Asymptomatic meningiomas

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This issue of the Journal of Neurosurgery includes a very good article by Salvetti et al. from the University of Virginia. They retrospectively analyzed their prospectively kept database on patients treated with Gamma Knife surgery and found 42 consecutive patients who had been treated for asymptomatic meningiomas over a 14-year period. The diagnosis was suspected from an imaging study or was confirmed by a previous surgery. Over a mean imaging and clinical follow-up period of 59 and 76 months, respectively, only 1 tumor (2.4%) increased in size. Interestingly, 2 patients without tumor growth demonstrated clinical symptomatology related to the tumor. Only 1 patient showed possible signs of radiation-induced injury. The actuarial tumor control rates were 100%, 95.7%, and 95.7% at 2, 5, and 10 years, respectively.

This paper, which is very well written and very well discussed, is timely because it addresses a very important clinical issue—whether asymptomatic meningiomas should or should not be treated. In addition, the study confirms that radiosurgery is an effective and safe treatment modality to achieve “control” of meningiomas. This finding, of course, is not new, and there is plenty of evidence in the literature to that effect. The study has some limitations, such as its retrospective nature, possible biases, and a follow-up that, although relatively complete, was somewhat short for a benign tumor and not ideal in that many of the patients, because of the widespread referral pattern, were not seen in follow-up at the authors’ institution. Perhaps the major limitation is the small number of patients, but we assume that at this very busy radiosurgical center, the small number of treated asymptomatic meningiomas is a reflection of this group’s very conservative attitude about treating asymptomatic patients with meningiomas. The authors discuss these limitations very well. We would also add that their definition of a “stable” tumor, which most would interpret as no growth at all, is a bit generous in that they allow growth up to 15% of the initial tumor volume.

The authors’ indications for treating patients fell into 4 categories—residual tumor after surgery, recurrent tumor, documented tumor growth, or patient preference—which unfortunately creates a relatively heterogeneous cohort. There needs to be no discussion about treating tumors with documented recurrence or growth. The issue of whether to treat or to observe residual tumor after surgery can be discussed with the larger issue of whether or not to treat asymptomatic meningiomas. More controversial, in our minds, is the issue of treating in response to patient preference. This is an indication that lends itself to abuse in many settings given the relatively good safety profile of radiosurgery. However, knowing the well-earned, excellent reputation of this group, we suspect that they were very careful in this respect and treated patients under the rubric of patient preference only in those cases in which they truly did not know whether treatment or no treatment was the preferred option. We are sure, for example, that they would not offer radiosurgery to an elderly patient with an asymptomatic, 1-cm, calcified convexity meningioma even if such a patient would prefer to have that treatment.

It is important to know that in this series of 42 patients, 11 (26.2%) were treated because of documented tumor growth and 5 (11.9%) because of recurrent tumor. We have every reason to expect that since these tumors had grown, they would have continued to grow if left untreated, and yet only 1 tumor (we are not told if this tumor fell in the category with proven tumor growth or not) grew significantly after treatment; this is fairly convincing evidence of the effectiveness of radiosurgery in controlling tumor growth. The fact that 23 tumors (54.7%) in this series showed a > 15% reduction in tumor volume serves as further evidence of the effectiveness of radiosurgery. Moreover, there was no growth or new symptom in any of the 7 cases of tumors in the cavernous sinus, a location where other studies have shown that at least half of the patients experience new symptomatology and/or tumor growth over the follow-up period if left untreated.

We would like to expand on the authors’ discussion of whether asymptomatic meningiomas should or should not be treated. Obviously, we all agree that not all asymptomatic meningiomas should be treated; therefore, it is important to analyze what characteristics of the patient and the tumor are predictive of tumor growth or symptom development in those who present with an asymptomatic meningioma.

The effect of tumor size on future lesion growth or symptom development has been addressed in several studies. Sughrue et al. systematically reviewed the natural his-
Meningiomas in certain locations may be associated with variable rates of tumor growth and symptom progression. As we have mentioned, the review by Sughrue et al.9 showed that cavernous sinus meningiomas have a significantly higher rate of new or worsening symptoms. On the other hand, some studies have suggested that skull base meningiomas, in general, may have a lower growth rate. Hashimoto and colleagues1 compared the growth rates and patterns between incidentally discovered skull base and non–skull base meningiomas. They found that only 40% of skull base meningiomas demonstrated growth, as compared with 75% of the non–skull base lesions. Furthermore, the percentage of growth was significantly lower and the doubling time was significantly higher in skull base than in non–skull base meningiomas.

In addition to the effect of location on tumor growth, the proximity of a meningioma to critical neural or venous structures should also play a role in the decision-making process. We frequently consider early surgery for tumors adjacent to major venous sinus or neural structures, such as parasagittal meningiomas near the superior sagittal sinus or medial sphenoid wing meningiomas close to the optic nerve, superior orbital fissure, or cavernous sinus. The rationale for such an approach is based on the assumption that if the tumor were to grow, it would involve these critical structures, which may not only increase the morbidity of resection but may also decrease the chances of gross-total resection and “cure.” However, the surgeon must keep in mind that the overall risk of surgery must be reasonably low to justify intervention. Furthermore, as we emphasize to our residents, clinical decision making does not stop once a decision has been made to operate but is a continuous process of assessing risks and benefits throughout the procedure. The surgeon should not take any excessive risks to achieve a greater degree of resection for a benign tumor. Similarly, the option of “backing out” should always be considered if an unexpected finding, such as an adherent large cortical vein, a fibrous nonsuctionable tumor, or a poor arachnoid plane, increases surgical morbidity as compared with the surgeon’s preoperative assessment. This is particularly important considering that there is a reasonable alternative. Although radiosurgery is an option for small tumors and the tumor control rates appear to be good, we prefer resection for such tumor locations, provided that the patient is young and healthy, to avoid the small yet known risk of radiation-induced malignancy or a poor arachnoid plane.

In addition to the previously discussed tumor characteristics that influence decision making, there are several patient-related factors that must be taken into consideration. Several studies have shown a higher incidence of meningioma growth in younger patients. In a series of 37 patients with incidental meningiomas, Yoneoka et al.11 reported a significant increase in the likelihood of tumor growth in younger patients. In a series of 37 patients with incidental meningiomas, Oya et al.7 showed that cavernous sinus meningiomas have a significant higher rate of new or worsening symptoms. On the other hand, some studies have suggested that skull base meningiomas, in general, may have a lower growth rate. Hashimoto and colleagues1 compared the growth rates and patterns between incidentally discovered skull base and non–skull base meningiomas. They found that only 40% of skull base meningiomas demonstrated growth, as compared with 75% of the non–skull base lesions. Furthermore, the percentage of growth was significantly lower and the doubling time was significantly higher in skull base than in non–skull base meningiomas.