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Orbital Complications of Sinusitis A Review

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Abstract:

Introduction:

Despite availability of excellent antibiotics, orbital complications' following sinusitis is rather common. With the emergence of fungal sinusitis orbital involvement by the disease is getting frequent. Prevalence of life style disorders like diabetes mellitus has added to the woes. This article attempts to review the entire gamut of orbital complications following sinus infections.

Aim:

This study aims at analyzing orbital complications following sinusitis at Government Stanley Medical College Hospital during the period 2009 – 2013.

Study design: Retrospective study

Methodology:

Cases with rhinosinusitis treated in our Institution during the period 2009-2013 were taken up for analysis. 112 patients were chosen for the study. Their case records were analyzed. CT scan images taken during the time of admission were also evaluated. Patients with orbital

complications following rhinosinusitis were included. Chandler's classification was used to categorize the stage of disease.

Results:

112 patients were included in the study.

76 Male patients

36 Female patients

26 patients developed orbital complications

Number of male patients with orbital complication – 22

Number of female patients with orbital complication – 4

Number of patients who died due to complications - 2

Conclusion:

High degree of suspicion, early diagnosis and aggressive medical management of Chandler's categories I and II will go a long way in preventing irreparable damage to vision. All our patients were managed initially with parenteral antibiotics. Patients who do not show improvement even after 4 days of antibiotic therapy were taken up for surgical management.

Introduction:

Orbital complications following sinusitis are not uncommon [1] despite the availability of excellent antibiotics. Common occurrence of fungal sinusitis is adding to the problem of orbital complications. Lamina papyracea (thin paper like bone) separates orbit from ethmoidal sinuses. This thin lamina is easy to breach during infections involving paranasal sinuses. Complications following sinusitis could affect the orbit and its contents. Orbital complications are seen both in acute and chronic infections of sinusitis. Prior to antibiotic era orbital complications following rhinosinusitis was rather common about 26%. With the advent of excellent antibiotics this figure has come down to less than 5% [1].

Orbital complications following sinusitis is seen due to:

1. Anatomical proximity of paranasal sinuses to the orbit
2. The thinness of lamina papyracea which separates nasal cavity from orbit. This bony plate contains numerous thin blood vessels which allow active and rapid spread of infection to the orbit.
3. Palpebral vessels do not contain valves. These vessels travel parallel with the lamina papyracea.
4. Periorbita is a strong barrier to spread of infections into orbit. This gives the clinician much needed time to handle the problem of orbital infection.

Appearance of edema in the corner of eye in a patient with acute sinusitis should always be viewed with suspicion.

Classification of orbital complications:

Classification of orbital complications will help otolaryngologist in devising optimal treatment modality. Ideal classification system needs to take into consideration the anatomy of orbit and the mechanism causing it. Hubert was the first to embark on scientific classification of orbital complications following sinusitis [3]. He based his classification on anatomy of orbit, perceived progression of infection, responsiveness to treatment and general prognosis. This classification system was fine tuned by Chandler[2].

Chandler grouped his patients under 5 heads [5]:

1. Group I – Preseptal cellulitis
2. Group II – Orbital cellulitis
3. Group III – Subperiosteal abscess
4. Group IV – Orbital abscess

5. Group V – Cavernous sinus thrombosis

Group I (Preseptal cellulitis): This is actually inflammatory oedema anterior to orbital septum causing the eyelids to swell. This condition is caused due to restricted venous drainage. The eyelids though swollen are not tender. Since the inflammation doesn't involve postseptal structures there is no chemosis, Extraocular muscle movement limitations and vision impairment. Proptosis may be present to a mild degree.

Group II: Orbital cellulitis causes pronounced oedema and inflammation of orbital contents without abscess formation. It is imperative to look for signs of proptosis and reduced ocular mobility as these are reliable signs of orbital cellulitis. Chemosis is usually present in this group. Loss of vision is very rare in this group, but vision should be constantly monitored.

Group III: In this group abscess develops in the space between the bone and periosteum. Orbital contents may be displaced in an inferolateral direction due to the mass effect of accumulating pus. Chemosis and proptosis are usually present. Decreased ocular mobility and loss of vision is rare in this group.

Group IV: Orbital abscess usually involves collection of purulent material within the orbital contents. This could be caused due to relentless progression of orbital cellulitis or rupture of orbital abscess. Severe proptosis, complete ophthalmoplegia, and loss of vision are commonly seen in this group of patients.

Group V: Cavernous sinus thrombosis – Development of bilateral ocular signs is the classic feature of patients belonging to this group. These patients classically manifest with fever, headache, photophobia, proptosis, ophthalmoplegia and loss of vision. Cranial nerve palsies involving III, IV, V1, V2 and VI are common.

Schramm's modification of Chandler's classification:

Schramm after studying his patients classified those patients with preseptal cellulitis with chemosis as a separate entity. Prognostically he placed these patients between Chandler's group I and group III patients. Schramm considered these patients as a separate entity as they did not consistently improve with antibiotics and surgery needs to be advocated [6].

Moloney's modification of Chandler's classification [7]:

Moloney modified Chandler's classification by according lower priority to preseptal orbital infections. In a nutshell he divided orbital complications into preseptal and postseptal complications.

Most common origin of orbital complication is ethmoiditis. This is followed by frontal and maxillary sinusitis. Orbital complications following ethmoiditis are rather common in young children.

Methodology:

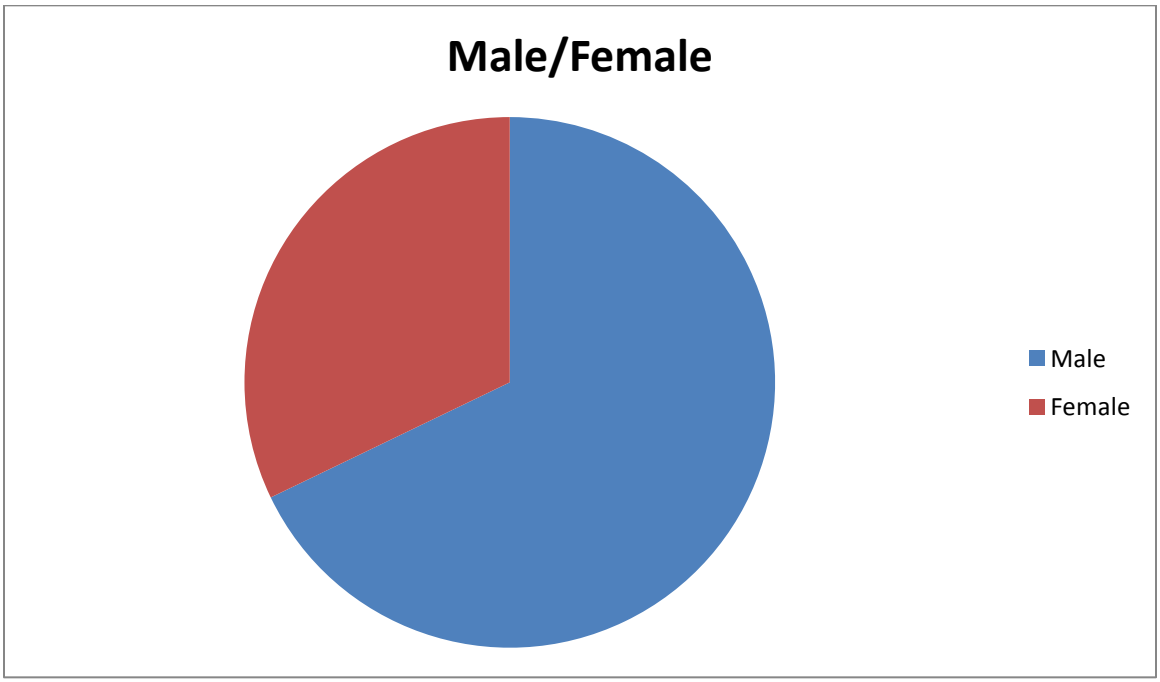
This study was based on review of hospital records during the period 2009-2013. About 112 cases of sinusitis were selected for the study. Majority of these patients were admitted for sinus surgical procedures.

Case sheets and imaging results were used to study these patients.

Even though a number of classification systems are available in classifying patients with orbital complications following sinusitis, Chandler's classification was used because of its simplicity and wide acceptance.

2 cases that developed preseptal cellulitis following endoscopic sinus surgery were excluded from the study.

Results:



Graph showing Male to Female ratio of patients taken up for study

Patients with intracranial complications were excluded from our study.

Among 112 patients with sinusitis taken up for study 100 patients were admitted for surgical intervention, while 12 were admitted for intravenous administration of antibiotics.

Among 112 patients taken up for study 26 patients had developed orbital complications following sinus infection. CT imaging was used to identify these patients.

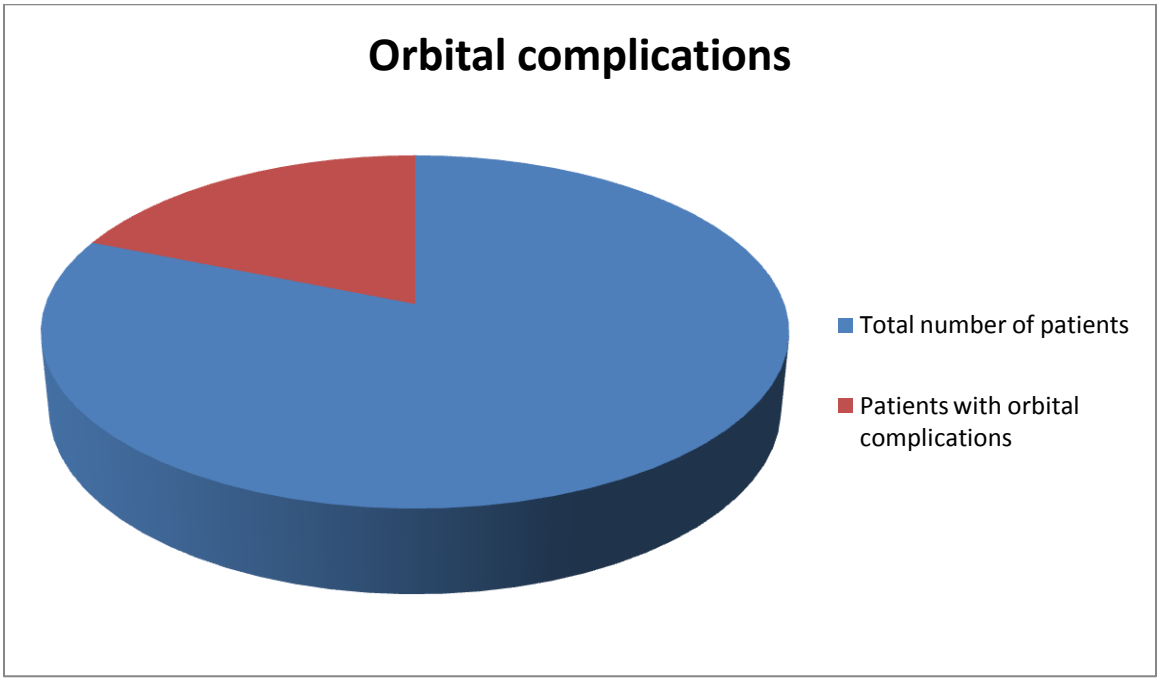


Chart showing total number of patients admitted for sinusitis with orbital complications

All these patients were evaluated by ophthalmologist.

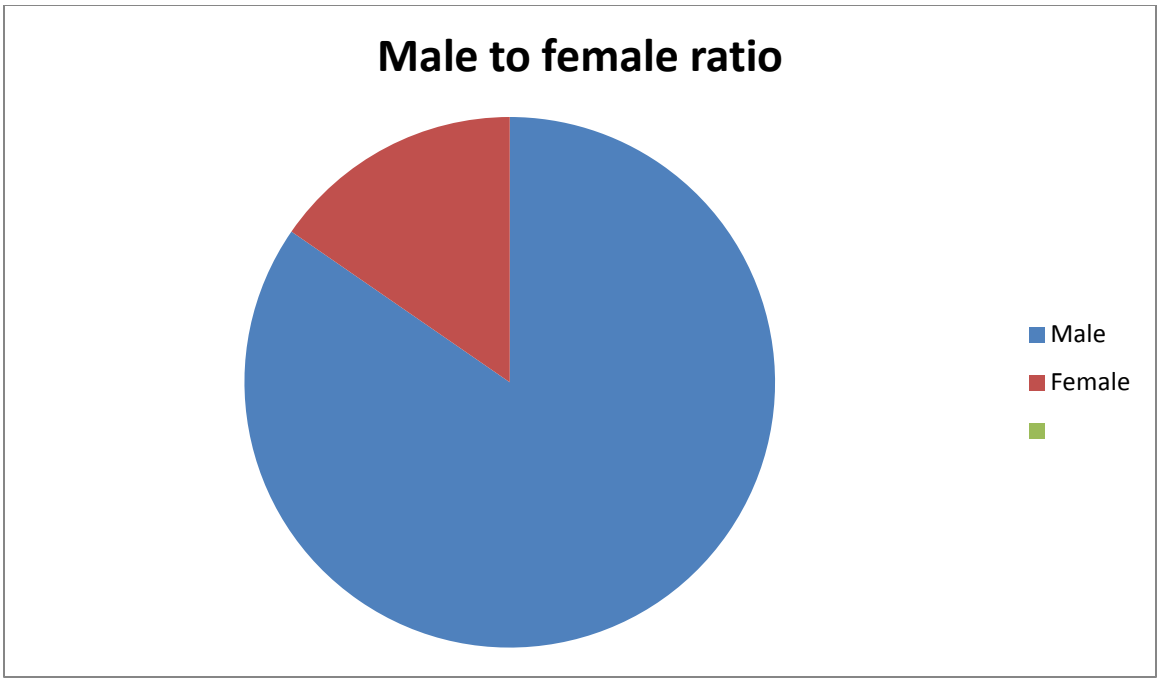
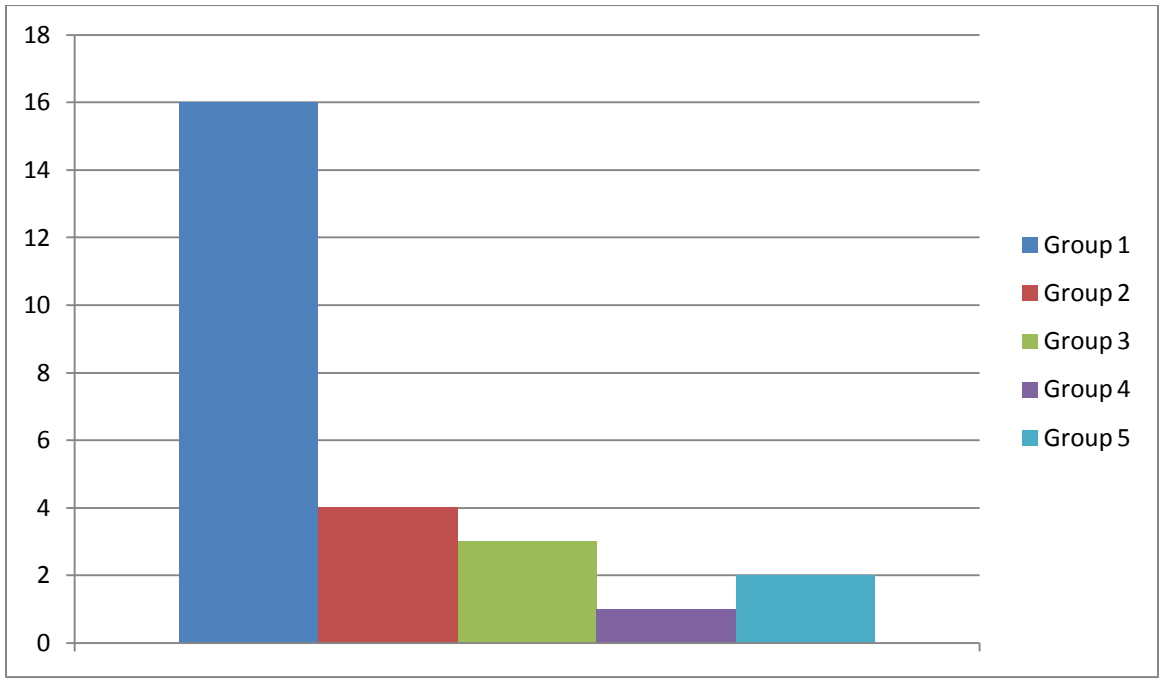


Chart showing number of males and females who presented with orbital complications following rhinosinusitis

Orbital complications classified as per Chandler's classification

Chandler group 1	Chandler group 2	Chandler group 3	Chandler group 4	Chandler group 5
16	4	3	1	2



Graph showing number of patients falling in to various groups of Chandler's classification

Majority of our patients belonged to Chandler's group I and II (20).

Patients belonging to Chandler's group I and II were managed conservatively with parenteral antibiotics. These patients recovered without residual morbidity.

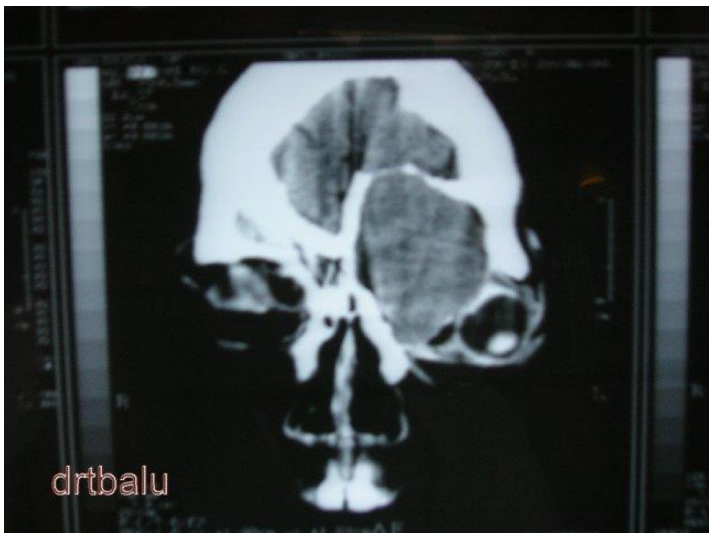
Patients belonging to Chandler's group III were managed by endoscopic drainage of the abscess cavity through the nasal cavity under cover of antibiotics.

One patient in Chandler's group IV was managed with endoscopic drainage of abscess through nasal cavity under cover of antibiotics.

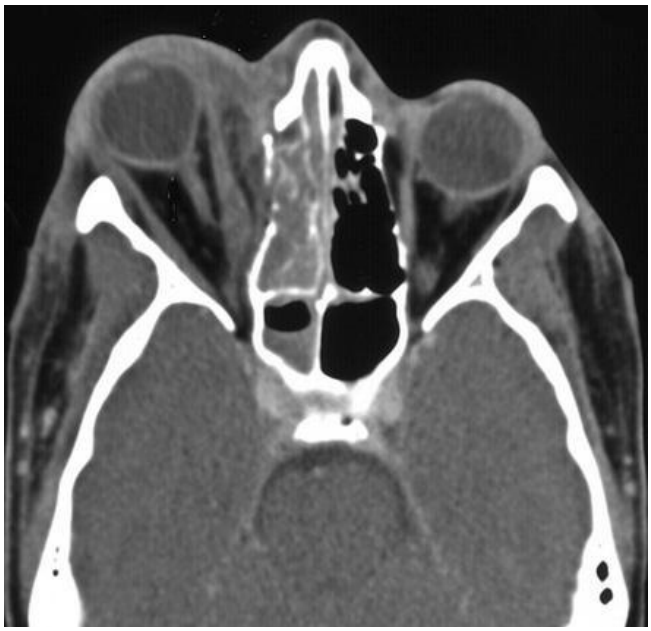
Two patients with cavernous sinus thrombosis following sinusitis were managed conservatively. Both of these patients had loss of vision on admission.

All of our patients belonging to Chandler's classification categories I, and II were managed conservatively with a course of parenteral antibiotics. If they did not show significant clinical improvement within 5 days after treatment, they were taken up for surgery. One patient who belonged to Chandler classification category IV was managed surgically immediately on admission.

2 patients belonging to chandler's category V died on the 6th day of admission.



Coronal CT scan showing proptosis due to frontal sinus mucocele



Axial CT image showing ethmoidal sinusitis causing orbital cellulitis

Image showing a patient with orbital involvement following sinusitis

Image showing a patient with orbital cellulitis following sinus infection

Image of a patient with orbital cellulitis

Among the patients taken up for study 6 patients had allergic fungal sinusitis with orbital complications.

Discussion:

Incidence of orbital complications following rhino sinusitis is on the decline. Our studies revealed that more and more patients were identified fairly early during the course of the disease and treated.

Reasons for orbital complications following sinusitis:

1. Lamina papyracea (thin bone that separates orbit from the nasal cavity) can easily be breached by infections. It contains multiple thin walled blood vessels through which infections can reach the orbit.
2. Orbit is closely related to nose and sinuses

Majority of our patients were males. May be female immune system is more efficient than male in combating infections [8].

CT imaging proved very vital in clinching the diagnosis.

Our study also revealed that allergic fungal sinusitis is emerging as an important cause for orbital complication.

Cavernous sinus thrombophlebitis is a difficult condition to treat. In the pre antibiotic era mortality was 100%. The advent of excellent antibiotics has made a difference in the mortality rate. Since our patients presented very late in a comatose stage both of them died on the 6th day of admission.

Conclusion:

High degree of suspicion, early diagnosis and aggressive medical management of Chandler's categories I and II will go a long way in preventing irreparable damage to vision. All our patients were managed initially with parenteral antibiotics. Patients who do not show improvement even after 4 days of antibiotic therapy were taken up for surgical management.

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