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Angiographic Diagnosis of Small Aneurysms of the Posterior Communicating Artery

Angiographic diagnosis of an aneurysm of the internal carotid-posterior communicating arteries (ICA-PCoA) is usually straightforward [1], unless the aneurysm is small (<5 mm) or the PCoA itself is not filled on carotid angiography. In the latter case, the aneurysm may be confused with an infundibulum. In 1964, Fox et al. [2, 3] described five patients with subarachnoid hemorrhage, three of whom had intact infundibula at surgery. These investigators suggested vertebral angiography with carotid compression as a means to show the PCoA arising from the apex of the infundibulum. The reverse situation (i.e., showing angiographically that a small aneurysm lies next to—not continuous with—the PCoA), however, has not been reported. We now describe five cases of surgically proved aneurysms in which the maneuver of Fox et al. was used to provide objective angiographic evidence of an aneurysm.

Methods and Results

Carotid magnification angiography of five patients (25–57 years old), with subarachnoid hemorrhage showed small outpouchings (3–5 mm) near the origin of the PCoA. In each case, either the PCoA was not filled, or the silhouette sign did not help distinguish the outpouching from an infundibulum. In fact, two of these outpouchings had been diagnosed elsewhere as infundibula. Selective vertebral angiography with digital compression of the involved carotid artery was performed. We used a 4- to 5-French catheter, an injection volume of 8–10 ml given at a rate of 5–8 ml/sec, and a filming sequence of two films/sec in the lateral projection. The outpouchings filled 0.5 sec after the ICA (Fig. 1), suggesting they were aneurysms. This was proved at surgery.

Discussion

Most PCoA aneurysms arise at or quite near the junction of the PCoA and the ICA. They usually lie on the PCoA, frequently con-

cealing it and giving the superficial impression that the sac arises from that vessel. If the orifice of the aneurysm is examined carefully, however, it usually will be found to enter into the ICA [4, 5]. On the other hand, an infundibulum of the PCoA is a focal dilatation (arbitrarily <3 mm) at the origin of the PCoA from the ICA [6]. The maneuver of Fox et al. [2] is valuable in showing this anatomic difference in origin. An infundibulum should be filled in the following sequence: basilar artery, posterior cerebral artery, PCoA, infundibulum, ICA. A small aneurysm will be filled in the following sequence: basilar artery, posterior cerebral artery, PCoA, ICA, aneurysm. In addition, only flash filling of the ICA occurs, so the relationship between the PCoA and the infundibulum or aneurysm can be established more readily. We suggest that the maneuver proposed by Fox et al. be added to the three classical angiographic criteria used to differentiate an aneurysm from an infundibulum, and hope that use of this maneuver will reduce the prevalence of false-negative angiograms and explorations.

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Fig. 1.—Angiographic diagnosis of small aneurysms of the posterior communicating artery.

A, Left common carotid angiogram, lateral projection shows 3-mm outpouching (arrowhead), but its posterior communicating artery (PCoA) is not filled.

B, Left vertebral angiogram with left carotid compression, lateral projection, shows retrograde filling of right (small arrowhead) and left (large arrowhead) PCoAs and left internal carotid artery (ICA), without filling of the ICA-PCoA aneurysm.

C, Left vertebral angiogram obtained 0.5 sec after B shows faint opacification of PCoA aneurysm (arrowhead).

