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Intracranial Aneurysms and MR Angiography: Questions and Answers

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Many patients with unruptured aneurysms come to medical attention because their lesions are discovered by magnetic resonance (MR). Recent studies suggest a low (1) mortality and morbidity with surgical obliteration of these unruptured aneurysms. This contrasts with significantly higher overall rates once the aneurysm is ruptured. Thus, a highly reliable and accurate detection technique to discover unruptured aneurysms is desirable and, if available, could significantly lower the likelihood of a lethal outcome of aneurysmal subarachnoid hemorrhage.

The article by Huston et al (2) in this issue of the *AJNR* assesses the rate of detection of aneurysms by MR angiography (MRA). These authors note that the size of the aneurysm and type of MR sequencing influence the sensitivity of detection. Thus, 87% of aneurysms greater than 5 mm were detected by time-of-flight MRA, but smaller aneurysms were discovered less often. MR appears similar in sensitivity to less costly infusion computed tomography scanning (3). The latter technique was capable of detecting 96% and 69% of aneurysms 6 to 9 mm and 3 to 5 mm, respectively. Among the relevant questions that remain to be addressed are the influence of hemorrhage and location on the detection rate (ie, What is the rate of detection of ruptured versus unruptured aneurysms?).

In our experience, anterior communicating artery aneurysms are underrepresented in our unruptured series compared with patients presenting with subarachnoid hemorrhage. Many of these unruptured aneurysms are diagnosed

by MR. If location influences sensitivity of detection, the anterior communicating artery location may emerge as the most frequently overlooked site. In the Huston et al series, only one patient had an aneurysm at this location. In regard to the influence of hemorrhage on detection rate, the presence of subarachnoid or intracerebral hemorrhage, by its appearance, could increase the rate of detection. However, as illustrated by the patient in their Figure 3, the false-positive rate also may increase.

A neurosurgeon faced with a patient who may have a cerebral aneurysm needs to know the answers to the following questions: Does an aneurysm exist? Has it ruptured? What is its location and configuration? Are there coexisting and perhaps confounding conditions such as multiple aneurysms, an arteriovenous malformation, or associated atherosclerotic disease in the proximal or cervical vessels? Today, plain computed tomography and angiography provide answers to these questions, but MR is helpful at a secondary level. In the future, further advances in technology may allow these questions to be addressed by MR technology alone.

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