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Graves' Disease: Orbital Bony Decompression and Mini-Osteotomy of the Infraorbital Nerve. Case Report

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ABSTRACT

Aim: Graves' disease or endocrine orbitopathy (EO) is an immune system disorder that results in the overproduction of thyroid hormones (hyperthyroidism). EO is characterized by the symptomatic triad of hyperthyroid goiter, orbitopathy, and dermatopathy. The surgical techniques used to correct EO can be fat decompression by using the Olivari technique, 3-wall bony decompression, or the combination of these surgical strategies. Fat decompression is indicated when the intraconal and extraconal fat tissue is increased, whereas bony decompression is used when there is extraocular muscle involvement associated with a normal quantity of intraconal-extraconal fat. Surgical techniques include the transconjunctival approach and ostectomy of the medial wall (when possible, through endoscopy), orbital floor, and lateral wall of the orbit. Complications of bony decompression are often represented by sensitivity disorders of the second branch of the trigeminal nerve, compressed by the intraorbital contents when they prolapse into the sinus. Possible sensitivity disorders are paresthesia, anesthesia, hypoesthesia, dysesthesia, and hyperesthesia. **Methods:** The technique consists of performing a mini-osteotomy around the infraorbital foramen with removal of a small bony fragment. This causes the nerve to relax and makes it easier for the descent of periorbital tissue into the maxillary sinus, allowing a larger expansion of the orbit contents. The absence of compression significantly reduces sensitive complications. **Conclusion:** The use of the mini osteotomy of the infraorbital foramen combined with a 3-wall bony expansion leads to a significant reduction of sensitive complications that otherwise often cause patient discomfort.

Keywords: Graves' disease, endocrine orbitopathy, exophthalmos, orbital fat decompression, orbital bony decompression, orbital surgery,infra-orbital nerve,sensitivity disorders

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INTRODUCTION

Graves' ophthalmopathy is a chronic and multisystem disorder caused by an autoimmune process, characterized by the presence of antibodies that stimulate a general fibroblastic reaction (thyroid gland and lower extremities), and involves orbital fat tissue and muscles. Various types of surgical treatments are currently available for Graves' ophthalmopathy It is thus necessary to choose the best option to treat each case. The possible surgical techniques are transpalpebral decompression by removal of intraorbital fat, 3-wall osseous expansion, and zygomatic osteotomy. Adjunctive procedures include lengthening of the levator muscle of the upper eyelid, lengthening of the retractor of the lower eyelid (if necessary), and surgery of the extrinsic muscles to correct diplopia. All these techniques can be useful in treating the disease, which is characterized by chronic evolution and, at times, a "malignant" outcome. Close cooperation among a team of specialists, including an endocrinologist, ophthalmologist, neuro-radiologist, surgeon, anesthesiologist, and radiotherapist is essential to manage and to quantify the postoperative results of this complex disorder. The Authors describe a mini-osteotomy-ostectomy around the exit of the infraorbital nerve in combination with bony wall expansion. The release of the infraorbital nerve from the bony lower wall determines a downward transposition of the nerve and, at the same time, a lowering of the nerve tension with less sensitivity disturbances. [1]

CASE REPORT

A 45-year-old female patient with a diagnosis of EO was admitted for orbital surgery. The patient's history revealed that onset of the disease symptoms started in 2013. The patient was subjected to tests and later, in 2015, underwent total thyroidectomy followed by out-patient therapy with Eutirox and Inderal. Examination showed bilateral exophthalmos with values of 25mm and 27 mm obtained by exoph-thalmometry for the right and left orbit, respectively.Extrinsic ocular motility limited to looking upward with diplopia; scleral show of 2 mm for the right orbit and 3 mm for the contralateral orbit. Photophobia, tearing, and gritty sensation were also present.The patient was evaluated through neuroradiologic investigations using MRI and CT scans, which allowed for the most appropriate surgical treatment (Figures 1, 2). During a single surgical session, the patient underwent fat decompression with Olivari's technique and 3-wall orbital expansion with infraorbital nerve marginal osteotomy-ostectomy, lengthening of the elevator muscles, and lateral bilateral canthopexy.The surgical approach to the upper eyelid involved transcutaneous access. For both fat and bony decompression, the lower orbital quadrants were approached through the transconjunctival route. Bony decompression was performed by removing the three walls of the orbit (medial, lateral, and inferior) after having separated the periorbit and having released the infraorbital nerve by a marginal osteotomy (Figure 3).

This decompression determines a downward transposition of the nerve, thus lowering the tension caused by the nerve stretching, produced by pressure from the eyeball. A transconjunctival continuous suture was performed using a reabsorbable monofilament, and then a slightly compressive suborbital medication was applied. Postoperatively, the patient had cold packs for about 36 to 48 hours.[2]

The medial orbital wall may also be approached intranasally through endoscopy. This method involves better visualization of the medial wall and consequently allows for better control of the operative field during partial removal of the ethmoidal cells with an increment in endo-orbital space that usually turns out to be greater with respect to classic technique.

RESULTS AND DISCUSSION

Mini-osteotomy around the infraorbital nerve in

orbital bony decompression was first described in 2010; the technique consists of performing a mini-osteotomy-ostectomy around the infraorbital foramen. [1]

Through a nerve hook, a slight stretching of the infraorbital nerve is produced, freeing the nerve from residual adhesion. The release of the infraorbital nerve from the bony structure also determines the downward transposition of the nerve and, at the same time, a reduction of the tension caused by the stretching of the nerve that was caused by the pressure exerted by the eyeball.This concomitantly leads to an improved postoperative course with less sensitivity disturbances. [3,4,5]

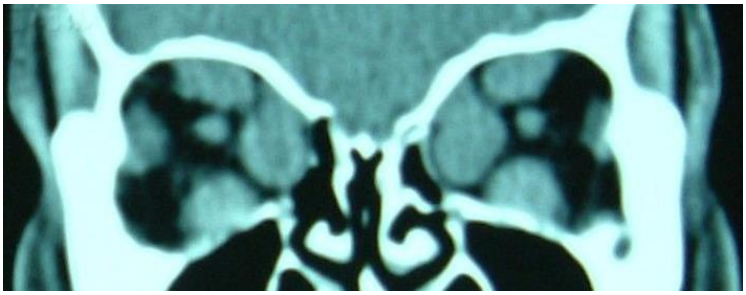

Figure 1. Graves'disease. Axial CT scan shows endo-orbital muscular involvement with bilateral endo-orbital engulfement.

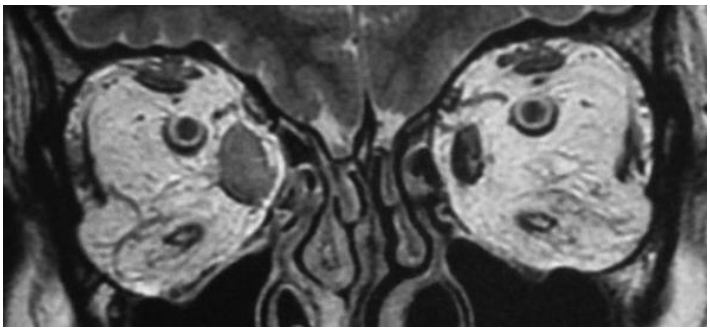

Figure 2. MRI: Both muscular and fat tissue augmentation in both orbits.

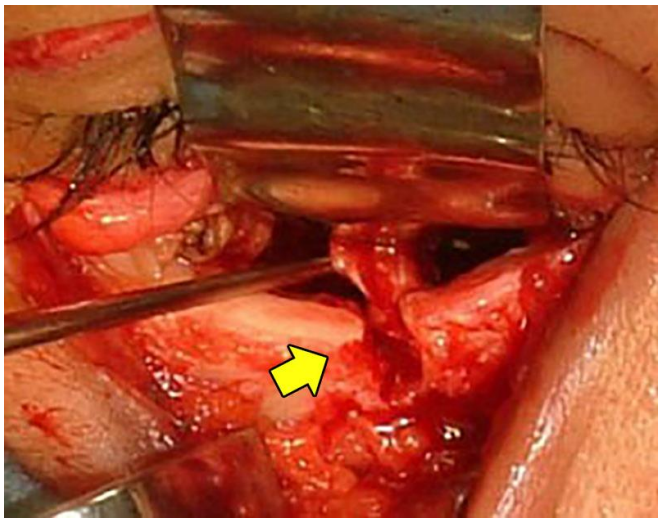

Figure 3. Intraoperative view left orbit: freeing of the infraorbital nerve (arrow) after marginal bony mini osteotomy- ostectomy.

1991;87:627Y641, PMID: 200846

DECLARATIONS

Authors' Contributions:

Luigi Clauser and Andrea Edoardo Bianchi designed the clinical data and research; Luigi Clauser performed surgical treatments and sample collection;Luigi Clauser and Riccardo Luoni Orsi prepared the article.

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Not applicable

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Conflict of interest:

All Authors declared that there are not conflicts of interest

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Not applicable

Consent for publication:

Written informed consent was obtained for all patient images

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