

# Epidemiological, Clinical and Therapeutic Profiles of Ophthalmological Complications of Rhino-Sinusitis in a Tertiary Facility in Black Africa

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## Abstract

**Introduction:** Rhinosinusitis is one of the most common ENT diseases. Its main complications are of three types: cranial, endo-cranial and ophthalmological. The aim of this study was to contribute to the study of ophthalmological complications of rhino-sinusitis in our context. **Material and Methods:** This was a prospective study, of descriptive type, of six (6) months (July-December 2017), concerning the patients received and treated for ophthalmological complications of rhino-sinusitis at the National IgnaceDeen Hospital. **Results:** During our study period, we collected 32 ophthalmological complications of rhinosinusitis, *i.e.* 65.31% of cases. The average age of our patients was  $34.25 \pm 15.15$  years with extremes of 8 and 76 years and a sex ratio of 0.45. A history of rhinitis and/or rhino-sinusitis was reported in all our patients. Housewives were the most affected socio-professional group, accounting for 34.37% of cases. The average consultation time was  $20 \pm 52$  days. Tearing, palpebral oedema and purulent rhinorrhea were present in all our patients. Preseptal cellulitis and abscess were the most common complications, accounting for 56.25% and 28.12% of cases respectively. The treatment was medical-surgical. Drainage of a subperiosteal abscess of the ethmoid involved 53.12% of cases. Surgical treatment of the maxillary sinus and/or ethmoid by endoscopy was sometimes associated. The evolution was favourable in all cases. **Conclusion:** Ophthalmological complications of rhino-sinusitis are still frequent in our developing countries. Their management must be multidisciplinary.

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## Keywords

Complications, Ophthalmologic, Rhino-Sinusitis, Conakry

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## 1. Introduction

Rhinosinusitis is the inflammation, most often of infectious origin, of the nasal mucosa and paranasal air cavities. It is one of the most frequently encountered pathologies in Otolaryngology (ENT) [1]. The main complications are of three types: cranial, endo-cranial and ophthalmological. The latter, the most frequent complication of rhino-sinusitis, is linked to the fact that the paranasal sinuses, which surround the orbit on three walls (inferior, internal and superior), are separated from it by bony partitions that are dehiscant in places, thus constituting a random barrier against the extension of infections from the sinuses into the orbital cavities. The role of sinusitis is therefore universally recognized as an important etiology of orbital infections. It accounts for 60% of all diseases of the orbit and 60% - 80% of oculo-orbital inflammatory diseases [2] [3]. The main ophthalmological complications of rhino-sinusitis (OCRS) include subperiosteal abscesses and orbital cellulitis (preseptal and post-septal). In Cameroon, Ahounkeng Nanda P *et al.* in their study of sinus pathologies in children in Yaoundé reported 66.67% ophthalmological complications including 50% orbital cellulitis (3 cases) and 16.67% periorbital abscesses [4]. In Morocco Daoudi A *et al.* [5] found 85% of preseptal cellulitis and 15% of retroseptal cellulitis. The aim of this series was to analyze the epidemiological, clinical and therapeutic aspects of ophthalmological complications of rhino-sinusitis in our context.

## 2. Material and Methods

This was a prospective study, of descriptive type, of a duration of six (06) months, going from July 1 to December 31, 2017. It focused on a series of ophthalmological complications of rhino-sinusitis collected in the ENT and Ophthalmology departments of the IgnaceDeen National Hospital. We included in this series, all patients received and managed in our services for an OCRS, during the study period. Recruitment was exhaustive. For each patient, we noted age, sex, personal and family history, profession, time and reason for consultation. Complete ENT and ophthalmological examinations were performed, sometimes supplemented by medical imaging (digital radiography, CT scan). General, neurological and stomatological examinations to exclude an extra-sinusal infection were also performed. We considered that there was an ophthalmological complication of rhino-sinusitis when a conjunctival or orbital infection was associated with and/or preceded by rhino-sinusitis in the absence of other infectious sites. Conjunctival or ocular inflammations for which the role of rhino-sinusitis as an aetiology was questionable were excluded. The treatment was medico-surgical, both ophthalmologic, stomatologic and ENT. Progress was assessed after one year.

The Ethics Committee of the Faculty of Health Sciences and Techniques of the University of Conakry approved the study. Our data were processed using SPSS software.

The limitation of the study was the financial inaccessibility of some patients to paraclinical examinations such as CT scans, which are still very expensive for our populations. The indications for CT scan were therefore well specified with clinical criteria relating to significant palpebral edema with eye closure, exophthalmos and/or palpation of a fluctuating mass or even the presence of pus at the internal angle of the eye.

### 3. Results

Of the 881 patients admitted for rhino-sinusitis during our study period, we counted 49 complications, of which 32 were ophthalmological, *i.e.* 65.31% of cases. We report, through this prospective study, 32 patients with ophthalmological complications of rhino-sinusitis (O CRS).

The average age of our patients was  $34.25 \pm 15.15$  years, with extremes of 8 and 76 years. We observed a female predominance with a sex ratio of 0.45. Housewives represented 34.37% ( $n = 11$ ) of the cases. The risk factors were dominated by rhinitis and/or rhino-sinusitis, reported in all our patients (**Table 1**).

**Table 1.** Socio-demographic characteristics.

Characteristics	Number	Percentage (%)
<b>Age</b>		
<20	4	12.50
21 à 40	22	68.75
>40	6	18.75
<b>Sex</b>		
Female	22	68.75
Male	10	31.25
<b>Occupations</b>		
Housewife	11	34.37
Civil servant	10	31.25
Student/Pupil	7	21.88
Self-employed*	4	12.50
<b>Risk factors</b>		
Rhinitis/Rhino-sinusitis	32	100
Type 2 diabetes	6	18.75
Smoking	3	9.37
Nasosinus polyposis	1	3.12
<b>Total</b>	<b>32</b>	<b>100</b>

\*Merchants, hairdresser worker.

The delay in consultation ranged from 10 days to 90 days with a mean delay of  $20 \pm 52$  days. The clinical characteristics of the patients are summarized in **Table 2**.

Analysis of the radiological findings (CT and/or digital skull radiographs, Blondeau or face up) noted isolated maxillary involvement in 34.37% ( $n = 10$ ) of cases. The other attacks always involved the ethmoid (**Table 3**).

These different sinus attacks led to ophthalmological complications which we have summarized in **Table 4**.

**Table 2.** Distribution of patients according to reasons for consultation (N = 32).

Reasons for consultation	Number	Percentage
Watery eyes	32	100
Rhinorrhoea	32	100
Nasal obstruction	32	100
Pus in the middle meatus	32	100
Headache	31	96.87
Conjunctival hyperaemia	22	68.75
Decreased visual acuity	20	62.50
Palpebral oedema	15	46.87
Release of pus at lacrimal points	12	37.50
Corneal ulceration	7	21.87
Poor oral status	11	34.37

**Table 3.** Distribution of patients according to facial sinus involvement.

Anatomical lesion	Number	Percentage (%)
Isolated jaw	11	34.37
Ethmoido-maxillary	10	31.25
Ethmoido-maxillo-frontal	6	18.75
Ethmoidal	5	15.63
<b>Total</b>	<b>32</b>	<b>100</b>

**Table 4.** Distribution of ophthalmological complications of rhinosinusitis.

Complications	Number	Percentage
Preseptal cellulitis	18	56.25
Preseptal abscess	9	28.12
Orbital cellulitis	2	6.25
Subperiosteal abscess	2	6.25
Dacryocysto-keratitis	1	3.12
<b>Total</b>	<b>32</b>	<b>100</b>

Bacteriology of the pus taken from the internal angle of the eye or during surgery was sterile in all cases. The biology showed a high CRP level with a median CRP of 70 mg/l and extremes of 21 and 215 mg/l. The mean polynucleosis was 14,000/mm<sup>3</sup> with extremes of 10,000 and 19,000/mm<sup>3</sup>.

All patients in our series had received medical treatment with parenteral antibiotics for an average of 7 days, followed by oral treatment for 7 to 10 days. The most commonly used antibiotics were third generation cephalosporin, amoxicillin-clavulanic acid, aminoglycosides and imidazole. We recommended dual therapy in most cases and an imidazole was added in cases of suspected anaerobic infection to broaden the spectrum of action. Adjuvant treatment systematically included nasal cavity lavage and blowing followed by aerosol therapy, nasal decongestant in 75% (n = 24) of cases, antibiotic and anti-inflammatory eye drops in 68.75% (n = 22) of patients, analgesics/antipyretics, corticosteroids in 56.25% (n = 18) of cases, and treatment of the dental cause in 50% (n = 16) of patients.

Surgical treatment included drainage of the purulent collection (palpebral and/or septal drainage), sometimes extended to the maxillary sinus (middle meotomy) and ethmoid by endoscopy in 56.25% (n = 18) of cases, and decompression by internal orbitotomy in 12.50% (n = 4) of cases.

The evolution was marked by the persistence, for several months, of signs of clinical naso-sinus dysfunction, with good local evolution under symptomatic treatment in 31.25% (n = 10) of cases. The long-term evolution had been favourable in all patients.

#### 4. Discussion

Ophthalmological complications of rhino-sinusitis are relatively common in our practice. In this study, we observed 32 cases of ophthalmologic complications of rhino-sinusitis. However, this is a hospital-based frequency. It should be higher in the general population because not only was our study mono-centric, not including patients treated in other ENT and ophthalmology departments in the country, but also patients treated by traditional practitioners. Laure B *et al.* [4] reported that ophthalmological infections constituted 80% of the complications of rhino-sinusitis.

The female predominance in our study is comparable to the series by Daoudi A *et al.* [5], who found a female majority of 58% with a sex ratio of 0.78, but different from the data reported by most authors [6] [7].

Most of our patients were young adults with a mean age of 34.25 years. Our result is superior to that of Ben Amor M *et al.* who reported a mean age of 15.75 years with extremes of 1 and 59 years [8].

Oculo-orbital infections are manifested by the inflammatory reactions observed in the eye and orbit rather than by orbital cellulitis, which is less frequent but more serious [9].

Delayed consultation was evident with an almost systematic history of allergic rhinitis and chronic sinusitis and dental extractions in half of the cases. Chahed

H *et al.* [7] in their series found a mean delay in consultation of 7.68 days.

On physical examination, our results were comparable to those of Manpreet Singh *et al.* [3] who reported that all their patients had eyelid edema, conjunctival congestion and chemosis.

In contrast to our series, where the ophthalmological complications of rhino-sinusitis were dominated by pre septal cellulitis and pre septal abscess, Bejor UN *et al.* [10] found exposure keratopathy, increased intraocular pressure, central retinal artery or vein occlusion and optic neuropathy as ocular complications. This confirms the hypothesis that the types of complications vary according to the initial anatomical involvement, which was mainly maxillary and ethmoid in our series. The thinness of the bony walls that separate the sinus cavities from the orbital structures accounts for the diffusion of the infection to this organ. Anatomical variations such as spontaneous dehiscence of the papyraceous blades of the sinus walls also facilitate the spread of the infection to the orbit [11]. Our results differ from those of Ben Amor M *et al.* [8] who reported fronto-ethmoid-maxillary sinus involvement in 38.23% and ethmoid-maxillary in 20.58% of cases.

The management of CORS is multidisciplinary, involving the ENT specialist, the ophthalmologist, the stomatologist, the radiologist and the infectious diseases specialist. It is a therapeutic emergency, which is always based on medical treatment (broad-spectrum antibiotics, analgesics/antipyretics and nasal drops and eye drops), combined or not with surgical treatment and dental care. This medical treatment was supplemented by nasal lavage and aerosol therapy. Manpreet Singh *et al.* [3] reported the same protocol in the management of their patients.

Surgical treatment was directed at the ophthalmic complication (palpebral or septal drainage) and the sinus focus. This allowed the sinus cavities to be ventilated, their contents to be drained and, if necessary, bacteriological samples to be taken.

The favourable evolution of our patients is comparable to the series of Chahed H *et al.* [7] who reported a 93.1% favourable outcome.

## 5. Conclusion

Ophthalmological complications of rhino-sinusitis are still relatively frequent in our developing countries. The clinical signs observed in our series made it possible to specify that it was a  $\pm$  serious attack of the eye. Medical imaging helped in the management. These complications constitute a diagnostic and therapeutic emergency whose management must be multidisciplinary.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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