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Stereotactic Radiosurgery versus Observation for Incidentally Diagnosed Intracranial Meningiomas: A Meta-Analysis of Patient-Reported and Survival Outcomes

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Abstract
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Abstract

Objectives:

Meningiomas are predominantly benign, slow growing extra-axial lesions that typically become symptomatic when they are large enough to compress critical brain structures through mass effect or irritate the meninges (headache) or become epileptogenic foci (when supratentorial). The incidence of intracranial meningiomas has been on the rise due to improvements in imaging technology coupled with recent emphasis on screening protocols following head injury. In the following study, we seek to identify indications for stereotactic radiosurgery (SRS) versus observational monitoring while analyzing the efficacy of each of these non-operative management strategies.

Methods:

We performed a systematic review of the literature through the PubMed, Scopus, and Web of Science databases according to PRISMA guidelines using predefined search terms. Specifically, we sought to identify all primary prospective trials and retrospective series comparing outcomes associated with SRS management versus serial imaging for the management of asymptomatic meningiomas.

Results:

Five studies reporting outcomes for 794 patients remained eligible for inclusion in the present meta-analysis. Median follow-up durations ranged from 42-63 months and the cohort was >80% female. Mean age across the studies varied from 44-64 years. Overall quality was assessed as high. Serial observation was slightly more prevalent among the patients included in this analysis. With respect to mean tumor diameter, initiation of SRS was associated with lager tumors ($p=0.030$). In terms of clinical outcomes, patients undergoing serial observation were more likely to experience radiographic progression or clinical signs of progression ($p< 0.0001$). While there was no significant difference in the rate of patients exhibiting neurologic decline between the two cohorts ($p=0.880$), patients eventually required surgical intervention at a much higher rate in the observation group ($p< 0.0001$).

Conclusion(s):

Questions regarding the efficacy of SRS appear to have largely abated. Now that this is the case, an important source of further investigation will be optimization of outcomes in patients eligible for serial observation. At present, it appears that young patients with long life expectancies and patients who may eventually be lost to follow-up stand to benefit from proactive discussions explaining the rationale behind early SRS and its associated benefits as a preemptive, precautionary measure.