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The place of endonasal endoscopy in the treatment of orbital cellulitis*

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SUMMARY

Orbital cellulitis secondary to acute sinusitis is uncommon, dangerous, and can lead to blindness and death. The ethmoid is the predominantly involved sinus. Management policy consists of early drainage of the affected sinus combined with systemic antibiotic therapy. If no improvement is achieved within the first 48 h, exploration of the fronto-ethmoidal region is mandatory. Endonasal endoscopic surgery facilitates early drainage of the affected sinus, eradication of the disease from the fronto-ethmoidal region, and drainage of the subperiosteal abscess. Sixteen cases of orbital cellulitis were treated successfully by endonasal endoscopic surgery with no complications.

Key words: orbital cellulitis, subperiosteal abscess, endonasal endoscopy, middle meatal antrostomy, ethmoidectomy

INTRODUCTION

Orbital cellulitis is a condition which is still frequently seen in Otolaryngology, Ophthalmology and Paediatric Clinics (Figures 1-2). There are many causes of an acute orbit, and sinusitis still remains by far the commonest cause. The extent of orbital involvement ranges from simple periorbital inflammation to cavernous sinus thrombosis. In the pre-antibiotic era, 17% of patients with orbital cellulitis died from meningitis and 20% of the survivors had permanent loss of vision (Chandler, 1970). Acute sinusitis of the ethmoidal complex and the maxillary antra are the most frequent sources of orbital cellulitis (Mills, 1985). Orbital sepsis has been classified according to the severity of orbital involvement into: (1) inflammatory oedema; (2) orbital cellulitis; (3) subperiosteal abscess; (4) orbital abscess; and (5) cavernous sinus thrombosis. Other possible complications include meningitis, intracranial abscesses, osteomyelitis, blindness and even death (Swift, 1990).

The treatment of orbital cellulitis consists of early drainage of the affected sinus combined with systemic antibiotic therapy (El-Silimy, 1987). If no improvement is achieved in the first 24-48 h, then exploration of the fronto-ethmoidal region is mandatory with the view of ethmoidectomy (El-Silimy, 1987). Endonasal endoscopic surgery - first introduced by Messerklinger (1978) - facilitates early drainage of the affected sinus (Stammberger, 1991, 1993), eradication of the disease from the fronto-ethmoidal region (Kennedy, 1985; Lusk, 1990), and drainage of the subperiosteal abscess.

MATERIAL AND METHODS

Sixteen patients with orbital cellulitis secondary to sinusitis were treated by the author in the period from 1987 to 1991. This collection does not represent a consecutive series. All patients were put on parenteral antibiotic cover (amoxycillin, flucloxacillin and metronidazole) prior to surgery. Coronal CT was done on an emergency basis for all cases to assess the orbit, ostiomeatal complex, sinuses and, particularly, to have a clear idea about the extent of the ethmoidal disease. The surgical technique utilizes Hopkins telescopes with different angles (0°, 30°, and 70°) and the Messerklinger endoscopic sinus instruments.

Under general or local anaesthesia the patient is placed in the supine position with the head slightly elevated and turned towards the surgeon, who is seated alongside. Topical surface anaesthesia in the form of 10% lignocaine with adrenalin (1:100,000) is applied to the nasal mucosa and the middle meatal area. After a few minutes, the medial infundibular wall and anterior middle turbinate area are injected with 2% lignocaine with adrenalin (1:100,000).

The middle turbinate is subluxed medially to allow adequate visualization of the middle meatus. Infundibulotomy is then performed with a sickle knife. The uncinate process is then subluxed medially and removed allowing access to the anterior ethmoidal area.

The maxillary sinus ostium is then identified by visualization or by gentle probing and widened with a curette or upward-cutting forceps. The maxillary sinus is then aspirated and irrigated. A

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Figure 1. Orbital cellulitis of the left orbit and periorbital cellulitis of the right orbit.

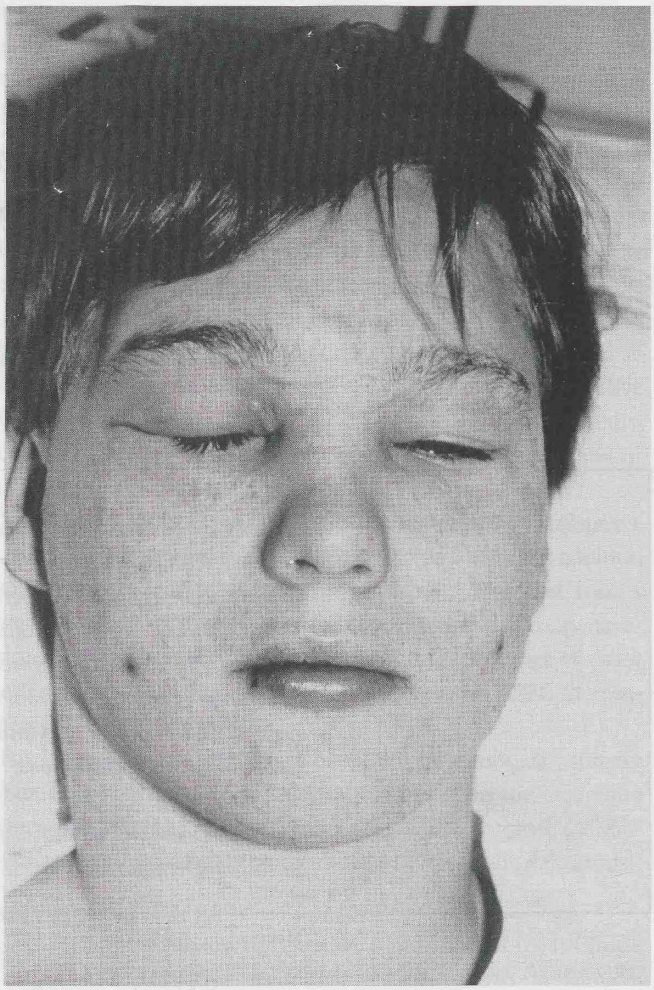

Figure 2. Subperiosteal abscess of the right orbit with periorbital cellulitis of the left orbit.

good view of the maxillary sinus can be obtained with the 70° telescope. If a natural ostium cannot be identified, endoscopic inferior meatal antrostomy should be performed. If required, the anterior ethmoidal cells and ethmoidal bulla are removed. As more superior cells are removed, care is taken to identify the roof of the ethmoid and the anterior ethmoidal artery. The frontal recess is then explored using 30°- or 70° telescopes, if needed. The basal lamella of the middle turbinate can be opened to gain access to the posterior ethmoidal cells. Care must be taken to remove all diseased ethmoidal cells. Removal of diseased lateral ethmoidal cells and the diseased lateral ethmoidal wall (medial orbital wall) should be carried out with the utmost care and all material removed should be put in saline (orbital fat will float). By removal of the diseased lateral ethmoidal wall a subperiosteal abscess, if present, will be drained intranasally.

From the following morning, the patients were started on nasal toilet, consisting of normal saline nasal douches, steam inhalations, topical nasal decongestant spray and Fucidin nasal cream for a period of 2-3 weeks. All patients were followed up weekly for a period of three weeks following surgery and every two months thereafter.

RESULTS

During the period from 1987 to 1991, 16 cases of orbital cellulitis were treated successfully with endonasal endoscopic surgery. The male to female ratio was 3:1. The average age was 13 with a range of 4-24 years.

Detailed operative procedures are shown in Table 1. Only two of our patients required exploration of the frontal recesses. Two patients needed inferior meatal antrostomy because of the difficulty encountered during middle meatal antrostomy (i.e., excessive bleeding). Evacuation of the subperiosteal abscess was carried out in four of our patients, two of them were not shown on computerized axial tomography (CT). None of our patients had permanent eye complications. Only one patient had adhe-

Table 1.

No. of patients	surgical procedure
14	middle meatal antrostomy
2	inferior meatal antrostomy
8	ethmoidectomy
4	evacuation of subperiosteal abscess
2	exploration of frontal recess

sions requiring resection under local anaesthesia in the outpatient department. All of our patients attended regularly for follow-up.

DISCUSSION

Although antibiotic usage has reduced the prevalence of chronic sinus infection and its complications, acute sinusitis remains a major cause of the acute orbit. For this reason sinusitis should be considered in every patient with swelling of the eye. The history may suggest other causes of the swelling, such as an insect bite or trauma, when the real cause is sinusitis. The absence of a possible predisposing factor does not rule out sinusitis. The infection enters the orbit either by direct extension or less commonly by local thrombophlebitis or infected thrombo-emboli along valveless venous connections (Chandler, 1970). Orbital cellulitis secondary to acute sinusitis affects all age groups from infancy to old age, but presents most often in children and adolescents (Walters, 1976; Schramm, 1982; Shapiro, 1982). The diagnosis of orbital cellulitis is based on the presence of one or more of the following signs or symptoms: paired eye movements, limitation of ocular movements, ecchymosis, proptosis, and monocular visual loss. It is difficult to distinguish between a subperiosteal abscess and orbital cellulitis and/or orbital abscess. All these conditions may give rise to proptosis, limited ocular movements and diplopia.

A wide variety of micro-organisms have been isolated from patients with an acute orbit, the most common are *Staphylococcus aureus*, *Streptococci*, and *Haemophilus influenzae* (Welsh, 1974; Hawkins, 1977; Morgan, 1980; Noel, 1981). In one study, both anaerobic and aerobic bacteria have been observed in 4% of the cases, and the former being the only isolate in 9% of the cases (Frederick, 1975).

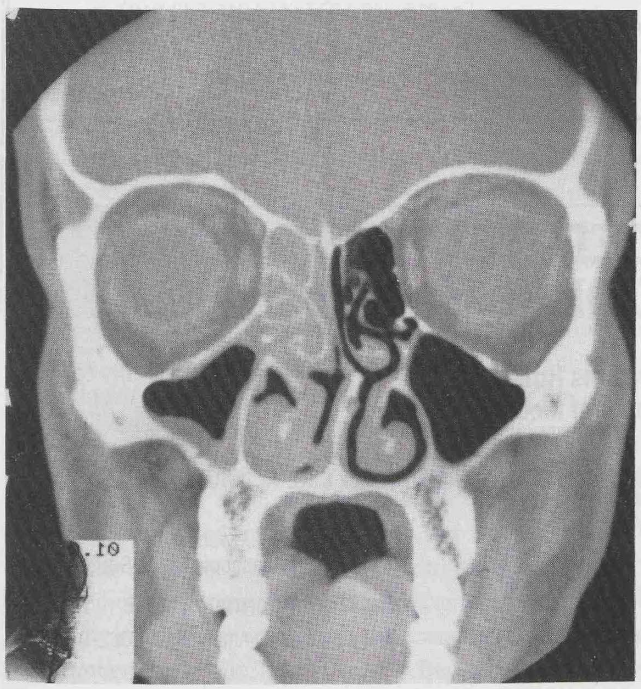

Figure 3. Coronal CT showing unilateral ethmoiditis.

Our antibiotic policy was designed to cover all the common isolates. CT and nasal endoscopy have significantly improved our ability to diagnose diseases in the nasal cavity (El-Silimy, 1992), the ostiomeatal complex and the sinuses. Coronal CT is an important means of investigation prior to endoscopic surgery; it can show the extent of the sinuses disease and may reveal the presence of a subperiosteal abscess (Figure 3). It is not a suitable investigation for detecting a small collection of pus (El-Silimy, 1987); this was the case in two of the four cases of subperiosteal abscess drained intra-operatively. Furthermore, negative CT may well give the clinician a false impression of security (El-Silimy, 1987).

Ostiomeatal complex diseases have previously been recognized as a causative factor in the pathogenesis of ethmoidal, maxillary and frontal sinusitis. The use of endoscopes during surgery on the paranasal sinuses improves visualization, reduces the necessity for wide excision, and facilitates drainage of sinuses and evacuation of a subperiosteal abscess. Significant complications may still occur, even in experienced hands. A 2% rate of cerebrospinal fluid leak occurring during surgery has been reported (Wigand, 1982). Adhesions were reported as a major complication by Kennedy (1985). Careful post-operative care and toilet is probably the reason for the lack of complications in our collection.

Some authors advocate intensive antibiotic therapy and re-evaluation of visual acuity and ocular motility. They even state that the appearance of a subperiosteal abscess does not necessarily need surgery (Goodwin, 1982). Visual acuity is difficult to assess accurately in a sick child with a painful swollen eye.

The most common intra-operative finding in exploration of the fronto-ethmoidal region for the treatment of orbital cellulitis was an area of periostitis on the medial orbital wall and even bone sequestration. Removal of these areas of infected friable bones usually revealed polyps packing the ethmoid (El-Silimy, 1987). Cellulitis, periostitis, subperiosteal abscess and early sequestrum formation, in their own right can lead to spreading cellulitis and oedema in the tightly-packed orbital contents, with a possible compression effect on the optic nerve and/or ophthalmic vessels. After all, it is a basic surgical principal that abscesses should be drained.

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