International Journal of Pediatric Otorhinolaryngology 96 (2017) 72–76

Contents lists available at ScienceDirect

International Journal of Pediatric Otorhinolaryngology

journal homepage: http://www.ijporlonline.com/

Management of orbital cellulitis and subperiosteal orbital abscess in pediatric patients: A ten-year review

Vittorio Sciarretta, MD [a], Marco Demattè, MD [a], Paolo Farneti, MD [a, *], Martina Fornaciari, MD [a], Ilaria Corsini, MD [b], Ottavio Piccin, MD [a], Domenico Saggese, MD [a], Ignacio Javier Fernandez, MD [a]

[a] Department of Otolaryngology, Sant'Orsola-Malpighi Hospital, University of Bologna, Via Massarenti 9, 40138 Bologna, Italy
[b] Department of Pediatrics, Sant'Orsola-Malpighi Hospital, University of Bologna, Via Massarenti 9, 40138 Bologna, Italy

ARTICLE INFO

Article history:
Received 29 December 2016
Received in revised form
23 February 2017
Accepted 25 February 2017
Available online 6 March 2017

Keywords:
Orbital cellulitis
Orbital abscess
Subperiosteal abscess
Preseptal cellulitis
Postseptal cellulitis
Sinusitis

ABSTRACT

Objective: Pediatric periorbital cellulitis represents a common disease complicating a nasal infection.
Methods: A ten–year retrospective review of fifty-seven children admitted to our institution with the diagnosis of periorbital cellulitis as a complication of sinus infections was carried out.
Results: The age varied from one month to eleven years (mean 3.9 years). Thirty-five were males (62%), while twenty-two were females (38%). Nine out of fifty-seven (15.8%) presented exophthalmos associated with eyelid erythema and edema, while the rest suffered mainly from eyelid erythema and edema. Twenty-two patients complaining of exophthalmos or not responding to medical therapy within 48 h were assessed with a computed tomography scan (38.6%). A subperiosteal orbital abscess was detected in nine cases and these patients underwent surgical drainage (15,8%). Recurrence of orbital infection occurred in three cases (5.3%).
Conclusions: Medical management is the main treatment for both preseptal and postseptal orbital cellulitis. Nevertheless, there is no universally accepted guideline for the treatment of subperiosteal abscesses and each case should be treated accordingly. Urgent surgical drainage should be considered in cases not responding to adequate medical management, or those cases presenting visual deterioration.

1. Introduction

Periorbital cellulitis is defined as an infection of the soft tissue surrounding the eye. Although it can occur at all ages it is prevalent of the pediatric population [1]. Indeed, orbital complications are more commonly seen in the pediatric aged group with the overall incidence of 3–4% in children affected by acute rhinosinusitis [2].

In general, rhinosinusitis is responsible for 66%–82% of cases of orbital infection and the acute ethmoiditis represents the most common rhinosinusitis linked to the orbital cellulitis in children [3,4]. The spread of infection from the ethmoid sinus is usually very quick and orbital complications can ensue even under antibiotic therapy. Orbital involvement can be easily suspected in case of ophthalmoplegia and proptosis. The diagnosis is usually achieved through the combination of clinical examination and radiologic findings. Chandler classification still represents the most complete and popular to indicate the severity of the infection (Table 1) [5].

The aim of this manuscript was to report our ten-year experience for the management of periorbital cellulitis and subperiosteal orbital abscess due to a sinus infection in children.

2. Material and methods

This study was performed at the University of Bologna, Sant'Orsola - Malpighi Hospital and received the approval from its ethic committee. A retrospective chart review was performed from the period of January 2006 to January 2016.

Inclusion criteria were the following: 1) clinical diagnosis of orbital complication of acute rhinosinusitis; 2) age of patients <14

* Corresponding author. Ear, Nose and Throat Unit of Sant'Orsola-Malpighi Hospital, Via Massarenti 9, Biblioteca Otorino Pad. 5, Secondo Piano, 40138 Bologna, Italy.
E-mail addresses: sciarrettavittorio@hotmail.com (V. Sciarretta), mrc.dematte@gmail.com (M. Demattè), paolo.farneti5@unibo.it (P. Farneti), mrt.fornaciari@gmail.com (M. Fornaciari), ilaria.corsini@aosp.bo.it (I. Corsini), o1piccin@yahoo.it (O. Piccin), domsaggese@yahoo.it (D. Saggese), ignafernandez@yahoo.it (I.J. Fernandez).

http://dx.doi.org/10.1016/j.ijporl.2017.02.031
0165-5876/

Table 1
Chandler's classification of orbital complications.

Chandler classification of orbital complications	
I	Preseptal cellulitis
II	Orbital cellulitis
III	Subperiosteal abscess
IV	Orbital abscess
V	Cavernous sinus thrombosis

years; 3) clinical and endoscopic ground (with or without imaging support) for the diagnosis of acute rhinosinusitis as the leading cause of orbital pathology. All patients having a previous history of facial trauma or those immuno-compromised were excluded from this study.

All patients received ophthalmologic evaluation with visual acuity, pupil reactivity testing of the affected eye and ocular movement impairment. Diplopia could not be detected in the patients with complete eye closure. The ear-nose-throat (ENT) specialist always evaluated the nasal cavity for any sign of acute rhinosinusitis (edema of nasal mucosa and purulent secretions) and when possible, nasal decongestion under endoscopic view was also performed. A CT scan was performed in the patients suffering from exophthalmos or not responding to medical therapy within 48 h.

In our population we studied the patients' features (age, gender, allergic rhinitis) the clinical and radiological features (ophthalmic signs, temperature, extent of sinus involvement), the treatment required (steroids, antibiotic therapy, surgical therapy, days of hospitalization), the season at the time of disease onset. Finally, we searched for significant association of those variables with recurrence or with subperiosteal abscess development. Recurrence was defined as a further episode of orbital complication of rhinosinusitis occurring one month or after the previous one.

Statistical analysis was conducted by means of SPSS 17.0 for windows (SPSS inc. Chicago, USA 2003). The association between binary variable "recurrence" and other categorical variables were tested with χ^2 test or Fisher exact test as appropriate. The Student's T test was used to evaluate the association with continuous variables with normal distribution (age) and with Mann Whitney text for those without normal distribution (Hospital stay days). The association between the presence of a subperiosteal abscess and other categorical or continuous variables was explored in the same manner. Results were considered statistically significant for $p < 0.05$. Confidence intervals were set at 95%.

2. Results

Between January 2006 and January 2016, fifty-seven children were admitted to our Institution with the diagnosis of periorbital cellulitis as a complication of sinus infection. Their age varied from one month to eleven years (mean 3.9 years). Thirty-five were males (62%), while twenty-two were females (38%). Nine out of fifty-seven (15.8%) presented exophthalmos associated with eyelid erythema and edema (Fig. 1), while the rest suffered mainly from eyelid erythema and edema. 65% of cases of these orbital infections occurred during spring and winter time. Ten cases were also been suffering from an allergic rhinosinusitis (17.5%).

All children received intravenous (i.v.) antibiotic treatment. The antibiotic was associated with i. v. steroid therapy in twelve cases when exophthalmos or a complete closure of the eye due to the presence of eyelid edema were present.

Twenty-two patients complaining about exophthalmos or not responding to medical therapy within 48 h were assessed with a CT scan (38.6%). Three cases received also a magnetic resonance imaging (MRI) to rule out an intracranic extension of the infection. In 3 cases orbital cellulitis was diagnosed with the CT scan (Chandler's stage II). A subperiosteal orbital abscess (Fig. 2) was detected in nine cases (Chandler's stage III) and these patient underwent through a surgical drainage (15,8%). These nine cases had already been treated for at least 48 h by antibiotic therapy without any significant improvement. All cases of subperiosteal orbital abscess were surgically treated with a transnasal endoscopic approach to clear the pus build up. One case of subperiosteal orbital abscess due to a purulent frontal sinusitis, was also affected by an intracranic abscess that required neurosurgical drainage. The diagnosis of these concomitant intracranial and fronto-orbital abscesses was achieved radiologically via an MRI and CT scan. In accordance with the Department of Neurosurgery it was decided to treat first the source of the infection at orbit and frontal sinus level before addressing the intracranial spread of the infection. The 45 remaining cases were classified as preseptal cellulitis (Chandler's stage I).

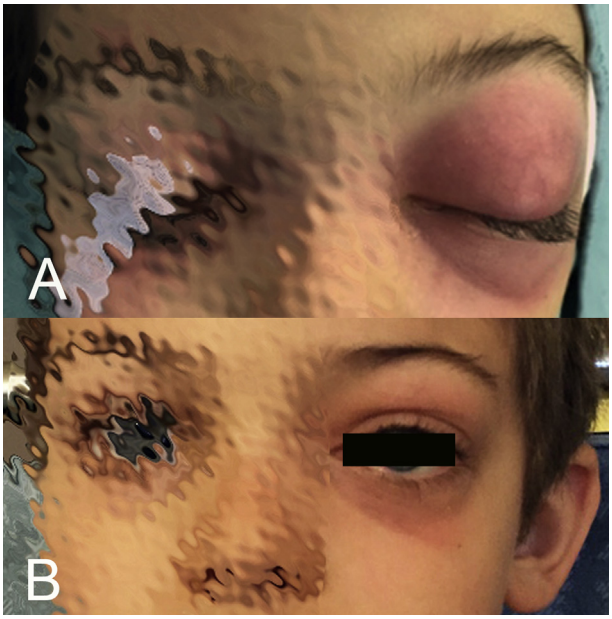

Fig. 1. A six years old child suffering from a subperiosteal orbital abscess of the left orbit. A: preoperative exophthalmos associated with eyelid erythema and edema of the left eye. B: postoperative appearance at 48 h after the surgical drainage of pus collection.

Recurrence of orbital infection occurred in three cases (5.3%). Two cases were preseptal cellulitis that recurred at 1 and 2 months after the previous admission and required a second i.v. antibiotic treatment. The other case suffered from a recurrent cellulitis at 25 months from the previous surgically treated subperiosteal abscess. Nevertheless, the second episode was a preseptal cellulitis and it was successfully controlled with i.v. antibiotic therapy.

Recurrence did not result in any significant association with any of the variables studied (Table 2). On the other hand, the only data that reached any statistical significance was the association between the presence of a subperiosteal abscess and the presence of pansinusitis ($p = 0.04$). None of the other variables showed any association with orbital extent of disease.

3. Discussion

The orbital cellulitis represents a serious infection warranting a prompt antibiotic therapy due to catastrophic complications such as visual loss, intracranic infection and sepsis. Before the antibiotic era, patients affected by orbital cellulitis died from meningitis in