

Introduction

Removal of tuberculum sella (TS) meningiomas is traditionally performed through transcranial approaches. Wide use of the endoscope in transphenoidal pituitary surgery is recently accessible through the TS with an endoscopic technique. Extended endoscopic approach (ETS) is an important and alternative route for meningiomas, which are located on the midline originating from the TS and particularly extended to optic canals.

Methods

We compared the indications and the limitations of inferior (ETS) and superior (transcranial) approaches for TS meningiomas depending on the volume, location, optic nerve and vascular invasion, preoperative MRI findings of the tumor, reoperation rates and complications. 51 patients with TS meningioma were operated on, between July 2000 - March 2015 at Kocaeli University. 39 patients were female and 12 patients were male. Age ranged between 28-71. We have performed 56 operations on 51 patients consisting of; 30 endoscopic approaches on 28 patients, 26 transcranial approaches on 23 patients. In 3 patients, inferior approaches were abandoned and superior approaches were performed.

Results

Total removal was achieved on 23 of 28 patients (82,14 %) for inferior approaches and 19 of 23 patients (82.60%) for the superior approaches. In these series, there were 5 reoperations. The 2 of which were for CSF fistula after inferior approaches, and rest 3 were transcranial approaches for the recurrence after the superior approaches.

Transcranial approach is favorable for the lesions

-Above 3 cm with/without

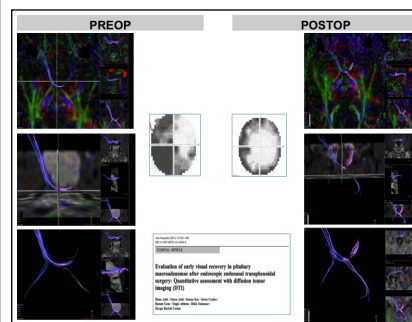
- Arterial encasement
- Pial invasion
- Lateral extension

Disadvantages of Transcranial A.

- Simpson Gr I resection is difficult
- Surgical manipulation is difficult in cases with optic canal invasion and laterally growing to the optic nerve
- Needs much more optic nerve manipulation
- Infundibular dissection is difficult
- Needs brain retraction
- Higher olfactor injury risk

	Total Resection	Postop Vision	Complic	Follow-up
TSM Endoscopic 30	76%	75%	3 CSF 2 DI	3-81 months
TSM Transcranial 26	81.8%	73.3%	3 CSF 1 DI 1CSW	4-166 months

DTI Fiber tractography of the optic pathways are shown on 3-dimensional colored FA maps



Advantages of ETS

- Brain retraction is avoided
- Optic apparatus manipulation is minimized and infundibular dissection is easier
- Extended Endoscopic Approach provides Simpson Gr I Removal
- TSM invading optic canal can be removed easier
- Infrachiasmatic arachnoid membrans are important to conserve and protect neurovascular elements
- This approach allows an early devascularisation of the meningioma by early occlusion of the feeding arteries and subsequent blood-less debulking

Disadvantages of ETS

- Total removal may not be possible especially in cases with grade 3 meningiomas with Carotis, A1, Ant. Comm. A. or pial encasement
- Surgical manipulation is difficult in TSMs laterally growing to the optic nerve
- CSF leakage > % 5

Conclusions

ETS should be the first choice for the lesions below 3 cm with optic canal invasion
Transcranial approach should be the first choice for the Yasargil Gr III lesions
In the calcsified and fibromatous lesions, ETS can be abandoned transcranial approach

Learning Objectives

Comparison of limitations and complications of the inferior and superior approaches for TS meningiomas.

MICROSCOPIC	N	Total Resection (%)	Postop Vision (%)	Complication
Aju et al (2002)	70	84.2	70	2 (TD), 2Ex
Pamir et al (2005)	42	81	58	2.4% Mort, 7.1 % Morb
de Divitis et al (2008)	44	86.4	61.4	3(CSF 0)
Melby et al (2010)	58	87.9	83	5 (CSF 0,1 Ex), 1 (epineuropt)
Hemesseini et al (2012)	52	87	52	3 (CSF 0, 2 (Hydroc), 1 (Subdural Hematoma)

ENDOSCOPIC	N	Total Resection (%)	Postop Vision (%)	Complication
de Divitis et al (2008)	7	85.7	71.4	2 (2 CSF 1 Ex)
Wang et al (2010)	12		92	1 (DI)
Frank et al (2011)	13	70	67	1Stroke
Quarier et al (2014)	65	76	89.7	25.3 % (CSF 1)
Schwartz et al (2014)	21	80	82	Cerebell. Hemorrhage
Ceylan et al (2014)	25	75	75	1 (DI)

Related Articles

- Ceylan S, Anik I, Koc K, Cabuk B. Extended endoscopic transphenoidal approach infrachiasmatic corridor. Neurosurg Rev. 2015 Jan;38(1):137-47
- Anik I, Koc K, Cabuk B, Ceylan S. Endoscopic transphenoidal approach for fibrous dysplasia of clivus, tuberculum sellae and sphenoid sinus; report of three cases. Turk Neurosurg. 2012;22(5):662-6.
- Ceylan S, Koc K, Anik I. Extended endoscopic transphenoidal approach for tuberculum sellae meningiomas. Acta Neurochir (Wien). 2011 Jan;153(1):1-9.



Movie

RG 49 F

ETS was abandoned and transcranial approach was performed



Movie

FA 42 F

Firm, fibrotic and small (<3cm) tumor was removed by extracapsular dissection



Movie

YD 52 F

Soft tumor was removed by internal capsular dissection after debulking