

Sinusitis as a cause of orbital cellulitis

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التهاب الجيوب الأنفية كمسبب للتهاب الخلوي في الحجاج

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خلاصة: من أجل تحديد مدى أهمية التهاب الجيوب الأنفية كمسبب للتهاب الخلوي في الحجاج، ولمعرفة الجراثيم المسببة لهذه الحالة والذروة العمرية التي تحدث فيها، تمت دراسة 25 مريضاً يعالجون داخل المستشفى من التهاب خلوي حجاجي، تتراوح أعمارهم بين ثمانية أشهر وسبعة عشر عاماً، و80% منهم يبلغون من العمر 1-4 سنوات. فأجري لكل منهم عدّ كامل لخلايا الدم، وتصوير الجيوب بالأشعة، كما أخذت مسحات من عيونهم لاستزاعها قبل معالجتهم بالمضادات الحيوية. ولقد كان التهاب الجيوب واضحاً في 72% من المرضى. وأثبتت مزارع مسحات العيون أن 80% من المرضى كانت بهم عدوى بالعقديات أو العنقوديات أو المكورات المعوية. وتؤكد معطيات الدراسة أن التهاب الجيوب مسبب له أهميته في التهاب الخلوي الحجاجي. وتبين أن أكثر الجراثيم المسببة شيوعاً هي العقديات المخضرة (44%) والعنقوديات الذهبية (32%). ولذلك ينبغي إعطاء المريض مضادات حيوية منذ البداية تغطي هذين النوعين من الجراثيم.

ABSTRACT To determine the importance of sinusitis as a cause of orbital cellulitis, the causative organisms and peak age of occurrence, 25 patients hospitalized with orbital cellulitis (ages 8 months to 17 years; 80%, 1-4 years) were studied. Complete blood counts were carried out and radiographic sinus examinations and eye swabs (for culturing) performed prior to antibiotic treatment. Sinusitis was evident in 72% of the patients. Eye swab cultures indicated 80% had streptococcal, staphylococcal or enterococcal infection. The data indicate that sinusitis is an important cause of orbital cellulitis. The most common causative organisms were *Streptococcus viridans* (44%) and *Staphylococcus aureus* (32%). Initial antibiotics should therefore cover both organisms.

La sinusite comme cause de cellulite orbitaire

RESUME Afin de déterminer l'importance de la sinusite en tant que cause de cellulite orbitaire, les agents pathogènes et l'âge auquel le maximum de cas surviennent, 25 patients hospitalisés pour cellulite orbitaire (âgés de 8 mois à 17 ans; 80% 1-4 ans) ont été examinés. On a procédé à une numération globulaire complète et à une radiographie des sinus, et des prélèvements oculaires ont été réalisés (pour mise en culture) avant le traitement antibiotique. La sinusite était évidente chez 72% des patients. Les cultures des prélèvements oculaires ont révélé que 80% d'entre eux avaient une infection streptococcique, staphylococcique ou entéroccocque. Ces données indiquent que la sinusite est une cause importante de cellulite orbitaire. Les agents pathogènes les plus fréquents étaient *Streptococcus viridans* (44%) et *Staphylococcus aureus* (32%). Les antibiotiques prescrits d'emblée devraient donc s'appliquer aux deux micro-organismes.

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Received: 19/02/98; accepted: 06/06/98

Introduction

Orbital cellulitis is an infection commonly encountered by the ophthalmologist. Its serious complications and hazards — including optic nerve involvement that may lead to loss of vision, cavernous sinus thrombosis, meningitis and brain abscess — make diagnosis and therapeutic intervention a medical emergency necessitating admission to hospital in most cases.

The patient is usually a child or young adult who presents with a relatively sudden onset of unilateral chemosis, pain, lid oedema, reduction of ocular movements and proptosis, most often laterally and downwards [1,2].

The infection usually spreads to the orbit from the nasopharynx or from the frontal, maxillary or ethmoidal sinuses. Spread of infection from sphenoidal sinuses is however uncommon [2]. The strong association between orbital cellulitis and sinusitis, and the difference in management that may be needed when sinusitis is present, make it necessary to exclude the presence of sinusitis in all patients with orbital cellulitis [1].

This study was conducted to confirm the above-mentioned association, and to determine the causative organisms and peak age of occurrence.

Subjects and methods

The study was conducted at Prince Ali Hospital in Al-Karak, Jordan over a 2-year period. A total of 25 patients admitted to hospital with the clinical diagnosis of orbital cellulitis were included in the study, regardless of age.

Prior to antibiotics treatment, all patients underwent complete ophthalmologi-

cal and ear, nose and throat (ENT) evaluation, and eye swabs were taken for culturing. Complete blood count and sinus X-rays were performed for all patients. Computerized tomography scans for sinuses were carried out on five patients to reveal the anatomy of the ethmoid and sphenoid sinuses. These were patients under 2 years of age, in whom the presence or absence of sinusitis could not be confirmed by X-ray.

The patients were treated with a wide range of antibiotics, the most commonly used being ampicillin, ceftriaxone and prostaphyllin. These antibiotics were given alone or in combination. Treatment was later modified according to culture results.

Surgical drainage of sinuses was carried out for one patient while still infectious. Two patients required drainage at a later stage, following discharge.

Results

Of the 25 patients in the study, 20 were under 4 years of age, 3 were aged between 4 years and 14 years and 2 were older than 14 years.

Eighteen (18) patients (72% of the total) had evidence of sinusitis. Of these, 11 patients (61% of the 18) had evidence of ethmoiditis, 3 (16%) had evidence of maxillary sinusitis and 4 (22%) had evidence of pansinusitis. A 2-year-old patient had recurrent orbital cellulitis on top of ethmoiditis.

The eye swab cultures showed 20 patients (80% of the 25) to be infected as follows: 11 patients (44% of the 25) with *Streptococcus viridans*, 8 (32%) with *Staphylococcus aureus* and 1 (4%) with *Enterococcus faecalis*.

Most of the cases were seen between November and February, whereas only a few patients were seen in the summer months. It was found that 65% of the patients had a temperature on admission; also 60% of the patients had neutrophilic leukocytosis, while in 40%, the complete blood count was considered normal.

Discussion

Orbital cellulitis is generally an infection of children and young adults. Patients on presentation usually have proptosis, anaesthesia of the area innervated by the ophthalmic and maxillary branches of the trigeminal nerve, impaired ocular rotations, ocular pain aggravated by ocular rotation, increased intraocular pressure, decreased visual acuity and afferent pupillary defect [2].

History of upper respiratory tract infection with or without nasal discharge may be present. ENT evaluation frequently shows nasal hyperemia, swelling and pus issuing from the middle meatus. X-ray evidence of sinusitis is positive in 70% of adults where frontal, maxillary and ethmoidal sinuses show equal involvement, whereas the ethmoidal sinuses are most frequently involved in the paediatric age group [3].

Venous congestion and papilloedema indicate abscess formation, which may be detected by ultrasound and is usually a dangerous sign especially in the second decade of life [2]. The most common causative organisms reported are *S. pneumoniae*, *Staph. aureus*, *S. pyogenes*, and, in children under 5 years of age, *Haemophilus influenzae* [2,3].

Patients with orbital cellulitis should immediately be admitted to hospital. Management requires a complete and differen-

tial blood count, Gram stain and cultures of secretions from the conjunctiva, nasal cavity, abscesses, fistulas and from any lacerations. If meningeal signs are present a cerebrospinal fluid sample should be taken. Sinus X-rays should be obtained for all patients and if there is orbital involvement, a computerized tomography scan is indicated [4].

Initial treatment consists of appropriate intravenous antibiotics based on the result of the Gram stain as well as to cover the commonest organisms reported [5]. In the paediatric age group, *H. influenzae* should always be considered [3,4].

A lack of response to antibiotics, decreasing vision, the presence of an orbital or subperiosteal abscess, and the need for diagnostic biopsy in atypical cases are indications for surgical intervention. Both the orbit and the infected sinuses should be drained [4].

Conclusion

The above-mentioned data indicate that sinusitis is an important cause of orbital cellulitis. Radiographic studies are recommended and if necessary, computerized tomography scans or magnetic resonance imaging, to exclude the presence of sinusitis for all patients with orbital cellulitis. The most common causative organism in our study was *S. viridans* (44%), followed by *Staph. aureus* (32%). Thus, initial antibiotics should fully cover both organisms. It was noted that none of our patients had *H. influenzae* infection, which may be explained by the widespread use of the Hib vaccine.

References

1. Paerregaard A, Lund I. Periorbital og orbital cellulitis hos born. [Periorbital and orbital cellulitis in children.] *Ugeskrift for laeger*, 1995, 157 (47):6576-80.
2. Brook I, Fraizer EH. Microbiology of subperiosteal orbital abscess and associated maxillary sinusitis. *Laryngoscope*, 1996, 106(8):1010-3.
3. Barone SR, Aiuto LT. Periorbital and orbital cellulitis in the *Haemophilus influenzae* vaccine era. *Journal of pediatric ophthalmology and strabismus*, 1997, 34(5):293-6.
4. Bergin DJ et al. Orbital cellulitis. *British journal of ophthalmology*, 1986, 70(3): 174-8.
5. Asensi V et al. Cellulitis orbitarias graves: resultados terapenticos en 9 pacientes y revision de la literatura. [Severe orbital cellulitis: therapeutic results in 9 patients and review of the literature.] *Enfermedades infecciosas y microbiologia clinica*, 1996, 14(4):250-4.

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