

PERIORBITAL SWELLING – COMPLICATION FROM ADJACENT STRUCTURES CASE REPORTS AND REVIEW OF LITERATURE

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SYNOPSIS

Three cases of orbital cellulitis arising from primary infection in the paranasal sinuses are presented and discussed. Multidisciplinary approach in arriving in the diagnosis and treatment either conservatively or surgically, prevented the dangerous complication of cavernous sinus thrombosis and blindness. Three illustrations of periorbital swelling with similar clinical appearance but from other causes are presented for comparison.

INTRODUCTION

Sinus infections are very common, but with the advent of antibiotics, the complications from these infections have greatly been reduced. Ethmoidal, frontal and maxillary sinuses are structures adjacent to the orbit and orbital cellulitis can develop from the spread of infections from any of these sinuses. In clinical presentation, orbital cellulitis mimics other conditions which presents the clinician with a difficult task of diagnosis and treatment. In view of this mixed presentation which originates from the various structures around the orbit, the diagnosis and treatment of orbital cellulitis is multidisciplinary involving the otolaryngologist, ophthalmologist and oral surgeon. Three cases are presented where the source of orbital swellings were from each of the three sinuses.

MATERIALS AND METHOD

CASE REPORT NO. 1

A 14 year old Indian boy was referred from the oral surgeon to the ophthalmologist in the University Hospital with a history of swelling of the right side of the face following a toothache off and on in the upper right first molar for the past four days.

On examination there was a firm and diffuse proptosis with swelling and tenderness around the right eye. The eye was partially closed with severe restriction of right ocular movements. The conjunctiva was chemotic with partial prolapse laterally (Figure 1). The pupil was semi-dilated with sluggish pupillary reaction. The visual acuity was 6/9. The cornea was bright and fundoscopy revealed no abnormality. Radiographs revealed a periapical lesion of the right upper

molar tooth and opaque maxillary antrum (Figure 2 and Figure 3). A diagnosis of orbital cellulitis secondary to dento-alveolar abscess was made and a swab taken. Together with dental consultation, the patient was started on Ampicillin 500 mg qid, Flagyl 400 mg qid and ephedrine nasal drops. Bacitracin eye ointment was applied qid to the eye to prevent exposure keratitis and secondary infection. The temperature was 102°F on admission and white blood cell count was 12,000. On the 3rd day, the temperature dropped to 99.4°F and the swelling started to subside. On the 4th day, proptosis improved and the chemosis decreased. The pupillary reflexes and the ocular movements returned to normal on the 5th day. Visual acuity was normal during this period. He had complete resolution on the 10th day. The antibiotics was discontinued and he was discharged home. A fortnight later, the upper molar tooth was extracted under local analgesia. The patient was followed up 2 months later and there were no residual complications.



Fig. I Chemotic Conjunctiva with partial prolapse laterally.

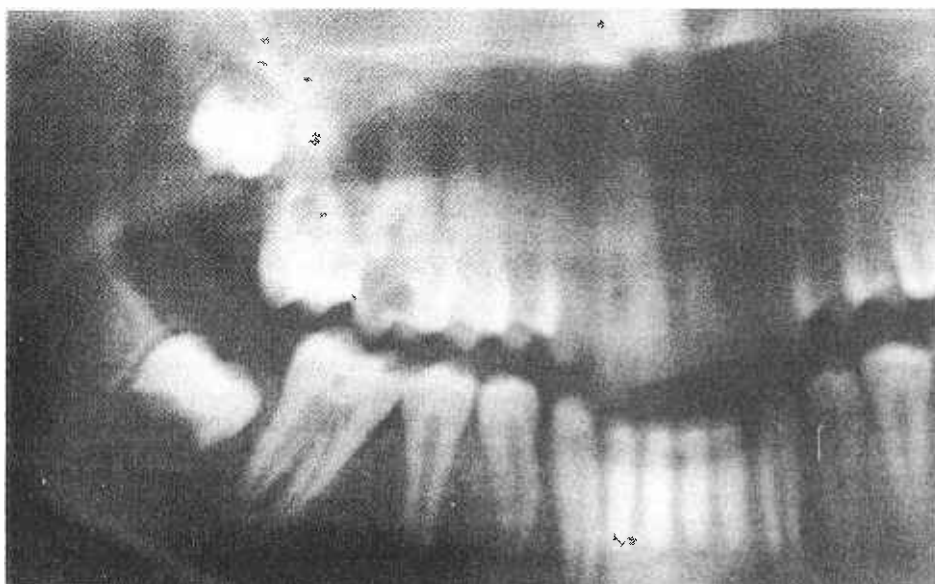


Fig. II Periapical lesion of the right upper molar tooth.

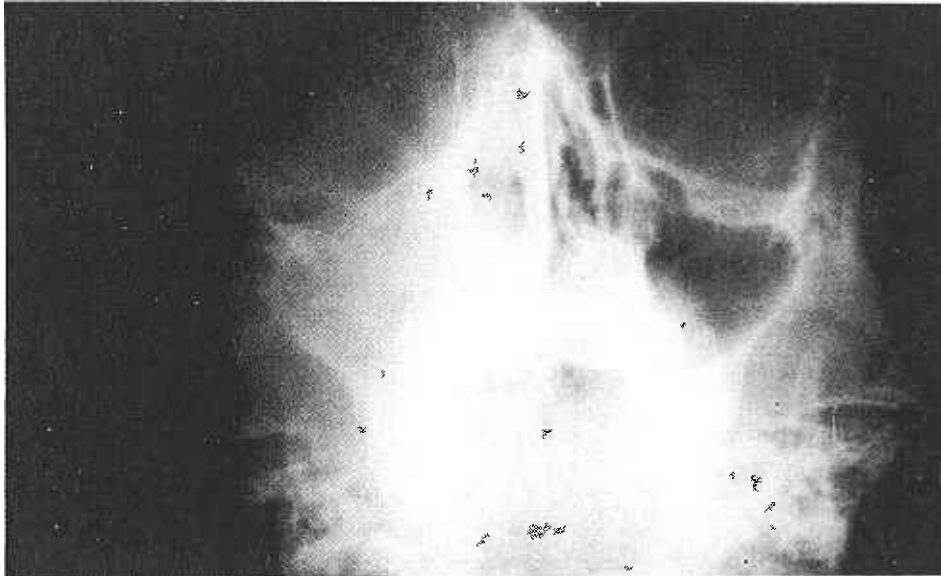


Fig. III Opaque right maxillary antrum

CASE REPORT NO. 2

A 28 year old Malay male presented himself to the eye clinic with a history of discomfort and irritation of his left eye for 3 days followed by swelling, ecchymoses and pain. On examination there was proptosis, chemosis and marked impairment of right ocular movements (Figure 4). Visual acuity was 6/12 corrected to 6/6 with refraction. Radiographs revealed diffuse clouding of the frontal and ethmoidal sinuses. After 4 days of conservative treatment there was no significant improvement. A superiosteal abscess was encountered and drained by an external ethmoidectomy. Complete recovery resulted within a week.

CASE REPORT No. 3

A 50 year old Malay male presented with a running nose,

headache and pain around the left eye of 3 days duration. On examination he had left proptosis, oedematous swelling of the lids, chemosis and moderate restriction of ocular movements (Figure 5). The cornea was bright, visual acuity was normal and fundoscopy revealed no abnormality. The temperature was 100.2°F and white blood cell count was 7,500. X-ray of the orbit showed clouding of the left frontal and maxillary sinuses. A culture of the left nasopharynx grew staphylococcus albus which was sensitive to Ampicillin. He was started on Ampicillin 500 mg qid decongestants were also prescribed. The diagnosis of orbital cellulitis secondary to acute sinusitis was confirmed. In addition, there was an underlying allergic rhinitis. A middle turbinate infraction and antral irrigations were performed. He was discharged well after 9 days and developed no further complications.



Fig. IV Marked proptosis and chemosis



Fig. V Proptosis, oedematous swelling of the lids and chemosis.

DISCUSSION

Of all the acute periorbital swellings, orbital cellulitis is the commonest cause in adults. 70-80% of orbital cellulitis of bacterial origin spread from the neighbouring structures (1). It is uncommon for an inflammatory condition to arise spontaneously in the orbit (2). Bacteria along with the foreign matter, may be implanted in the orbit by trauma, or occasionally the orbit, may be the site of blood borne metastatic focus of infection during the course of systemic illness (2). For more commonly, however, the orbital inflammation occurs as a spread from neighbouring structures such as skin of the lids, the teeth and paranasal sinuses. In the adult, frontal and less commonly maxillary sinusitis are the causes but in children ethmoidal sinusitis is more common (3).

When the sinuses are the primary site of inflammation, the infection can spread to the orbit by one of the two major routes along the venous system as peri or thrombophlebitis and direct spread through the thin bone separating the sinuses from the orbit (2). They may give a history suggestive of recent sinus infection. As the infection progresses, conjunctival chemosis and immobility of the globe appear due to oedema. Vision is usually not affected at this stage unless a vascular occlusion has occurred (2). This presents a problem for the clinician to distinguish between primary orbital disorders and those appearing as secondary manifestations of sinus diseases. It should be remembered that proptosis is not caused by iritis, glaucoma, endophthalmitis or any other intraocular pathology. When it is unilateral it may be difficult to differentiate at the early stage but with radiograph and C.T. Scan it can be differentiated (5). For differential diagnosis of orbital cellulitis, septic cavernous sinus thrombosis and superior orbital fissure syndrome should be considered (Table I). The origin of acute periorbital swelling is not always evident. Other than the above mentioned, infections of the lacrimal sac and the nasal vestibule should be considered (6). The diagnosis should be arrived after consultation with the otolaryngologist and oral surgeon. The cloudy opaque appearance of the sinuses in the radiograph gives a clue. History of trauma, a recent upper

respiratory tract infection, bronchitis or recurrent sinusitis may also be helpful in the diagnosis.

The question of treatment for orbital cellulitis is either conservative or surgical. Conservative treatment with massive antibiotic therapy, nasal congestant and hot compresses should commence immediately. Culture should be taken from the sinuses but one should not wait for the results before beginning antibiotic therapy. It is important to watch for signs of improvement once the regime has been started. According to Welsh, (7) two main criteria for surgery are failure of medical treatment which is characterised by persistent toxicity, fever, headache, continued oedema, proptosis, chemosis and progression of infection which is characterised by orbital abscess, sinus involvement and intracranial extension. In their series they found that young children below 10 years old have been successfully treated medically. As the age of the patient increases, there is less success with aggressive medical treatment. In the adults surgical procedures such as frontal trephine, external ethmoidectomy in conjunction with drainage of orbital abscesses and intranasal antrostomy may be required.

The sequelae of the orbital complications from sinusitis are resolution, or it can lead to septic cavernous sinus thrombosis, blindness and death (8). Blindness may occur in treated as well as untreated patients (9). Donahue describes the actual sequences of events which produced blindness and intraocular changes in a patient with orbital cellulitis (10). He concludes that the loss of vision in these cases (and probably in the majority of cases in which impairment of vision follows a condition that produces extreme congestion and oedema within the orbit together with proptosis of the eyeball) was due to obstruction of the blood flow through a retinal artery brought about by compression and constriction of this artery by external congestion and oedema.

Cavernous sinus thrombosis is a common sequela due to the extensive two way venous communication between the face, nasal cavity, pterygoid region and the sinuses by the absence of valves in the ophthalmic venous system (inferior and superior ophthalmic veins) (11).

TABLE 1
Differential Diagnosis of Orbital Cellulitis

	Orbital Cellulitis	Cavernous Sinus Thrombosis	Superior orbital fissure syndrome
Onset	gradual	acute and rapid	acute and rapid
Origin	Infections from paranasal sinuses, eyelids, tonsils, middle ear and teeth, spread directly or by veins	Infection spreading via ophthalmic, facial or pterygoid plexus of veins	Narrowing or compression of the fissure by cellulitis
Sides affected	Unilateral	Initially unilateral rapidly progressing bilaterally	Unilateral
Signs and symptoms	Oedema of eyelids, ptosis, proptosis and chemosis	Oedema of eyelids, ptosis, proptosis and chemosis	Motor and sensory changes of the 3rd, 4th and 6th nerve areas
Limitation of extra ocular movement	Due to congestion of oedema and retrobulbar pressure from infection	Due to involvement of III, IV and IV nerves	III, IV and VI nerve damage
Additional features	May also present with optic neuritis, atrophy or blindness.	Meningitis or meningeal irritation	Optic nerve is consistently spared. Loss of corneal reflex.

Compiled from Ref. 11

CONCLUSION

When there is an acute orbital swelling one should consider infections from the adjacent structures. Hence this should be viewed as a multi disciplinary approach and a consultation with the otolaryngologist and oral surgeons is mandatory so that treatment could be instituted promptly to prevent the tragic sequela of septic cavernous sinus thrombosis, blindness and death.

ACKNOWLEDGEMENT

The author would like to thank the Medical Illustrations for the photographs and Ms T.C. Yap for her secretarial work.

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