

## Orbital Complications of Rhinosinusitis

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#### SUMMARY

**Background:** Suppurative extension of rhinosinusitis to the orbit is a complication that often results from delay in diagnosis and, or inadequate treatment. These complications may range from preseptal cellulitis, orbital cellulitis, orbital abscesses, and subperiosteal abscesses to intracranial extension with a threat to both vision and life. This study aims to review the clinical profile, treatment modalities and outcome of orbital complications of rhinosinusitis in Ibadan, Nigeria.

**Method:** A retrospective review of the charts of patients with orbital complications of rhinosinusitis managed in the departments of Otorhinolaryngology and Ophthalmology, University College Hospital, Ibadan over a five year period (Feb 2002- Jan 2007) was carried out. The diagnosis of rhinosinusitis was based on history, physical examination, plain x ray and CT scan findings and antral puncture. Demographic data, clinical presentation and treatment were evaluated.

**Results:** A total of 24 patients were reviewed in the study. There were 13males and 11females (M/F, 1:1). The age range was 8months to 75years, 14 (58.3%) patients were children and while 10 (41.7%) patients were adults. 75% of the patients were seen during the dry season (November to February). The duration of symptoms ranged from one day to three weeks. Involvement of one eye occurred in 14 patients (58.3%); right eye (4), left eye (10). Both eyes were involved in 10 patients (41.7%). Non-axial proptosis was seen in 8 patients (33.3%). It was infero-lateral in 6 patients (25%) and infero-nasal in two (8.3%) patients. Orbital cellulitis was seen in 10 (41.7%) patients, 6 (25%) patients had preseptal cellulitis while 8 (33%) patients had orbital abscess. Cavernous sinus thrombosis was seen in 3 (12.5%) patients. The cases with preseptal and orbital cellulitis were effectively managed by intravenous antibiotics. Orbital abscesses were drained surgically with complete resolution. Sinus surgical procedures were done in 10(41.7%) patients. This group of patients had preoperative visual acuity of between 6/6 and 6/60. They all had complete resolution of proptosis and good visual outcome.

**Conclusion:** Orbital complications of acute rhinosinusitis are common in children. Surgical drainage and aggressive medical management remain the standard to achieve a good prognosis and visual outcome.

#### INTRODUCTION

Rhinosinusitis is the inflammation of the mucous membrane of the nasal cavity and the paranasal sinuses. It can be classified into acute, subacute, and chronic on the basis of duration of symptoms [1]. Any of these classes can give rise to complications, which usually are related to the local region of the affected sinus. These include orbital complications, osteomyelitis of the frontal bone or maxilla and intracranial complications [2]. The paranasal sinuses are closely related to the orbit, the lateral wall of the ethmoidal sinus is the lamina papyracea, which is also the “paper-thin” medial wall of the orbit [2]. The floor of the orbit forms the roof of the maxillary sinus [3]. The frontal sinus sometimes also extends into the roof of the orbit [3].

According to Chandler orbital complications of rhinosinusitis can be classified into five groups namely: preseptal cellulitis, orbital cellulitis, subperiosteal abscess, orbital abscess and cavernous sinus thrombosis [4]. The treatment is both medical and surgical therapy.

Orbital complications have been identified by Ogunleye et al to occur in 41% of cases of paranasal sinusitis [5]. Wulc et al reported that sinusitis was

responsible for orbital infection in 75-78% of a large series of patients with orbital cellulitis [6].

This study aims to review the clinical profile, treatment modalities and outcome of orbital complications of rhinosinusitis in Ibadan, Nigeria.

#### METHODS

A retrospective review of the charts of patients with orbital complications of rhinosinusitis managed in the departments of Otorhinolaryngology and Ophthalmology, University College Hospital, Ibadan over a five year period (Feb 2002- Jan 2007) was carried out. The diagnosis of rhinosinusitis was based on history, physical examination, plain and CT scan x ray findings and antral puncture.

Demographic data, clinical presentation, sinus involvement, type of orbital complication and treatment were evaluated.

#### RESULTS

A total of 24 patients were reviewed in the study. There were 13 males and 11females (M/F, 1:1).

The age range was 8months to 75years.14 (58.3%) patients were children (younger than 14years), while

10 (41.7%) patients were adults. 75% of patients were seen during the dry season (November to February).

The presenting complaints included fever, recurrent history of rhinorrhea, nasal obstruction or blockage, hyposmia, eye discharge, facial pain or fullness, periorbital swelling, impairment of vision, redness of the eyes, painful and impaired movement of the eye(s), protrusion of the eyes. Table I.

**TABLE 1:** The duration of symptoms ranged from one day to three weeks.

Fever	24
Eye Discharge	14
Progressive loss of vision	6
Progressive proptosis Right eye	6
Left eye	6
Both eyes	12
Visual Acuity: 6/6 – 6/60	8
Light perception	2
No light perception	4
Restricted extra ocular eye movement	12
Fixed and dilated pupils	12
Headache	6
Rhinorrhea	20
Nasal obstruction	2
Snoring	2
Mouth breathing	2

Plain x-ray and CT scan findings includes: air-fluid level, opacification, mucosal thickening, erosion or destruction of the wall of the involved sinuses. The sinuses involved were ethmoid sinus in 15(66.6%) patients, frontal sinus in 10(41.6%) patients, maxillary sinus in 8(33.3%) patients and sphenoid sinus in 4(16.6%) patients. One (4.1%) patient also had concurrent frontoethmoidal mucocele. Other findings were hyperaemia of nasal mucosa, engorged inferior turbinate, and posterior nasal drip.

Involvement of one eye occurred in 14 patients (58.3%); right eye (4), left eye (10). Both eyes were involved in 10 patients (41.7%). Non-axial proptosis was seen in 8 patients (33.3%). It was infero-lateral in 6 patients (25%) and infero-nasal in two (8.3%) patients.

The degree of proptosis was 2 to 15 mm with mild to severe painful restriction of extra-ocular muscle movement. Two patients (8.3%) had only light perception while 2 other patients had no light perception. The pupils were fixed and dilated in 6(20%) patients. Optic nerve involvement was seen in 3(16.6%) patients with retinal oedema and engorged veins. One patient had features suggestive of ischemic optic neuropathy, central retinal artery and vein occlusion and HIV retinopathy. Orbital cellulitis was seen in 10 (41.7%) patients, 6 (25%) patients had preseptal cellulitis while 8 (33%) patients had orbital abscess. Cavernous sinus thrombosis was seen in 3 (12.5%) patients.

One (4.1%) patient was found to be positive on HIV screening and had chest x ray features suggestive of pulmonary tuberculosis.

The cases with preseptal and orbital cellulitis were effectively managed by intravenous antibiotics. Orbital

abscesses were drained surgically with complete resolution. Sinus surgical procedures like frontoethmoidectomy, Caldwell Luc and intranasal antrotomy were performed in 10(41.7%) patients. This group of patients had preoperative visual acuity of between 6/6 and 6/60. They all had complete resolution of proptosis and good visual outcome.

Postoperatively, proptosis regressed spontaneously within one week of surgery in 8 (85%) out of the 10 patients that were operated. By fourth week post surgery, there was complete regression of proptosis with improvement of visual acuity from 6/5 to 6/9. Those with intracranial complications were referred to the Neurosurgery clinic for follow up after discharge.

## DISCUSSION

Infection spread to the orbit either from direct extension or defect in the thin wall of the paranasal sinuses (especially lamina papyracea), local thrombosis, and direct extension of preseptal cellulitis through the orbital septum or haematogenous seedlings [7]. The orbital complications are preseptal cellulitis, orbital cellulitis, orbital abscess, subperiosteal abscess [7].

Orbital cellulitis is an inflammation of the soft tissue of the eye posterior to the orbital septum [7]. It may lead to optic nerve compression, panophthalmitis, meningitis extradural, subdural or intracerebral abscess and cavernous sinus thrombosis [2].

Orbital complication of acute rhinosinusitis typically affects children and young adults [6] but delayed diagnosis in all age groups is a threat to both vision and life [8] and are therefore regarded as medical emergencies.

In this study our findings correlate well with the previous studies which reported that one of the most common complications of acute rhinosinusitis is orbital cellulitis [8, 9]. A higher frequency of presentation was seen between November and February similar to what was reported by Ubah *et al* [10]. This may be due to the dry weather during this period associated with dryness causing irritation leading to inflammation and nasal obstruction with subsequent rhinosinusitis. The orbital complications were commoner in children in the study population similar to what has been previously documented in the literature [6]. The ethmoid sinus (66.6%) was most commonly involved; however this contrasts to previous work by Ubah *et al* which reported the maxillary sinus to be the most common [10]. The role of ethmoiditis as the cause of orbital complications as been ascribed to the valve less venous connections between these cavities and the thin, sometimes dehiscent, lamina papyracea [11, 12]. Above the sphenoid sinuses are the pituitary body and optic nerves [2], it is this close relation which causes the optic nerve to be involved at times in sinusitis giving rise to a sudden loss of vision (retrobulbar neuritis)

In our study two patients with bilateral visual acuity of no light perception, lost their vision suddenly and computerised tomography scan of their sinuses showed features of sphenoid frontal sinusitis.

They also had thrombosis of the cavernous sinus which lies lateral to the sphenoid sinus. Though these patients neither had lumbar puncture nor cerebrospinal fluid analysis they complained of headache, neck pain, nor high grade fever which suggests meningitis.

The incidence of intracranial complications of acute rhinosinusitis was reported to be between 3% and 17% in various studies, [13, 14, 15] while in this series we found 8.3%.

Also the fundus of a patient showed features suggestive of central retinal artery and vein occlusion, ischemic optic neuropathy, optic nerve involvement which are complications of the orbital cellulitis. Proptosis regressed completely at one month in the patients that had both medical and surgical intervention. They also had had good visual outcome and full recovery.

## CONCLUSION

Orbital complications of acute rhinosinusitis are common in paediatric age group. Surgical drainage procedures in conjunction with aggressive medical management remain the standard of care for this condition to achieve a good prognosis and visual outcome.

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