered amenable to surgical care if managed correctly and expeditiously [5]. On the other hand, pontine hemorrhage is fatal almost without exception, and it is generally accepted that acute

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**Fig. 1. Case 1.**

a) Vertebral arteriogram, lateral projection. The basilar artery is displaced forward against the clivus. Some suggestion of stretching of the posterior cerebral and superior cerebellar artery trunks is present, but this could be within normal range. There is also slight forward displacement of the interpeduncular perforating branches (arrow). b) Vertebral arteriogram, Towne projection. There is marked stretching and lateral displacement of the left superior cerebellar artery with some lateral displacement of the distal or quadrigeminal segment of the right superior cerebellar artery (arrows). Both posterior cerebral arteries appear stretched as well. c) Postmortem specimen. Marked hemorrhage into the brainstem is seen which extends superiorly to involve the hypothalamus.