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Original article

Minimal incision surgery in strabismus: Modified fornix-based approach[☆]



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ABSTRACT

Objective: To evaluate the modified fornix-based technique as an approach for minimal incision surgery in strabismus.

Methods: The medical records of all consecutive patients that underwent strabismus surgery with fornix-based conjunctival incision between 2007 and 2012 were retrospectively reviewed. As a primary variable, an analysis was made of the wound size depending on the number of stitches. A descriptive study was performed on the variables related to patients and to the type of strabismus and surgery.

Results: Out of 153 patients identified, 138 with 294 surgeries were included. In 200 (68%) interventions, the incision was sutured with one stitch, in 77 (26.2%) with 2, in 13 (4.4%) with 3, and in 4 (1.4%) with 4, with the mean number of stitches being 1.39 ± 0.64 . The mean age of the patients was 39 years (2–80), and 36 (26.1%) had previous strabismus surgery, with topical anaesthesia being used in 35 (25.4%) cases. At 3 months after surgery deviation was ≤ 10 DP in 114 (82.6%) patients. There were no wound-related complications.

Conclusions: The modified fornix-based technique is an effective and safe approach for minimal incision surgery in strabismus, in patients at all ages, with previous history of strabismus surgery and with topical anaesthesia.

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Cirugía de mínima incisión en estrabismo: técnica base fórnix modificada

RESUMEN

Objetivo: Evaluar la incisión base fórnix modificada como abordaje para la cirugía de mínima incisión en estrabismo.

Métodos: Estudio retrospectivo de las historias clínicas de todos los pacientes consecutivos que fueron intervenidos de estrabismo con incisión conjuntival base fórnix entre 2007 y 2012. Como variable principal analizamos el tamaño de la herida en función del número de puntos de sutura. Realizamos un estudio descriptivo de variables relativas a los pacientes y al tipo de estrabismo y cirugía.

Palabras clave:

Cirugía de estrabismo
Técnicas de incisión
Incisión conjuntival
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Mínima incisión

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Resultados: Del total de 153 pacientes identificados, se incluyeron 138 con 294 cirugías. En 200 (68%) intervenciones se suturó la incisión con un punto, en 77 (26,2%) con 2, en 13 (4,4%) con 3 y en 4 (1,4%) con 4; la media fue de $1,39 \pm 0,64$ puntos. La edad media de los pacientes fue de 39 años (2-80); 36 (26,1%) pacientes presentaban antecedentes de cirugía previa y se utilizó anestesia tópica en 35 (25,4%) casos. A los 3 meses de la cirugía, la desviación fue ≤ 10 DP en 114 (82,6%) pacientes. En ningún caso hubo complicaciones relacionadas con la herida.

Conclusiones: La técnica base fórnix modificada es un abordaje eficaz y seguro para la cirugía de mínima incisión en estrabismo, en pacientes de todas las edades, con antecedentes de cirugía de estrabismo previa y con anestesia tópica.

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Introduction

Over the last few decades, microincision techniques have been developed in different areas of ophthalmic surgery, including interventions for strabismus.¹⁻⁴ A number of different conjunctival incisions have been designed and assessed, seeking the least amount of postoperative discomfort with the best functional outcome. One of the most commonly used by the majority of surgeons is the limbal incision described by Harms.⁵ This incision is made parallel to the limbus with 2 radial cuts at each end, allowing easy access and a good view of the rectus muscles. Modified versions of the limbal incision have been proposed, in addition to other approaches,⁶ but the technique designed by Parks is one of the most widely used. Parks introduced the fornix-based or cul-de-sac approach, with which the incision made in an oblique quadrant is covered by the eyelids.⁷

Gobin was the first to describe access to the rectus muscles through 2 small radial incisions adjacent to both sides of the muscle.⁸ More recently, Mojon developed and perfected this approach, paving the way for minimally invasive strabismus surgery (MISS).^{2,9,10}

While there seems to be consensus that MISS is superior to the limbal incision in terms of patient wellbeing and appearance of the wound immediately post-surgery, these benefits do not seem to be so clear when compared to the fornix-based incision.

It has been suggested that the main drawback of the fornix-based incision is that, in adult patients with relatively inelastic conjunctiva, tears can often occur when trying to slide the conjunctiva over the hook and the muscle to correctly expose it.¹¹⁻¹⁴

Guyton added the design for a "small-incision" muscle hook to the Parks technique.¹² This was a modification of the Jameson hook, with a ball at the end and a double bend in the shape of an S. This shape allows the hook to slide under the conjunctiva, causing minimal traction on the conjunctival incision during the muscle insertion exposure manoeuvre. The small ball at the end of the hook prevents the muscle from sliding. Coats also proposed modifications to the standard technique to minimise the traction exerted on the conjunctiva: first, rotating the hook with

the muscle under the conjunctiva until the end of the hook appears, which is preferable to pulling the conjunctival incision over the muscle, and second, placing fixation forceps at the distal end of the insertion as soon as it is exposed, allowing proper viewing and minimising conjunctival traction.¹³

The aim of this study was to analyse our experience with the modified fornix-based incision as minimal-incision surgery technique in strabismus.

Subjects, materials and methods

We retrospectively reviewed the medical records of all consecutive patients operated on for strabismus with fornix-based conjunctival incision by the same surgeon (IPF) between 2007 and 2012. Inclusion criteria were: strabismus surgery with modified fornix-based conjunctival incision, record of the number of conjunctival sutures and postoperative follow-up ≥ 3 months.

The choice of quadrant for the conjunctival incision was random: in asymmetric horizontal surgery, an upper quadrant was chosen for one muscle and a lower quadrant for another; in the case of isolated vertical surgery, either the nasal or temporal quadrant were chosen equally, and for combined horizontal and vertical surgery, the quadrant common to the muscles involved was selected. The incision technique and location of the muscle are shown in Fig. 1(A)-(F). In all cases, the hook rotation manoeuvre was performed similar to that described by Coats.¹³ Since 2011, we have been using the Guyton small-incision hook¹² (Katena® K3-6820) and 2 fixation forceps (Katena® K5-2552) as fastening system for the muscle insertion at the 2 ends. For the intraoperative adjustment with topical anaesthetic, a 6/0 silk (Silkam-B/Braun®) traction suture was used anchored to the distal end of the insertion with respect to the conjunctival opening. Fig. 2(A) and (B) shows the appearance of the incision during the hang-back retro-insertion and the resection. In all cases, the wound was sutured by loose sutures with 7/0 polyglactin (Vicryl-Ethicon®). As many sutures as necessary were used to properly bring together the conjunctiva borders without prolapse of Tenon's capsule or exposure of the sclera; although in some cases the wound could have been left without sutures, we always use at

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