

Endonasal technique for orbital decompression surgery in a patient with Graves' exophthalmopathy

Técnica endonasal para cirurgia de descompressão orbitária em paciente com exoftalmopatia de Graves

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ABSTRACT

Female, 29, former smoker, diagnosed in September 2012 with Graves' disease and rapid presentation of bilateral exophthalmos. In the ophthalmologic evaluation, it presented preserved motility, proptosis and upper fat sac in OA with retraction of PPSS and PPII and exophthalmometry in OD of 26 mm, and in OE of 24 mm. In May 2014, he performed the mapping of the retina that showed scars of chorioretinitis in both eyes and computerized campimetry, presenting a nasal step in OD, superior contraction, central-inferior depression. In June 2016, he underwent orbital decompression surgery of the medial and inferior bilateral walls by endoscopic approach using the Karl Storz nasal endoscope at 30 degrees of optics. The surgical approach of Graves' ophthalmopathy should be used in the cicatricial phase except in cases with risk of loss of vision. Before performed by external access, orbital decompression can now be performed endoscopically, with minimal invasiveness and allows the removal of the inferior wall and Without external incisions. It is a safe procedure for the treatment of dysthyroidal orbitopathy, associated with lower morbidity, in which lesions are avoided in the nasolacrimal, nasofrontal, or infraorbital ducts and it is possible to reduce proptosis between 3 and 4 mm. The benefits of decompression are related to Improvement of visual acuity, besides the aesthetic result. The continuation of the surgical treatment will be performed by correction of palpebral retraction followed by blepharoplasty.

Keywords: Decompression, surgical/ methods; Graves exophthalmopathy; Orbit/surgery; Case reports

RESUMO

Paciente do sexo feminino, 29 anos, ex-tabagista, diagnosticada em setembro de 2012 com doença de Graves e apresentação rápida de exoftalmia bilateral. Na avaliação oftalmológica, apresentava motilidade preservada, proptose e bolsa de gordura superior em AO com retração de PPSS e PPII e exoftalmometria em OD de 26 mm, e em OE de 24 mm. Em maio de 2014, fez o mapeamento da retina que evidenciou cicatrizes de coriorretinite em ambos os olhos e campimetria computadorizada, apresentando degrau nasal em OD, contração superior, depressão centro-inferior. Em junho de 2016, realizou cirurgia de descompressão orbitária de paredes medial e inferior bilateral por via endoscópica com uso de endoscópio nasal Karl Storz, em 30 graus de óptica. A abordagem cirúrgica da oftalmopatia de Graves deve ser empregada na fase cicatricial exceto nos casos com risco de perda da visão. Antes realizada por acesso externo, atualmente a descompressão orbitária pode ser realizada via endoscópica, com mínima invasividade e permite a remoção da parede inferior e medial sem necessidade de incisões externas. É um procedimento seguro para o tratamento da orbitopatia distireoidiana associada a menor morbidade, no qual se evita lesões ao ducto nasolacrimal, nasofrontal ou ao infraorbital e se possibilita redução da proptose entre 3 a 4 mm. Os benefícios da descompressão estão relacionados com a melhora da acuidade visual, além do resultado estético. A continuidade do tratamento cirúrgico será realizada por meio de correção de retração palpebral seguida de blefaroplastia.

Descritores: Descompressão cirúrgica/métodos; Exoftalmopatia de Graves; Órbita/cirurgia; Relatos de casos

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INTRODUCTION

Graves ophthalmopathy is the ocular manifestation of Graves disease, present in 20 to 25% of the patients with the disease, in the proportion of 16 women and 3 men in every 100 thousand inhabitants/year. Proptosis and periorbital edema are its main characteristics. In addition, there may be eye irritation, eyelid retraction, photophobia, discomfort or retro-orbital pain, excessive tearing, diplopia and even sight loss. It may also occur the patient does not experience any change, being asymptomatic.⁽¹⁾ Ocular manifestations and hyperthyroidism usually occur simultaneously or within 18 months period from one another.⁽²⁾

Several factors may increase the risk for its development, but there are still controversies over some. Family history of Graves or Hashimoto disease, autoimmune diseases and the presence in monozygotic twins are plausible arguments that lead to define a genetic component for pathology. However, clinical practice reveals few cases of agreement between patients and his relatives.⁽¹⁾ It is more common in female patients, but in males it is related to a greater severity, and mechanisms for this are still not clear. Smoking is recognize as a risk factor and is associated with more severe cases of the diases. It is believed that substances contained therein stimulate the production of glycosaminoglycans and adipogenesis in a dose-dependent manner.⁽¹⁾ Radioactive iodine treatment for Graves disease and high titles of anti-TSH receptors antibodies are also raised risk factors, besides stress and advanced age (over 60 years).⁽¹⁾

The Pathogenesis of Graves exophthalmos involves cellular proliferation, inflammation and glycosaminoglycans (mainly hyaluronic acid) accumulation in the extra-orbitary muscle tissues, as well as in the adipose and retro-orbital connective tissue. Researches has pointed to fibroblasts as target cells in ophthalmopathy. It is believed that its proteins function as self-antigens, producing hyaluronic acid in response to cytokines. In addition, a fibroblasts subgroup differentiate into mature adipocytes, increasing thyrotropin receptors expression. These alterations lead to an increase in orbital pressure and to the onset of all typical symptoms of the conditions, with periorbital edema resulting from decreased venous drainage due to local vascular compression.^(1,2)

Surgical treatment of Graves ophthalmopathy is indicated whenever there are symptoms of ocular surface exposure, optic neuropathy or desire for cosmetic correction.⁽³⁾ Decompressive surgery has evolved into a less invasive technique in which endonasal endoscopic access proves to be useful in reversing and preventing visual deterioration and improving proptosis.^(4,5)

The current study aims to report a case of orbital decompression in a female patient with Graves exophthalmos who underwent an endoscopic nasal surgical procedure.

CASE REPORT

M.B.F.M, 29 years old, female, financial manager, from Brasília-DF. Former smoker (3 packs/year), was diagnosed in September 2012 with hyperthyroidism associated with Graves disease, with a fast bilateral exophthalmos and related photophobia presentation.

A biomicroscopy, performed in February 2013, showed preserved motility, absence of diplopia, proptosis, dermatocalaze and upper fat bag in BE with PPSS and PPII retraction. Luedde's Exophthalmometry: 24 mm RE and 21 mm LE

The patient followed up with ophthalmologist and endocrinologist, aiming at stabilizing the hormonal rates to approve surgical correction.

In May 2014, a retinal mapping was performed, which revealed inactive scars of chorioretinitis in both eyes. In digital campimetry, was a nasal degree in RE, superior contraction, central and inferior depression.

Exams in November 2015, once again showed the evolution of exophthalmos through Hertel Exophthalmometry. The values obtained were 26 in RE and 24 in LE, which continued the same until surgery. In figure 1, we can see the patient's pre-operative pictures.

In June 2016, an orbital decompression of medial and inferior bilateral walls surgery was performed by endoscopic approach using Karl Storz nasal endoscope at 30 degrees of optics. Until the end of this study, the patient remained under ophthalmologic analysis awaiting subsequent blepharoplasty. In figure 2, we can see the patient's post operative.



Figure 1: Pre-operative pictures. Incidences A. Left-facing profile B. Base C. Frontal D. Right-facing profile



Figure 2: Post-operative pictures. Incidences A. Left-facing profile B. Base C. Frontal D. Right-facing profile

DISCUSSION

The orbital decompression is a well-known procedure, used to restore visual function in cases of optic neuropathy related to thyroid dysfunction; as prevention and progression limiting, in cases of lagophthalmos due to corneal involvement; for rehabilitation, in cases of significant proptosis and ophthalmopathies; an for aesthetic correction.⁽⁶⁾

Ophthalmopatiadistireoideana is a pathology with a variable clinical/radiological status. Regardless of disease activity, these condition might be separated into: 1) volumetric increase of extraocular muscles and fat; 2) volumetric increase of only extraocular muscles; 3) volumetric increase of only adipose tissue (lipogenic form).⁽⁷⁾

Therefore, the surgical technique consists in removing the orbital bone wall (medial, lateral superior and inferior), fat or both.⁽⁶⁾ The bone removal allows the opening of the orbital space, increasing its volume. The content that was once congested distributes itself through the space created by the increase of volume

and decrease of orbital pressure, causing the retroposition of the eye. In the same way, fat removal decreases the orbital content, increasing the orbital space, allowing the exophthalmos correction. Together, both procedures offer the best correction in cases of thyroid ophthalmopathy.⁽⁶⁾

Inferomedial decompression is indicated for patients with severe dysthyroid optic neuropathy. Lateral decompression is associated to a lower strabismus rate associated to exophthalmos reduction, specially if performed in temporal fascia. Maximum decompression is achieved by deep removal of the lateral wall.⁽⁶⁾ In severe cases, two or more techniques might be combined, being three walls decompression used in patients with a high degree of proptosis, and in two walls in cases of minor exophthalmos.⁽⁶⁾

Additionally, there is evidence from uncontrolled studies showing that removal of medial or lateral wall with or without fat removal may be the most effective and less complicated method.⁽⁶⁾ It also showed that fat removal is a safer alternative with a greater impact on proptosis reduction and with a similar efficiency to bone wall decompression, besides preserving vision functionally in cases of dysthyroid optic neuropathy.

Orbital decompression was performed for the first time in 1899 by surgeon Kronlein, in a lateral orbitotomy. In 1911, Dollinger began using the technique in cases of exophthalmos.⁽⁸⁾ Since then, many approaches were developed, and, in 1990, Kennedy et al. published the first results of the endonasal endoscopic approach for orbital decompression.⁽⁹⁾ This is a medial wall and orbital floor removal technique that is been preferred rather than the transantral, developed by Walsh-Ogura,^(6,8) in 1957.

The approaches for orbital decompression are highly diverse (lateral orbitotomy, frontal craniotomy, external frontoethmoidectomy, transantralorbital decompression)⁽¹⁰⁾ and it is still not defined which intervention is most effective. In former times, it was believed that the efficacy might be related to the indications (dysthyroid optic neuropathy, proptosis, ophthalmopathy, lagophthalmos) and to the stage of the disease (active, controlled). It is generally agreed that the most common complication is diplopia, but there are still disagreements about what would be the causal factor (removal of posterior medial wall, inferomedial, displacement of the extraocular muscles).⁽⁶⁾ In addition, the therapeutic outcome depends on factors such as pretreatment, extraocular involvement degree and duration of disease.⁽⁷⁾

The literature on orbital decompression surgeries does not provide safe guidelines for the efficacy and safety of specific surgical procedures, or even a treatment option that is better than the others, except for cases of dysthyroid optic neuropathy.⁽⁶⁾ The chosen technique should be determined by orbitopathy characteristics, by the amount of decompression proposed and by the medical expertise preferred by the one responsible for the case. Otorhinolaryngologists, for example, have preferred the Kennedy endoscopic approach, that can be combined with other surgical techniques for better results.^(6,7)

The high incidence of complications of the transantral approach led to the technical evolution of removal of the medial, lateral wall and part of the orbital floor.⁽⁶⁾ In addition, compared with the Walsh-Ogura transantral technique and the endoscopic approach of Kennedy et al.⁽⁹⁾ are equally effective, but the former was related to a higher incidence of complication and adverse effects, such as diplopia, orbital nerve damage (hypoesthesia due to infraorbital injury), and hypoglobus, being considered less safe than the second. The first is associated with the morbidity of the Caldwell-Luc procedure, which may result in inferior

displacement of the ocular globe, with access limitations for the decompression of the orbital apex.⁽¹⁰⁾

With the advent of endoscopic instrumentation, transnasal removal of the papyraceous lamina has produced a reduction in proptosis when compared to results of other approaches. It provides an excellent view without external incisions, with lower morbidity and more efficient optic neuropathy approach. Through endoscopic a retraction of a variable proptosis has been achieved, between 3,2 and 4,7 millimeters. However, further reductions can be achieved if associated with external procedures such as the removal of lateral orbital wall. Among the disadvantages are a higher incidence of diplopia, than can be corrected later, and the potential development of secondary sinusitis or mucocele. Other complications related to procedures are: CFS fistula, nasolacrimal duct injury and strabismus. This last one may have spontaneous resolution in three to four weeks, but may also have a late onset in the course of the disease. In these cases, a strabismus correction surgery is needed.⁽¹⁰⁾

Previously performed by external access, orbital decompression can now be performed via endoscopic, a less invasive procedure that allows the inferior and medial wall removal without the need for external incisions. It is a safe procedure to treat dysthyroid orbitopathy, associated with lower morbidity, in which lesions to the nasolacrimal, nasofrontal, or infraorbital duct are avoided and it is possible to reduce proptosis between 3 and 4 mm. Besides, it allows maximum decompression of the orbital apex in cases of optic neuropathy. However, it must be performed by a trained professional. In this case, an authorized endoscopic surgeon in order to obtain good results and avoid complications.⁽¹⁰⁾

It has, as advantages, a better view of the inner wall of the orbit, which assists in the complete bone removal, especially in the orbital apex (area with restricted transantral access and greater suffer of optical nerve). It also has the advantage of not needing external incisions and, consequently, scars that are associated to paresthesias, facial edema, oroantral fistulas and dental alterations.⁽⁸⁾

In addition to completely decompress the medial wall, it allows extending this decompression to the orbit floor, limited by the infraorbital nerve, respecting the functionality of the place. Therefore, it is deferred, especially in cases of concomitant compressive optic neuropathy.

One of the main postoperative complications is strabismus, expected in 15 to 63% of patients with pre-existing diplopia, often related to large decompression due to changes in extraocular muscles. During surgery, this can be avoided by first decompressing medial and external walls.

The benefits of decompression are related to improvement of visual acuity, in addition aesthetic result. In patients with dysthyroid optic neuropathy, intravenous steroids have been reported as having an effect superior to surgery, due to surgical-related comorbidities and greater long-term benefits through the reduction of transient side effects and visual rehabilitation.⁽⁶⁾

Current therapeutic approaches, such as local actions, use of corticosteroid, orbital radiotherapy and surgery often fail to significantly improve the quality of life of patients with Graves ophthalmopathy. Therefore, efforts are important to prevent the development or progression of the disease in patients with Graves hyperthyroidism. In this way, to identify risk factors for its development, such as radioiodo therapeutic treatment for hyperthyroidism, smoking, high T3 pretreatment values (325 ng/dL or 5 nmol/L) and hypothyroidism post treatment with radio-

active iodine.⁽¹¹⁾

The surgical approach of Graves ophthalmopathy should be done at the stable phase of the disease, also known as the healing phase, except for urgent cases where there is a risk of sight loss.⁽¹⁰⁾ Treatment should start by orbital decompression, followed by strabismus, eyelid retraction and blepharoplasty correction, as needed in each case. This treatment order is often used, once the previous treatment interferes with the subsequent approach.^(8,12) Blepharoplasty is reserved as the final approach, since after ocular proptosis and eyelid retraction correction there is a change in the amount of skin to be removed to obtain the appropriate aesthetic result.⁽⁸⁾

CONCLUSION

The patient in the case under study had a healing stage of Graves ophthalmopathy, performing an endoscopic orbital decompression with the Karl Storz nasal endoscope. The procedure obtained satisfactory aesthetic and functional results, with no complications reported. The surgical treatment follow-up will be performed by eyelid retraction correction followed by blepharoplasty.

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