

Figure 28-19 Common sites of saccular (berry) aneurysms in the circle of Willis.

the ventricular system, vascular malformation, hematologic disturbances, and tumors.

Saccular aneurysm is the most common type of intracranial aneurysm. Other aneurysm types include atherosclerotic (fusiform; mostly of the basilar artery), mycotic, traumatic, and dissecting. These latter three, like saccular aneurysms, are most often found in the anterior circulation, but differ in that they more often cause cerebral infarction rather than subarachnoid hemorrhage.

Saccular aneurysms are found in about 2% of the population according to recent data from community-based radiologic studies. About 90% of saccular aneurysms are found near major arterial branch points in the anterior circulation (Fig. 28-19); multiple aneurysms exist in 20% to 30% of cases in autopsy series.

Pathogenesis. While the etiology of saccular aneurysms remains obscure, the structural abnormality of the involved vessel (absence of smooth muscle and intimal elastic lamina) suggests that they represent a developmental disorder. Although the majority occur sporadically, genetic factors may be important in their pathogenesis, since there is an increased incidence of aneurysms in first-degree relatives of those affected. There is also an increased incidence in individuals with certain Mendelian disorders (e.g., autosomal dominant polycystic kidney disease, Ehlers-Danlos syndrome type IV, neurofibromatosis type 1 [NF1], and Marfan syndrome), fibromuscular dysplasia of extracranial arteries, and coarctation of the aorta. Other predisposing factors include cigarette smoking and hypertension (estimated to be present in about half of affected individuals). Although they are sometimes referred to as “congenital,” the aneurysms are not present at birth but develop over time because of an underlying defect in the media of the vessel.

MORPHOLOGY

An unruptured saccular aneurysm is a thin-walled outpouching, usually at an arterial branch point along the circle of Willis or a major vessel just beyond. Saccular aneurysms measure from a few millimeters to 2 or 3 cm in diameter and have a bright red, shiny surface and a thin, translucent wall (Fig. 28-20). Atheromatous plaques, calcification, or thrombi may be found in the wall or lumen of the aneurysm. Sometimes there is evidence of prior hemorrhage, in the form of brownish discoloration of the adjacent brain and meninges. The neck of the aneurysm may be wide or narrow. Rupture usually occurs at the apex of the sac and leads to extravasation of blood into the subarachnoid space, the substance of the brain, or both. The arterial wall adjacent to the neck of the aneurysm often shows some intimal thickening and attenuation of the media. Smooth muscle and intimal elastic lamina do not extend into the neck and are absent from the aneurysm sac itself, which is made up of thickened hyalinized intima and a covering of adventitia.

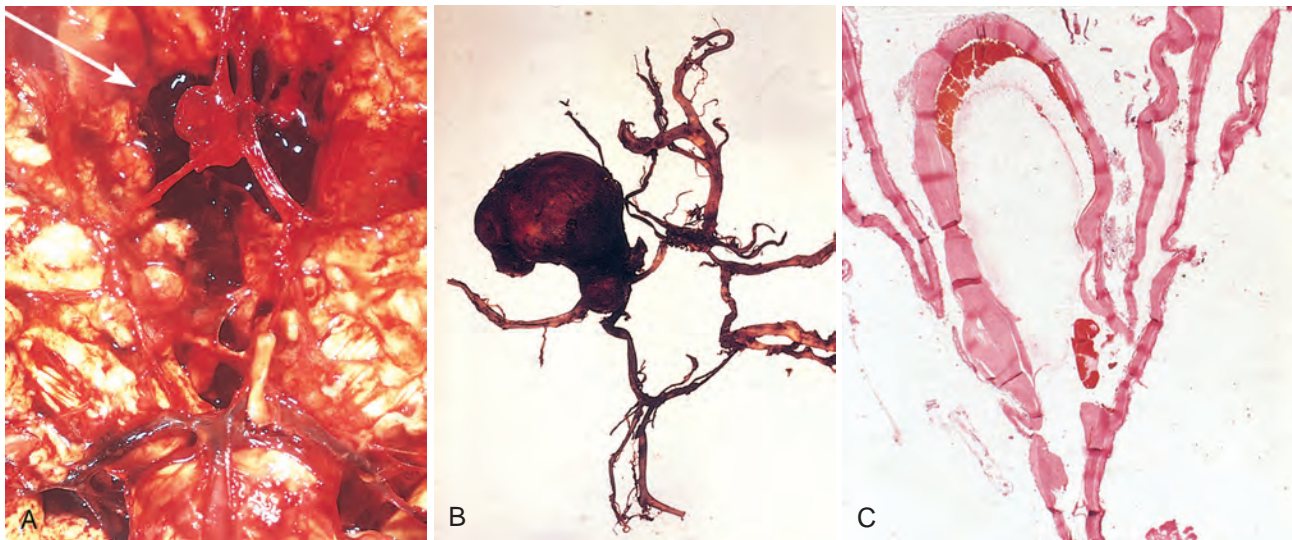


Figure 28-20 **A**, View of the base of the brain, dissected to show the circle of Willis with an aneurysm of the anterior cerebral artery (arrow). **B**, Dissected circle of Willis to show large aneurysm. **C**, Section through a saccular aneurysm showing the hyalinized fibrous vessel wall (hematoxylin and eosin).