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Orbital Exenteration and Reconstruction

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Orbital exenteration is surgical procedure representing removal of orbital content and eyelids. It is usually indicated for treatment of advanced or resistant to radio or chemotherapy malignancies of orbital components and/or secondary involvement by spreading of tumors from paranasal sinuses, frontal skull base metastatic lesions. Rarely it is used for treatment of inflammatory processes without response to treatment usually after penetrating injuries, carrying risks of spread to the brain.

Histology most often demonstrates basocellular or squamous cell carcinoma and less frequently retinoblastoma, sarcoma, uveal or conjunctival melanoma, lacrimal gland carcinoma, metastatic lesions, or carcinomas spreading from paranasal sinuses [1-4].

Reviews of recently published articles show no rigid criteria for unquestionable surgical decision making regarding the optimal techniques. Some guidelines that have to be taken into consideration and should be tailored individually include the characteristic features of local pathology: size, location spread to surrounding structures previous or future adjuvant radio and/or chemotherapy [1,2,4,5]. Moreover, the progress in early diagnosis of these lesions as well as the progress of adjuvant radio and chemotherapy, better surveillance for recurrences leads to direction of surgical strategies to less complex techniques [2]. Different techniques are related to differences of hospital stay, the required optimal time for prothesis and local conditions [1-4,6].

The main objectives in treatment of these problematic lesions are radical excision and acceptable esthetic result. Multidisciplinary teams are as a rule required for obtaining optimal results.

Thus it was enough relevant to us to present and recommend operative technique that was applied in several cases as well as to present some examples for orbital reconstructive options. It has advantages of short hospital stay, creates optimal space for early prosthesis placement and acceptable esthetic result.

Operative technique

Supine position was used with elevation 30 degrees of upper part of body and head slightly extended. If the reconstruction requires change in positioning it can be done by rotation of the table. Contralateral tarsoraphy is necessary. Skin incision is typical for frontotemporal craniotomy, but for pathology strictly limited to orbital content transsupercillial incision may be utilized with extension over the zygomatic process. If the eyelids reconstruction is necessary, skin incision is modified to allow formation of the correspondent rotational flap based on vascular pedicle. After reflecting the skin galeal flap the anterior 1/3 of the temporal muscle is seen and curvilinear incision parallel to muscle fibers is made. Then the temporal muscle is separated subperiostaly from the anterior portion of temporal fossa. Branches of deep temporal vessels should be preserved in order to prevent subsequent ischemic atrophy. The removal of the orbital content begins with incision over the orbital margins. Then the orbital content is separated from orbital walls by careful subperiostal dissection. Ethmoidal arteries are coagulated at their exit points from anterior and posterior ethmoidal foramina. Ophthalmic veins are also coagulated near the orbital fissures. At the orbital apex optic nerve is cut and brisk hemorrhage from the ophthalmic artery is controlled by coagulation. If areas of orbital walls destruction are encountered they might be repaired by titanium mesh grids or pieces of bone from craniotomy. Special attention should be paid to defects bordering the paranasal sinuses. in order to prevent fistulas. Larger defects of inferior orbital wall have to be covered in order to prevent ptosis after prosthetic placement.

Then lateral orbital wall is fenestrated by microdril preserving the lateral orbital margin thus creating a corridor for placement of temporal muscle flap (Figures 1-3). The muscle should be tailored so to fit the concave space for prosthesis placement. To avoid retraction muscle edges might be fixed to orbital margins

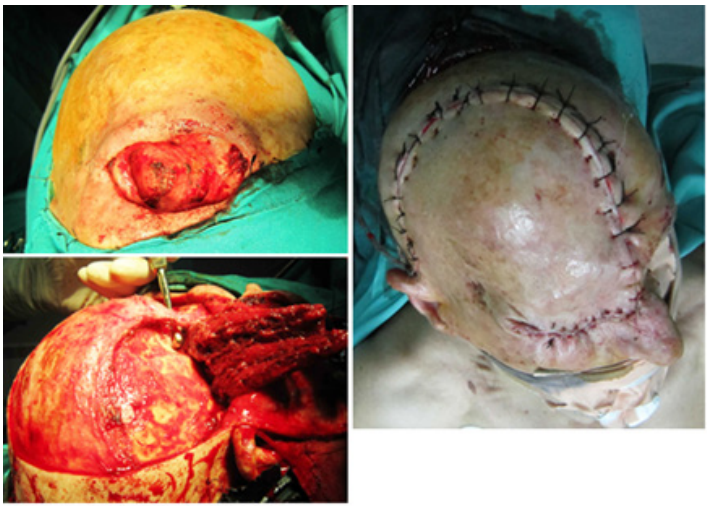
by sutures through small holes made by microdril. If the excision of the eyelids is not necessary exenteration might be performed starting by incision of conjunctival fornices.

After total exenteration / i.e. additional removal of eyelids/ the orbital cavity may be covered by rotational vascularized pedicle skin flaps based on supraorbital, supratrochlear and/ or dorsal nasal arteries. Other pedicle flaps based of superficial temporal of facial blood vessel allow coverage of wither defects, as illustrated on Figures 1-3.

Figure 1: Patient with recurrent basocellular carcinoma involving the left orbital region. Orbital exenteration was performed. Defect was covered with temporalis muscle flap. Skin coverage was achieved with advancement flap from nasolabial, facial and temporal regions.

Figure 2: Recurrent skin cancer involving the right orbital region. Exenteration of orbital content and coverage with temporalis muscle flap and facial advancement flap was executed.

Figure 3: Patient with right orbit exenteration due to malignancy surgery. Orbital defect was filled with temporalis muscle flap and skin coverage was completed with fronto-parieto-temporal rotational flap.



In cases of extensive involvement of orbit and paranasal sinuses free myocutaneus flaps are used. Most frequently m. rectus abdominis /a. epigastrica inferior/, latissimus dorsi /thoracodorsal artery/, radial artery forearm flap, or pectoral muscle as second choice. They are anastomosed usually to facial artery and branches of jugular veins. In these cases multidisciplinary team approach with participation of plastic surgeon, who has experience with microvascular anastomoses is recommended [2,3,5,6].

The use of temporal muscle flap has advantages over simple tamponade and /or use of pieces fat tissue, of muscle to fill the cavity. Since the transferred temporal muscle has preserved blood supply there is no risk of atrophy and adequate space for prosthesis is available. However, recurrences surveillance is some times more difficult, and the operation time is longer than in cases with simple tamponade or use of split thickness graft to cover the cavity. Similar operative techniques that include temporal muscle transfer were reported and summarized in recent reviews [2,3,4,6].

Conclusion

The technique of temporal muscle transfer through the “window” in the lateral orbital wall creates optimal stable space for prosthesis placement and offer conditions for speedy uncompromised healing and shortens the hospital stay. Moreover, adjuvant radio or chemotherapy might be started earlier.

Radical treatment of extensively involved structures in nearby vicinity (mainly paranasal sinuses) is achieved by myocutaneus rotational flaps or free flaps with vascular microanastomosis.

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