

A Case of Multiple Cerebral Aneurysms Associated with Fenestration of the Basilar Artery

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Summary: A case of multiple cerebral aneurysms associated with a fenestration of the basilar artery is described. A 63-year-old woman complained of a headache and was transferred to our hospital on September 13, 1985. There were no neurological deficits, except for a mild headache and nuchal stiffness, on admission. A computerized tomographic (CT) scan revealed a subarachnoid hemorrhage. Right carotid angiography disclosed saccular aneurysms arising from the bifurcation of the ophthalmic artery and the right internal carotid artery and from the trifurcation of the right middle cerebral artery. These aneurysms were successfully treated by neck clipping. The postoperative recovery was uneventful and a vertebral angiography was performed. This demonstrated a fenestration of the proximal basilar artery which is an uncommon anomaly of the cerebral vessels. The embryological basis of this anomaly is briefly discussed.

Key words: cerebral aneurysm — fenestration — anomaly — basilar artery — cerebral angiography

Introduction

Fenestration of the basilar artery is an uncommon anomaly of this cerebral vessel. It is rarely demonstrated on the vertebral angiogram of a patient. In this report, a case with multiple cerebral aneurysms associated with this anomaly of the basilar artery is described and the embryological basis of the anomaly is briefly discussed.

Case Report

A 63-year-old female had a severe headache on September 8, 1984, while at home. She was admitted to the hospital five days later with a probable diagnosis

of subarachnoid hemorrhage. On admission, she complained of a mild headache and nuchal stiffness. A general physical examination was normal and there were no neurological focal signs. A computerized tomographic (CT) scan revealed a subarachnoid hemorrhage at the basal subarachnoid cisterns. Carotid angiography (CAG) was performed and it demonstrated multiple saccular aneurysms arising from the bifurcation of the ophthalmic artery and the internal carotid artery and from the trifurcation of the middle cerebral artery on the right side (Fig. 1). On September 14, a right pterional approach was performed for radical treatment of the aneurysms and neck clipping for the aneurysms were successfully performed. From the operative findings, an internal

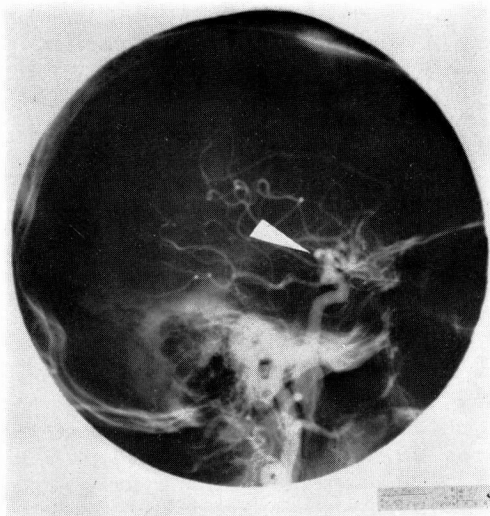


Fig. 1. A right carotid angiography showing the saccular aneurysm arising from the bifurcation of the ophthalmic artery and the internal carotid artery.

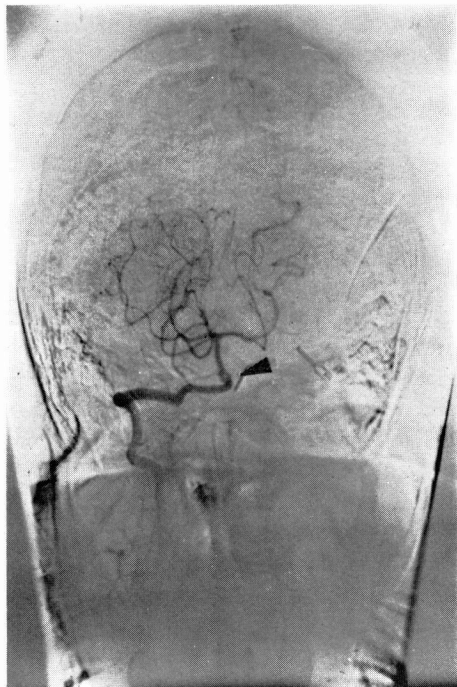


Fig. 2. A right vertebral angiography demonstrating a fenestration of the basilar artery.

carotidophthalmic artery aneurysm was determined to be the cause of the subarachnoid hemorrhage.

The postoperative course was uneventful. A vertebral angiography was performed. This demonstrated a fenestration of the proximal basilar artery, but no aneurysms or other vascular abnormalities (Fig. 2). The patient was discharged without any neurological deficit, after one month.

Discussion

Paget (1948) described the embryological development of the cerebral vessels in detail. The basilar artery appears to form from the fusion of the paired primitive longitudinal neural arteries at the second stage of the embryo. The fenestration of the basilar artery is considered to result from an incomplete union of these primitive arteries at this stage. Fenestration of the basilar artery has been found in 1.3 to 5.3% of autopsy cases. It is not commonly found on the vertebral angiogram of a patient because the fenestration itself does not produce any symptoms or signs. On the other hand, cerebral saccular aneurysms also have a congenital origin and hemodynamic factors lead to development of it. In the present case, the association of these two vascular abnormalities may be co-incidental, because the site of the aneurysm is different from the site of the fenestration. It is also known that the saccular aneurysm arises from the fenestration of the basilar artery. To our knowledge, only seven such cases have been reported. (Hoffman et al. 1979; Becker et al 1979; Takashi et al. 1973; Matricali et al. 1980; Nakasu et al. 1982) In these cases, the aneurysms were usually at the proximal end of the fenestration. Mizukami et al. (1968) noted that the proximal end of the fenestration lacks of the tunica media of arterial wall in

their case. In these cases, the force of the blood stream against the proximal site of the fenestration may induce the development of the saccular aneurysm. Therefore it is important to follow the patient with the fenestration of the basilar artery to determine whether a saccular aneurysm develops in the future.

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