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Clinical and Therapeutic Characteristics of Acute Maxillary Rhinosinusitis in a Hospital of Cotonou

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Abstract

Introduction: Acute maxillary rhinosinusitis (AMRS) is one of the most common ear, nose and throat infections. The aim of this study was to contribute to the improvement of the management of the condition in sub-Saharan Africa. **Material and Method:** This was a cross-sectional, descriptive study that ran from January 1, 2017 to December 31, 2021 in the ENT-HNS department of the "Centre Hospitalier et Universitaire de Zone de Suru-Léré" (CHUZ SL) in Cotonou, Benin. It involved all patients who consulted during the study period and in whom the diagnosis of acute maxillary rhinosinusitis was made. **Results:** A total of 405 cases were identified. The mean age was 34.26 ± 15.26 years with extremes of 9 and 63 years. The predominance was female with a sex ratio of 0.61. Acute maxillary rhinosinusitis was bilateral in 371 cases (91.60%). The main symptoms were facial pain in 346 cases (85.43%), mucopurulent rhinorrhea: 315 cases (77.78%), headache: 283 cases (69.88%), and nasal obstruction: 244 cases (60.25%). The most frequent physical signs were pain on pressure of the maxillary sinus points in 405 cases or 100%, purulent secretions at the middle meatus: 11.35%, hyperemia of the nasal mucosa: 53.58%, hypertrophy of the middle turbinate: 41.48% and discharge of pus on the posterior pharyngeal wall: 36.79%. Amoxicillin + clavulanic acid was the main antibiotic prescribed. Vasoconstrictors were used in 228 cases 56.30%. The evolution was favorable in all cases. **Conclusion:** The diagnosis of acute maxillary rhinosinusitis is clinical. Treatment with antibiotic gives good results.

Keywords

Acute, Maxillary, Rhinosinusitis

1. Introduction

Acute maxillary rhinosinusitis (AMRS) is one of the infections of the nasal-sinusal cavities that have been evolving for less than 4 weeks. They are often caused by viral infections of the respiratory tract [1]. The symptomatology of both viral and bacterial infections is almost identical [1] [2]. Previous studies have shown that rhinosinusitis is the most frequent ENT disease [1] [3] [4]. In 2010, Yehouessi Vignikin *et al.* [4] reported 528 cases of acute maxillary sinusitis in 5 years, *i.e.* 30.1% of cases of maxillary rhinosinusitis at the HKM National Hospital Center of Cotonou in BENIN. The diagnosis is essentially clinical. The origin is often rhinological or dental. Odontogenic AMRS are the most dreaded with lingering bacterial infections. Antibiotic therapy has revolutionized the treatment of the condition. The aim of this study was to contribute to the improvement of the management of the condition in sub-Saharan Africa. The ENT-CCF department of the Center Hospitalier et Universitaire de Zone de Suru-Léré (CHUZ SL) in Cotonou was created in 2008. To date, no study has yet been carried out there on maxillary rhinosinute. The main objective was therefore to provide recent data on the condition in the hospital setting in Cotonou, Benin.

2. Material and Method

This was a cross-sectional, descriptive study that took place from January 1, 2017 to December 31, 2021 in the ENT-HNS department of the "Suru-Léré Zone Hospital and University Center" (CHUZ SL) in Cotonou, Benin. It concerned the files of patients who consulted during the study period and in whom the diagnosis of acute maxillary rhinosinusitis was made. The clinical signs that led to this diagnosis were facial heaviness exaggerated by anteflexion, nasal obstruction, pain on pressure of the maxillary sinus points, and mucopurulent rhinorrhea with the presence of pus in the middle meatus on anterior rhinoscopy. The duration of evolution of less than 3 weeks allowed to qualify the condition as acute. Cases of sinusitis received outside the study period were excluded from the study, as well as cases without the necessary diagnostic data. A pre-established survey form was used to collect data. The dependent variable was the AMRS. The independent variables were sociodemographic (age, sex, profession), clinical (reason for consultation, duration of evolution of the symptomatology before the first consultation, clinical signs) and therapeutic (treatment received and evolution). The evolution was said to be favorable when the clinical signs disappeared. It was unfavorable in case of complications. If the symptoms persisted, the evolution was said to be stationary. The data collected were recorded and processed with Epi data 3.1.fr and SPSS (statistical package for social sciences) version 2.1. These softwares were used to analyze the statistical data. Microsoft Word 2019 had been used for data entry and Excel 2019 for organizing the data in tables and graphs. Quantitative variables were expressed as mean plus or minus standard deviation or median depending on whether the distribution was symmetrical or

not. The qualitative variables were expressed as simple counts and percentages. The work was done in strict compliance with ethical and deontological standards. All data collected during the survey were used only for the purpose of this study and were kept confidential.

3. Results

3.1. Sociodemographic Characteristics

In 5 years, 405 cases of AMRS were identified out of 8296 patients consulted during the study period, *i.e.* 4.88%. All age groups between 9 and 63 years were concerned. The average age was 34.26 ± 15.26 years. The predominance was female with a sex ratio of 0.61. Young subjects in the age group of 26 to 35 years were the most affected by the disease: 107 cases or 26.42%. People of the 3rd age were the least affected: 28 cases or 6.91%. Figure 1 shows the distribution of patients according to gender and age.

Various professions were recorded. The subjects concerned by the SMA were largely learners or active workers. Table 1 shows the distribution of patients by

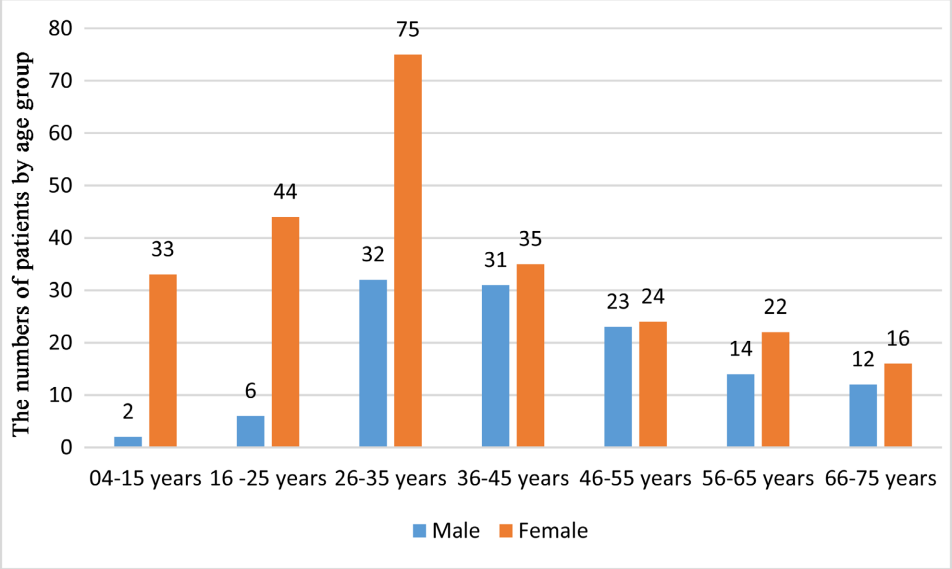

Figure 1. Distribution of patients by gender and age groups.

Table 1. Distribution of patients by profession.

	Number	Percentage
Pupils/students	139	34.32
Workers exposed to dust	112	27.65
Housewives	71	17.54
Teachers	58	14.32
Other	25	06.17
Total	405	100

profession.

The time to progression of symptomatology varied from a patient to another. The majority of patients consulted relatively early between 1 and 5 days. Figure 2 shows the time before consultation.

Some facilitating factors were identified during the study. Exposure to dust linked to air pollution was the most incriminated. Table 2 shows the factors noted.

3.2. Clinical Characteristics

Facial pain was the main symptom: 346 cases or 85.43%. It was of the infraorbital heaviness type, often exacerbated by the head tilted forward position. The signs of endonasal inflammation were objectified on anterior rhinoscopy. The clinical signs identified have been grouped in Table 3.

Medical imaging was performed on 143 patients (35.31%). These were Blondeau incidence radiographs in 116 cases (28.64%) and CT scans of the facial mass in 25 cases (6.17%). These images showed opacities in the maxillary sinuses in 63 cases (30.07%). The appearance of the maxillary sinuses was normal in the other cases. AMRS was bilateral in 371 cases (91.60%). It was part of a polysinusitis in 26 cases (6.42%) and part of a pansinusitis in 2 cases (0.5%). It was of

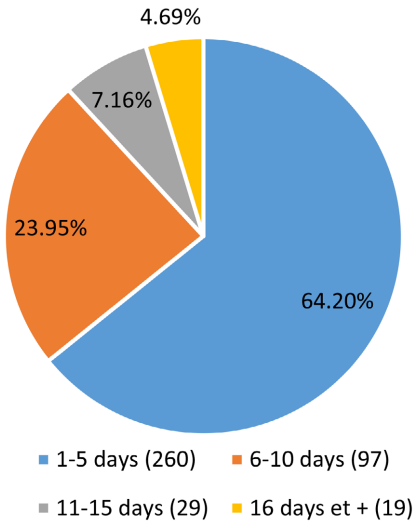

Figure 2. Distribution of patients according to time before consultation.

Table 2. Distribution of cases according to identified risk factors.

	Number	Percentage
Exposition to dust	380	49.87
nasal and sinusal Allergy	102	13.38
Flu Syndrome	217	28.48
Dental disease	63	08.27
Total	762	100

Table 3. Distribution of cases by clinical signs.

	Number	%
Symptoms		
Facial pain	346	85.43
Rhinorrhea	315	77.78
Headache	283	69.88
Nasal obstruction	244	60.25
Salivary sneezing	108	26.67
Oropharyngeal pruritus	100	24.69
Smell disorder	85	20.99
Coughing	35	8.64
Dental pain	4	0.99
Physical signs		
Painful pressure of maxillary sinus points	405	100
Nasal mucosal congestion	217	53.58
Turbinate hypertrophy	168	41.48
Posterior discharge	149	36.79
Inflammation of the throat	92	22.71
Lymphoid formations on the posterior pharyngeal wall	91	22.47
Venous lacerations on the posterior pharyngeal wall	61	15.06
Pus on the middle meatus	46	11.35
Tooth decay	6	1.48
Pallor of the nasal mucosa	3	0.74

rhinogenic origin in 403 cases (99.5%) and of dental origin in 2 cases (0.5%).

All cases were treated with medication. Analgesics and antibiotics were systematically prescribed to all patients. Figure 3 shows the distribution of the pharmaceutical classes used.

Amoxicillin + clavulanic acid was the main antibiotic prescribed: 289 times (71.35%). Macrolides were used in 88 cases (21.73%).

The evolution was favorable in all cases with disappearance of the symptoms.

4. Discussion

AMRS accounted for 4.88% of the diseases treated in ENT department. It is therefore a frequent inflammatory pathology in consultation. This important place among ENT disorders justifies the interest given to the subject by a numerous authors [2] [5]. Young people were most affected by a predilection for women between the age of 25 to 35 years: 75 women out of 107 patients. This female predominance could be explained by the greater sensitivity of women to

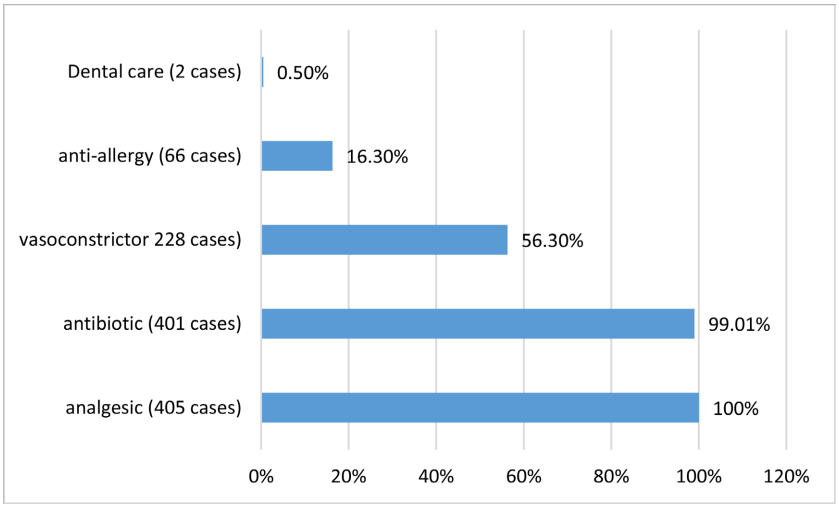

Figure 3. Summary of the main drugs prescribed.

pain, which leads them to consult more frequently than men. On the other hand, other studies on rhinosinusitis in general, have reported a male predominance [4] [6] [7]. The difference may also be related to the focus made on lesion topography in these works, or to the fact that men are more exposed to air pollution by their professions outside the home. As proof, Keita and al, as well as Yotio and al also reported a predilection among young subjects is unanimous with respective sex ratios of 1.8 and 1.2 [8] [9].

Schoolchildren and students were the most affected in the series, followed by workers exposed to dust and teachers. These are dust-exposing occupations. Students in our context study with chalk and inhale the polluted air emanating from the erasing of the boards. The same is true for teachers who are exposed during working hours. Workers exposed to dust are carpenters, masons, and others. Inhalation of wood or cement dust is very harmful to human health. The deposit of dust particles in the sinus cavities and their infection could justify the apparition of the disease. Smoke may explain the unhealthy air inhaled by housewives who often cook with coal or wood. The main risk factor identified in this study was indeed dust exposure reported by more than half of the patients. Influenza epidemics were also incriminated in the occurrence of AMRS. They were contemporaneous with AMRS in 28.48% of cases. Naso-sinusal allergy was also a predisposing factor, especially in the hot and humid context of the tropical climate. More than half of the patients consulted early before the onset of symptoms: 69% between 1 and 5 days after the onset of signs. The unpleasant pain caused by AMRS could explain why patients promptly consulted at the hospital without dwelling too much on self-medication as it is customary [10] [11].

Cephalic pole pain was the main symptom complained. It consisted of headache (283 cases or 60.25%) and facial heaviness (345 cases or 85.46%). Inflammation due to the disease generates pain, which is one of the 4 signs of Celse's tetrad. The hypersecretions and the edema installed in the pneumatic maxillary sinus cavities are at the origin of a cephalic heaviness which manifests itself at

the face causing discomfort to the patient. It is a sign also described by other authors [8] [12] [13]. Rhinorrhea was the 2nd most frequent sign in this series. This symptom can be understood by the fact that acute rhinosinusitis is considered to be an evolutionary process of acute common rhinitis or coryza [1] [2] [6] [7] [13]. In this case, the nasal discharge is a means of defense through hypersecretion and cleaning. Watery beforehand then mucous, it can become frankly purulent due to the presence of dead cells and pathogens. Its presence in the middle meatus during anterior rhinoscopy systematically evokes rhinosinusitis. A few cases of associated dental pain have been recorded in the series, suggesting AMRS of dental origin. The pain is often accompanied by an abnormal long tooth sensation. It is intense, insomnia and can be accompanied by a debacle of fetid pus in the mouth or in the nose. This is a revealing sign of odontogenic rhinosinusitis according to the work of Keita *et al.* [8]. Salvo sneezing, oropharyngeal pruritus and dysosmia were in favor of nasosinusal allergies. Nasal mucosal congestion, turbinate hypertrophy and the presence of pus in the middle meatus objectified on physical examination in this study reinforced the diagnosis of rhinosinusitis whose maxillary topography was supported by pain on pressure of the maxillary sinus points. These different clinical pictures allowed us to make a positive diagnosis of AMRS, justifying the lack of interest in imaging, the use of which would be an excessive use of diagnostic tools as reported by Jaume *et al.* [2]. However, imaging performed in some patients allowed to establish the topographic diagnosis of rhinosinusitis. Bacteriological examination of the pus would also be of great value to justify the relevance of antibiotic therapy. In our context (lack of national health insurance companies), biological examinations are rarely performed by patients, explaining the prescription of wide range of antibiotic therapy covering the most frequent germs. Thus, the combination of amoxicillin and clavulanic acid is the antimicrobial of choice and the first-line treatment in ENT. In this study, 289 patients (71.35%) received this treatment. This antibiotic was recommended by previous studies taking into account the most frequent germs [14] [15] [16]. Macrolides are used in case of allergy to beta-lactam. It is regrettable that PCR and microbial cultures were not carried out, which would have made it possible to avoid indiscriminate antibiotic therapy, which contributes to microbial resistance [17] [18]. Clinical evolution was in general favorable as AMRS is frequently of viral etiology and heals with proper symptomatic treatment [1].

This study being retrospective, we deplore the existence of some poorly informed files as well as the absence of sampling of secretions in order to identify the germs responsibles.

5. Conclusion

The diagnosis of acute maxillary rhinosinusitis is clinical and is based on cephalic heaviness pain exacerbated by pressure on the maxillary points, associated with nasal congestion and the presence of pus in the middle meatus. The evolu-

tion of the picture in less than 3 weeks confers to the affection its acute character. PCR and microbial cultures would be of great help in identifying the causative organism in order to adapt to the treatment.

Conflicts of Interest

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

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Pre-established survey form

N°	Questions	Responses	Codages
Identifiant			
Q1	Number of file		...
Socio-démographic data			
Q2	Age (year)		...
Q3	Sex	1-Male 2-Femal	...
Q4	socio-professionnal Occupation	1-Pupils/students 2-Workers exposed to dust 3-Housewives 4-teacher 5-other to precise	...
	Ethnic group	1-Fon 2-Mina 3-Yoruba 4-Bariba 5-Dendi 6-Non beninese	
Q5	Place of residence	1-Cotonou 2-Outside Cotonou	...
Clinical caracteristics			
Q6	Delay before Consultation (in number of days)	a-1 à 7 b-8 à 14 c-15 à 21 d-21 à 28 e-> 28 f-unspecify	
Q7	Triggering circumstance	1-Acute rhinitis 2-Tooth decay 3-Facial bone trauma 4-Nasosinus polyposis	
General signs and background			
Q8	Change in general condition	1-Present 2-Absent	...
Q9	Medical background	1-None 2-Diabet 3-HBP 4-Atopic terrain 5-sickle cell disease 6-other	...
Symptoms			
Q10	Latérality of symptoms	1-Unilateral 2-Bilateral	...
Q11	if unilateral	1-Right 2-left	...
Q12	Nasal obstruction	1-Present 2-Absent	...
Q13	Rhinorrhea	1-Présent 2-Absent	...
Q14	Aspect of rhinorrhea	1-Mucosa 2-Purulent 3-Bloody 4-Muco-purulent	...
Q15	Type of rhinorrhea	1-Antérior 2-Postérior	...
Q16	headaches	1-Present 2-Absent	...
Q17	Headquarters of headaches	1-Sus-orbital 2-Infra-orbital 3-Occipital 4 -Temporal	...
Q18	Sneeze	1-Present 2-Absent	...
Q19	Smell disorder	1-Present 2-Absent	...
Q20	Type of smell disorder	1-Anosmy 2-Hyposmy 3-Cacosmy 4-Parosmy	...
Q21	Duration of evolution	1-inferior to 4 weeks 2-sup to 12 weeks	...
Q22	Installation mod	1-Sudden 2-Progressif	

Continued

Q23	Mode d'évolution	1-Intermittent	2-Permanent			
Physical	exam					
Q24	Anterior Rhinoscopy	1-purulent secretion at the middle meatus 3-nasal Congestion		2-endo-nasal mass 4-Turbinal hypertrophy		...
Q25	Statut of nasal septum	1-normal	2-deviation			...
Q26	Bucco-pharyngal exam	1-Normal	2-Tooth decay	3-other		...
Q27	pain of sinus points	1-Suborbital	2-canine pit	3-Sus-orbitaire		
Radiologic caracteristics						
Q28	Imaging examination performed	1-Rx of sinus Blondeau	2-TDM of sinus	3-IRM des sinus		
Q29	Topography of sinusitis	1-Maxillar	2-Frontal	3-Ethmoïd	4-Sphénoïd	...
Q30	Type of lésion radiologic lesion	1-sinus opacity 3-Thickening of the sinus framework		2-hydroaeric level 4-sinus veil		...
Treatment and évolution						
Q31	Type of treatment	1-Médical	2-Médico-surgical			...
Q32	Antibiothérapy	1-Amoxicillin + clavulanic acid 3-Macrolides 5-Unspecified		2-Fluoroquinolones 4-Cephalosporin of 3rd generation		...
Q33	Analgesic	1-stage 1	2-stage 2	3-None		...
Q34	Antiinflammatory	1-stéroïdal Antiinflammatory 3-Bronchic antiinflammatory		2-Nonsteroidal anti-inflammatory 4-None		...
Q35	Décongestionnant nasal	1-Vasoconstrictor simple 3-physiologic serum		2-Vasoconstrictor + antiseptic + mucolytic 4-none		...
Q36	Antiallergy	1-oral		2-nasal		...
Q37	Surgical Treatment	1-yes		2-No		...
Q38	Evolution	1-Favorable		2-Non favorable		...