

Transsphenoidal Surgery for Resection of Anterior Skull Base Meningioma: Considerations in Patient Selection

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Introduction

Although traditionally approached transcranially, anterior skull base meningiomas can occasionally be resected via the extended, endoscopic, transsphenoidal approach. Here we discuss important considerations of patient selection and risk stratification to optimize outcomes for patients with these difficult lesions, and also include considerations that should be reviewed during approach selection.

Methods

Medical records were retrospectively reviewed for patients who underwent transsphenoidal surgery with the senior author between April 2008 to March 2017 (938 procedures), and patients with pathologic confirmation of meningioma were identified. Outcomes were compared to other series in the literature (Table 1).

Surgeon Experience

- Surgeons will likely prefer the method with which they have more experience
- Emergent cases may limit surgeon or equipment availability and require a transcranial approach

Considerations for Surgical Approach

Presenting Symptoms

- Patients with progressive visual loss may require a more urgent operation
- Risk of damage to the pituitary gland may be less of a concern in patients with preexisting endocrine disease (e.g., Hashimoto's) or who have pituitary dysfunction

Results

Seven patients (four women, three men) underwent transsphenoidal resection (five endoscopic, one microscopic, and one hybrid endoscopic/microscopic) of pathologically-confirmed anterior skull base meningioma during the study period. Five patients presented with visual field deficit, three presented with headache, two presented with hypopituitarism, and one woman presented with infertility. The median maximum tumor diameter was 1.7 cm (range=1.4-4.2 cm). Six patients underwent subtotal resection, and one underwent gross total resection. Two patients had reoperations for recurrence after five and six years.

Tumor Location

- Tumors located above the optic nerves or that invade the optic canal may be more amenable to craniotomy
- Tumors that displace neurovascular structures superiorly may be better suited to the transsphenoidal approach
- Transcranial approaches may be better for lesions involving the intracranial internal carotid artery or its branches, given the access to proximal vascular control

Tumor Characteristics

- Patients with soft-suckable tumors may be more appropriate for transsphenoidal approach
- Fibrous tumors may require the improved access and visualization provided by the transcranial approach
- Larger tumors may be better suited to the wider operative field provided by the transcranial approach
- Small lesions may be adequately treated transsphenoidally



Patient Characteristics

- Patients with aggressive lesions who underwent surgery by one approach may benefit from the alernate approach
- Many patients may favor the better cosmetic outcomes of the transsphenoidal approach
- Older patients or patients with significant co-morbid conditions may be more suitable for the endonasal approach, given reduced complication rates and faster recovery associated with this minimally invasive approach

Table 1. Comparison of outcomes with other case series in the literature [1,2,3,4,5].

Demographics (no., %)	Present Series	Kassam et al.	Koutourousiou et al.	De Divitiis et al.	Gardner et al.	Van Gompel et al.
Patients undergoing TSS ^b	938	800	-	51	-	-
Patients with meningioma	7 (0.7%)	94 (11.9%)	75	7 (13.7%)	35	13
Age, years (mean, range)	58 (31- 73)	49 (3- 96) ^a	57 (36-88)	-	55 (39- 79)	62 (31- 77)
Follow-up, months (median, range)	19 (3- 104)	-	Mean: 29 (1- 98)	(1-20) ^d	(12-48)	8 (0- 65)
Complication (no., %)						
CSF Leak	0	15.9% ⁸	19 (25%)°	2 (29%)	14 (40%)	0
New Neurological Deficit	0	6 (0.6%) ^a	3 (4%)	0	1 (3%)	0
Death	0	7 (0.9%) ^a	0	1 (17%)	0	0
Transient DI ^b	1 (14%)	- '	-	-	1 (3%)	0
Permanent Endocrine Deficiency	1 (14%)	-	-	0	2 (6%)	0
Epistaxis	1 (14%)	-	-	0	1 (3%)	0
SBO ^b	1 (14%)	-	-	0	-	0
Reoperation	2 (29%)	-	1 (1%)	0	0	0

endonasal surgery, not just patients with meningiomas

* TSS = transphenoidal surgery; D = diabetes insipidus; SBO = small bowel obstruction

* 5 of these patients had post-operative meningitis; the rate of CSF leak in the most receivers of this study was 11.7%

* median and mean not available, only range shown

- = metric not reported.

Conclusions

Transsphenoidal surgery for a select sub-group of meningioma patients can be used to resect or debulk tumor safely and to alleviate mass effect on parasellar structures such as neurovasculature and the optic chiasm.

References

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