Endonasal versus transcranial resection

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Anterior skull base meningiomas are among the easiest to remove completely with a very low morbidity rate and excellent long-term outcome. This goal can be reached in nearly all frontobasal midline meningiomas by using a small minimally invasive frontolateral craniotomy. The approach allows one to achieve optimal functional results (both ophthalmological and endocrino-logical) and to avoid new deficits and complications in general, which is the second goal of their treatment.

From a historical point of view larger craniotomies have been favored because they offer a better overview of the whole tumor and of the surrounding structures, as well as more space for manipulations, giving a feeling of safety to the surgeon. The anatomical location and relations of some meningiomas to the surrounding vital structures restrict the operative radicality, whatever approach is used. Examples of such tumors are the cavernous sinus and the petroclival meningiomas.

The introduction of the surgical microscope improved intraoperative illumination and visualization. Tumor removal became feasible through smaller craniotomies. However, the use of the microscope did not necessarily mean that a less invasive technique was applied. Such less-invasive microsurgical techniques were developed later by neurosurgical masters, such as Yaşargil and Samii. The keyhole concept, which benefits from the application of both microscope and endoscope, was elaborated by Pernezcky. In the case of frontobasal meningiomas, the gentle dissection of the tumor capsule from the optic nerve/tract and from the hypothalamopituitary system with their sophisticated vascular supply became possible. Samii described recently his interindividual improvement in terms of achieving more radical resection and better functional results. In a series of 72 cases with tuberculum sellae meningiomas, in which the bifrontal, then the pterional and then—the frontolateral approach were used, total resection was achieved in 92%. Notably, the rate of visual improvement increased from 46% to 64%, and then to 78% with each of the approaches. Fahlbusch published a series of 47 patients operated on in the period 1982–2002: 46 of 47 of the meningiomas were removed totally and the rate of visual improvement was 80%. Until 2006, additional 22 cases were operated and further improvement of the results was possible: all tumors were resected completely and the visual improvement rate was 85%. Mathiesen, who favors the routine opening of both optic foramina, achieved even better rate of visual improvement—90%. Currently at the International Neuroscience Institute, we approach all frontobasal midline, including the large and giant olfactory meningiomas, via the minimally invasive frontolateral craniotomy.

We cannot avoid the impression that some neurosurgeons—those that are not satisfied with their own surgical results, those who have never had the chance to be trained in microsurgery by experts, and those who started their neurosurgical training with endoscopy and want to expand its indications—are inclined to favor the endonasal transsphenoidal, respectively transtetmoidal approach to the anterior skull base.

Harvey Cushing himself, who had pioneered the transsphenoidal approach for pituitary adenomas, changed from the transsphenoidal to the transcranial technique, which offered better visualisation and allowed more radical tumor resection. The first renaissance of transsphenoidal surgery occurred with the introduction of operating microscope; the second one, with the introduction of the endoscope. The latter technique, pioneered first by Jho, and then by Diviitis and Cappabianca, allows for even better illumination and visualisation of all structures, a panoramic overview of the operative field, and a possibility to “look around the corner.” The excellent operative results of microsurgery for pituitary adenomas in experienced hands are meanwhile going to be achieved also with the pure endoscopic technique. Adequate publications on the outcome of endoscopic surgery should be expected.

The extended transsphenoidal approach to suprasellar lesions via the tuberculum sellae is best suited for surgery of small lesions. Larger tumors, such as craniopharyngiomas extending to the foramen of Monro or tumors with lateral parasellar extension, are less suitable. For us, the main domain of the extended endonasal transsphenoidal approach is not the anterior but the posterior parasellar and clival area, for example, in cases of chordomas.

In this article, the authors from Rochester and Bologna present a series of 13 patients with frontobasal meningiomas, surgically treated by Frank and Pasquini in Bologna. Meta-analysis of the literature is also per-
formed and includes 69 cases: 19 olfactory meningiomas and 50 suprasellar meningiomas. In this selective series, 7 (54%) of 13 tumors were removed completely, visual improvement occurred in 8 (62%) of 13, and 1 patient had a stroke. Unfortunately, no data regarding the pituitary function are provided. Commendably, CSF leaks could be avoided. In contrast, the literature review showed that the average CSF leakage rate was 32%: 26% in olfactory groove and 34% in suprasellar meningiomas. Although not discussed in this review, relatively high rates of pituitary insufficiency were reported in other series: 14%–20% rates of permanent diabetes insipidus and up to a 7.7% rate of panhypopituitarism. In a recently published selective series of 9 cases there were no CSF leaks but only 6 of 9 tumors were removed totally; visual improvement occurred in 6 patients, and 1 patient had permanent diabetes insipidus.

The comparison of these selective series that exclude tumors with asymmetric extension to the major (lateral) vascular structures with the craniotomy series shows that in the latter total resection is feasible in nearly all cases, the rate of visual improvement is higher and hormonal disturbances develop only exceptionally.

The authors of the present paper conclude that “Transnasal endoscopic resection of anterior cranial base meningiomas is feasible in selected cases” and that “long-term results are necessary before considering transnasal endoscopic resection removal as a valid alternative in selected cases, to the more established transcranial techniques.” For an ultimate comparison of the 2 techniques the following additional criteria should be met: standardized ophthalmological protocol (as the one used by Fahlbusch and Schott), long-term follow up, pre- and postoperative endocrine dynamic test results, postoperative MR imaging follow-up, and larger patient series. In our point of view, the frontolateral approach is the most appropriate and favorable approach in all meningiomas of the anterior midline. Total removal can be achieved in nearly all cases and long-term follow-up studies are available.

Still, we would not neglect the possibility that the endonasal approaches to skull base tumors will benefit from future developments and optimization of the visualization tools. At present, however, the question on the optimal management of frontobasal meningiomas is already answered. (DOI: 10.3171/2011.2.FOCUS1161)

Disclosure

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

References