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Letter to the Editor

Extent of resection and survival outcomes in the World Health Organization Grade II meningiomas

Gustavo R. Isolan[1], Rafael Roesler[2]

[1]Department of Surgery, Mackenzie Evangelical University of Paraná (FEMPAR), Curitiba, [2]Department of Pharmacology, Federal University of Rio Grande do Sul, Porto Alegre, Brazil.

E-mail: *Gustavo R. Isolan - gustavo.isolan@fempar.edu.br; Rafael Roesler - rafaelroesler@hcpa.edu.br

***Corresponding author:**
Gustavo R. Isolan,
Department of Surgery,
Mackenzie Evangelical
University of Paraná
(FEMPAR), Curitiba, Brazil.

gustavo.isolan@fempar.edu.br

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How to approach resection of meningiomas is a critical issue for neurosurgeons that have increasingly raised attention. For example, Soni *et al.* reported a retrospective analysis of 214 patients with Grade II meningiomas. Patients who underwent gross total resection (GTR) (which the authors defined as being a Simpson Grade 1 or 2 resection) had significantly longer progression-free survival than patients who underwent subtotal resection (a Simpson Grade 3 or 4 resection). They found that the extent of resection played a more significant role in patients with skull base tumors than in those with nonskull base tumors. In addition, they also found that GTR did not prolong overall survival in patients 75 years of age or older, suggesting that surgeons should take a less aggressive posture with this group.[6] These findings are of great importance and confirm, with statistical significance, the need for surgeons to take a more aggressive surgical posture regarding the GTR of skull base meningiomas in patients under 75 years of age.

We find it important here to comment on three aspects of skull base meningiomas as these benefits the most from GTR: (1) the heterogeneity of this group of tumors; (2) the difficulty of conducting epidemiological studies resulting in clear and reliable recommendations due to the rarity of these tumors; and (3) the potential bias and low external validity (or ability to generalize) in extrapolating from the results found to other examples of this type of retrospective and uncontrolled study. This is further complicated by the unexamined biases of the various surgical teams involved as well as differences in surgical infrastructure.

Skull base meningiomas are a heterogeneous group of tumors, each with its own management parameters. While sphenoid wing meningiomas are amenable to full resection, petroclival meningiomas are more challenging and present a greater potential for sequelae. Some studies on petroclival meningiomas[1,4] recommend GTR of Simpson Grades 1, 2, and 3 where Grade 3 resections may have the same prognosis as Grade 2. More recent studies find that such tumors with serrated shapes extending from their limits to the brainstem or altered brainstem signals are factors that contraindicate an aggressive resection as they are correlated with increased risk of resulting in neurological sequelae.[1,3,4] Cavernous sinus meningiomas also have unique characteristics. Although still a matter of controversy, the current trend has been to resect the part of the tumor that compresses the optical apparatus as well as the part located in the lateral wall of the cavernous sinus and to avoid resecting the tumor inside the cavernous sinus to avoid cranial nerve damage. Another aspect of skull base meningiomas is that resection of hyperostosis caused by some tumors must be performed to classify the surgery as GTR Simpson Grade 1

and Grade 2.[2] This is especially true for those en plaque sphenoid wing meningiomas that cause hyperostosis of the anterior clinoid process, orbital walls, and pterygoid plate, as well as for tuberculum sellae meningiomas and olfactory groove meningiomas.

Given that it is difficult to collect large sample groups of Grade II skull base meningiomas and, by extension, it is hard to conduct studies with a large number of patients and highly reliable evidence, treatments end up being individualized based on location of the tumor, patient's expectations, and surgeon's experience. We believe that skull base meningiomas should be managed by a team specialized in skull base surgery, preferably multidisciplinary, with in-depth knowledge of microsurgical anatomy, familiarity with the many available surgical techniques, and should be qualified in all surgical approaches (i.e., lateral, posterior, and endoscopic endonasal). Likewise, quality neurointensive care and a complete surgical armamentarium (endoscope, microscope, ultrasonic aspirator, and intraoperative neurophysiological monitoring) increase the chance of successful GTR and decrease the risk of complications. This is especially helpful when regarding neurosurgical units located in the developing countries where every effort should be made to equip neurosurgical referral hospitals.

Last, but not least, the results of the management of skull base meningiomas may have a number of biases, as in all areas of surgical sciences, including selection bias, chronology bias, design bias, detection bias, determination bias, transfer bias, performance bias (nonuniform intervention), recency illusion or availability bias (the latest is the best), and conflicts of interest (trying to prove that a given technique is better).[5] In addition, even when biases can be controlled for and validated internally through statistical significance (internal validity), extrapolation of results (external validity) to other cases should be analyzed with caution as surgery performed on complex tumors such as Grade II skull base meningiomas still relies on both art and science for its success.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

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