Aneurysm of the Posterior Communicating Artery Itself

Shiro Waga, Tadashi Kojima, Hiroshi Tochio and Atsunori Morikawa

Department of Neurosurgery, Mie University School of Medicine, Tsu, Mie

Abstract

Two cases of saccular aneurysms arising from the posterior communicating artery itself are presented. They account for 0.5% of the 409 intracranial aneurysms we have treated. Classification of so-called posterior communicating artery aneurysms and the incidence of aneurysms arising from the posterior communicating artery itself are reviewed, and the surgical significance of this aneurysm is briefly discussed.

Key words: cerebral aneurysm, cerebral angiography, internal carotid artery, posterior communicating artery, subarachnoid hemorrhage

Introduction

"True" saccular aneurysms originating from the posterior communicating artery itself are rare, although their presence has been known since the dawn of intracranial aneurysm surgery. We report two cases with "true" saccular aneurysms of the posterior communicating artery itself which were successfully obliterated by clipping, and discuss their surgical significance.

Case Reports

Case 1: This 54-year-old man complained of a sudden severe headache while working, and vomited several times. He was admitted to a local hospital where a spinal puncture disclosed grossly bloody cerebrospinal fluid. On admission to our hospital in June, 1979, there were still severe occipital headache and moderate nuchal stiffness. Otherwise neurological examinations revealed no abnormalities. Transfemoral angiography demonstrated a saccular aneurysm arising from the right posterior communicating artery itself (Fig. 1). Through a right frontotemporal craniotomy with a pterional approach, the aneurysm was clipped without difficulty. The aneurysm did not originate from the junction of the internal carotid artery and posterior communicating artery; it arose from the posterior communicating artery about 5 mm distal from its origin and was projected laterally.

Fig. 1 Case 1. Right carotid angiogram, lateral projection, shows an aneurysm arising from the posterior communicating artery itself.
and inferiorly. The arachnoid around the aneurysm was remarkably thickened, and the small perforating branches from the posterior communicating artery, which all ran medially and superiorly, were preserved. The postoperative course was smooth and uneventful, and postoperative angiograms showed that the aneurysm had been completely obliterated and that the right posterior communicating artery was patent (Fig. 2). He was discharged without any sequelae and, when last seen in February, 1983, he was doing well.

Case 2: The patient was a 64-year-old hypertensive man who was admitted to a hospital because of a sudden severe headache with chills followed by a brief unconsciousness, and 7 days later he was referred to us. On admission in December, 1981, he was disoriented to time and place. There were bilateral slight papilledema, a sluggish direct light reaction on the left and a slight central facial paresis on the right. The blood pressure was 180/108 mmHg. Other laboratory examinations were negative. A CT scan demonstrated moderate ventricular dilatation with periventricular lucency. Angiography disclosed a saccular aneurysm of the left posterior communicating artery. We were not sure whether the aneurysm arose from the junction of the internal carotid and posterior communicating arteries or from the posterior communicating artery itself (Fig. 3). Through a left frontotemporal craniotomy with a pterional approach, the aneurysm arising from the posterior communicating artery itself was clipped (Fig. 4). The arachnoid in the paracarotid cistern was markedly thickened and the fundus of the aneurysm was embedded in the left temporal lobe.

The aneurysm was on the posterior communicating artery itself about 3 mm distal from its origin and projected laterally and inferiorly, and the perforating branches from the posterior communicating artery ran superiorly and medially, so that the aneurysm was easily dissected from the perforating branches and clipped without compromising them. The postoperative course was complicated by moderate disorientation and urinary incontinence. Metrizamide CT cisternography demonstrated ventricular reflux and delayed clearance of the contrast medium. A lumbar
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Discussion

Krayenbühl et al. reported that in the “so-called” posterior communicating artery aneurysms, the precise relationship of the aneurysmal neck to the posterior communicating artery became apparent with microsurgical dissection; the aneurysms were divided into 1) infundibula of the posterior communicating artery (14 cases), 2) fusiform aneurysms of the posterior communicating artery (5 cases), 3) saccular aneurysms of the posterior communicating artery (2 cases), and 4) aneurysms most often arising from the internal carotid artery between the posterior communicating and anterior choroidal arteries (43 cases).

Pia classified aneurysms of the internal carotid artery, posterior communicating artery and anterior choroidal artery region into 1) those of the internal carotid-posterior communicating artery junction, 2) those of the posterior communicating artery, 3) those of the para-posterior communicating artery, and 4) those of the internal carotid-anterior choroidal artery junction. He noted that aneurysms of the posterior communicating artery itself belonged to a rare group and were further divided theoretically into four subgroups: 1) infundibula of the posterior communicating artery, 2) fusiform aneurysms of the posterior communicating artery, 3) saccular aneurysms of the posterior communicating artery, and 4) internal carotid artery aneurysms from the origin of the posterior communicating artery with its aplasia. Pia, however, experienced only two cases of aneurysms of the posterior communicating artery, in each of which an infundibulum of the posterior communicating artery had developed into a true aneurysm after observation for several years.

The incidence of aneurysms arising from the posterior communicating artery itself has been reported to be from 0 to 3.3% of the intracranial aneurysms. In the large series of intracranial internal carotid artery aneurysms reported by Yasargil et al., there were 11 intracavernous aneurysms, 25 proximal medial wall (carotid-ophthalmic) aneurysms, 2 distal medial wall aneurysms, 132 proximal lateral wall (posterior communicating) aneurysms, 15 inferior wall aneurysms, and 43 bifurcation aneurysms. Among 132 posterior communicating artery aneurysms, only six arose from the posterior communicating artery itself, 43 shared their neck with the internal carotid and posterior communicating arteries, and 83 arose from the internal carotid artery adjacent to the origin of the posterior communicating artery. According to their series, aneurysms from the posterior communicating artery itself accounted for 2.5% of 238 internal carotid artery aneurysms.

We have treated a total of 409 intracranial aneurysms in 334 patients from 1977 to 1982. There were 145 internal carotid artery aneurysms; 6 intracavernous, 12 carotid-ophthalmic, 3 distal medial wall, 98 posterior communicating, 10 anterior choroidal, and 16 internal carotid bifurcations. Among 98 posterior communicating artery aneurysms, only 2 (2%) were from the posterior communicating artery itself, and they made up 0.5% of our 409 intracranial aneurysms.

In operations we must be especially careful to preserve the small perforating branches from the posterior communicating artery. Anatomical studies have shown the presence of important small branches from the posterior communicating artery. According to Saeki and Rhoton, 4 to 12 (seven on the average) branches arise from the posterior communicating artery along its course, especially from the anterior half, run superiorly and medially to penetrate the optic chiasm, optic tract, tuber cinereum, posterior perforating substance, mammillary body, cerebral peduncle, and interpeduncular fossa, and to supply the posterior hypothalamus, anterior thalamus, posterior limb of the internal capsule, and subthalamus. Fortunately, in our cases the saccular aneurysms projected laterally and inferiorly, and were successfully clipped without compromising any perforating branches, which all ran medially and superiorly, as in the other reported cases. In fusiform aneurysms trapping of the posterior communicating artery has been performed. Such trapping, however, may bring about occlusion of the artery itself and its branches and may result in ischemic damage to the above-mentioned important areas. Small angled fenestrated clips may be necessary for such fusiform aneurysms in order not to compromise the posterior communicating artery and its branches.
References

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Address reprint requests to: S. Waga, M.D., Department of Neurosurgery, Mie University School of Medicine, 2-174 Edobashi, Tsu, Mie 514, Japan.