

Trends in the clinical pattern, diagnosis and management of Rhinosinusitis in a sub-urban tertiary health centre

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Abstract

Background: Rhinosinusitis (RSS) is a common form of upper airway disease encountered by Otolaryngologists.

Objectives: To describe the trends in the clinical presentation, diagnosis and management of RSS in a tertiary hospital.

Methods: Retrospective analysis of clinical information retrieved from the hospital records of patients with RSS managed in the ENT department of OOUTH Sagamu over an 18-month period was done.

Results: Out of 1814 patients, 143 had RSS with the prevalence rate of 7.9%. The male-to-female ratio was 1.1:1, the age ranged from 7 to 79 (median = 32.4) years. The presenting symptoms included mucoid nasal discharge (68.7%), nasal congestion (61.5%) and excessive sneezing (46.8%). Most (71.3%) of the patients presented after 3 weeks of the onset of symptoms and the median duration was 3.2 months. The leading physical findings included engorged nasal turbinates (78.3%), oedematous nasal mucosa (72.0%), mucopurulent anterior rhinorrhoea (28.6%) and pale nasal mucosa (25.9%). The investigations done included plain X-Rays of the sinuses (86.0%), full blood count (67.1%) and computerized tomographic (CT) scan of the sinuses (8.4%). Plain X-Ray abnormalities were most common in the maxillary sinuses (45.5%) while 30.1% had multi-sinusitis. The trend of diagnosis ranged from infective RSS in 51.7% to allergic RSS in 38.5%. About a quarter had different forms of non-endoscopic surgical intervention. Recorded complications included nasal polyps in 11.9%.

Conclusion: The trend of RSS observed relative affectation of adults and mostly chronic infective types, and sometimes allergic types. Radiological assessment was by plain X-Rays in most cases, management was either medical or non-endoscopic surgical methods, frequently complicated by polyps.

Key words: Nigeria, Plain X-rays, Rhinorrhoea, Rhinosinusitis, Sinus surgery.

Introduction

Rhinosinusitis (RSS) is one of the common reasons for prescription of antibiotics by primary care physicians and Otolaryngologists. It arises from the inflammation of the mucosal lining of the nose and paranasal sinuses either singly or in combination. Therefore, it is a variety of upper respiratory tract disease. The incidence of RSS varies worldwide depending on location, type, age group, predisposing factors and the methods of diagnosis. Epidemiological studies have reported the prevalence of bacterial infections in acute RSS to

range from 0.5% to 86%.^[1] RSS was previously reported to be one of the leading reasons for hospital admission for childhood respiratory diseases at the Emergency Paediatric Unit in Enugu, Nigeria.^[2]

The clinical pattern and trends of RSS is variable; for instance, chronic RSS has been reported to be more common in the tropical Sub-Saharan African countries.^[3] However, acute and allergic types of RSS are reportedly more common in the developed and temperate countries.^[3] Although some symptoms of nasal obstruction and congestion are commonly found in many clinical types of RSS, some other features are rather specific for certain clinical pattern of RSS. Allergic forms of RSS have features resulting from IgE-mediated hypersensitivity reaction, including skin reactions, excessive sneezing and itchy eyes, ears, and throat.

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Early diagnosis and appropriate treatment often lead to good outcome without or with minimal morbidity. Late presentation and disease progression are associated with complications and worse treatment outcome. The severity of the disease can equally influence its outcome. It has been reported that the severity of chronic RSS affected all domains of functions including physical, cognitive and emotional and it impacted negatively on the health-related quality of life (HRQoL) of patients.^[5] RSS can be diagnosed by combining the clinical features scores with the findings on investigations which can be radiological, bacteriological, or immunological in type. However, it is important that clinicians identify the common clinical patterns and trends in their local environment to enhance early diagnosis and provide the appropriate interventions required for good outcome. Therefore, the present study aimed to describe the trends of clinical presentation, diagnosis and management of RSS in a sub-urban tertiary hospital in south-western Nigeria.

Methods

This was a retrospective analysis of patients with the clinical diagnoses of Rhinosinusitis (RSS) referred to and managed in the Ear, Nose and Throat department of Olabisi Onabanjo University Teaching Hospital, Sagamu, Nigeria between July 2013 and December 2014.

The hospital records of the patients were retrieved from the Medical Records Department of the hospital. The data extracted from the case notes included the age, sex, presenting complaints, duration of symptoms at presentation and the physical examination findings. For the purposes of this study, patients aged less than eighteen years were categorized as children and those aged 18 years and above as adults.

Particular emphases on examination were in the nasal cavities and oropharynx, especially the posterior pharyngeal wall. The recorded findings in contiguous structures, including the orbits, were

noted. The results of the ancillary investigations such as skin sensitivity, nasal smear cytology and full blood count were recorded. The reports of the plain radiographs of the paranasal sinuses comprising the occipitofrontal (Caldwell), occipitomental (Water) and lateral views, as well as the results of the computerized tomographic (CT) scans, where available, were obtained. The final diagnosis, treatment modalities, presence of complications or other associated nasal diseases confirmed with histology reports in the patients were also recorded.

RSS is diagnosed in our centre based on the clinical and investigative evidences. These include symptomatology of runny nose (catarrh), nasal obstruction, which may be associated with fever (for infective RSS), and excessive sneezing, itchy nose, ears, throat which may be provoked by noted precipitants (for allergic RSS). These are combined with radiological evidences of inflamed mucosae of the nasal and paranasal sinuses and results of ancillary investigations such as total and differential white cell counts (for both infective and allergic RSS), nasal smear for cytology, and skin sensitivity test (for allergic RSS). Once the clinical diagnosis is confirmed, appropriate medical or surgical interventions are commenced and the patients are usually followed up for a minimum of twelve weeks (3 months) using appointment regime of 2-, 4-, and 6 weeks intervals.

Excluded from the study were (1) people whose sinusitis were secondary to trauma such as the fractures of the facial bones, in malignancies of the sinonasal region especially sinonasal and nasopharyngeal cancers, and (2) those with loss of or inadequate important information.

The data were recorded in a spreadsheet for subsequent collation and analysis using the SPSS statistical package version 17.

Results

One hundred and forty-three 143 patients with RSS met the inclusion criteria for the study and had

sufficient data. This represented 7.9% of the total number of 1814 cases seen in the ENT Clinic during the study period. Twenty six patients were excluded due to incomplete data. Seventy-five (52.4%) were males and 68 (47.6%) were females giving a male-to-female ratio of 1.1:1. The age ranged between 7 and 79 years with the median of 32.4 years. Forty-five (31.5%) patients were aged <18 years as shown in Table I.

Table I: Age and Sex distribution of the patients with Rhinosinusitis

Age range (Years)	Male (n = 75)	Female (n = 68)	Total (n = 143)
17	21 (28.0)	24 (35.3)	45 (31.5)
18-30	19 (25.3)	15 (22.1)	34 (23.7)
31-45	27 (36.0)	21 (30.8)	48 (33.6)
46-60	6 (8.0)	7 (10.3)	13 (9.1)
61	2 (2.7)	1 (1.5)	3 (2.1)
Mean $\pm$ SD	30.3 $\pm$ 11.2	28.7 $\pm$ 10.5	29.5 $\pm$ 10.9

Figures in parentheses represent the percentages of the total in each column.

The three major presenting symptoms included mucoid nasal discharge in 98 (68.7%), nasal obstruction/congestion in 88 (61.5%) and excessive sneezing in 67 (46.8%) cases as depicted in Table II.

Table II: Presenting symptoms of all patients based on category

Symptoms	Children (n = 45)	Adults (n = 98)	Total (n = 143)
Excessive sneezing	15 (33.3)	52 (53.1)	67 (46.8)
Mucoid nasal discharge	45 (100.0)	53 (54.1)	98 (68.5)
Facial pain	2 (4.4)	9 (9.2)	11 (7.7)
Nasal congestion/obstruction	32 (71.1)	56 (57.1)	88 (61.5)
Hawking	2 (4.4)	14 (14.3)	16 (11.2)
Headache	7 (15.6)	29 (29.6)	36 (25.2)
Itching (Nose, Throat)	5 (11.1)	21 (21.4)	26 (18.2)
Epistaxis	2 (4.4)	0 (0.0)	2 (1.4)
Halitosis	0 (0.0)	9 (9.2)	9 (6.3)

Figures in parentheses represent the percentages of the total in each column.

Forty-one (28.7%) presented within three weeks (range: 4-21 days) of the onset of symptoms as acute RSS while 102 (71.3%) presented after three weeks (range: 4weeks - 15 months) of the onset of symptoms as chronic RSS. For all the patients, the median duration of presentation was 3.2 months (Mean $\pm$ SD = 3.9 $\pm$ 2.7 months; comprising 13.1 $\pm$ 5.7 days for acute and 5.7 $\pm$ 3.3 months for the chronic types). The nasal examination findings included

engorged nasal turbinates observed in 112 (78.3%), oedematous nasal mucosa in 103 (72.0%), mucopurulent anterior rhinorrhoea in 41 (28.6%) and pale nasal mucosa in 37 (25.9%) as shown in Table III.

Table III: Physical findings in patients with Rhinosinusitis

Signs	Frequencies (%)
Oedematous nasal mucosa	103 (72.0)
Engorged turbinates	112 (78.3)
Septal abnormalities	7 (4.9)
Mucopurulent anterior rhinorrhoea	41 (28.6)
Pale nasal mucosa	37 (25.9)
<i>Associated findings</i>	
Polypoidal nasal growth	23 (16.1)
Supra-orbital sinus discharge	2 (1.4)

The investigations included skin sensitivity test in 5 (3.5%), full blood count in 96 (67.1%), computerized tomographic (CT) scan of the paranasal sinuses in 12 (8.4%) and plain X-Rays of the paranasal sinuses in 123 (86.0%) cases. The radiological films appeared normal in 16/123 (13.0%) of cases while the others demonstrated various abnormalities such as haziness, fluid levels and mucosal thickening. These abnormalities were found mainly in the maxillary sinuses (56/123), ethmoids (14/123) and in various combinations as multi-sinusitis (37/123). One hundred and twelve (91.1%) had associated nasal diseases/abnormalities. All the CT scans revealed various pathologies in the sinuses and were mostly multi-sinusitis.

The final diagnoses included infective RSS (74; 51.7%), allergic RSS (55; 38.5%), and non-allergic RSS in the remaining 14 patients as displayed in Figure 1.

Thirty-seven cases (25.9%) had different forms of surgical intervention, including proof puncture and antral lavages (23), nasal polypectomies (5) and different forms of intranasal antrostomies (11), partial inferior turbinectomies (3) and Caldwell-luc operation (1). Some of the cases had more than one surgical intervention. Fluid specimens collected from the sinuses of patients who had surgical interventions (mainly proof puncture and antral lavages, and intranasal antrostomies) were

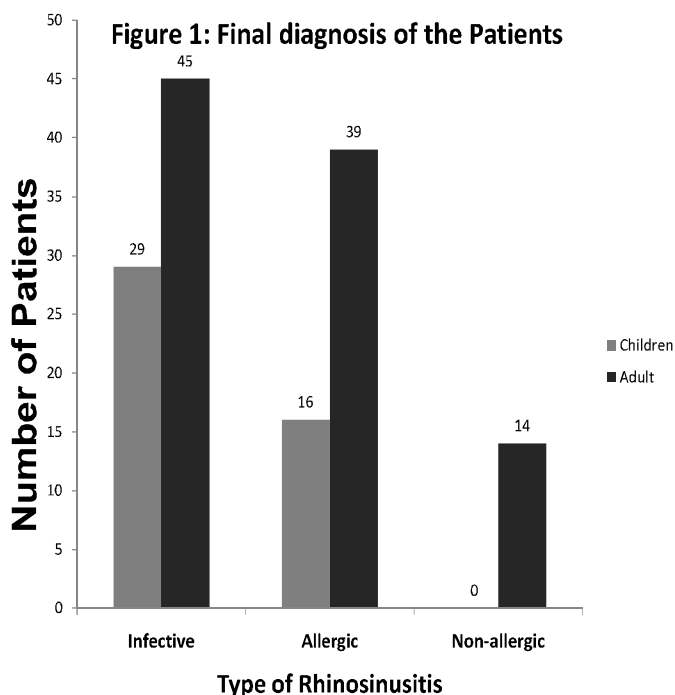


Figure 1: Types of Rhinosinusitis

subjected to bacteriological studies. Mixed growth of organisms including *Streptococcus*, *Pseudomonas* and *Staphylococcus* species were reported in 17 patients while no organism was cultured in 7 patients. The observed complications included nasal polyps different from the associated polypoidal nasal growth found pre-operatively in 17 (11.9%), nasal papilloma in 5 (3.5%) and fronto-ethmoidal mucocoeles in 3 (2.1%).

Discussion

This study has shown that RSS is a common disease of the upper respiratory tract in our local setting constituting 7.9% of all out-patient clinic attendees. The prevalence of RSS in the present study may likely be higher than this if the patients that were excluded by virtue of missing data had been considered. Iseh had earlier reported that RSS constituted 11.1% of ENT cases seen in Sokoto, Nigeria.^[6] There was no sex predilection in the present study in consonance with the previous reports on RSS.^[6-8] RSS has been reported to be comparatively common among adults,^[6, 7] and the median age of 32.4 years, found in the present study resonates with this.

Although RSS is a disease of multi-factorial aetiology, the common clinical symptoms include nasal discharge, nasal congestion and obstruction and excessive sneezing as reported in the present as well as other similar studies in Nigeria.^[9-11] This has been the rationale for the introduction of symptoms scoring system in diagnosing RSS. The majority of our patients (71.3%) presented relatively late, after 3 weeks of the onset of symptoms with the median duration of 3.2 months. Patients tend to take the symptoms less important and commonly attribute them to viral upper respiratory tract infection (common cold) which is self-limiting. Furthermore, many patients in this part of the world indulge in self-medication and present in the hospital only when the symptoms become persistent or complications develop. The trend of clinical presentation in the present study suggested cases featuring as chronic RSS.

The common findings on rhinoscopic examination namely engorged nasal turbinates, oedematous nasal mucosa and anterior rhinorrhoea found in this study were similar to the findings in a previous report.^[7] Most of these physical findings are non-specific, thus limiting the validity of diagnosis of RSS based only on clinical criteria and affirming the need for investigations to aid diagnosis.^[10, 12] The standard global practice for radiological assessment of disease in paranasal sinuses is by computerized tomographic (CT) scan of the sinuses. This is predicated upon its high sensitivity and specificity in this disease.^[13] CT scan of the sinuses diagnosed lesions in the sinuses in all the patients who had that investigation done. CT scan scores can also help clinicians predict the severity of symptoms of nasal obstruction and discharge.^[11] However, the CT scan has limitations in the form of relatively high costs and low accessibility in resource-limited settings like ours. Therefore, we often resorted to performing traditional plain radiographs to assess lesions of the sinuses and this has remained the trend of investigation for RSS in our centre. In the present study, maxillary sinusitis and multi-sinusitis were the major radiological findings. Sinusitis had been reported to affect the ethmoids

more frequently in children, while it affected the maxillary sinuses more frequently among the adults.^[14] However, the pattern of the involvement of specific sinuses in RSS varies greatly. This might explain the fewer number of radiological evidence of ethmoid sinuses involvement in the present study. Furthermore, the normal plain X-Rays may denote a relatively mild sinus mucosa affectation which is yet to be evident radiologically. Yet, this does not preclude the treatment of such patients, especially, if there are other evidences of RSS. The treatment policy adopted in our centre for such cases was to treat medically based on our clinical suspicion. However, various combinations of sinus involvement occur which present as multi-sinusitis. It is important that lesions prevalent in particular sinuses are considered to make the correct diagnosis which will also influence treatment options.

The spectrum of clinical diagnosis observed in the present study was generally infective RSS, although allergy was very prominent in the adult population. While the patterns of infecting organisms vary with the locality, common microorganisms that had generally been implicated in RSS include *Streptococcus pneumoniae*, *Morixella catarrhalis* and *Haemophilus influenzae*.^[15] Allergic RSS, an immunoglobulin E- mediated type 1 hypersensitivity reaction was, however, prominent in the adult population. Manifesting with seasonal, perennial or occupational patterns, allergic rhinologic symptoms were notably persistent sneezing and runny nose. Some other forms of non-allergic diseases can also present with similar symptoms. Taking appropriate medical history, performing a good physical examination coupled with objective allergy testing constitute important steps prior to confirming the diagnosis of allergic RSS.^[16] Therefore, we admit inability to conduct skin sensitivity tests on all the patients as a limitation of this study. Only 3.5% had objective allergic skin testing among 38.5% of the patients who were clinically diagnosed to have allergic RSS based on the symptoms.

Non-allergic rhinitis is a diverse syndrome characterized by symptoms akin to allergic rhinitis but it is not an IgE-mediated event. They are further

differentially classified as atrophic, drug-induced (rhinitis medicamentosa), hormone-induced or non-allergic rhinitis with eosinophilia syndrome (NARES) based on the eosinophil counts in nasal secretion and venous blood.^[17] Another sub-classification is the idiopathic variant formerly known as vasomotor rhinitis (VMR), but more accurately denoted as non-allergic rhinopathy (NAR).^[18] The idiopathic variant which is one of the most prevalent forms of non-allergic rhinitis is mainly a diagnosis of exclusion; 9.8% of the patients seen in this study had NAR. Most cases of infective, allergic and non-allergic RSS are amenable to medical management including the use of antibiotics, specific anti-allergic medications, and ancillary treatments. Medications tend to fail when the symptoms are severe, disease is extensive, or complications had arisen. Total failure of medical therapy is an indication for surgical management.^[19] The types of surgical procedures performed commonly in our patients were proof puncture and antral lavages, intranasal antrostomies, and other procedures like partial turbinectomies and Caldwell-luc procedure as indicated.

The most common complication or association of RSS found in this study was nasal polyps ahead of others such as nasal papilloma and fronto-ethmoidal mucocoeles. Polyps are prolapsed oedematous mucosa of the nasal and paranasal cavities consequent upon recurrent or persistent inflammation associated with allergy or infection. Nevertheless, due to its common occurrence in different nasal pathologies, rhinologists had categorized RSS based on the presence or absence of polyps. Chronic rhinosinusitis (CRS) with nasal polyps (CRSwNP) is reported to be different in inflammatory patterns of the sinonasal mucosa from that of CRS without nasal polyps (CRSsNP) in the Caucasian and Chinese populations.^[20,21] Irrespective of the sinonasal mucosa pattern, the treatment remains either medical or surgical. The Cochrane database provided no evidence to show superiority of medical or surgical treatment of CRSwNP over one another in terms of patient-reported symptom scores and quality of life measurements.^[22] In our centre, we usually start with medical treatment and sometimes, perform

nasal polypectomies with intranasal antrostomies on patients with nasal polyps complicating RSS.

Other complications and associations of RSS such as orbital and intracranial complications are more dangerous. Most of these will require surgical intervention from the outset. The advent of endoscopic sinus surgeries has revolutionized surgical management of all forms of sinus diseases. However, despite this global trend, the developing countries in Sub-Saharan Africa are lagging in its application to sinus surgeries. Majority of our cases had the traditional non-endoscopic surgeries of the maxillary sinuses. Regardless of the shortcomings of these surgical techniques, many of our patients improved appreciably without complications related to the surgery. Medical literature has however shown that endoscopic approach is associated with less morbidity than the traditional surgical approach.^[23] A limitation to this study is the retrospective nature of the design which has inherent problems of incomplete data.

Conclusion

The present study has shown the trends of clinical presentation, diagnosis and management of rhinosinusitis in Sagamu, south-western Nigeria. Rhinosinusitis frequently presented as chronic infective forms which frequently affected adults who tended to present late for care in our centre. Radiological assessment was frequently limited to plain X-Rays and the cases were managed medically or by traditional non-endoscopic surgical methods.

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