Otolaryngology–Head and Neck Surgery (2005) 133, 185-189

Orbital Decompression in Graves' Ophthalmopathy by Medial and Lateral Wall Removal

Stefano Sellari-Franceschini, MD, Stefano Berrettini, MD, Amelia Santoro, MD, Marco Nardi, MD, Salvatore Mazzeo, MD, Luigi Bartalena, MD, Barbara Mazzi, MD, Maria Laura Tanda, MD, and **Claudio Marcocci, MD, Aldo Pinchera, MD,** Pisa and Varese, Italy

OBJECTIVE: The objective of this study is to describe a technique for balanced orbital decompression and to analyze the results.

METHODS AND MATERIALS: We conducted a retrospective study of 140 patients (276 orbits). Orbital decompression was carried out by removal of the medial orbital wall by ethmoidectomy and complete removal of the lateral wall by bringing out the entire sphenoid wing together with part of the zygomatic bone down to the inferior orbital fissure.

RESULTS: One hundred thirty-six patients underwent bilateral decompression, 4 patients underwent monolateral decompression. Proptosis was reduced on average by 5.3 mm; 28 (20%) patients showed onset or worsening of diplopia.

CONCLUSIONS: Medial and lateral approach allows a balanced orbital decompression. As some patients may present different degrees of proptosis and visual impairment, we stress the importance of carefully weighing the preoperative conditions of the individual patient when choosing the surgical approach.

Decompressive orbitotomy represents an established treatment of Graves' Ophthalmopathy when steroids do not arrest or reverse the process.

Decompression can be carried out by removal of the intraconal fat[1] or the orbital walls.[2-9] The most commonly used technique is two wall decompression as described by Walsh and Ogura.[2] This technique, both in its original as well as modified endoscopic[10] formulation, affords good results in terms of reducing the proptosis. However, it also involves a large risk of postoperative diplopia,[4-11] which some authors even consider a normal sequela of such surgery.[12]

Some authors claim that in some cases the procedure requires opening of the lateral wall as well, though they provide neither the relevant indications[13] nor the technique for its execution.[10,12] Graham et al[7] suggest balanced decompression by medial and lateral orbital wall surgery; 2 horizontal osteotomies are carried out on the lateral wall. The osteotomized lateral wall was removed and placed in a new more anterolateral position by lag screw fixation. The bone of the greater wing of the sphenoid can be drilled down through the diploe to the opposite cortex to further expand orbital volume. Goldberg et al[8] maintain that lateral wall decompression should produce less new postoperative strabismus than balanced orbital decompression. Another widely-used technique is the 3 walls decompression reported by Mourits et al[5] and Kalmann et al[14]; reportedly, the results are good and have a low incidence of postoperative diplopia.

The present report describes the technique that we have adopted; it offers the advantage of providing access to all 4 of the orbit's bony walls, through various surgical approaches that are both very precise and not very invasive.

From the Department of Neuroscience, I[a] ENT division (Drs Sellari-Franceschini, Berrettini and Santoro) and Ophthalmology Division (Dr Nardi), the Department of Oncology, Transplants, and Advanced Technologies in Medicine, Diagnostic and Interventional Radiology Division (Dr Mazzeo), and the Department of Endocrinology and Metabolism, Orthopaedics and Traumatology, Occupational Medicine (Drs Mazzi, Marcocci, and Pinchera), University of Pisa, and the Department of Clinical and Biological Science (Drs Bartalena and Tanda), University Insubria, Varese.

Presented at the Annual Meeting of the American Academy of Otolaryngology-Head and Neck Surgery, New York, September 19-22, 2004.

Reprint requests: Stefano Sellari-Franceschini, MD, Dipartimento di Neuroscienze, Sez. Otorinolaringoiatria Universitaria I[a], Ospedale S. Chiara – Via Savi 10 56100 Pisa, Italy.

E-mail address: s.sellari@med.unipi.it.

0194-5998/$30.00
doi:10.1016/j.otohns.2005.02.006

Table 1
Patients data

	Total	No diplopia	Postoperative diplopia extreme gaze direction diplopia	Primary diplopia
Pts without preop diplopia	72	54	10	8
Pts with preop extreme gaze direction diplopia	41	16	15	10
Pts with preop primary position diplopia	27	2	6	19

Moreover, the walls can be removed by degrees, taking the patient's needs into account.

MATERIALS AND METHODS

A total of 276 orbital decompressions were performed with this technique on 140 patients between December 1998 and June 2003; 45 men and 95 women with a mean age of 46.6 years (range, 20 to 67). Four patients underwent a monolateral procedure (Table 1). Preoperative patient evaluation included examination of visual acuity, binocular visual field, intraocular pressure measurements, extraocular muscle function, fundoscopic examination, and measurement of exophthalmos.

All patients were euthyroid at the time of surgery. Computer tomographs of the orbits and sinuses were obtained in the axial and coronal planes. All patients were advised that orbital decompression potentially constituted the first in a series of procedures, the possible subsequent ones being muscle surgery for correction of diplopia and corrective eyelid surgery.

SURGICAL TECHNIQUE

The purpose of the intervention is to remove the medial and the lateral walls of the orbit together with the lateral part of the roof, the lateral part of the floor, and as needed the posterior part of the floor with the aim of balancing the decompression and adapting it to the needs of the patient (Fig 1).

The surgery is performed with the patient under general anesthesia. The first stage of the surgical procedure consists of ethmoidectomy performed while preserving the middle turbinate and, at the outset, the lamina papyracea. Afterward the maxillary sinus is opened through the middle meatus until the orbital floor, the medial wall, and the angle between the 2 walls have been exposed. At this point, the lamina papyracea is removed by separating it from the periorbita with an elevator. Initially, only the posterior half of the lamina papyracea is removed completely. If needed, the removal of lamina papiracea may be wider, always leaving its anterior part not too close the nasofrontal canal and according to Abramoff et al,[15] to reduce the risk of postoperative diplopia. These authors, in their study of postoperative motility disturbances, conclude that to prevent ocular motility disturbances as much as possible, it may be advisable to avoid extending osteotomies to the orbital rim. In very serious cases, we may approach the floor, ensuring that only the posterior part is removed. The next stage consists of *ab externo* exposure of the lateral wall. Initially, we had opted for a coronal approach that allowed for excellent exposure of the lateral wall, but it was found to be too traumatic and poorly tolerated by patients. For this reason, we later came to prefer gaining access through an eyebrow incision, which is far less traumatizing, and from February 2003 we have used a crease lid incision. After displacing the globe medially, a drill fitted with cutting and diamond burrs is used to remove the sphenoid wing as far back as the dura mater of the middle cranial fossa. The angle between the dura mater of the anterior and middle cranial fossae is exposed. Demolition of the lateral aspect of the roof and of the lower segment of the lateral wall down to inferior orbital fissure is carried out to the extent dictated by the needs of the individual case (Fig 2). The medial face of the temporal muscle is then exposed laterally. After bone demolition has been completed, the periorbita is incised.

The fibrous connections of the adipose tissue are then carefully severed with scissors or a sickle lancet, being

Figure 1 Balanced medial and lateral orbital decompression.