Basilar bifurcation aneurysm associated with bilateral internal carotid occlusion

C. Yamanaka 1, T. Hirohata 1, K. Kiya 1, H. Yoshimoto 1, and T. Uozumi 2

1 Department of Neurosurgery, Futami Central Hospital, and
2 Department of Neurosurgery, Hiroshima University School of Medicine, Hiroshima, Japan

Summary. A case of subarachnoid hemorrhage from ruptured aneurysm of the basilar bifurcation associated with occlusions of both internal carotid arteries at the neck is presented. Each internal carotid artery mainly received collateral flow at the cavernous portion from the internal maxillary artery through anastomotic artery of the foramen rotundum. Posterior circulation also supplied collateral blood flow via the right posterior communicating artery. This case report suggests that hemodynamic stress may be regarded as an important factor in the formation or development of cerebral aneurysm.

Key words: Cerebral aneurysm - Bilateral carotid occlusion - Subarachnoid hemorrhage

Cases of carotid occlusion, especially bilateral, associated with cerebral aneurysms have been rarely reported. The present case demonstrating main collateral vessels from the internal maxillary artery through the artery of the foramen rotundum seems to be unique. The combination of congenital and degenerative factors has been mooted in pathogenesis of cerebral aneurysms [1, 2]. Recently, hemodynamic stress has also been regarded as one of important factors, especially in cases of vascular anomalies such as carotid occlusion in which collateral blood flow influences the hemodynamics of cerebral circulation [3-11]. The present report may be thought to support this view.

Case report

A 71-year-old woman, with no history of cerebral ischemic attack or hypertension, was found unconscious on April 5, 1985. She was admitted to Futami Central Hospital in coma showing stiff neck and left hemiparesis. Arteries of ocular fundi were extremely sclerotic. The systemic blood pressure was 144/90 mmHg, and pulse rate 90/min. There were no carotid bruits.

CT scan showed high density in the basal cisterns, sylvian fissures and lateral ventricles. Right carotid angiogram disclosed internal carotid occlusion at its origin. A tortuous vessel, regarded as the artery of the foramen rotundum, arising from the internal maxillary artery, flowed to the cavernous portion of the right internal carotid artery. The right middle meningeal artery had also anastomosed with the internal carotid artery (Fig. 1 a, b). A left carotid angiogram revealed similar internal carotid occlusion just above its origin. The left carotid artery was supplied in its cavernous portion by dilated arteries of the foramen rotundum and anastomotic vessels from the middle and accessory meningeal arteries (Fig. 2 a, b).

Left vertebral angiogram demonstrated a saccular aneurysm at the basilar bifurcation. Collateral flow to the right internal carotid artery through the right posterior communicating artery was seen. The vertebral artery and proximal portions of both posterior cerebral arteries were irregularly curved (Fig. 3 a, b). Right vertebral angiogram showed the same findings (Fig. 4 a, b).

The patient was treated conservatively because of her age and severe clinical state. Though her consciousness level improved, she suddenly developed apnea and deep coma a month later and died on May 10, 1985, because of rerupture of the aneurysm.

Discussion

Both internal carotid arteries seemed to be obstructed due to arteriosclerotic change, not to aplasia, because internal carotid origins were recognized and
sclerotic changes were seen in vertebral arteries, posterior cerebral arteries and the retinal arteries of ocular fundi. Collateral blood flow for each intracranial internal carotid artery was mainly supplied by the external carotid artery through dilated tortuous anastomotic vessels of the internal maxillary artery. Anatomically, this anastomotic vessel is regarded as the artery of the foramen rotundum which arises from the internal maxillary artery and joins, passing through the foramen rotundum, with the artery of the inferior cavernous sinus arising from the internal carotid artery and supplying the Gassnerian ganglion [12-16]. Usually this anastomosis is too small to be demonstrated angiographically. Other collateral...