

Posterior Inferior Cerebellar Artery Aneurysm associated with Fenestration of the Vertebral Artery

—Case Report—

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Abstract

A 72-year-old male hospitalized for disturbance of consciousness and vomiting was found to have a left vertebral artery fenestration and a left posterior inferior cerebellar artery aneurysm. The aneurysm was successfully clipped through the lateral suboccipital approach and he recovered with minimal deficits. The association of vertebral artery fenestration and posterior inferior cerebellar artery aneurysm is rare, and their etiologies and relationship are discussed.

Key words: posterior inferior cerebellar artery, aneurysm, vertebral fenestration, congenital cerebrovascular anomaly

Introduction

Fenestration or partial duplication of the vertebral artery is considered an anomalous anastomosis occurring during embryological development.^{3,9)} Cases have been reported⁴⁻⁸⁾ in which this anomaly was complicated by other cerebrovascular disorders, such as aneurysms and arteriovenous malformations. However, fenestration of the vertebral artery is rarely associated with aneurysms of the posterior inferior cerebellar artery. We describe such a case.

Case Report

A 72-year-old male was admitted to our hospital on September 28, 1985, with unconsciousness and vomiting. Neurological examination disclosed mild weakness in the right extremities and nuchal stiffness, but the lower cranial nerves were not impaired. The past and family histories were noncontributory. Computed tomography (CT) showed marked ventricular dilatation and high density in the fourth ventricle, basal cistern, and bilateral Sylvian cisterns (Fig. 1). Cerebral angiography demonstrated a saccular aneurysm at the junction of the left vertebral and posterior inferior cerebellar arteries associated

with a fenestration of the left vertebral artery. The fundus of the aneurysm was oriented superiorly and posteriorly. The fenestration of the vertebral artery began at the level of the upper margin and ter-



Fig. 1 A precontrast CT scan reveals blood in the fourth ventricle and subarachnoid space, with hydrocephalus.

Received August 28, 1987; Accepted May 6, 1988

minated at the lower margin of the atlas. The diameter of the bypass artery was larger than that of the true vertebral artery (Fig. 2). No other significant abnormalities of the cerebral arteries were noted. A general physical examination was negative except for hypertension.

On November 13, a ventriculoperitoneal shunt was placed for persistent, symptomatic hydrocephalus. On December 2, when his general condition and level of consciousness had improved, a suboccipital craniotomy was performed, with him in the lateral recumbent "park bench" position. The neck of the aneurysm was successfully clipped, and the postoperative course was uneventful. Cerebral angiography confirmed the complete obliteration of the aneurysm and the patency of the posterior inferior cerebellar artery (Fig. 3). At discharge he was ambulatory and exhibited only slight cerebellar ataxia and dysarthria.

Discussion

The incidence of angiographically documented vertebral artery fenestration has been reported to be 0.3–2.0%.^{3,6-8)} Fenestration or partial duplication of the vertebral artery is regarded as a developmental anomaly that occurs early in the embryological period.^{3,4)} According to Mizukami *et al.*,⁷⁾ a bypass artery formed in the anterior portion of the anomaly is a remnant of the bilateral longitudinal neural artery, and one formed in the posterolateral portion is a remnant of the primitive lateral basilovertbral artery. In this case, the original vertebral artery was located in the anterolateral part of the bypass anomaly. Therefore, this anomaly appeared to be a remnant of the anastomosis between the vertebral artery and the distal portion of the first cervical intersegmental artery, which was present in the embryonic stage.¹⁰⁾

Such congenital anomalies as persistent hypoglossal artery are occasionally complicated by intracranial aneurysms. Some authors have observed a similar tendency in cases of vertebral artery fenestration, although no significant relationship has been found concerning the location of the vertebral artery fenestration and the site of the intracranial aneurysms.⁵⁻⁸⁾

Aneurysms of the posterior inferior cerebellar artery are relatively rare, accounting for 0.5–3.0% of all intracranial aneurysms.^{1,9,11-13)} Hudgins *et al.*²⁾ reported six of 21 cases in which the posterior inferior cerebellar artery aneurysms were associated with vascular anomalies, but none of his cases involved a fenestration of the vertebral artery. To our



Fig. 2 Anteroposterior (*left*) and lateral (*right*) views of a left vertebral angiogram, showing a fenestration of the left vertebral artery and a saccular aneurysm (*arrowhead*). *arrow*: true vertebral artery, *double arrow*: bypass artery.

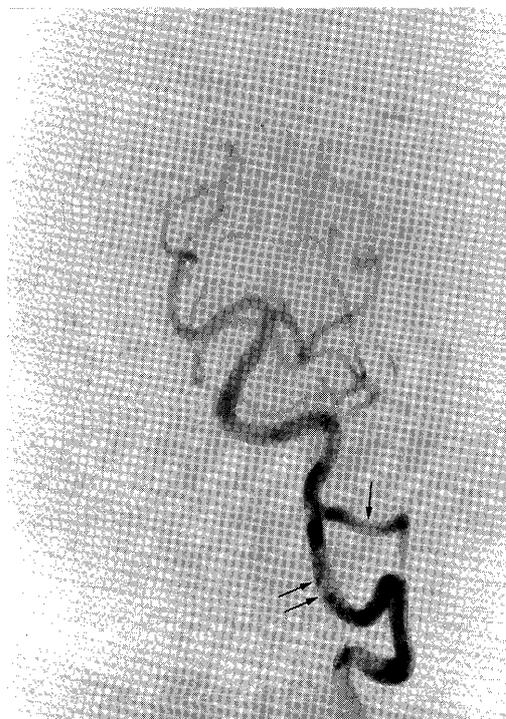


Fig. 3 A postoperative angiogram demonstrating complete clipping of the aneurysm. *arrow*: true vertebral artery, *double arrow*: bypass artery.

knowledge, only two other cases of a vertebral artery fenestration associated with a posterior inferior cerebellar artery aneurysm have been reported.^{5,14)}

In this case, we cannot be sure that hemodynamic stress caused by the fenestration of the vertebral artery enhanced the formation of the aneurysm. However, their coexistence does suggest the possibility that cerebrovascular developmental derangement played a role in the later development of the aneurysm.

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