See the corresponding article in this issue, pp 538–543.

J Neurosurg 105:536–537, 2006

Editorial

Asymptomatic meningiomas

WILLIAM T. COULDWELL, M.D., PH.D.

Department of Neurosurgery, University of Utah School of Medicine, Salt Lake City, Utah

With the increasing availability and use of contemporary neuroimaging, the diagnosis of asymptomatic intracranial meningiomas has become commonplace. Although the growing use of magnetic resonance and computed tomography imaging for justifiable indications (such as headache or neurological deficit) has facilitated the diagnosis of these lesions, private consumers now also have the opportunity to undergo "imaging checkups" in many parts of the developed world and a significant proportion of incidental lesions identified will be meningiomas.[5] In this issue of the *Journal of Neurosurgery*, Yano and Kuratsu have reviewed the natural history of asymptomatic intracranial meningiomas in 351 patients who were observed over time without treatment. These authors note that, in the majority of patients observed for longer than 5 years (42 of 67 patients), the lesions exhibited no appreciable growth. Only 6.4% of patients with asymptomatic lesions later experienced symptoms during the follow-up period (mean 3.9 years).

This is a landmark study of the natural history of incidental meningiomas. Although the follow-up period for these patients with meningiomas was quite short, the results indicate that, in the majority of patients harboring asymptomatic meningiomas, the disease followed a benign clinical course, which would indicate that an initial period of observation would be a prudent and reasonable course of management. This is especially true in the older population: whereas the resection of asymptomatic tumors was associated with less risk of morbidity than that of symptomatic tumors, in patients 70 years of age and older the risk of morbidity associated with treatment of asymptomatic tumors was 9.4%.

What are the implications of these results? First, it would seem that surgery may not be necessary unless the tumor demonstrates growth during observation, especially in an elderly patient. I, too, have adopted a policy of offering to follow all asymptomatic meningiomas with serial imaging as an initial recommendation for the past several years. This course of action has the benefit of revealing the natural history of the tumor and, perhaps more importantly if the tumor grows, it provides more justification to consider resection, especially in cases in which resection carries a significant risk, such as in patients harboring tumors in certain skull base locations.[1] The timing of follow up is important because judicious serial imaging should enable detection of growth before the lesion becomes symptomatic and the risks of treatment increase. In addition, one must avoid a situation in which an interval tumor growth would reduce the surgeon's ability to achieve a lower Simpson grade removal. Patient compliance is important here. As noted by Yano and Kuratsu, and by other authors,[4] younger patients must be observed very carefully, especially those harboring noncalcified tumors. The timing of the first follow-up imaging study should be short (I prefer 3–4 months after diagnosis) to rule out the uncommon atypical or malignant tumor with aggressive behavior. Nothing is lost by adhering to this approach; in fact, many of my patients appreciate the fact that I do not immediately suggest surgery for their tumors, and those patients whose tumors have grown have been grateful that I had offered them the opportunity to try to avoid surgery.

A related corollary is not addressed by the authors. Under current widespread use, stereotactic radiosurgery, conventional fractionated field treatments, and, more recently, stereotactic radiation therapy, have all demonstrated remarkably good tumor control rates for the treatment of benign meningiomas, exceeding 90% in most reported series.[2,3,6] Nevertheless, the rate of growth of incidental tumors shown in the study by Yano and Kuratsu suggests that the true rate of tumor control may be overestimated in these reports, as a large proportion of tumors that have been treated would not grow if left to their natural history. One must consider this baseline of quiescent tumors in interpreting the true efficacy of radiation therapy or radiosurgery (similarly when interpreting the efficacy of subtotal surgery), and when considering subjecting the patient to the low but definite risk of complications associated with these treatments.

The authors are to be congratulated for performing this study, which adds significantly to our knowledge of the natural history of meningiomas.

References

1. Couldwell WT, Fukushima T, Giannotta SL, Weiss MH: Petroclival meningiomas: surgical experience in 109 cases. **J Neurosurg 84:**20–28, 1996
2. Lee JY, Niranjan A, McInerney J, Kondziolka D, Flickinger JC,

Lunsford LD: Stereotactic radiosurgery providing long-term tumor control of cavernous sinus meningiomas. **J Neurosurg 97:** 65–72, 2002
3. Mendenhall WM, Morris CG, Amdur RJ, Foote KD, Friedman WA: Radiotherapy alone or after subtotal resection for benign skull base meningiomas. **Cancer 98:**1473–1482, 2003
4. Nakamura M, Roser F, Michel J, Jacobs C, Samii M: The natural history of incidental meningiomas. **Neurosurgery 53:** 62–71, 2003
5. Onizuka M, Suyama K, Shibuyama A, Hiura T, Horie N, Miyazaki H: Asymptomatic brain tumor detected at brain checkup. **Neurol Med Chir (Tokyo) 41:**431–435, 2001
6. Stafford SL, Pollock BE, Foote RL, Link MJ, Gorman DA, Schomberg PJ, et al: Meningioma radiosurgery: tumor control, outcomes, and complications among 190 consecutive patients. **Neurosurgery 49:**1029–1038, 2001

RESPONSE: We appreciate the thoughtful comments offered by Dr. Couldwell. As he points out, advances in diagnostic imaging have made the detection of asymptomatic meningiomas commonplace and the careful consideration of treatment approaches both possible and necessary.

Our most recent investigation was based on our previous work[1] on the natural course of asymptomatic meningiomas registered in the Kumamoto University Brain Tumor Data Bank and our assessment of outcomes in patients surgically treated for these lesions. We were surprised to find that the tumor enlarged in only approximately 30% of nonsurgically treated patients and that only 6.4% of patients with asymptomatic lesions became symptomatic over the course of observation. This rate is similar to the surgery-related morbidity rate in patients with asymptomatic meningiomas. The relatively short mean follow-up period of 3.9 years leaves open the possibility that these rates may increase in long-term follow-up studies, although only one of seven tumors observed longer than 10 years (range 10–13.6 years) manifested signs of growth and none became symptomatic. We are continuing to observe the patients in our data bank and will report long-term findings at a later time.

We think that the low incidence of symptom development in patients with incidental meningiomas must be considered, especially in assessing the indications for operative treatment in elderly patients, as this subgroup is at increased risk for surgery-related morbidity. Therefore, we prefer to monitor these patients without surgical intervention unless their tumors become symptomatic. As the timing of such intervention in patients with asymptomatic meningiomas at risk for symptom development is of utmost importance and is difficult to determine, we agree with Dr. Couldwell that close monitoring is essential. In our most recent study, we considered only the maximum tumor diameter. At present, we measure the tumor volume on serial magnetic resonance images[2] and maintain a tumor-volume curve for individual tumors throughout the course of observation. If the tumor grows to the mean size of symptomatic meningiomas shown in Fig. 1 of the article under discussion, we consider surgical removal with interventional timing based on the speed of tumor growth.

Furthermore, our decision-making process coincides with that of Dr. Couldwell with respect to the surgical indication for growing skull base meningiomas. Although it may be argued that it is advisable to perform an early operation in patients with asymptomatic skull base lesions, we continue to observe these patients closely and at short intervals to detect potential tumor growth as early as possible and to allow for the lowest possible Simpson grade removal.

In the current manuscript we did not discuss the effectiveness of interventional treatment approaches. Of 603 patients with asymptomatic meningiomas, 61 (10.1%) chose radiosurgery. However, we did not unequivocally establish the presence or absence of tumor growth in these cases preoperatively. For the reasons stated by Dr. Couldwell, we also believe that the true control rate of incidental tumors may be overestimated in reports on the effectiveness of radiosurgery.

We are honored to have our work considered a landmark study of the natural history of incidental meningiomas, and we continue our efforts to gain a better understanding of this clinical entity.

SHIGETOSHI YANO, M.D., PH.D.
JUN-ICHI KURATSU, M.D., PH.D.
Kumamoto University
Kumamoto, Japan

References

1. Kuratsu J, Kochi M, Ushio Y: Incidence and clinical features of asymptomatic meningiomas. **J Neurosurg 92:**766–770, 2000
2. Nakamura M, Roser F, Michel J, Jacobs C, Samii M: The natural history of incidental meningiomas. **Neurosurgery 53:**62–71, 2003