



Research Paper

# Rhinosinusitis with Orbital/Intracranial Complications Case Series in University Of Port Harcourt Teaching Hospital

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## Abstract

**Background:** Rhinosinusitis implies inflammation of the mucous membrane lining the nose and sinuses resulting in nasal obstruction and Rhinorrhoea, with or without associated symptoms. Complications of paranasal sinus disease are more common in children and adolescent than adults, especially the ethmoid sinus.

## Aim

To report four cases of combined orbital and intracranial complications of Rhinosinusitis in each of these cases.

## Case Report

We report cases of Rhinosinusitis in four adolescent male, each with orbital and intracranial complications. Diagnosis were confirmed with C.T scan. All had external orbital decompression and drainage of intracranial abscesses. All had rapid response after surgical procedure.

## Conclusion

Orbital and intracranial complications following Rhinosinusitis is an uncommon presentation in children/adolescent, however, early diagnosis and surgical treatment is mandatory to prevent mortality.

## Key words

Rhinosinusitis, Orbital Abscess, Intracranial Abscess.

Received 11 Jan., 2022; Revised 25 Jan., 2023; Accepted 27 Jan., 2023 © The author(s) 2023.

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## I. Introduction

The paranasal sinuses are air-containing sacs lined by ciliated epithelium and communicating with the nasal cavity through narrow, and therefore easily included, channels. These sinuses, extend superiorly to the skull base and laterally to encompass the medial wall and floor of the orbit. In many places, these air-containing spaces are separated from each other by a thin sheet of bone. They are namely from above downward, the frontal sinus, in the forehead, the ethmoid sinus in the ethmoidal bone, the maxillary sinus and the sphenoidal sinus below the sella turcica.<sup>1</sup>

Rhinosinusitis is inflammation of the mucous membrane lining the nose and paranasal sinuses resulting in nasal obstruction and rhinorrhoea, with or without associated symptoms. It may be restricted to a single sinus or may be present in several (multisinusitis) or in all sinuses of one or both sides (pan-sinusitis, unilateral or bilateral).<sup>2</sup>

Complication of Rhinosinusitis may be defined as any adverse progression of chronic or acute bacterial infection beyond the paranasal sinuses, or compromise in function of any part of the sinus due to local or distant effects of this condition. Complication can be divided into those due to local progression and systemic, due to haematogenous spread.<sup>3</sup>

The most important and frequent complication of Ethmoid Rhinosinusitis is orbital cellulitis which can vary in degree and severity. Others include orbital abscess and cavernous sinus thrombosis/abscess. Distant spread will give rise to Brain Abscess, septicaemia and septic shock syndrome.<sup>4,5</sup>

In most cases one complication either, local or distant had been observed in these patients. However, in our series, each developed both complications (from local and distant).

In these series, therefore, we highlight combined presence of orbital and intracranial complication from Rhinosinusitis in each of these patients, which is usually an uncommon presentation.

### **Mechanism and Pathophysiology of Spread**

Various routes are involved in the spread of organism involved in the pathophysiology of infection to the orbit and intracranial compartments.

The lamina papyracea is a very thin bone between the orbit and the ethmoidal sinus. Sometimes there is anatomical dehiscence in between the two structures. Therefore spread easily occurs from the ethmoid to the orbit and surrounding tissues.

Absence of venous valves between the orbit and sinuses also exist, making it possible for easy spread.

Spread also exist from the dental roots of the 2<sup>nd</sup> premolar and 1<sup>st</sup> molar dentitions.

Subperiosteal spread also cause abscess formations at the frontal region. The so called potts puffy tumour. Inward progression to the intracranium gives rise to abscess and meningitis.

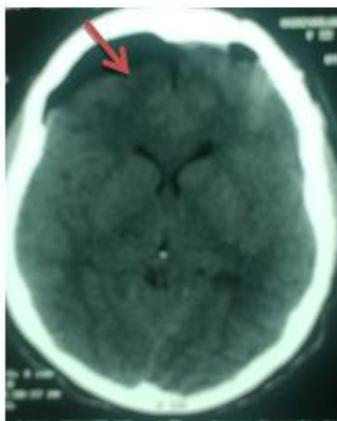
Penetration through the optic foramina to the cavernous sinus will give rise to thrombophlebitis and finally, but not even the least is Haematogenous spread.

### **CASE REPORT**

#### **Case 1**

Ten (10) year old boy with 1yr history of recurrent rhinorrhoea. Headache, fever for eight days. Orbital swelling and convulsion for three days. Various medication were known to have been given in the past for rhinorrhoea. Examination revealed semiconscious child. Diffuse swelling of left upper and lower lids, closing completely the orbit. Neck stiffness and left sided paresis. Full blood count, urea/electrolyte results were essentially within normal limits.

CT scan (computerised tomography) of the brain and paranasal sinuses demonstrated Hyperdensities of the left ethmoid, frontal and maxillary sinuses. A subdural abscess was also demonstrated on same side. Child was offered emergency intracranial abscess drainage, followed by orbital decompression through frontoethmoidectomy. Response was very good.



#### **Case 2**

Twelve (12) year old boy with four (4) day history of frontal swelling and discharge. Previous history of recurrent nasal obstruction and rhinorrhoea. Two days before presentation he was noted to have developed headache and fever.



Post operative orbital decompression

Examination revealed semiconscious child, frontal and orbital swelling. Orbital swelling discharged purulent fluid on pressure.

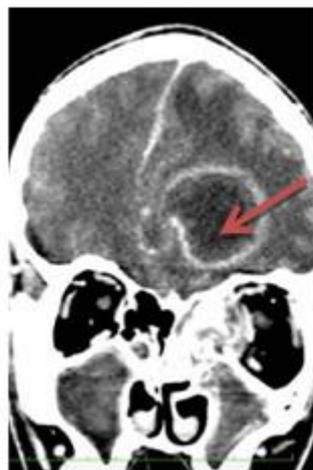
CT scan of brain and paranasal sinuses demonstrated hyperdensity of frontal/ethmoidal sinuses and cerebral abscess. He was offered external orbital decompression and drainage of cerebral abscess. He responded well to treatment.

**Case 3**

Thirteen (13) year old female with history of recurrent rhinorrhoea and 3 day nasal obstruction. Left sided orbital swelling.

There was also associated fever and headache. Examination revealed ill looking child. Left orbital swelling and diffuse ipsilateral facial swelling.

CT scan paranasal sinus and brain showed hyperdensity of both frontal/ethmoidal sinuses. Multiple intracranial abscesses were demonstrated on both sides. External orbital decompression and intracranial abscess drainage were done. Child responded to treatment.



Cerebral abscess complication

**Case 4**

Sixteen (16) year old female with history of nasal obstruction on the left with orbital swelling on same side. Examination revealed ill looking young girl with massive orbital swelling on the left, tender, on palpation.

CT scan demonstrated hyperdensity of the ethmoid and frontal sinuses, with subdural abscess formation on the same side. Orbital decompression and intracranial abscess drainage were done with good response.

## II. Discussion

Sinusitis with its orbital and intracranial complications that are devastating require multidisciplinary approach. Otolaryngologist, neurosurgeon, anaesthetist and rehabilitative physician are needed for effective management.

Fortunately, the incidence has declined considerably in recent decades due to improved diagnostic and treatment modalities. With prompt diagnosis and aggressive treatment, patient come out good.<sup>6</sup>

In our series, patients presented with sinus symptoms as rhinorrhoea, nasal obstruction. However, in some series these sinus symptoms were not obvious. Therefore in evaluating these patients consideration of sinusitis as a cause should be noted, even when there is no symptom.<sup>7</sup>

Open surgical/endoscopic drainage/decompression are needed in progressive disease that does not respond to conservative medical treatment. In our series open surgery and drainage were available for these patients, and response was good post operatively.

Nwaorgu et al in their 90 cases of orbital cellulitis recorded 51 cases of sinusitis as underlying cause of orbital cellulitis.<sup>8</sup>

Most orbital intracranial complications arise from primary sinus inflammations, especially the ethmoid. The young are more frequently affected. In this series all the patients were below 20 years of age. This is in agreement with two studies from Miloney et al, and Nwaorgu et al<sup>9</sup> who had 85% and 84% of their patients below 20 years of age, respectively.

The indication for neurosurgical intervention is mainly mass effect causing lateralizing sinus. In our series burr hole was surgical choice used. This agrees with Nicole et al in their series of intracranial suppurative complication of sinusitis.<sup>10</sup>

Various studies on sinogenic complications are centred on either orbital or intracranial, depending on which complication was encountered. In this series each patient had both complication (orbital, intracranial). This was also the case of Blumfield et al in their<sup>11</sup> analysis of intracranial and orbital complications as the initial presentation of sinusitis in healthy adolescents.

The management of these combined complications require multidisciplinary approach for effective results.

All our series had spread through the sinus, especially the ethmoid. However, Rosen D. et al reported a case arising from primary tooth infection.<sup>12</sup>

Sphenoidal origin was reported by Sow A. et al in a child that has disastrous intracranial sequela. However, we did not encounter such presentation in our series.<sup>13</sup>

Early presentation and prompt application of antibiotics can prevent severe morbidity arising from sinusitis. In our series all received antibiotics<sup>14</sup> following surgical treatment. Osuntokun et al observed 35 cases of orbital and periorbital cellulitis, without intracranial extension. This is different from our series where both intracranial and orbital complications presented in each patient.<sup>15</sup>

## III. Conclusion

Combined orbital and intracranial complication following Rhinosinusitis in children/adolescent is an uncommon clinical condition, however, early diagnosis and treatment is mandatory to prevent mortality. Good imaging and surgical drainage of abscesses, remains good standard treatment.

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