

# THE SURGICAL TREATMENT OF ORBITAL TUMOURS

C. MATEI<sup>1</sup>, ADRIANA STĂNILĂ<sup>2</sup>

<sup>1</sup>PhD candidate "Lucian Blaga" University of Sibiu, <sup>2</sup>"Lucian Blaga" University of Sibiu

**Keywords:** orbital tumours, ophthalmologist, surgical treatment

**Abstract:** The orbit represents a complex area situated on the border between cranial and facial regions. The treatment of orbital pathology is multidisciplinary with the involvement of neurosurgeons, ophthalmologists, ENT surgeons, maxillofacial surgeons, oncologists and neuro-ophthalmologists. This paper presents the surgical approaches realized for tumoral orbital pathology. Modern medicine includes the orbit surgery in the skull base surgery, with continuous improvements in the last decades. The surgical treatment of the orbital tumours includes many approaches; in order to choose an approach, it is necessary to take into consideration the localization and the extension of the tumour, as well as the patient's clinical status. The tumours might be situated in any region of the orbit and an adequate approach is based on a very good imagistic study. Surgical techniques aim at accomplishing one of the following objectives: biopsy, debulking or gross total tumoral resection.

**Cuvinte cheie:** tumoare orbitală, oftalmolog, tratament chirurgical

**Rezumat:** Regiune complexă situată la granița dintre regiunile craniană și facială, reprezintă sediul a numeroase leziuni ale căror tratament complex necesită o strânsă colaborare interdisciplinară: oftalmologie, neurochirurgie, ORL, BMF, oncologie, neurooftalmologie. Chirurgia modernă include chirurgia orbitei în cadrul chirurgiei bazei craniului, care a cunoscut o importantă dezvoltare în ultimile decade. Lucrarea de față își propune prezentarea abordurilor chirurgicale efectuate în cadrul patologiei tumorale orbitale. Tratamentul chirurgical care se adresează tumorilor orbitei include numeroase aborduri chirurgicale alese în funcție de localizarea și extensia tumorală dar și de stare clinică generală a pacientului. Tumorile orbitei pot fi localizate oriunde în cavitatea orbitei, astfel încât alegerea tipului de abord chirurgical are la bază în primul rând un bun studiu imagistic. Tehnicile chirurgicale urmăresc realizarea unuia dintre următoarele obiective: biopsia, decompresia sau rezecția tumorală totală.

Orbital tumours represent processes of space replacement developed by abnormal cell multiplication, on the border between the two different structural and functional regions: the facial region and the cranial region. The surgical approach of the orbit involves both detailed knowledge of anatomy and physiology in terms of visual analyzer and neighbourhood craniofacial structures, and the knowledge and mastery of the microsurgery techniques.

**Preoperative evaluation:** Preoperative evaluation should begin with the medical history and the physical examination of the patient, no matter how obvious the diagnosis is. Then, it will be continued with the general clinical examination on apparatus and systems, afterwards, with the imaging examination, ultrasonography, computer tomography and magnetic resonance imaging. Especially coagulation abnormalities should be monitored. It is very important to know whether the patient is being treated with antiplatelet, prostaglandin inhibitors, anticoagulants and NSAID's. These treatments need to be interrupted two weeks before surgery. In cases of paediatric age patients, the purchase and the preparation of the operation with two units of isogroup izoRh blood or substitutes are required.

**Anaesthesia:** Most surgical interventions in adult and in all paediatric patients are performed under general anaesthesia. Occasionally, surgery in adults can be performed under local anaesthesia. Particular attention should be paid at the end of the surgery during extubation or patient mobilization, when an

intraorbital bleeding may occur.

#### General surgical principles:

**Patient's position.** The optimal position in orbital surgery is the "reverse trendelenburg", which reduces blood flow and venous stasis.

**Incision.** Incisions at orbit level imply the skin, the conjunctive, and the bone. Skin incision in the eyelid and periorbital area should follow the skin folds. The incision interests only the skin and not the adjacent structures. The incision is made along the drawn length, in a single motion, to avoid bleeding at the incision level and masking its trajectory.

#### Haemostasis

It is very important to preserve a clean operative field, to avoid the stagnation of blood in the field and major vessel damage and coagulation. The vessel responsible for the bleeding will be isolated, clamped, coagulated or ligatured. In case of diffuse hemorrhage, Gelfoam or sterilized tampons will be applied. The sterilized gauze used in neurosurgery, as well as other hemostatic material, Gelfoam, Gelaspon, Surgicel is preferable in orbital surgery.

**Wound closure and postsurgical care.** Wound closure is the last stage of any surgery. Although suture techniques vary from surgeon to surgeon, there still are basic principles that shall ensure a good cosmetic and physiological result. For a good functional and cosmetic result, the tissues will be closed layer by layer: periosteum, bone, subcutaneous tissue, skin and conjunctive. After skin suture, ophthalmic ointment with

<sup>1</sup>Corresponding author: C. Matei, Str. Oltului Nr. 7 cod 550218, Sibiu, România, e-mail: claumatei@yahoo.com, tel +40745 313348  
Article received on 28.10.2011 and accepted on 31.01.2012  
ACTA MEDICA TRANSILVANICA March 2012;2(1):169-170

## CLINICAL ASPECTS

antibiotics and dry sterile dressing with light compression and a bag of ice will be applied. After surgery, corticosteroids (60-80 mg prednisone/day for 2-3 days) and antibiotics 7-10 days treatment is recommended.

### Complications

#### *Intrasurgical complications*

The most serious and rarest complication is the damage to the vital structures such as: nerves, vessels, muscle and eyeball. As soon as such an intraoperative injury is identified, it will immediately be repaired and only after this, the intervention will be continued. Other complications are represented by the scleral dilacerations, the extraocular muscle lesion, the lesion of the naso-lachrymal drainage system and CSF leak.

#### *Postsurgical complications*

The most feared postsurgical complication is the bleeding. This can immediately occur after the surgery with a peak incidence in the days 4-6. Post surgery haemorrhages which produce chemosis or a low degree of exophthalmos but without pain or afferent pupillary defect, can be solved conservatively. When a hematoma is suspected, the following will be immediately examined: visual acuity, intraocular pressure and photo-motor reflexes. Acute increase of intraocular pressure can cause optic neuropathy, as well as hypo-perfusion of the optic nerve and retina. As medical treatment, Acetazolamide and Mannitol can be administered. The sudden increase of intraocular pressure is an emergency, and its persistence after applying the medical needs surgery. The simplest and most effective method to drop the intraocular pressure is the lateral canthotomy. If all the above mentioned methods fail to control the intraocular pressure, the reopening of the surgery will be practiced. Other postoperative complications are: postsurgical emphysema, wound infection, suture dehiscence or orbital cellulites; these are rare complications occurring after the surgery of orbital tumours. Another complication is postoperative scar. This mainly occurs in the people prone to it or after a surgery of an important orbital dissection with excessive traction and coagulation or after an inadequate wound closure.

#### **Surgical approaches of orbital tumours**

Surgery addressed to orbital tumours includes many surgical approaches chosen according to the tumour location and extension, and the patient's general clinical status. Orbital tumours can be located anywhere in the orbital cavity, as so the choice of surgical approach is based first on a good imaging study (even for lesions located above where possible rear extension can easily escape clinical examination). In general, previous injuries are treated by transorbital surgical approaches while lesions in the 1/3 posterior orbit are operated through the extraorbital surgical approaches. This is not true in all cases because there are posterior tumours that can be treated through combined surgical approaches, extraorbital or extension of extraorbital surgical approaches, as well as lesions of 1/3 of the middle orbit can be dealt very well with extraorbital surgical approaches. Apart from the location of the tumour process, there are a number of factors to be taken into account: the size of the lesion, purpose of surgery (biopsy, decompression or total tumour resection) as well as tumour imaging characteristics (degree of infiltration of adjacent tissue, vascularity. Anterior located tumours are treated surgically through anterior, upper or lower orbitotomy. For giant lesions located anterosuperiorly, an additional osteotomy can be practiced. Tumours located laterally are approached by lateral approach which can sometimes be extended back to the sphenoid wing, allowing a good view of the postero-lateral tumours. Small tumours located anteromedial are approached through medial orbitotomy. Large tumours or those located posteromedially are resected by combined lateral and medial orbitotomy with slight sprain of the eyeball in the created defect, for such lesions, the extraorbital fronto-temporal

approach can be addressed. Posteroinferior located lesions, between the optic nerve and inferior rectus muscle are excised through lower orbitotomy, sometimes involving the ENT surgeon, his participation is also necessary when performing surgical approaches on tumours invading the ethmoid cells or paranasal sinuses. Endoscopic techniques can make a significant contribution when you want complete excision in minimally invasive procedures.(11,14) Lesions with intracranial extension are the best addressed through a frontotemporal extraorbital approach. This approach is also used in cases of tumours located in the orbital apex or optic nerve canal. In these cases orbital osteotomy may be associated which reduces the degree of brain retraction necessary in this case for a better view. Tumours located posterolaterally, at the superior orbital fissure level, can be excised through a pterional approach.

#### **Classification of surgical approaches on orbital surgery**

**A. extraorbital surgical approaches of orbital tumours:** inferior orbital approach; frontotemporal approach

**B. transorbital surgical approaches:** anterosuperior orbitotomy (with or without osteotomy) and inferior without osteotomy; lateral orbitotomy; medial orbitotomy; combined medial and lateral orbitotomy.

## REFERENCES

1. Karcioglu Z. Orbital tumors, Springer. 2005;340-390.
2. Szabo I, Szabo B. Neurosurgical Approach to the primary Intraorbital Tumors, Anatomic Bases and Neurosurgical Techniques, Ed. Dacia. 2004;9-23,104-113,154-155,279-280, 2004.
3. Henderson JW. Orbital Tumors, 4th Edition, Raven Press 2006;28-44.
4. Maroon JC, Abla AA, Kennerdell JS: Transfrontal approach to orbital tumors, in Wilson CB (ed): Neurosurgical Procedures: Personal Approaches to Classic Operations. Baltimore: Williams & Wilkins. 1992;1-9.
5. Dandy WE. Orbital Tumors: Results Following the Transcranial Operative Attack. New York: Oskar Priest. 1941;161-164.
6. Frazier CH. An approach to the hypophysis through the anterior cranial fossa. Ann Surg. 1913;57:145-150.
7. Housepian EM. Intraorbital tumors, in Schmidek HH, Sweet WH (eds): Operative Neurosurgical Techniques. Philadelphia: WB Saunders. 1988;(1):235-244.
8. Ghassan K, Bejjani M, Kimberley, Cockerham, John S. Kennerdell, and Joseph C. Maroon: A reappraisal of surgery for orbital tumors. Part I: Extraorbital approaches, Neurosurg Focus. 2000;10(5)
9. Tim E, Darsaut BH, Giuseppe Lanzino, Beatriz lopes, and Steven Newman: An introductory overview of orbital tumors, Neurosurg Focus. 2001;10(5)
10. Kimbery P. Cocherham M, Ghassan K., Bejjani, John S. Kennedrell, AND Joseph C. Maroon: Surgery for orbital tumors. Part II: transorbital approaches, Neurosurg Focus. 2001;10(5)
11. Norris JL, Stewart WB: Bimanual endoscopic orbital biopsy: An emerging technique. Ophthalmology. 1985;92:34-38.
12. Pertuiset B, Morax PV, Aron D, et al. La voie fronto-temporale, extra-durale: sa place dans l'abord des tumeurs de l'orbite, (d'après 18 observations). Ann Oculist. 1963;196:917-933.
13. Thompson TP, Lunsford LD, Flickinger JC: Radiosurgery for hemangiomas of the cavernous sinus and orbit: technical case report. Neurosurgery. 2000;47:778-783.
14. Janecka IP, Sen CN, Sekhar LN, et al. Facial translocation: a new approach to the cranial base. Otolaryngol Head Neck Surg. 2000;413-419.