When a saccular aneurysm ruptures, it is usually assumed that the dome has ruptured, yet this is not always the case. Occasionally, the wall of the aneurysm base can be the rupture site of the lesion, which poses a unique challenge for treatment. An aneurysm with a basal rupture may be unsuitable for endovascular treatment and may also present the neurosurgeon with a formidable technical challenge due to the risk of premature bleeding as the aneurysm neck is dissected and the possible requirement of a suture technique instead of simple aneurysm neck clipping.

To predict a basal rupture and determine the appropriate treatment modality, it is crucial to know the angiographic configuration of the aneurysm base. While the angiographic depiction of a basal rupture of a saccular aneurysm by a small outpouching at the aneurysm neck has already been reported, this is the first report of saccular aneurysms in which a basal rupture was angiographically depicted as a stalk-like narrow neck due to a thrombus sealing the rupture point and occupying the lumen of the aneurysm base. The author reports on 2 such cases: a 49-year-old woman who presented with a basal rupture of a saccular aneurysm arising at the middle cerebral artery bifurcation, and a 44-year-old man who presented with rupture of a saccular aneurysm arising at the junction of the A2 segment and the anterior communicating artery. In both cases, a pterional craniotomy allowed the surgeon to determine that the base of the aneurysm was ruptured, and he surgically obliterated the aneurysm. Microsuture reconstruction and clipping of the aneurysm neck were successful in obliterating the ruptured aneurysm and avoiding any compromise of the parent artery.

**Key Words**  •  aneurysm  •  angiography  •  subarachnoid hemorrhage  •  thrombus
eurysm base, the lesion was clipped successfully without compromising the parent artery (Fig. 2D and E). Meanwhile, on the left side, the other MCA lesion was a typical unruptured narrow-necked aneurysm (Fig. 2F), and it was simply clipped at its neck. The postoperative recovery was uneventful and control digital subtraction angiography showed successful obliteration of the aneurysms. Nine months later CT angiography showed no abnormal findings and the patient’s Glasgow Outcome Scale score was 5.

**Case 2**

**Examination.** This 44-year-old man presented with a sudden bursting headache without mental deterioration. A CT scan showed a diffuse subarachnoid hemorrhage...
Stalk-like narrow aneurysm neck

in the basal cisterns and in the inferior part of the frontal interhemispheric cistern. On the day of admission, digital subtraction angiography and CT angiography demonstrated a forward-projecting 4-mm saccular aneurysm attached to the junction of the left A2 and ACoA by a stalk-like narrow neck (Fig. 3).

Operation. An immediate surgical exploration, via a right pterional craniotomy, revealed that the rupture point was located at the base of the ACoA aneurysm reaching the parent artery (A2 segment) before the origin of the orbitofrontal artery (Fig. 4). After placing a 10-0 nylon suture stitch on the arterial side of the rupture point, a surgical clip was successfully placed at the aneurysm neck, effectively excluding the rupture site from the arterial circulation.

Postoperative Course. The patient recovered without neurological deficits. Postoperative digital subtraction angiography and 1-year follow-up CT angiography showed successful obliteration of the aneurysm without compromising the parent artery. One year later, the patient returned to his prior occupation.

Discussion

Although aneurysmal ruptures usually occur at the fundus, the wall at the base may sometimes be the most fragile portion. When Crompton examined 275 cases of ruptured cerebral aneurysms at autopsy, he found when the lesions were divided lengthwise from the origin to the fundus into equal thirds (the neck portion, body, and apex), that 6 cases (2%) showed a rupture in the neck portion of the aneurysm.

Meanwhile, the pattern of hemostasis for ruptured aneurysms, as reported by Ishikawa et al., included an inside-arrest pattern with a thrombus attached to the rupture point from inside the aneurysm in 10% of their surgical cases and an outside-arrest pattern in 80% of the cases. However, a thrombus occupying the lumen of an aneurysm can indent and distort the angiographic configuration of the aneurysm, as in the present cases.

The treatment decision is complicated in cases of aneurysms with a basal rupture. Although the efficacy of endovascular treatment for ruptured aneurysms has been well acknowledged, the use of detachable coils to close off an aneurysm with a basal rupture can be problematic, as it is hard to prevent rebleeding with only a small part of the coil mesh intervening between the arterial circulation and the rupture point. In addition, an intraaneurysmal thrombus may disturb a complete obliteration of the lesion. Thus, surgical treatment of such aneurysms is favored over endovascular coiling by the author. If the rupture point is apart from the parent artery by approximately 1 mm, the aneurysm neck can be clipped without compromising the parent artery. Yet, in cases of a basal rupture encroaching on the parent artery, additional techniques may be required, such as microvascular suture repair and clip wrapping.

In one reported case, a basal rupture of a posterior communicating artery aneurysm was treated by applying a fenestrated, right-angled clip, and in another a partial avulsion of the neck of an ACoA aneurysm was treated by wrapping the aneurysm neck with a swathe of cotton and placing a clip on it. However, while such maneuvers can be applied quickly and more easily, they can compromise the parent artery, in which case the present technique can be recommended. Nonetheless, technical difficulties can be encountered in cases of a deep and narrow operative field. In addition, the edges of an aneurysm neck can be too friable to suture.

In the present cases, angiograms revealed a stalk-like, tubular narrow-necked portion and a globoid body

![Fig. 3. Case 2. Preoperative catheter-based angiogram (left) and CT angiogram (right) revealing a forward-projecting 4-mm saccular aneurysm attached to the junction of the left A2 and ACoA by a stalk-like narrow neck (arrows).](image)

![Fig. 4. Case 2. Intraoperative photographs. A: Basal rupture clarified after dissecting the ACoA aneurysm. B: Corresponding illustration. C: Aneurysm clipping after placing a 10-0 nylon suture stitch at the rupture site of the aneurysm neck.](image)
portion. When the stalk-like neck portion has a larger diameter, the possibility of a simple narrow-necked aneurysm is increased. However, a third version of this angiographic configuration, in the author’s experience, is a very small aneurysm (stalk-like neck portion) and an associated larger pseudoaneurysm (globoid body portion). Thus, strict differentiation and prediction are not possible on angiograms.

Conclusions

A basal rupture of a saccular aneurysm can be depicted as a stalk-like narrow neck on angiograms. Microsuture reconstruction and clipping of the aneurysm neck were successfully performed in the reported cases.

Disclosure

The author reports no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

References