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Endoscopic repair of medial and inferior orbital wall

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ABSTRACT

Introduction: Orbital fractures are common in facial and orbital trauma, with orbital floor and medial wall commonly affected.
Objective: The aim of this study was to evaluate the outcomes of endoscopic repair of medial and inferior orbital wall fracture.
Design: A case series with chart review (observational study), the study was conducted in academic tertiary care medical centers.
Methods: Nine patients underwent endoscopic repair of medial and inferior orbital wall fracture between the years May 2013 and August 2016.
Results: Significant changes in preoperative eye lid ecchymosis, diplopia, enophathalmus, emphysema and facial hypoesthesia. Other postoperative complication of nasal endoscopy (blandness, hemorrhage, infection, exposure, and extrusion of the graft) were absent in all patients.
Conclusions: Endoscopic repair of medial and inferior orbital wall fracture using porous polyethylene was an easy and fast approach with satisfactory outcomes with avoiding the external incision.

Reparación endoscópica de la pared orbital media e inferior

Palabras clave:
Disrupción
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RESUMEN

Introducción: Las fracturas orbitales son frecuentes en los traumatismos faciales y orbitales, en los que frecuentemente se ve afectada la pared orbital media e inferior.
Objetivo: El objetivo de este estudio fue evaluar los resultados de la reparación endoscópica de la fractura de la pared orbital media e inferior.
Diseño: Estudio de serie de casos con cuadro de revisión (estudio observacional), realizado en centros médicos de cuidados terciarios académicos.

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Métodos: Nueve pacientes sometidos a reparación endoscópica de fractura de pared orbital media e inferior entre mayo de 2013 y agosto de 2016.
Resultados: Cambios significativos de equimosis preoperatoria del párpado, diplopía, exoftalmo, enfisema e hipoestesia. No se observaron en los pacientes otras complicaciones postoperatorias de la endoscopia nasal (blandura, hemorragia, infección, exposición y extrusión del injerto).
Conclusiones: La reparación endoscópica de fractura de la pared orbital media e inferior con polietileno poroso resultó una técnica fácil y rápida que evitó la incisión externa.

Introduction

Orbital fractures are common in facial and orbital trauma, with orbital floor and medial wall commonly affected. The fractures may be either direct or indirect.[1] The main symptom is diplopia and sign is the ocular motility which occurs in the direction of the antagonist muscle due to restriction of the entrapped muscle.[2] Moreover, the muscle edema, muscle fibrosis, hemorrhage, and motor nerve paralysis are also causes of the limitation.[3] The aim of the surgical repair is restoring the traumatized wall, so preventing herniation of the contents of the globe into the maxillary sinus and causes complication.[4] Hence, the aim of this study was to evaluate the outcomes of endoscopic repair of medial and inferior orbital wall fracture using porous polyethylene.

Methods

The study was conducted between May 2013 and August 2016. A case series with chart review (observational study) over 4 years. The study was conducted in academic tertiary care medical centers (Department of ENT and Ophthalmology in Al-Azhar University Hospitals and, Ain-Shams University hospitals in Cairo – Egypt).

Our patients' inclusion criteria were: 1 – orbital fracture (medial and inferior orbital wall fracture) only, 2 – adult (≥18years old), 3 – patient with diplopia (with no response to medical treatment after 2 week or with radiological evidence of muscle or soft tissue entrapment) and 4 – the defect of the floor ≤20 mm. The Exclusion criteria included one or more of the following: 1 – other orbital fracture rather than medial and inferior orbital wall fracture, 2 – medial and inferior orbital wall fracture combined with other facial fractures, 3 – lager bone defect of the floor (≥20 mm).

According to the time of operation; we wait at least 2 week for edema subsiding with medical treatment in this period, our indications for urgent interference: diplopia with radiological evidence of muscle or soft tissue entrapment and rapid deterioration of vision, which have no happened in our patient.

All procedures performed in studies involving human participants were in accordance with the ethical standards of our universities and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. All patients or their legal guardians signed a preoperative consent for the operation and the conduct of research, to know their rights and duties. The study work was approved by our university ethical committee.

Total of nine patients reported with history of accident having facial trauma associated with orbital wall disruption were included in the study. Out of nine patients, seven were male and two were female.

Patient assessment

Pre- and post-operative clinical assessment of the patients by ophthalmologist and endoscopic nasal assessment was done by the rhinologist. In addition, the patients were evaluated by computed tomography (CT) scan paranasal sinuses (PNS) to see the size and site of the fracture. All of the pre- and post-operative details were recorded for further analysis of the data as in Table 1.

Surgical technique

The operation was performed under general anesthesia with the patient in a supine position. The uncinate is resected with 3–4 mm of uncinate is left intact superiorly to prevent frontal recess stenosis. This exposed the natural ostium of the maxillary sinus and an antrostomy is performed in a posterior and inferior direction. The size and fracture configuration are defined using a 30°, 4-mm endoscope.

The purpose of the maxillary antrostomy is to explore the floor of orbit and to prevent the potential development of chronic maxillary sinusitis due to traumatic obstruction of the sinus ostia (Fig. 1A). Once the fracture of the floor is noted the reduction was done (Fig. 1B).

The bone fragments at the site of ethmoidal bulla were then removed to expose the lamina papyracea defect (Fig. 2A). The orbital contents are reduced and held in place with a retractor with adequate reduction.

The orbital implant which is porous polyethylene (Medpore®, 0.85 mm, Porex Surgical Products); is then cut to the appropriate shape and size to cover the orbital floor and lamina papyracea defect. The implant was introduced through the endoscopes for visualization. Following to that implantation an absorbable (MeroPack®-Medtronic) nasal pack was inserted and a Foley's catheter size 12 was inserted in the maxillary sinus to support the floor (Fig. 2B).

Post-operatively, nasal saline irrigations are started and the Foley's catheter removed after 2 weeks, with CT scans PNS