

Complications of Sinusitis: About 9 Cases in the Ear Nose & Throat (ENT) Department of the University Hospital Gabriel Touré in Bamako

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Abstract

Objective: This study aims to analyze clinical, paraclinical and therapeutic aspects of sinusitis complications in the Otorhinolaryngology department at the teaching hospital of Gabriel Toure in Bamako. **Materials and methods:** This descriptive and longitudinal study was conducted on 12 months from March 2012 to February 2013 in 9 cases of sinusitis complications in the department of Otorhinolaryngology at the University Hospital Gabriel Toure in Bamako. **Results:** The average age of patients was 22.7 years; a median of 19 years within 6 men and 3 women with almost 12.9 days of care seeking duration. The factors of risky were the use of nonsteroid anti-inflammatory drugs NSAID (4 cases), maxillofacial trauma (1 case) and HIV (1 case). Facial pain was the major symptom, such as frontal oedema, rhinorrhea with pus shedding and nasal obstruction. Computer tomography was used for complications specification. Frontal sinusitis was the most encountered with subperiosteal abscess (44.4%). *Streptococcus pneumoniae* was identified in 3 cases. Medical treatment associated to surgery was conducted on 7 patients. Two cases of death have been registered. **Conclusion:** The complicated sinusitis is an emergency and dangerous disease requiring specific care by a multidisciplinary staff. Much of complications are commonly encountered despite the antibiotic era.

Keywords

Sinusitis, Complications, Diagnosis, Treatment, Surgery

1. Introduction

The complications of sinusitis are defined by the extension and spread of sinus attack to structures and adjacent tissues [1].

These complications are most of time orbital and cranial because of the anatomical situation of these structures [2] [3]. The outcomes of sinusitis complications can be central nerves injuries (hemiplegia, blindness) more or less severe after recovery [3]-[6]. However, the symptoms of these complications can be variable or dismiss antibiotic abuse [4].

Computer tomography with or without contrast has become the gold standard for complications identification [1] [5] [7] [8].

The treatment of sinusitis complications requires a multidiscipline staff and close monitoring system [4].

The aim of this study was to analyze the clinical, paraclinical and therapeutic aspects of sinusitis complications.

2. Materials and Methods

It was a prospective descriptive and longitudinal study having as framework the ENT department of CHU Gabriel Touré in Bamako, Mali from March 2012 to February 2013.

The proposal of this topic have been presented and approved by the Research Ethic Committee of Mali. Favor information and opinion of the patient were obtained the survey.

3. Results

The series consisted of 9 patients of those 6 were male and 3 female. The average age was 22.7 years with a median of 19 years, extreme were 6 and 51 years.

The time from first symptoms to care seeking ranged from 1 to 21 days with an average of 12.9 days. As auto medication 4 patients used non-steroidal anti-inflammatory drugs, 3 cases of none specify antibiotics and one case of maxillofacial trauma from traffic accident. The major symptoms were fever, unilateral nasal obstruction and purulent rhinorrhea. Headache was found in 3 patients and proptosis in one patient. Five patients had neurological signs. A frontal swelling was found in 4 patients.

The main complications were: subperiosteal abscess of the frontal (4 cases) (Figure 1), subperiosteal abscess of the orbit (1 case), thrombophlebitis of the cavernous sinus (1 case), the endocranial complications (3 cases including 2 cases of subdural empyema with subperiosteal abscess; one case of frontal or brain abscess).

The sinuses involved in the complications were: isolated frontal sinus in 4 cases, the isolated ethmoid sinus in 2 cases, the pansinusitis (sinusitis ethmoido fronto-maxillary) in 3 cases.

The computer tomography was used to perform the diagnosis (Figure 2, Figure 3).

Hyperleucocytosis more than 12,000/ml has been found in all patients associated with high rate C-reactive protein more than 50 ml/L. HIV serology was positive in one patient.

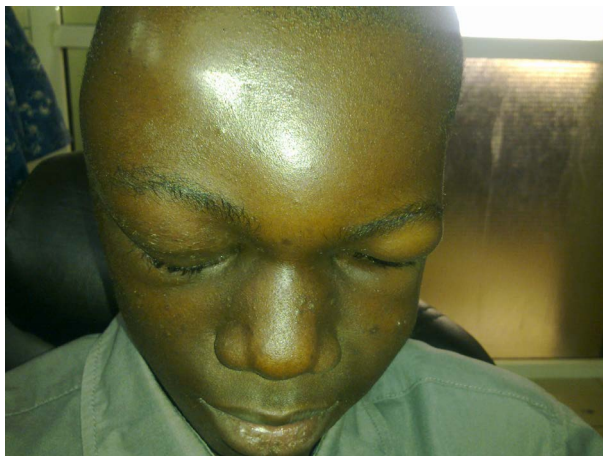


Figure 1. Patient male, 14-years old who have a subperiosteal abscess of the frontal.

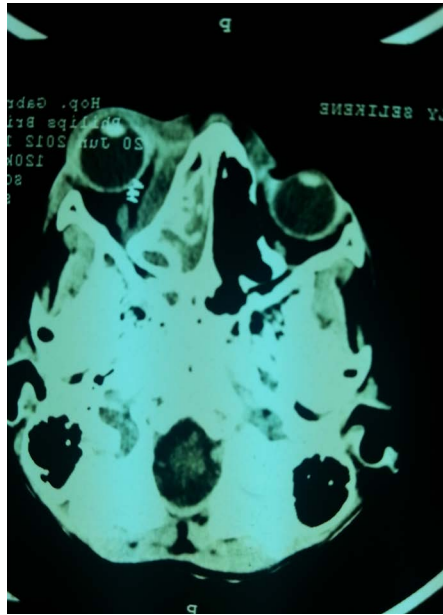


Figure 2. 6 years old male patient, CT (computed tomography) sinuses in axial section showing a subperiosteal abscess of the orbit and ethmoid sinusitis.



Figure 3. 16 years old female patient, brain CT showing subdural abscess.

Streptococcus pneumoniae (3 cases), *Pseudomonas aeruginosa* (1 case) and *Staphylococcus* (1 case) were identified. Amoxicillin-clavulanic acid, cefotaxime, to metronidazoles and quinolones were recommended to destroy all these pathogen agents.

Antibiotherapy has consisted to a combination of cefotaxime and metronidazole in 5 cases administered by parenteral route at the rate of 3 g/day and 1.5 g metronidazole/amoxicillin-clavulanic acid 3 g/day and gentamicin in 4 cases. For children under 30 kg (2 cases), the doses have been adapted to their weight. The average duration of antibiotic therapy has been 28 days range from 8 to 45 days.

Besides medical treatment, 7 patients have benefited surgical treatment which was performed under general anesthesia by the otorhinolaryngology team in 5 cases and the neurosurgery staff in 2 cases. This treatment has consisted to an external drainage of frontal abscess and frontal sinus, an external drainage of subperiosteal orbit abscess. Dural abscesses have been drained by the neurosurgery team.

The outcomes were successful in 7 cases marked by the disappearance of the clinical signs. Two cases of death have been registered, including one case of cavernous thrombosis and one case of brain abscess. The reasons for the deaths were due to the bad clinical state since the admission (**Table 1**, **Table 2**).

4. Discussion

Nine cases of orbital and intracranial complications of sinusitis were collected, from March 2012 to February 2013. The series was less than those found by some authors respectively 80 cases in 6 years and 47 cases in 2 years [2] [9].

These complications usually occur in young population (20 - 30 years) predominantly male [7]. Data for this study was consistent to those of the literature with an average age of 23.7 years. The similar result has been found by other authors with a mean age of respectively 23, 9 and 24 [2] [10].

The orbital complications in this study have been reported in a child of 6 years old. According to the literature, these complications are found in both children and adults [11] [12].

The use of non steroidal anti-inflammatory drugs (NSAIDs) before health facilities was found in 4 cases. These molecules have been evoked as risk factors, this by increasing the production of calciform cells and leucotrienes whose are responsible of the secretory metaplasia of the sinus mucosa. This phenomenon will contribute to the supuration of sinusitis, especially if an appropriate antibiotic therapy is instituted [2] [13].

The human immunodeficiency virus HIV is also involved in the emergence of dangerous sinusitis [2]. Few studies have shown the involvement of HIV in the occurrence of complications [14]. One case of frontal sinus abscess associated with HIV was encountered in a woman 31 years old.

The average of care seeking duration was 12.9 days longer than 5.50 and 6.47 days of other authors. This long time can be due to the use of non-steroidal anti-inflammatory drugs which can reduce pain postpone the diagnosis and management by a specialist since the first symptoms of sinusitis complication.

The diagnosis of sinusitis complicated has been performed based on clinical and radiological signs. Frontal sinusitis complication was the most seen but the pansinusitis, as reported in this study [1] [5]. The fever has been constantly found in our series and was related to the biological signs of the inflammation. However, it has been found in 56.3% of cases in the series of Otmani [10].

The frontal subperiosteal abscess manifesting by a soft frontal tumefaction, fluctuating and painful was encountered in frontal sinusitis. The similar observation was made by some authors. They are the consequence of the spread of sinus infection of the anterior frontal sinus wall [1] [8].

Table 1. Summary of 9 patients with sinusitis complications.

patients	Patient 1/M/6 years	Patient 2/F/16 years	Patient 3/M/12 years	Patient 4/M/14 years	Patient 5/M/19 years
Sinus involved	E	P	P	F	E
complications	Orbit subperiosteal abscess	Fever, headaches, consciousness disorders	Fever, O, R, headaches, consciousness disorders	Fever, R, O, frontal fluctuating tumefaction	Fever, palpebral oedema thrombosis

E: ethmoidal, F: frontal, P: pansinusitis (maxillary, ethmoidal, and frontal sinus attack), R = rhinorrhea, O = nasal obstruction, ICH syndrome (intracranial hypertension), M = male, F = female.

Table 2. Summary of 9 patients with sinusitis complications.

patients	Patient 6/M/18 years	Patient 7/M/27 years	Patient 8/F/31 years	Patient 9/F/51 years
Sinus involved	P	F	F	F
complications	Brain abscess	Fever, frontal fluctuating tumefaction	Frontal subperiosteal abscess	Frontal subperiosteal abscess

The subperiosteal abscess of the orbit was revealed by eye-orbital symptoms including unilateral axial exophthalmia with decreased visual acuity in 1 case. It was due to the spread of infection in the ethmoidal orbit [15]. The cavernous sinus thrombosis was revealed by a right ptosis, external oculomotor nerve paralysis, it was associated with meningeal syndrome as reported by Amat F. [4]. Other orbital complications of ethmoidal infection such as preseptal cellulitis, intra orbital abscess have been reported [2] [4] [10].

The symptoms of endocranial complications are highly variable. It may be a persistent acute headache, a meningeal syndrome, a motor deficit, convulsive crisis, altered consciousness or an intracranial hypertension syndrome [7]. In this study these symptoms have been revealed by headaches, consciousness disorders, meningeal syndrome, motor deficit and intracranial hypertension syndrome (ICHS).

The computer tomography has been requested in all patients and helped to confirm the diagnosis and to localize the sinus attack. The front seat was in 44.4% of cases, pan sinus in 33.3% and ethmoidal in 22.2% of cases. In Otmani N. *et al.* [10] the causal sinusitis was ethmoid in 50% of cases, front in 25% of cases, maxillary 6.25% and pansinus in 18.75% of cases.

The endocranial complications reported in this study were due to a pansinusitis. The same observation has been made by several authors [6] [7]. However for other authors, they were due to frontal sinusitis [2] [9].

The maxillary locations, the most common in practice are less associated to the risk of complications [16]. These data support the results of our series. Nevertheless orbital complication cases of maxillary sinusitis have been reported [3].

Certain factors influence the result of the samples microbiological analysis. It is amongst other the rigor of the samples collection techniques, transportation and processing delay, the previous anti-infectious treatments received by patients [6] [17].

The samples have been collected in per surgery and immediately sent to laboratory. The result remains sterile in 4 cases and this can be explained by antibiotherapy before bacteriological sample collection.

Germs found in the literature are aerobic and or anaerobic. Sometimes the infection is polymicrobial, mixed, combining aerobic and anaerobic bacteria *Streptococcus pneumonia* (3 cases), *Pseudomonas aeruginosas* (1 case) and *Staphylococcus aureus* (1 case) [6] [7] [11]. Similar bacteria have been found by other authors [2] [18].

The treatment of complicated sinusitis is a medical and surgical emergency [5]-[7].

The choice of empirical antibiotic therapy will be made based on the susceptibility of the germ, based on epidemiological data, the proper antibiotic diffusion, the field, the starting point [5].

The rule of antibiotic therapy is an association of 2 or 3 antibiotics [2] [5].

For endocranial complications, some authors recommend a triple antibiotic therapy based on third generation of cephalosporin associated to vancomycin and metronidazole [5]. Other authors have preferred the association of cephalosporin 3rd generation and metronidazole [7].

For orbital complications a dual antibiotic therapy is usually recognized which associates a 3rd generation cephalosporin and an anti staphylococci. An imidazole can be associated in case of suspicion of an infection by anaerobic [19].

In this study the endocranial complication cases and two frontal abscess cases have had a dual antibiotic therapy associating cefotaxime and metronidazole and the other cases have had an association of amoxicillin-clavulanic acid.

The duration of the antibiotic therapy has not been the object of consensus in the literature. According to Belcaid A. [2] intravenous antibiotic therapy should be maintained until an apyrexia is obtained, and after disappearance of local inflammation signs. The oral route takes over for 2 to 8 weeks with an average of 3 weeks. In our series the average time was 28 days with extremes of 8 and 45 days.

Surgical treatment includes drainage of complications and drainage of sinus site [2] [3] [7].

The surgical approach depends on the affected sinus and complications site [2] [5].

The external approach has been used in this study for frontal and pre septal abscess. Some authors have recognized mixed, external and endoscopic approach which gives a better result and will enable easily later achieve a surgery filling of frontal sinus [2] [14]. Internal approach is not feasible yet in our context because of the non availability of endoscopy equipment. In our series, two cases of subdural empyema have necessitated neurosurgical care. The terms of the treatment of neurosurgical complications are variable according to the authors [2] [17]. For voluminous intracranial collections that obstruct the cerebrospinal fluid pathways, neurosurgical drainage is indicated in emergency [20]. Small collections ≤ 1 cm without focal signs or intracranial hypertension

syndrome are treated with antibiotic therapy for 6 weeks associated to an endoscopic drainage of the sinusitis [21].

The endocranial complications of sinusitis can be life-threatening. They can cause neurological injuries [1] [7]. We had neurological sequelae and two patients died. However Page C. *et al.* [7] have reported severe neurological sequelae in 3 patients in a series of 22 cases of intracranial abscesses and empyema. Two cases of hemiplegia as and frontal syndrome and one case of aphasia and behavioral disorders have been reported.

Orbital complications can be responsible for visual sequelae, the most serious of which is the definitive blindness [3]. We did not notice any sight injury as the case of definitive blindness reported by Guibert M. *et al.* [3].

5. Conclusion

Complications of infectious sinusitis are extremely serious despite the brain abscess and much difficult to tackle because of antibiotic era. The computer tomography was imperative to perform the diagnosis. The prognosis should be much better by specific antibiotics at the right time.

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