Undiagnosed sinusitis leading to orbital cellulitis

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INTRODUCTION

Orbital cellulitis secondary to sinusitis is an uncommon but dangerous condition with potential serious complications. Paranasal sinus disease remains the commonest cause of orbital cellulitis (Ferguson and MacNab, 1999). Sinusitis was evident in 72% of patients with orbital cellulitis (Haddadin et al, 1999). The incidence of orbital cellulitis has been reported at between 21 and 90% (Lund, 1997). The most widely accepted classification of orbital cellulitis is as described by Chandler (1970):

1. Preseptal cellulitis – characterized by oedema of the lids without tenderness, visual loss or limitation of extraocular motility. This is the most common type (Uzcategui et al, 1998)
2. Orbital cellulitis without abscess formation
3. Orbital cellulitis with subperiosteal abscess
4. Orbital cellulitis with intraperiosteal abscess
5. Cavernous sinus thrombosis (Chandler, 1970).

The other serious complications of sinusitis include intracranial abscess, meningitis, encephalitis sagittal sinus thrombosis, osteomyelitis and toxic shock syndrome (Lund, 1997; Hytonen et al, 2000). Once orbital cellulitis is present there is potential for any of the above complications. Antibiotic use has reduced the prevalence of complications secondary to sinusitis. Computed tomography (CT) scans of the orbit and paranasal sinuses have facilitated the diagnosis and management of orbital inflammations. The management policy advocated for orbital cellulitis is hospital admission and intravenous antibiotics, e.g. cefuroxime or amoxicillin/clavulanate and metronidazole, combined with intranasal decongestants and analgesics (Lund, 1997).

CASE REPORT

Six patients who presented with symptoms and signs of orbital cellulitis during the period 1995–1999 had undiagnosed sinusitis as the underlying cause. All patients were ethnic Omanis (Arabs) coming from different geographical areas of Oman. Their ages ranged from 5 years to 72 years; five were male and one was female. All patients had eye symptoms and signs of pain, swelling, chemosis, restricted eye movements and proptosis with headache and fever. The patients were hospitalized and underwent ophthalmological, neurological, radiological and nasal endoscopic examination. None of these patients presented primarily to otolaryngology, as they did not have symptoms of sinusitis. They were referred to otolaryngology after computed tomography (CT) scan established the diagnosis of sinusitis as the cause of orbital cellulitis. The ethmoid sinus was the predominant sinus involved (*Figures 1* and *2*). Nasal endoscopy revealed some features common to five patients; these included generalized mucosal oedema, congestion and mucopurulent secretion, which on culture grew *Pseudomonas aeruginosa* in one patient and *Streptococcus pneumoniae* and *Moraxella catarrhalis* in the others.

Medical treatment consisted of intravenous broad spectrum antibiotics, either cefuroxime 1.5 g 8-hourly or amoxicillin-clavulanate 1 g 6-hourly. This was combined with oral antihistaminic and intranasal decongestant sprays. Five patients responded rapidly to medical therapy within 24 hours. In one patient the condition was fatal; a 53-year-old woman with known insulin-dependent diabetes mellitus presented to the accident and emergency department with high grade fever, vomiting and altered sensorium. Within 12 hours there was a rapid deterioration in her condition. CT and magnetic resonance imaging revealed cavernous sinus thrombosis. The patient succumbed to septicaemia and died, despite high doses of intravenous ceftizadime and augmentin. Culture of nasal mucopurulent secretion grew *Pseudomonas* spp.

DISCUSSION

Sinusitis is a common cause of orbital cellulitis. Other causes of orbital cellulitis include systemic disorders, altered immunological states, dental and orbital infections. In this series, none of the patients presented to otolaryngology, as they had no symptoms of sinusitis, leading to delay in diagnosis, disease progression and death in one patient. Patients do not think that nasal symptoms are relevant or important enough to comment on and unless they are asked specific questions they do not offer any symptoms.

Anatomical factors responsible for orbital complications of sinusitis are the close relationship of the ethmoids and the orbit, thin and often dehiscent lamina papyracea, communications via foramina, and spread of infection through blood vessels, especially valveless veins (Chandler, 1970). Most of the serious acute sinus-related complications are secondary to acute sinusitis. Chronic sinusitis has rarely been implicated in an acute complication.

The age of the patients is relevant since, although orbital cellulitis can occur at any age, it is more prevalent in children and young adults (Compdera et al, 2000). Five of the six patients were otherwise healthy males, and it is unclear why these individuals should suddenly and spontaneously

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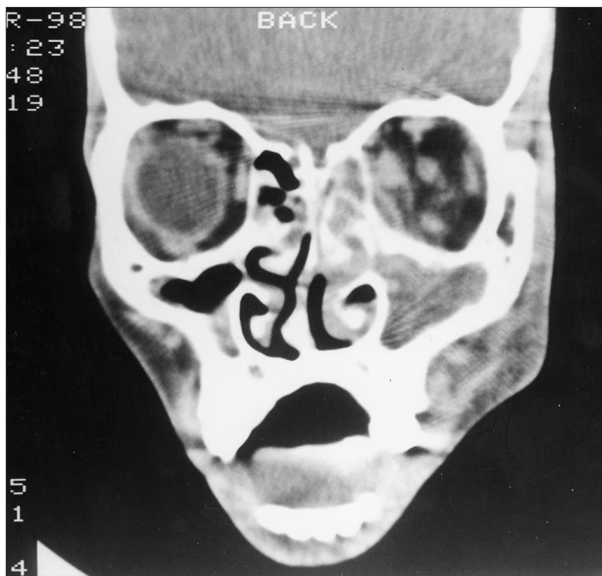

Figure 1. Coronal computed tomography scan showing gross sinus disease. Soft tissue swelling is noted in the right orbit with displaced medial rectus muscle.

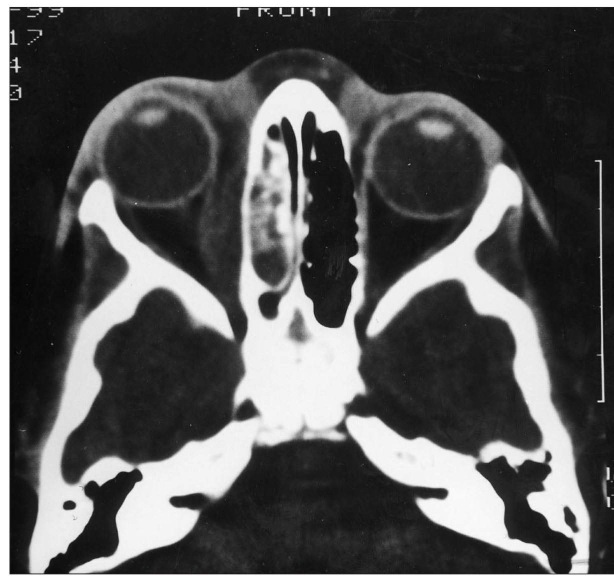

Figure 2. Axial computed tomography scan showing opacity of most of the anterior and posterior ethmoids. Soft tissue swelling displacing medial rectus and proptosis of the right eye.

develop a complicated sinusitis. The patient with insulin-dependent diabetes mellitus who succumbed to the infection presented in an advanced state where the orbital cellulitis had extended intracranially to produce cavernous sinus thrombosis and meningitis.

Similar presentations of sinusitis could have been missed in the pre-CT scan era, but antibiotic therapy would have treated the sinusitis as well. Another possible explanation for this silent presentation of sinusitis could be a changing pattern of disease. CT scans help in the classification of the orbital inflammations, identifying subperiosteal abscess collection and guiding therapy (Goodwin et al, 1982). In the series presented here the CT scans showed pansinusitis in three and ethmoidal sinusitis alone in the other three patients. CT scans of the sinuses were crucial in making the diagnosis.

The features that should be sought on a CT scan include obliteration of the sinus meatus, opacification of the sinuses, presence of subperiosteal or extraperiosteal abscess, displacement of orbit or medial rectus muscle. Attention should be paid to the adjacent anterior cranial fossa where covert collections may form. Any bony defects or dehiscence should be looked for. If available, magnetic resonance imaging offers an excellent alternative and will define very small collections (Weingarten et al, 1989).

In the present series, although the patients had a CT diagnosis of sinusitis, nasal endoscopy confirmed the diagnosis and provided samples for bacteriological cultures. The common species isolated are streptococci (Ferguson and MacNab, 1999). The organism grown from the patient with fatal orbital cellulitis was *Pseudomonas* spp. This is unusual and could have been a result of the underlying diabetes. In addition, nasal decongestion during endoscopy was found to be therapeutic since sinus ostium decongestion initiated paranasal sinus drainage and ventilation. Refractory cases of sinusitis may need sinus drainage by surgical methods.

Medical therapy alone (antibiotics and decongestants) is like to resolve the infection (Lund, 1997). In the present series five patients were successfully cured with medical therapy alone, and have been followed up for periods ranging from 10 to 44 months without any recurrence.

CONCLUSION

This article highlights undiagnosed sinusitis as the cause of orbital cellulitis. All patients presenting with orbital cellulitis should have a CT scan through the orbits and also the paranasal air sinuses. Early detection and prompt antibiotic and decongestant therapy would help alleviate the condition and prevent dangerous complications like cavernous sinus thrombosis and meningitis. **HM**

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