TRANSCRANIAL APPROACH FOR ORBITAL TUMOUR – CASE REPORT

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Keywords: *orbital tumour, transcranial approach of the orbit, cavernous hemangioma*

Abstract: *Introduction: Modern surgery includes orbital surgery in the skull base surgery. For the orbital tumours located in the orbital apex, most authors recommend the transcranial approach. This approach is recommended to be performed by a multidisciplinary team consisted of neurosurgeon, ophthalmologist and ENT surgeon. This route is used for tumours located posteriorly in the orbital cavity. Objectives: The aim of our paper is to highlight the role of the transcranial approach in orbital tumours surgical treatment. Methods: This paper presents a case of a male patient, 28 years of age, admitted in the Neurosurgery Department of the County Emergency Clinical Hospital of Sibiu for an orbital tumour. Upon admission, the clinical examination revealed right hemicrania, right propotosis, decreased visual acuity and modifications of the visual fields. Neuroimagistic examinations consisted in CT and MRI and revealed a right orbital mass, round, well circumscribed, with inhomogeneous contrast enhancement; the tumour filled all the intraconal retroocular space that spares the triangular space in the orbital apex. The treatment consisted in frontal craniotomy with extradural orbital approach with orbital roof removal, gross total tumour removal and cranial base reconstruction with Titanium Dynamic Mesh. Results: The postoperative course was uneventfully and the patient was discharged on the seventh day postoperatively in a very good condition. Histopathological examination revealed cavernous hemangioma. Conclusions: Transcranial route for orbital tumours remains one of the most important approaches especially for tumours situated posteriorly in the orbital cavity. A multidisciplinary team involved in diagnosis and treatment provide superior results.*

Cuvinte cheie: *tumoră orbitală, abordul transcranian al orbitei, hemangiom cavernos*

Rezumat: *Introducere: În prezent, chirurgia modernă include chirugia orbitei în chirurgia bazei de craniu. Pentru tumorile de vârf de orbită, majoritatea autorilor descriu abordul transcranian. Acesta se realizeaza de către o echipă multidisciplinară formată din neurochirurg, oftalmolog, chirurg buco-maxilo-facial. Scopul articolului este de a prezenta rolul abordului transcranian în tratamentul chirurgical al tumorilor orbitale. Metodă: Se prezintă cazul unui bărbat de 28 de ani, internat cu diagnosticul de tumoră orbitală în secţia de neurochirurgie a Spitalului Clinic Judeţean de Urgenţă Sibiu. La internare, examenul clinic a relevat hemicranie dreaptă, exoftalmie la OD, cu acuitate vizuală scăzută şi câmp vizual modificat. Examenele neuroimagistice, CT şi RMN au evidenţiat prezenţa unei mase tumorale ovalare, bine delimitată, cu o structură heterogenă şi cu o priză relativ intensă şi heterogenă a substanţei de contrast; formatiunea tumorală ocupa tot spaţiul intraconal retrobulbar, fără a umple spatiul triunghiular existent la nivelul apexului orbitei. Tratamentul chirurgical a constat în craniotomie frontală cu abord extradural al orbitei prin orbitotomie superioară, excizie în totalitate a tumorii şi reconstrucţie de bază de craniu placuţă de titan. Rezulate: Evoluţia postopetorie a fost favorabilă, fără complicaţii, pacientul a fost externat în ziua a 7-a postoperator. Diagnosticul histopatoloigic a fost de hemangiom cavernos. Concluzii: Abordul transcranian pentru tumorile de orbită este de elecţie pentru formatiunile tumorale situate posterior în cavitatea orbitală. Implicarea unei echipe multidisciplinare în diagnostic şi tratament asigură rezultate superioare.*

INTRODUCTION

Nowadays, modern surgery includes orbital surgery in the skull base surgery. Orbital cavity due to a great variety of tissues could be the site of numerous types of tumours. A great number of approaches are used for the surgical treatment of orbital tumours.

For the tumours located posteriorly and superiorly in the orbit and in the orbital apex, the transcranial approach is recommended.

The transcranial approach is used by a multidisciplinary team consisted of neurosurgeon, ophthalmologist and ENT surgeon. This approach is ideal for the apical lesions (reached via the orbital roof) and superior orbital fissure lesions (reached via the lateral wall of the orbit). Most of the tumours located in the orbital apex are represented by the optic nerve gliomas and menigiomas. In the orbital fissure, hemangioma and neuromas of the cranial nerves are more frequently located. Also, on this level sphenoid wing meningiomas can be localized that can invade the orbit in a secondary manner.

For sphenoid wing meningiomas, the approach is similar to that used to reach the lateral lesions, but because they can extend medially into the optic canal, they can be treated via a combined approach.

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The aim of our paper is to highlight the role of the transcranial approach in orbital tumours surgical treatment.

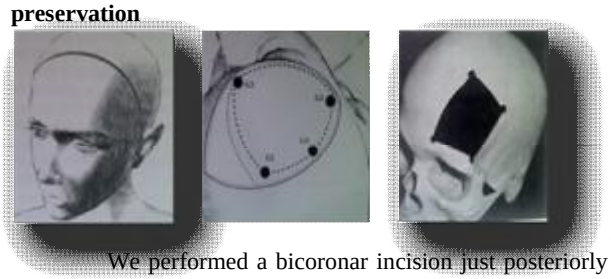
CASE PRESENTATION

This paper presents a case of a male patient, 28 years of age, admitted in the neurosurgical department of Sibiu County Emergency Hospital for an orbital tumour. Upon admission, the patient presented right hemicrania, right propotosis, decreased visual acuity and modifications of visual fields. Visual Acuity examination revealed a value of 0,5 and Visual Field Exam showed temporal scotoma. Neuroimagistic examinations consisted in CT and MRI and revealed a right orbital mass, round, well circumscribed, with inhomogeneous contrast enhancement; the tumour filled all the intraconal retroocular space that spares the triangular space in the orbital apex.

Surgery was performed with the patient under general anesthesia in supine, with cephalic extremity slightly elevated at 30 degrees and with the head turned to the left, thus bringing the epicentre area in the centre of the operator field.

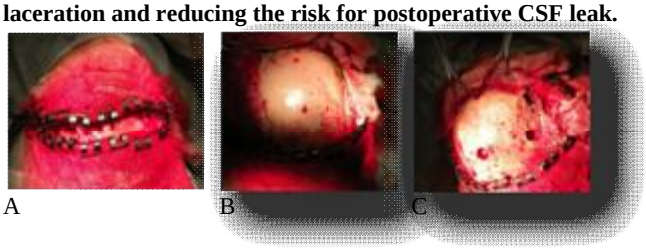
The technique was performed through a frontal craniotomy with superior orbitotomy followed by a star periorbital incision, tissue dissection and gross-total tumoral removal; on completion, a wather-thight suture of the periorbital membrane has been achieved and superior orbital wall reconstructed with Dynamic Titanium Mesh. The patient was placed in supine position and with the head turned to the opposite side of the disease process (figure no. 1).

Figure no. 1. Schematic presentation of the operation with schematic presentation of an orbital transcranian approach, scalp incision placement, we performed a bicoronar scalp incision and a frontal craniotomy with supraorbital edge preservation



We performed a bicoronar incision just posteriorly to the hairline that extends from 1 cm above the tragus to the opposite side. This incision gives an aesthetically effect (figure no. 2). Further dissection of the scalp is accomplished in different ways aiming at preserving the frontal branch of the facial nerve preservation. This case was accomplished in an interfascial manner, since most authors recommend and there is a much personal experience in this field.

Figure no. 2. Intraoperative aspects. A bicoronar scalp incision was located just behind the hairline and started from a point located 1 cm from the tragus to the opposite part, B. After temporal interfasscial dissection, we exposed the frontal bone, C. Placing the burr holes, 4 burr holes were used rather than one, thus minimizing the risk of dural laceration and reducing the risk for postoperative CSF leak.



A B C

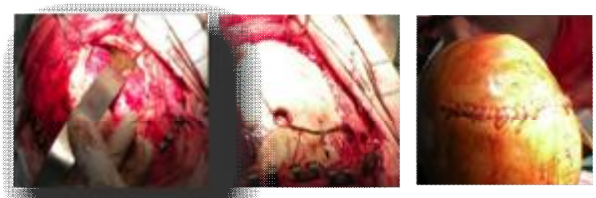
Later on, we proceeded to craniotomy planning, using 4 Burr Hole and making a frontal rectangular craniotomy with supraorbital rim preservation (figure no. 3). We may consider as an alternative the craniotomy by using only one trepan hole and then using electric craniotomy, obtaining a circular bon-flap. This option is risky with a great incidence of postoperative CSF leak.

Figure no. 3. Intraoperative aspects. A. Frontal craniotomy was performed with the preservation of the supraorbital edge, B. Extradural approach to the superior orbital wall with the retraction of the frontal lobe; superior orbitotomy was performed with high speed electric drills, C. After incision of the periorbital membrane and the dissection of the intrarbital fat tissue, we performed a gross total tumoral removal.

Afterwards, we proceeded to extradural frontal dissection with frontal lobe retraction and progressive advancement, making a great exposure of the superior orbital wall until the orbital apex. Access osteotomy was performed by using electrical cutters of different sizes. We performed a stellate incision of the perobita and a sharp dissection of the intraorbital fat tissue. Total tumoral resection is a major desideratum of the surgeons. We achieved a gross total tumoral removal.

After tumour resection and suture of periorbital, we reconstructed the skull base with Dymanic Titanium Mesh and periosteum. Transosseous sutures fixed the bone flap. Temporal muscle and the scalp suture were performed in two planes (figure no. 4).

Figure no. 4. Intraoperative aspects. A. Superior orbital wall reconstruction was performed using the Dymanic Titanium Mesh and the periosteal membrane, B. Reposition of the bone flap with transosseous wire fixation, C. Suture of the temporal muscle and scalp in anatomical planes



For this case, we used a transcranial approach in which the orbital rim was preserved. The postoperative course was uneventfully and the patient was discharged on the seventh day postoperatively in a very good condition.

Histopathological examination revealed cavernous hemangioma.

Subsequent clinical and imagistic control showed an improvment of the visual deficits, thus confirming complete tumour resection.

The advantages of this approach in surgical treatment of orbital pathology located in the posterior orbit are multiple. One advantage is to obtain a wide surgical field that facilitates a total resection. The bicoronal scalp incision behind the hairline ensures effective cosmetic results. The interfascial temporal

dissection with the preservation of the frontal branch of the facial nerve contributes to a favourable postoperative appearance without the risk of postoperative paresis. Making a cranitomy using several burr holes reduces the risk for postoperative cerebrospinal fluid fist appearance.

In surgical planning, CT scan plays a very important part, which provides important information regarding the size of the frontal sinus; it is advisable to avoid frontal sinus opening during craniotomy reducing thus the risk of infection; when it is not possible, it is recommended to proceed to the cranialisation of the frontal sinus. In this intervention, we performed frontal craniotomy without frontal sinus opening. The use of titanium and periosteum allows an efficient reconstruction of the orbital roof that reduces the risk of postoperative enoftalmia. This procedure contributed to achieving superior functional and cosmetic results.

Conclusions

Transcranial approach for the tumours of the orbit is a modality of choice, especially for those located in the posterior orbital cavity, retrobulbar intraconal, giving a wide operating field facilitating complete tumour resection.

In the surgical technique, the use of several burr holes to achieve craniotomy, using interfasciale temporal dissection and reconstruction of the orbital roof with Dynamic titanium Mesh, provides superior functional and cosmetic results.

The involvement of a multidisciplinary team, both in diagnosis and treatment of orbital tumour pathology ensures superior results.

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