

Endovascular Treatment of Unusual Multiple Aneurysms of the Internal Carotid Artery-Posterior Communicating Artery Complex

—Case Report—

Michiya KUBO, Naoya KUWAYAMA, Yutaka HIRASHIMA, Masayoshi OHI*, Masaaki TAKAMI*, and Shunro ENDO

Department of Neurosurgery, Toyama Medical and Pharmaceutical University, Toyama;

*Department of Neurosurgery, Yao Tokushukai Hospital, Osaka

Abstract

A 79-year-old female presented with subarachnoid hemorrhage due to rupture of a rare true posterior communicating artery (PCoA) aneurysm and with poor general condition. Endovascular therapy was performed in the chronic stage. Right carotid angiography just before embolization demonstrated unusual multiple aneurysms of the internal carotid artery (ICA)-PCoA complex. Superselective angiography and aneurysmography using microcatheter revealed two separate aneurysms arising from the PCoA and the ICA-PCoA junction. Endosaccular embolization using Guglielmi detachable coils (GDCs) was successfully performed for both aneurysms and complete occlusions were achieved with the PCoA fully patent. Embolization with GDCs is a good alternative to surgical clipping for PCoA aneurysm after careful evaluation of superselective angiography.

Key words: posterior communicating artery aneurysm, Guglielmi detachable coil, embolization, internal carotid artery-posterior communicating artery junction

Introduction

Aneurysms arising from the posterior communicating artery (PCoA) and located at some distance from the junction of the internal carotid artery (ICA) are called true PCoA aneurysms. Aneurysms arising from the PCoA are rare and account for only 0.1–0.5% of intracranial aneurysms.^{1,2,5,6,10,13,16,18)} Analysis of the relationship between so-called ICA-PCoA aneurysms and the PCoA in 173 cases with fine microsurgical dissection found only eight aneurysms arising from the PCoA (4.6%).¹⁷⁾ We report a case of ruptured aneurysm arising from the PCoA associated with another unruptured aneurysm at the ICA-PCoA junction on the same side, which were successfully embolized with Guglielmi detachable coils (GDCs).

Case Report

A 79-year-old female was admitted to our hospital in Hunt and Kosnik grade 2 for treatment of subarachnoid hemorrhage. She had a long history of rheumatoid arthritis. Her daily life was restricted due to painful severe joint deformities and atlanto-axial dislocation. Prior to admission, her consciousness had been clear without dementia, but she was almost completely bed-ridden or in a wheel chair.

Computed tomography on admission revealed subarachnoid hemorrhage in the basal cistern and right sylvian fissure. Initial angiography demonstrated an aneurysm at the right ICA-PCoA junction with the dome of approximately 4 mm diameter projecting medially and upward (Fig. 1). She had severe pulmonary edema on admission, and endovascular therapy was delayed until after improvement of her general condition. Repeat angiography on Day 18 found another aneurysm of 4 mm diameter around the ipsilateral ICA-PCoA complex projecting laterally and downward (Fig. 2).

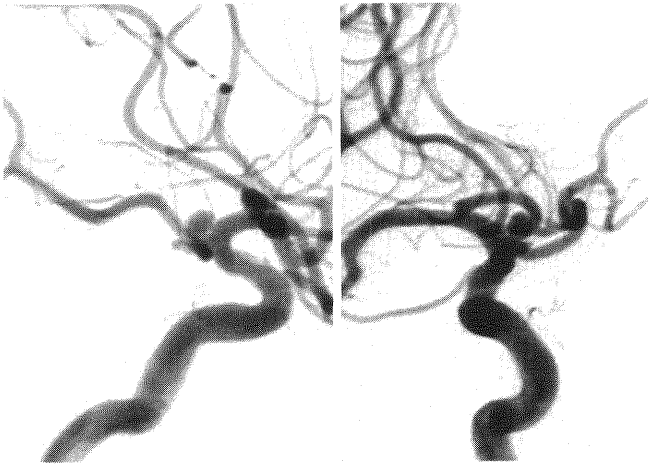


Fig. 1 Right carotid angiograms on admission, lateral view (*left*) and left anterior oblique view (*right*), showing an internal carotid artery-posterior communicating artery junction aneurysm.

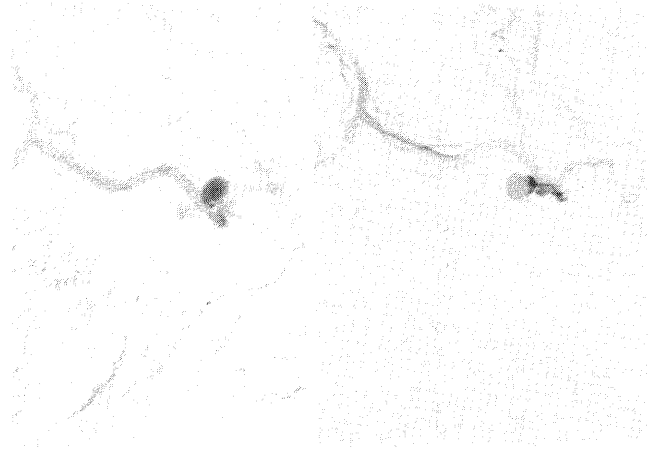


Fig. 3 Aneurysmograms of the internal carotid artery-posterior communicating artery (PCoA) junction aneurysm (*left*) and the true PCoA aneurysm (*right*), lateral view, showing the relationships to the PCoA. The PCoA aneurysm originates at the junction of the anterior thalamoperforating artery.

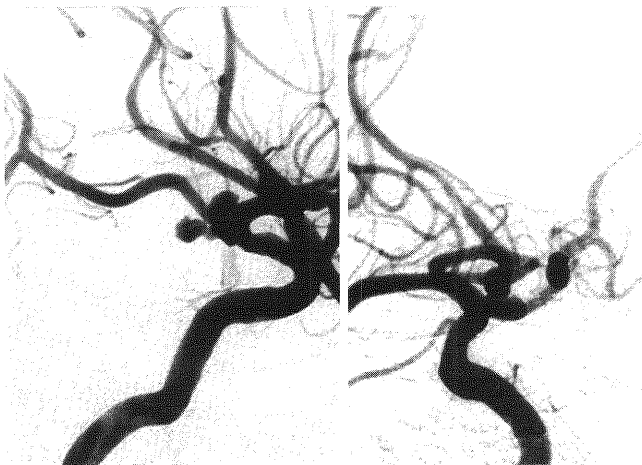


Fig. 2 Right carotid angiograms just before embolization, lateral view (*left*) and left anterior oblique view (*right*), showing the internal carotid artery-posterior communicating artery junction aneurysm and another aneurysm arising from the posterior communicating artery.

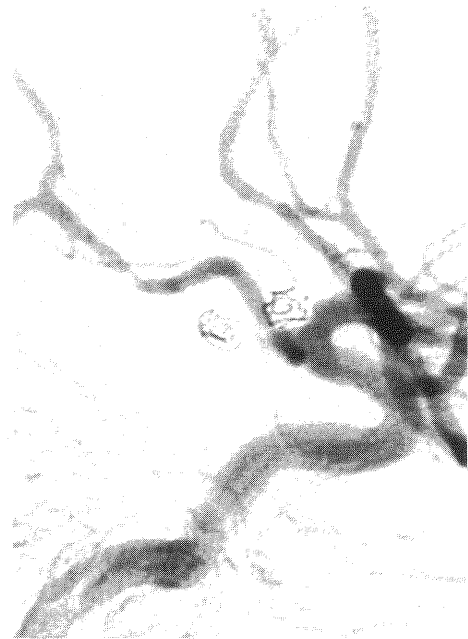


Fig. 4 Right carotid angiogram 3 months after embolization, lateral view, showing nearly complete obliteration of both aneurysms with the patent posterior communicating and anterior thalamoperforating arteries.

However, whether the two aneurysms had a common or separate orifices was unclear. Superselective angiography through the PCoA and aneurysmography using a microcatheter revealed that the two aneurysms were separate, one arising from the ICA-PCoA junction and the other from the PCoA (Fig. 3).

Embolization of the two aneurysms was successfully performed with GDCs on Day 18. The true

PCoA aneurysm was first embolized, followed by the ICA-PCoA junction aneurysm. Follow-up angiography 3 months after embolization revealed complete obliteration of the aneurysms (Fig. 4). The

patient has now recovered to the same condition as before onset.

Discussion

Superselective angiography and aneurysmography using a microcatheter are very useful for detailed examination of the ICA-PCoA complex and to distinguish two separate aneurysms from a "lobulated" aneurysm. In our case, the performance of superselective angiography first revealed that the lesion included two separate aneurysms, one located at the branch of the anterior thalamoperforating artery from the anterior half of the PCoA, which underwent a sharp change of direction and probably resulted in high hemodynamic stress, and the other arose from the ICA-PCoA junction.

True PCoA aneurysms can be divided into two groups based on the neck location in the anterior or posterior segment of the PCoA.⁶⁾ In this classification, 14 of 18 "true" PCoA aneurysms arose from the anterior half of the PCoA and the other four from the posterior half (posterior cerebral artery side). All true PCoA aneurysms so far reported have ruptured. In our case, the aneurysm arising from PCoA was also thought to be ruptured, because it was not detected at the initial angiography, perhaps due to thrombosis of the aneurysm, but finally appeared at the repeat angiography.

Operative complications occurred in four of 22 cases of true PCoA aneurysm with known surgical outcome, two with obstruction of perforators and two with oculomotor nerve paresis.^{1,5,7,13)} Endovascular treatment may be a good alternative to surgical clipping for true PCoA aneurysm, after careful evaluation by superselective angiography. Embolization with GDCs of ruptured cerebral aneurysm is quite efficacious for preventing aneurysmal rerupture.^{3,4,8,11,12,15)} Such endovascular treatment is especially indicated for patients with aneurysmal subarachnoid hemorrhage in poor general condition.^{9,11,12,14,15)} Our patient could be successfully treated with GDCs, despite her history of rheumatoid arthritis with severe painful joint deformities accompanied by atlanto-axial dislocation and pulmonary edema.

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Address reprint requests to: M. Kubo, M.D., Department of Neurosurgery, Toyama Medical and Pharmaceutical University, 2630 Sugitani, Toyama 930-0194, Japan.