Documented enlargement and rupture of a small arterial sacculation

Case report

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Small aneurysms may sometimes be considered junctional dilatations but may also progressively enlarge and cause spontaneous subarachnoid hemorrhage, as in the case reported. These small aneurysms should be treated precisely as an aneurysm directly responsible for bleeding. When found in conjunction with other aneurysms, they should either be treated simultaneously or followed until clinical developments indicate the need for such surgery.

Key Words: intracranial aneurysm · cerebral arteries · cerebral angiography · cerebral hemorrhage · subarachnoid hemorrhage

M INUTE aneurysms and infundibular widenings are occasionally found incidentally during intracranial angiography. Their enlargement and subsequent rupture is rarely documented. This case report illustrates the potential danger of these casually regarded lesions.

Case Report

First Admission. A 29-year-old woman was admitted to Vanderbilt Hospital on August 15, 1965, 5 hours after the acute onset of occipital headache, photophobia, and confusion. There was no history of hypertension. The vital signs were normal, and the neurological examination showed only neck stiffness and weakness of the right arm. The lumbar cerebrospinal fluid was grossly bloody. Carotid angiograms revealed small sacculations of the supracavernous portion of the left internal carotid artery (Fig. 1) and an aneurysm of the right posterior communicating artery (Fig. 2). The left posterior communicating artery was not sufficiently opacified by retrograde brachial arteriography to determine if the minute sacculations were aneurysms or infundibular widenings. On August 26, 1965, the aneurysm of the right posterior communicating artery was exposed through a frontotemporal craniotomy and its neck obliterated by clipping. The postoperative course was uncomplicated except for a transient right oculomotor palsy. At periodic examinations during the next 4 years, her only complaint was recurrent headache of undetermined cause.

Second Admission. On April 20, 1969, the patient was hospitalized because of sudden left temporal headache. The blood pressure was 160/100, and the neurological examination was normal except for neck stiffness. A carotid angiogram showed definite enlargement of the left internal carotid artery sacculations (Fig. 3). Two days later
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Fig. 1. Left carotid arteriogram, August 23, 1965. Single arrow (left) and upper arrow (right) indicate a 2 to 3 mm supracavernous internal carotid artery sacculcation with lateral projection on frontal view. Lower arrow (right) shows another smaller posteriorly directed sac.

Fig. 2. Right carotid arteriogram, August 25, 1965. Irregular posteromedially projected aneurysm was verified at operation to be situated at the posterior communicating artery origin (arrows).
she developed aphasia and right hemiparesis, but examination of the lumbar cerebrospinal fluid did not confirm a second bleeding episode. On May 9, 1969, the larger uppermost aneurysm was exposed through a left frontotemporal craniotomy and obliterated by clipping. The precise origin of the aneurysm was obscured by its rupture during the dissection. The lowermost sacculation was not visualized. Speech and motor function have gradually improved.

Discussion

Small outpouchings of intracranial arteries may be minute aneurysms or infundibular widenings. Infundibular widening is usually a round or funnel-shaped dilatation of the proximal portion of a branching vessel which is less than 3 mm in diameter. The distal portion of the branch emerges from the dilatation at its apex. Aneurysms are usually asymmetrical expansions and located between the bifurcation. The branching vessel usually does not emerge from the apex of the aneurysm. Infundibular widening occurs most frequently at the origin of the posterior communicating artery, and this level is also a common location of aneurysms. These lesions are infrequently located at the level of the anterior choroidal artery.

Angiographic differentiation of an aneurysm with a diameter of less than 3 mm from infundibular widening is often difficult. If infundibular widening occurs, the distal posterior communicating artery is usually narrow. Only the infundibulum may sufficiently fill with contrast material for opacification. The arteriogram shows only the infundibulum projecting from the internal carotid artery, which may be impossible to distinguish from a small aneurysm. These lesions can be differentiated only if the distal posterior communicating artery is opacified. Retrograde brachial arteriography or vertebral arteriography may clarify the exact anatomical situation. Carotid and vertebral artery compression techniques, which enhance filling of the posterior communicating artery, have been described by Fox, et al., and Saltzman.

Histological studies investigating the relationship between infundibular widening and aneurysms have furnished contradictory evidence. Hassler and Saltzman studied 21 cases of infundibular widening. Six speci-
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mens had defects in the elastic lamina identical to aneurysms, suggesting infundibular widening may be an early stage of aneurysm formation. Stehbens found degenerated elastic lamina in five of seven infundibular widenings. Sahs examined 130 arterial bifurcations, many of which were obtained from patients with aneurysms, and only one infundibular widening had severe fragmentation of the elastic tissue.

Documentation of the development of infundibular widening or minute aneurysms into larger aneurysms with subsequent rupture is rare, only two such instances having been reported. The Cooperative Study of Intracranial Aneurysms and Subarachnoid Hemorrhage reported no example of enlargement and rupture of an incidentally discovered aneurysm with a diameter of 3 mm or less. Aneurysms below 3 mm, which included an unspecified number of cases of infundibular widening, were all asymptomatic. Wollschlaeger, et al., observed no evidence of prior hemorrhage from infundibular widening in more than 700 postmortem injected brain specimens.

The regimen providing the greatest safety to patients harboring an incidental minute aneurysm or infundibular widening cannot be categorically prescribed. We recommend follow-up angiography only if the patient becomes symptomatic, and think the risk of complications occurring from immediate operative intervention or follow-up angiography surpasses the risk of ill effects from aneurysm growth and rupture.

Summary

We have reported the enlargement and rupture of a small arterial sacculation. Small sacculations may be minute aneurysms or infundibular widenings, and differentiation of these lesions often requires special angiographic procedures. Histologic studies suggest that infundibular widening may develop into an aneurysm, but clinical studies indicate that incidentally discovered minute aneurysms and infundibular widenings rarely become symptomatic.

References


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