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Review

Endoscopic treatment of orbital cellulitis in pediatric patients: Transethmoidal approach☆,☆☆

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ABSTRACT

Orbital cellulitis is a septic process of the soft tissues behind the orbital septum and is the most frequent cause of the monolateral exophthalmos in pediatrics.

Approximately 90% of the orbital cellulitis in pediatrics are associated to acute ethmoiditis. From 01.01.2001 to 31.12.2010 we treated 36 patients, less than 18 years of age, affected by Chandler stage II, III, or IV orbital cellulitis.

The inflammation was resolved medically in 6 patients. In the 30 cases that showed no improvement in 48–72 h, an endoscopic drainage of the pus was performed by the transethmoidal route.

In children, an adenoidectomy should be included in order to eliminate eventual infections of this lymphatic organ.

Endoscopic treatment has resulted in rapid resolution of disease without any complications. In addition, postoperative discomfort is minimal, with a rapid return to daily activities.

Tratamiento endoscópico de la celulitis orbital en la infancia: abordaje transetmoidal

Palabras clave:
Sinusitis aguda
Etmoiditis aguda complicada
Celulitis periorbitaria
Cirugía endoscópica nasosinusal
Absceso orbitario

RESUMEN

La celulitis periorbitaria es un proceso séptico de los tejidos blandos orbitarios y representa la causa más frecuente de exoftalmos unilateral en la infancia.

Aproximadamente el 90% de los casos de celulitis periorbitaria en edad pediátrica se asocian a etmoiditis aguda. En el periodo 1.° de enero de 2001–31 de diciembre de 2010 se han tratado 36 pacientes menores de 18 años con celulitis periorbitaria en los estadios II, III, IV de Chandler.

Seis pacientes consiguieron la resolución de la inflamación con el tratamiento farmacológico. En 30 casos que no demostraron una mejoría en un período de 48 a 72 h, se efectuó un drenaje quirúrgico endoscópico del moco-pus con abordaje por vía transetmoidal.

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En los niños es muy importante no olvidar el tratamiento quirúrgico de la adenoiditis crónica que, con toda probabilidad, se presentará simultáneamente.

La cirugía endoscópica permite una rápida resolución de la enfermedad sin ninguna complicación. Además, el malestar postoperatorio es mínimo, permitiendo un rápido regreso a las actividades cotidianas.

Introduction

Orbital cellulitis is a septic process between the ethmoid and the orbitary tissue representing the most frequent cause of unilateral exophthalmos in childhood.[1,2]

Clinically, orbital cellulitis begins with progressive pain at the level of the lacrimal bone followed by skin reddening in the area and subsequent progressive edematization of the eyelids. If the infection continues a general septic condition appears with high fever and acute pain. Palpebral edema worsens and impairs vision. Ocular global displacement is apparent in exophthalmos or enophthalmos depending on the site of the infectious process. In severe stages ophthalmological signs appear such as ocular global motility loss, paralyzing midriasis, corneal hyposthesia or anesthesia, all of which could cause loss of vision.[3]

In addition to the above symptoms, patients could exhibit other signs such as headaches and intense somnolency, a sign of intracranial complications.[4,5]

The most severe complications are related to the extension of the infectious process to vascular structures (thrombophlebitis of the cavernous sinus) as well as the brain (extradural or subdural abscess and meningitis) which cause neurological damage and could eventually be fatal.

Approximately 90% of orbitary cellulitis cases in children are associated to ethmoiditis[4,6] which occurs due to the dissemination of the infection from the ethmoid to the orbitary tissue due to bone rarefaction arising from osteitis involving the external wall of the ethmoid which corresponds to the internal region of the orbit, particularly at the level of the lacrimal bone.

The paranasal sinus are adjacent to the orbits and the walls are crossed by valveless vascular channels, presumably channels for migration of microorganisms.

The suture areas between the various parts of the bone walls of the orbits, the subra- and sub-orbitary channels, the delicate lamina papyracea separating the ethmoid from the orbits, possible acquired (osteitis, fractures) or congenital dehiscences are additional weak areas in suppurating sinusitis.[7] Less frequently, orbitary cellulitis could be a consequence of the conjunctivitis, dacryocystitis, insect bites, injuries or actions on adjacent tissue or septicemia.[8,9]

Orbitary cellulitis is a significant emergency. Prior to the appearance of antibiotics it was deadly in 17% of cases and between 20% and 50% of survivors lost their eyesight. At present, prognosis has improved: mortality rates does not exceed 1–2.5% and, when detection is premature and the treatment is adequate, blindness only occurs in 3–11% of cases.[4,6]

Traditionally, the orbitary axis is surgically drained by means of a subciliary incision between the eyebrow and the internal palpebral commissure with the inclusion of a drain. Optionally, the possibility of endoscopic surgery must be considered to enable ethmoid draining and access evacuation without leaving visible scars. However, this surgery is difficult due to the phlogosis caused by the infection. In addition and particularly in an emergency situation, the surgeon must be highly experienced in endonasal endoscopic surgery.

The purpose of this review is to assess the indications, surgical methods and efficacy of endoscopic surgery by means of a critical review of pediatric patients who have been attended in the emergency ward of the Salerno University hospital and were treated jointly by the Ophthalmology and ENT departments.

Methods

A retrospective study of patients with orbitary cellulitis admitted at the Salerno University hospital between January 1, 2001 and December 31, 2010. Onset age and disease stage were assessed according to Chandler's classification (Table 1),[10] together with bacteriological results, pharmacological and surgical treatment. The short and long-term results were established in accordance with the guidelines of the Helsinki declaration.

The study included subjects under 18 years of age with orbitary cellulitis in Chandler's stages II–IV (Figs. 1 and 2). The study excluded patients with inflammatory involvement exclusively in the preseptal area (stage I) and with cavernous sinus thrombosis at admission time (stage V), attended to by neurosurgeons.

The patients underwent ophthalmological examinations twice a day (comprising visual acuity, ocular motility and pupil reflexes), ENT examinations twice a day (comprising endoscopic exploration of the nasal fossae and aspiration of secretions in the middle meatus for bacterial culture), orbit and paranasal sinus multisection helicoidal CT, as well as pediatric and neurological assessments.

Pharmacological treatment was carried out in accordance with international standards, i.e., ceftriaxone 80 mg/kg once a day, metronidazole 7.5 mg/kg three times a day, nasal wash

Table 1 – Chandler's classification.

Stage I	Cellulitis/subperiostium abscess
Stage II	Orbitary cellulitis
Stage III	Phlegmon/subdural abscess
Stage IV	Orbitary abscess
Stage V	Cavernous sinus thrombophlebitis/supra-orbitary abscess