



## Basilar Perforator Aneurysms: Presentation of 4 Cases and Review of the Literature

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■ **OBJECTIVE:** Basilar perforator aneurysms (BPAs) are rare lesions that present a therapeutic challenge. We present 4 cases of ruptured BPAs treated either conservatively or by flow diverter deployment and review the literature.

■ **METHODS:** Patients (age 78, 59, 53, and 62 years) presented with World Federation of Neurological Societies grade I–IV and Fisher grade 3–4 subarachnoid hemorrhage. Initial angiography results were normal in 3 patients and necessitated a second angiography. BPA diameter was 0.5–3 mm; BPAs were located in the mid-third of the basilar artery in 2 patients and the upper third in 2 patients.

■ **RESULTS:** All patients were managed conservatively. One patient experienced rebleeding 10 days after initial ictus, which required the deployment of a flow diverter in the basilar artery. One patient developed a severe spontaneous pontine ischemic stroke with severe quadriparesis and refused further imaging. He was clinically stable at 1-year clinical follow-up. The other 3 patients showed complete resolution of BPAs on control follow-up imaging.

■ **CONCLUSIONS:** Ruptured BPAs are rare lesions that may heal spontaneously or be associated with spontaneous ischemic brainstem stroke or rerupture. These lesions can be managed conservatively initially with flow diverter deployment the most suitable therapeutic alternative in selected cases. Larger studies are needed to fully understand the natural history and refine the therapeutic strategy for these lesions.

### INTRODUCTION

Basilar perforating aneurysms (BPAs) are defined as aneurysms in which the neck is located entirely on a perforating artery without directly involving the basilar trunk.<sup>1</sup> Ruptured BPAs are a rare cause of subarachnoid hemorrhage (SAH). Since first described by Ghogawala et al. in 1996, 32 cases have been reported.<sup>1–16</sup> Thus, knowledge about the natural history and treatment options is limited. We report our experience of 4 patients with major SAH resulting from a ruptured BPA managed mostly conservatively, and we review the literature.

### MATERIALS AND METHODS

The Neurointerventional Department of the University of Nancy, Nancy, France, is a tertiary center serving a region of 2.35 million inhabitants. We reviewed our medical records for the period 2013–2016 and obtained the presentation, diagnosis, management, and clinical outcomes of 4 cases of interest. Because of the retrospective nature of the study, permission from the ethics committee of our institution was not necessary. This research complies with the STROBE (STrengthening the Reporting of OBServational studies in Epidemiology) reporting guidelines. We also performed a comprehensive literature search using PubMed. The following key words were queried singly and in combination: subarachnoid hemorrhage (SAH), cerebral aneurysm, basilar artery, perforator artery aneurysm. Our search resulted in case reports and case series describing posterior circulation perforator aneurysms. In all cases (including ours and the cases in the referenced articles), we collected the clinical presentation, imaging findings, management, outcome, and clinical follow-up when available.

### Cases

**Case 1.** A 59-year-old man presented with acute diffuse SAH, World Federation of Neurological Societies (WFNS) grade II and

#### Key words

- Basilar artery
- Basilar perforator aneurysm
- Flow diverter
- Subarachnoid hemorrhage

#### Abbreviations and Acronyms

**BPA:** Basilar perforator aneurysm

**DSA:** Digital subtraction angiography

**SAH:** Subarachnoid hemorrhage

**STROBE:** STrengthening the Reporting of OBServational studies in Epidemiology

**WFNS:** World Federation of Neurological Societies

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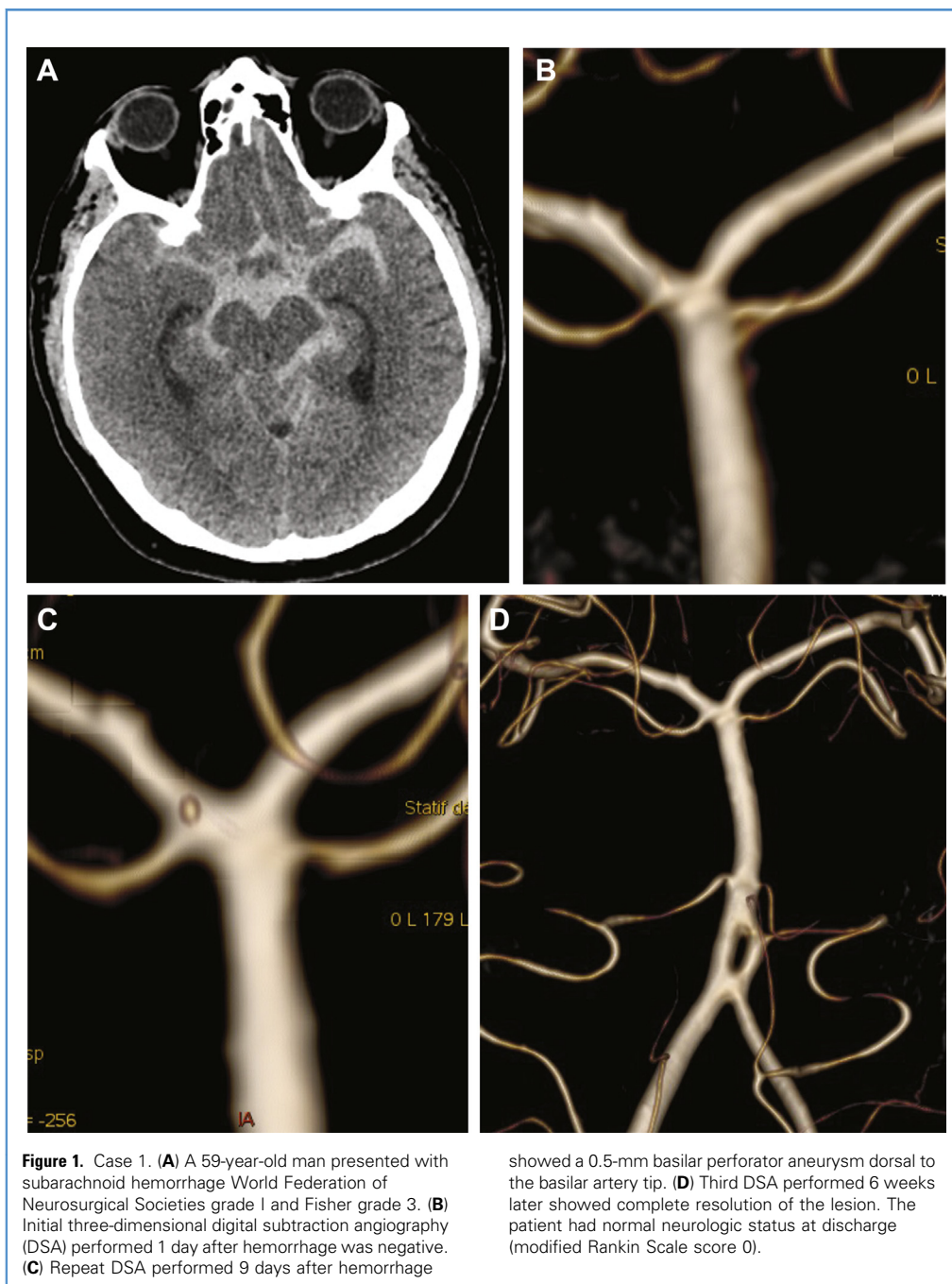
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Fisher grade 3 (Figure 1). Three-dimensional digital subtraction angiography (DSA) performed on day 1 postictus failed to show any vascular lesion. DSA performed on day 9 showed a very small aneurysm with a diameter of 0.5 mm at the posterior surface of the tip of the basilar artery. Conservative treatment was chosen. DSA performed 6 weeks later showed complete resolution of the lesion.

**Case 2.** A 62-year-old woman presented with diffuse SAH, WFNS grade 2, and Fisher grade 4 (Figure 2). Initial DSA was negative; however DSA performed 4 days later showed an aneurysm with

a diameter of 1 mm at the posterior surface of the middle third of the basilar artery. The patient was treated conservatively. On day 10 postictus, the patient presented with an episode of sudden headache with right ptosis, right paresis, and right hypoacusis. A head computed tomography scan demonstrated new bleeding at the level of the interpeduncular cistern. DSA showed enlargement of the aneurysm. The patient was given 600 mg of clopidogrel and 250 mg of aspirin orally a few hours before deployment of a Pipeline 2 × 16 mm (ev3 Neurovascular, Irvine, California, USA) flow diverter into the basilar artery.

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