Editorial

Small incidentally found aneurysms

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The management of small unruptured aneurysms continues to be one of the more controversial topics in neurological surgery. Unfortunately, selection of patients for conservative management, endovascular treatment, or microsurgical clipping relies on an inexact science, with a lack of data and continually evolving technology. These issues, along with a minimal rate of complications in all 3 treatment arms, make design of a meaningful clinical trial extremely difficult. Therefore, clinicians must be satisfied with trying to glean information from single-center consecutive series as presented in these articles by Dr. Loumiotis and colleagues.1, 2

In their 3-year study, Loumiotis and colleagues analyzed data obtained in 212 consecutive patients with incidental aneurysms less than 1 cm in diameter. A total of 125 patients were treated with observation only. These patients tended to be older and harbor smaller aneurysms than patients who underwent invasive treatment, but exact reasons for recommending treatment over observation are not detailed in these reports. The conservatively treated patients had the highest death rate due to non-aneurysmal causes, presumably reflecting the bias to withhold treatment from patients with advanced age and medical comorbidities. Endovascularly treated patients had a 3% combined serious morbidity and mortality rate, and the small surgical group had no significant complications.

The clinical experience from this group at the Mayo Clinic is of course excellent, as might be expected from such a high-level tertiary referral site. Unfortunately, it is hard to gain any insight as to how this group of patients should be treated in other settings. The authors state that their approach “has been to favor endovascular treatment over other options when it is judged a feasible and safe choice.” There is very little science behind this statement, and in fact little reason not to choose microsurgical clipping as the first-choice treatment option for small unruptured aneurysms, especially in the anterior circulation. In the Mayo Clinic experience, there were no complications in the surgical treatment arm. Even in the meta-analysis of surgical results published in 1998 by Raaymakers et al., 4 surgical morbidity and mortality for non–giant anterior circulation aneurysms was 2.7%. In the ISUIA (International Study of Unruptured Intracranial Aneurysms), patients treated surgically initially fared worse than patients treated conservatively or endovascularly. However, the survival curves crossed at 5 years and follow-up results at 8.5 years showed that surgically treated patients did better than conservatively or endovascularly treated patients.

Loumiotis and colleagues stress that careful patient selection is key to obtaining excellent results. I have seen our surgical results improve dramatically with the introduction of endovascular approaches for complex aneurysms. The important reason is that we are not forced to undertake a surgical procedure that carries a high risk if there is a good endovascular option. Similarly, high-risk endovascular treatment should not be undertaken when there is a good surgical alternative. The exact number of stented cerebral vessels is not stated in the present report, but it is interesting that 2 of the serious complications noted occurred in patients who underwent stent-assisted coiling. In the “experienced French centers” mentioned in the authors’ study, there was a 12% serious morbidity and mortality rate in patients treated with stent-assisted coiling.3

Although there were no cases of aneurysm rupture in this series, follow-up is limited. The anatomical obliteration rate was only 20% in the endovascular group, and in the long term these patients may still be at risk for subarachnoid hemorrhage. In my experience, the surgical risk for a small anterior circulation aneurysm is under 3%, about the same as the endovascular risk for simple coiling. In young healthy patients, microsurgical clipping may be a better option than coiling, because the risks are similar but the long-term obliteration rate is better with surgery. Patients in whom a stent is required can be offered a lower-risk procedure with surgery, and therefore stenting of incidental aneurysms should be reserved for cases in which the surgical risk is high, like large paraclinoid aneurysms and posterior circulation aneurysms.

I agree with the authors that patients with small incidental aneurysms need to be considered individually on the basis of age, aneurysm anatomy, and the individual’s emotional state. Expectant observation is usually the best course of action, but treatment should be offered to younger patients with larger aneurysms for which the likelihood of excellent surgical or endovascular outcome is high.
Disclosure

The author reports no conflict of interest.

References


Response

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We thank Dr. Solomon for his thoughtful analysis of our study. We agree that the management of small incidental aneurysms poses significant challenges, and there are many unanswered questions that remain regarding the lesion’s natural history as well as the risks and efficacy of different treatment modalities. However, we feel that, despite logistic challenges, a meaningful study to answer some of these questions can and should be done so that our decisions can be based on more scientific evidence. Optimally, such a study would be in the form of a randomized trial. It is understood that the challenges and feasibility of such a trial would be significant but should not be insurmountable. As an initial step, a prospective, all-inclusive registry of small aneurysms—with both short- and long-term follow-up data, and including repeat images, neuropsychological outcomes, and objective measures of quality of life—would clarify the risks of treatment, risk of bleeding for untreated aneurysms, and the role/frequency of radiological follow-up for aneurysms treated conservatively.

In our series, recommendations for either invasive treatment or conservative management were based on multiple factors that included aneurysm-related characteristics (location, size, shape, and perceived risks of treatment) and patient-related factors (age, comorbidities/life expectancy, attitude toward knowledge of harboring an intracranial aneurysm, presence or absence of family history and/or risk factors known to be associated with aneurysm formation and growth such as smoking and hypertension, and a patient’s preference for one option over the other). Once we recommend treatment, we prefer endovascular treatment when feasible and safe because patients usually better tolerate it. We agree that stent-assisted coiling carries a higher risk than simple coiling alone, and for small aneurysms we consider this technique almost exclusively for wide-necked small basilar bifurcation aneurysms.

Our reliance on endovascular treatment of unruptured aneurysms (unlike ruptured aneurysms for which there is firm scientific evidence to support the benefit of coil embolization over surgical clipping) is not based on strong scientific evidence. However, there are some practical observations that would support our position. 1) We know from ISAT (International Subarachnoid Aneurysm Trial) that the risk of rebleeding associated with a previously ruptured intracranial aneurysm 1 year after endovascular treatment is exceedingly low. Thus, it is reasonable to assume that the risk of rupture is even lower (than a ruptured aneurysm) for a previously unruptured small aneurysm treated with coil embolization. 2) Despite thousands of unruptured small aneurysms treated each year with endovascular coil embolization, the rupture of a previously unruptured small incidental aneurysm remains an extremely rare event. In ISUIA (International Study of Unruptured Intracranial Aneurysms), investigators observed 9 documented ruptures of the treated aneurysm during the follow-up period in the endovascular cohort, and all but one rupture involved large or giant aneurysms (ISUIA III, unpublished data). The only rupture of a small aneurysm occurred in a patient with an 8-mm-diameter middle cerebral artery aneurysm. We certainly agree that because of the lack of rigorous scientific evidence on the efficacy and safety of endovascular treatment for small unruptured aneurysms, it is imperative that we move forward with a well-designed multicenter prospective study. The ISUIA investigators are dedicated to conducting such a study. Unfortunately, there has been ongoing resistance to the idea of such a study, and the logistics of organizing such a trial and the feasibility of patient enrollment have been used as an excuse to perpetuate obstructionism. (DOI: 10.3171/2011.9.FOCUS11259)