

ORBITAL COMPLICATIONS OF ACUTE SINUSITIS

S Elango, T N Krishna Reddy

ABSTRACT

Orbital complications of sinusitis may occur either by spread along the venous system or by direct extension of infection between contiguous structures. The association between sinusitis and inflammation of the orbits has been known for centuries. But in the post antibiotic era there is a marked decline in the number of case reports in the literature. This paper presents 10 cases of sinusitis who had orbital complications. The classification of antibiotics as given by Chandler helps in planning the treatment. Groups I and II respond very well to antibiotics but in groups III, IV, V surgical intervention is necessary. Early identification and aggressive therapy reduces the morbidity of this disease.

Keywords : Acute sinusitis, orbital complications

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INTRODUCTION

The orbital complications of sinusitis is well established and has been described even during the days of Hippocrates⁽¹⁾. Since the advent of antibiotics there is a marked decline in the number of case reports. This paper presents 10 cases of sinusitis who had orbital complications. A review of the anatomy, clinical features and recent literature search on this topic is also done.

MATERIALS AND METHODS

The medical records of University Hospital, Universiti Sains Malaysia from 1986 to 1988 were reviewed and 10 cases were noted to have sinusitis with orbital complications.

RESULT

Nine of these cases were children, 5 of them below 5 years of age and the youngest one being 20 days old (Fig 1). The ethmoid sinus was the most frequently involved (80%), although more than one sinus was often diseased. The orbital complications were classified according to Chandler⁽²⁾ (Table I and II).

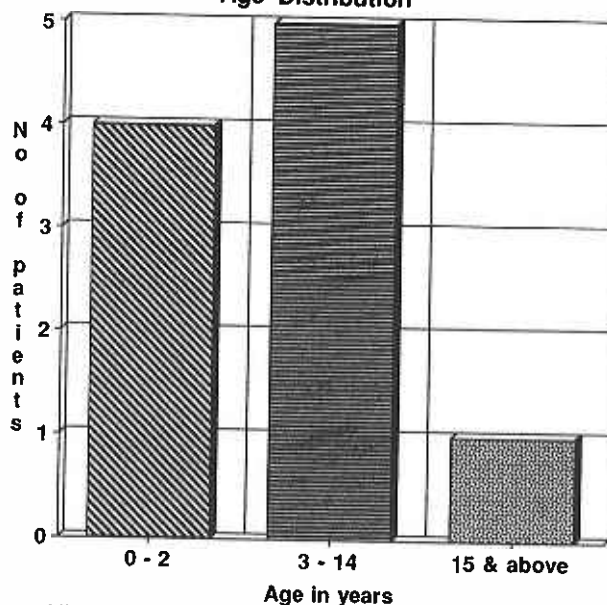
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Fig 1
Age Distribution



All the 4 cases of orbital cellulitis were less than 2 years and all of them improved with antibiotics without any surgical intervention. Six of our patients needed surgical intervention (Table III).

In most of the cases more than one surgical procedure were carried out. All the cases except one had complete recovery with treatment. The case of cavernous sinus thrombosis had reduced vision even after treatment. Case summaries of 2 of these cases are given below.

Case 1 : An 11-year old girl presented with left eye swelling and blurring of vision of 4 days duration. On examination she had proptosis of the left eye and her left eyeball movements were restricted. Her left lower eyelid was indurated and inflamed. There was chemosis of the conjunctiva. Examination revealed pus in the left middle meatus and thick purulent post nasal drip. Plain sinus films demonstrated left pansinusitis. CT scan (Fig

Table I
Classification of Orbital complications of Sinusitis

Group I	Inflammatory Oedema	Eyelids oedematous but usually not tender.
Group II	Orbital cellulitis	Diffuse oedema and inflammation of orbital contents without abscess formation.
Group III	Subperiosteal abscess	A discrete collection of purulent exudate between the periorbital and bony orbital wall with exophthalmos and chemosis
Group IV	Orbital abscess	A discrete collection of purulent exudate within the orbital tissues with marked exophthalmos, chemosis and visual impairment.
Group V	Cavernous sinus thrombosis	Proptosis, globe fixation, severe loss of visual acuity, progression of symptoms to the opposite eye.

Table II
Stages of disease

	No. of cases
Orbital cellulitis (Group II)	4
Subperiosteal abscess (Group III)	3
Orbital abscess (Group IV)	1
Cavernous sinus thrombosis(Group V)	1
Pappilitis	1
Total	10

Table III
Surgical Treatment given

Type of surgery	No. of cases
Incision and drainage	4
Frontal sinus trephining	1
Ethmoidectomy	2
Intranasal antrostomy	5

2 and 3) confirmed the above findings and also suggested subperiosteal abscess in the left orbit. A diagnosis of subperiosteal abscess in the left orbit secondary to

Fig 2
C T Scan

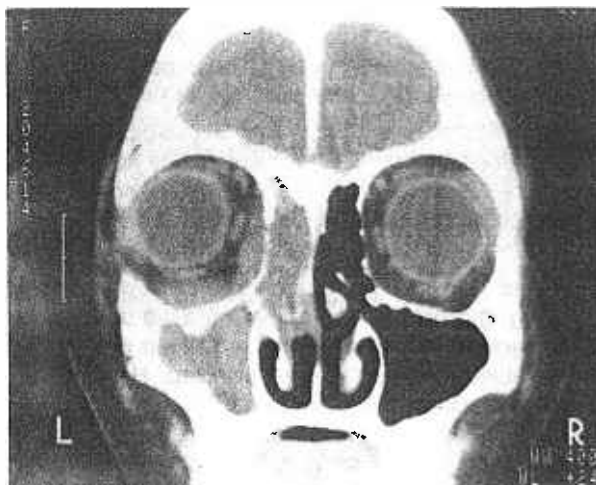


Fig 3
C T Scan



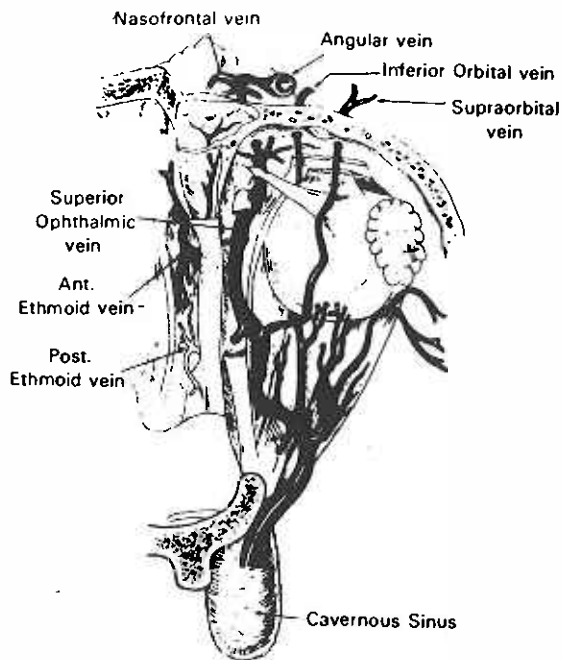
sinusitis was made. The subperiosteal abscess was drained and orbital periosteum was found intact. Left ethmoidectomy and antrostomy were performed and frank pus drained from these sites. Sinus aspirates and blood culture grew *Staphylococcus aureus*. She was maintained on intravenous ampicillin and cloxacillin. Post operative period was uneventful and there was complete resolution of orbital and sinus symptoms.

Case 2 : A 7-year old boy presented with fever of 10 days duration and progressive deterioration of vision on the right side. He also had right nasal discharge and purulent post nasal drip. On examination there was no proptosis, no chemosis and eye ball movements were normal. Fundoscopy showed blurring of the disc margins and vessel engorgement on the right side whereas the left side was normal. Examination of the nose revealed pus in the right middle meatus. Plain sinus film showed haziness of the right maxillary sinus. CT scan confirmed the involvement of right maxillary sinus. A diagnosis of Pappilitis secondary to right maxillary sinusitis was made. Right intranasal antrostomy was done and thick mucopurulent discharge was drained out. Sinus aspirate grew *Hemophilus influenzae*. He was maintained on intravenous ampicillin and cloxacillin. Post operatively his vision improved gradually and after one month vision was normal.

DISCUSSION

The main contributing factor for orbital involvement in cases of sinusitis is the close proximity of the orbit and its contents to the paranasal sinuses. Superiorly, the orbit forms the floor of the frontal sinus and inferiorly, the roof of the maxillary antrum. The medial wall of the orbit is formed by the frontal process of the maxilla, the lacrimal bone, the lamina papyracea of the ethmoid and a small part of the sphenoid bone. The lamina papyracea is thin and paper-like. Sometimes the lack of complete ossification of the medial orbital wall results in dehiscence in the medial wall with only orbital periosteum separating the orbital contents from the ethmoids. Another factor for the involvement of the orbit in sinusitis is because of the valveless ophthalmic veins which communicate with paranasal sinuses (Fig 4). The superior ophthalmic vein drains directly into the cavernous sinus, so any infection in the paranasal sinus can cause cavernous sinus thrombosis.

Fig 4
Valveless ophthalmic veins



Incidence

The orbital complications of sinusitis is found more commonly in children. Schramm⁽³⁾ has reported 134 patients with orbital complications of sinusitis of which three fourths of the patients were under 16 years of age and of whom one third were under 4 years of age. Fearon⁽⁴⁾, in a paediatric study has reported that 50% of the patients were under the age of six. Henryk Gans⁽⁵⁾ has quoted the incidence of orbital complications in sinusitis a range of 0.5% to 3.9%. Schramm⁽³⁾ has reported that 84% of patients admitted for acute orbital or periorbital cellulitis were caused by acute sinusitis.

Bacterial Aetiology

In most of the studies Hemophilus influenza was found to be the commonest organism cultured from blood⁽³⁾. In Schramm's series blood cultures were positive most frequently in young children and much less often in adults. 30% of children under 5 years of age were noted to have bacteraemia. In his series⁽³⁾ Hemophilus influenza was the most common organism in children followed by Diplococcus pneumonia, beta hemolytic streptococcus and Staph. aureus. In adults, diplococcus pneumonia was found to be the commonest organism followed by streptococcus. In Hawkins' series⁽⁶⁾ 58% of patients had positive blood culture and of these 42% grew Staph. aureus and 21% Hemophilus influenza. In our series Hemophilus influenza was the commonest organism isolated (in 4 cases) followed by Staph. aureus (in 2 cases).

Sinuses involved

The ethmoidal sinus was affected in more than 75% of patients with orbital complications. The maxillary sinus was the next sinus to be commonly involved followed by

frontal sinus. The reason orbital complications are common in children of less than 5 years of age is that the ethmoidal sinus is well developed and the frontal sinus not developed fully.

Radiography

The plain sinus film will be useful in older children and adults, but in children under 2 years of age there is considerable variation in the interpretation of roentgenograms⁽³⁾.

Ultrasonography

The ability to discriminate between mucosal thickening and retained secretions and lack of use of ionizing radiation has resulted in many centres using this procedure routinely for these cases. The abscesses in the anterior orbit or medial wall were detected in 90% of cases by B. Scan⁽³⁾. Ultrasound was done in only 3 of our cases.

CT Scan

CT scan can detect and delineate the extent of involvement and demonstrate abscess in the orbit. CT scan is recommended 1) when clinically an abscess is suspected, 2) when orbital cellulitis has not responded to medical therapy in 24 hours and 3) in patients with decreasing visual acuity. CT scans were 82% accurate in determining appropriate initial management⁽⁷⁾. Frequently CT scan has been noted to underinterpret the actual severity of disease. CT scan underestimated disease severity (false negative) 50% of the time when orbital cellulitis was diagnosed⁽⁷⁾. CT scan was done in 5 cases in the present series. We were able to interpret the actual severity of disease in 4 cases (80%).

Treatment

The first line of treatment suggested in all these series was intravenous antibiotics^(3,5). Penicillin, ampicillin, cephalothin and amoxycillin intravenously has been recommended. A majority of the patients belonging to Group I and Group II (Chandler) improved with antibiotics alone without surgical intervention. All our patients in these groups (I and II) improved with antibiotics alone (intravenous ampicillin and cloxacillin); 72% of cases in Schramm's series and 73% of cases in Gans' series improved with antibiotics alone^(3,5). The surgical intervention was indicated in patients belonging to Group III, IV and V (Chandler) or in whom there is significantly impaired vision or worsening visual acuity while on antibiotic therapy. The frequency of surgical intervention was 21% in Schramm's series, 27% in Gan's series and 28% in Giletto's series⁽⁸⁾. The frequency of surgical intervention increases with the age of the patient. The surgical intervention may be in the form of (a) incision and drainage of orbital abscess (b) intra nasal antrostomy (c) frontal sinus trephining and (d) ethmoidectomy. Recognition of this complication and immediate treatment will avoid serious sequelae.

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