

## CASE REPORT

# MRSA in recurrent frontal sinusitis

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## ABSTRACT

The authors present a case of recurrent frontal rhinosinusitis, for which the drug therapy was ineffective. To avert the risk of complications, multiple classic and endoscopic surgical procedures were performed on the frontal sinus pathology.

The bacterium involved in this form of rhinosinusitis was represented by a Methicillin-resistant *Staphylococcus aureus* (MRSA) diagnosed during the first endoscopic approach (the second surgical procedure) for which the treatment corresponding to the antibiogram was followed. At the last hospitalization, the patient has undergone a frontal bilateral drainage surgery (modified Lothrop procedure) and started an adequate anti-MRSA treatment.

The authors wondered whether multiple recurrences of frontal rhinosinusitis are determined by an incomplete drainage, by a persistent infection with MRSA or by both.

**KEYWORDS:** frontal rhinosinusitis, recurrent rhinosinusitis, MRSA

## INTRODUCTION

The acute or chronic rhinosinusitis became a hard to deal pathology due to the increased incidence of MRSA. The *Staphylococcus aureus* is one of the most frequent pathogens that produce a wide range of infections – from abscesses and cellulitis to infections such as endocarditis and sepsis, which endanger the life of the patient<sup>1-3</sup>.

Due to the increased frequency of this bacterium, different classes of antibiotics were used, and therefore the *Staphylococcus aureus* developed an increased resistance to many of them<sup>4</sup>. MRSA gathered a real interest in the recent times due to the growing prevalence of patients with acute or chronic rhinosinusitis.

In the situations in which the treatment with antibiotics is inefficient, the solution is the endoscopic surgical cure of the frontal sinus that confers a good sinus view through wide opening of the frontal recess ensuring sinus drainage and ventilation<sup>5</sup>.

## MATERIAL AND METHODS

We further present the case of a 38-year-old patient who was initially hospitalized in another territorial service with a frontal sinusitis highlighted with the help of a CT scan examination; the external surgical approach was used – Ogston Luc, in which a complete evacuation of the purulent secretion was conducted, but without an endoscopic drainage to the middle

meatus (hiatus semilunaris). There are a number of studies which mention an increased number of nasofrontal duct stenoses<sup>6</sup> following this type of procedure that lacks the use of drainage and also the formation of a postoperative frontal mucocele.

After a year, the patient was admitted in our clinic with unilateral exophthalmos, persistent frontal headache and mucopurulent rhinorrhea. The endoscopic examination suggested a blockage situated at the middle meatus, caused by the presence of polyp formations and multiple secretions that appear to rise from the superior portion of the hiatus semilunaris. The computed tomography scan revealed a full opacification of the right frontal sinus with the destruction of its anterior bony wall, as well as of the inferior wall (orbital) of the frontal sinus, with the presence of an abscess collection in the right orbit (Figure 1, Figure 2). Therefore, an endoscopic surgical cure of the frontal sinus with wide opening of the frontal recess and ostium was performed<sup>7</sup>.

At that moment, an endoscopic culture was performed and sent for bacteriological exam. The antibiotic treatment with levofloxacin was started with 5mg/ml for a five-day period until we obtained the results of the exam. The cultures highlighted a Methicillin-resistant staphylococcus aureus, sensitive to trimethoprim-sulfametoxazol, tetracycline, rifampicin, linezolid, clindamycin and vancomycin, and resistant to levofloxacin, ciprofloxacin, erythromycin, oxacillin and penicillin. Therefore, we decided to replace levofloxacin with cotrimoxazole 16 mg/80 mg for 10 days, which led to a favourable postoperative evolution<sup>8</sup>.

After one year, the patient was again admitted to our clinic with a periorbital edema, unilateral exophthalmos with throbbing pain and purulent secretions. The culture of secretions from the superior portion of

the middle meatus (drainage from the frontal sinus) showed an MRSA. It was further decided to undergo a complete endoscopic drainage of both frontal sinuses by using the Draf III procedure (modified Lothrop).

The Draf III procedure implies the removal of the right frontal sinus floor, the superior portion of the nasal septum, the left frontal sinus floor up to the lamina papyracea, and the inferior portion of the interfrontal septum<sup>9,10</sup>. The advantage of this procedure is the low rate of stenosis, ensuring the complete drainage of both frontal sinuses. The endoscopic method is a less invasive procedure than the classic surgery, with an increased cosmetic effect.

## RESULTS

The treatment of the pathology was successful through a therapeutic conduct of surgical drainage of both frontal sinuses by using the Draf III procedure (modified Lothrop). The large drainage of the frontal sinus ensured good sinus ventilation as well as a normal mucociliary clearance.

The bacteriological result of the secretion was MRSA, for which a treatment was established.

## DISCUSSIONS

Throughout these two years, the patient underwent 3 surgical approaches: classic procedure, endoscopic procedure and Draf III procedure during which the main aim was to restore the sinus drainage. This drainage is important because the frontal sinus recess and the frontal sinus ostium may close again and the rhinosinus inflammatory pathology may reoccur. The



**Figure 1** Sagittal CT scan - opacification of the right frontal sinus, with the destruction of its anterior bony wall



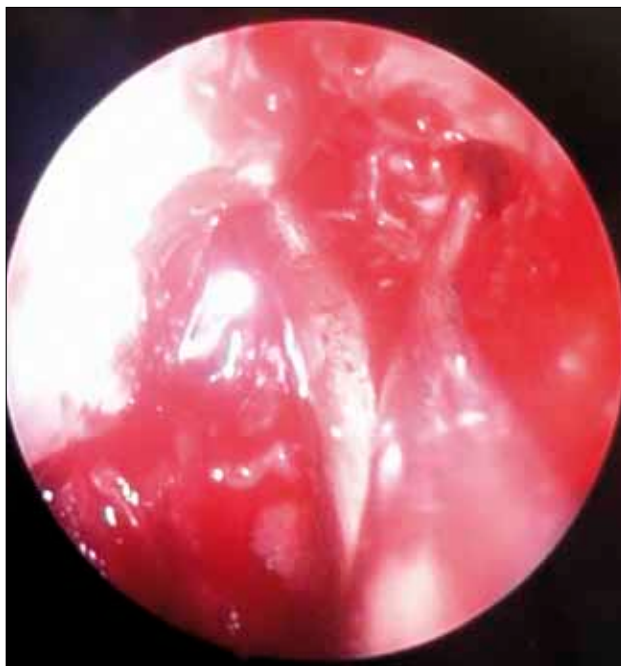
**Figure 2** Coronal CT scan - full opacification of the right frontal sinus, with the destruction of the orbital wall and the presence of an abscess collection in the right orbit

stagnation of the mucopurulent secretions (frontal sinus infection) can affect the mucociliary clearance of the mucosa of the sinus<sup>11</sup>.

Nasal secretions are constantly investigated from the patient who suffers of recurrent rhinosinusitis in order to investigate the bacterial etiology. In the case of MRSA apparition, the treatment consisted in complete sinus drainage and specific antibiotics therapy.

For this patient, the major problem that we had to confront with was determined by the recurrent rhinosinusitis. If, for the first classic surgical intervention, the drainage of the middle meatus of the frontal sinus was considered a secondary issue, which would explain the reappearance of the frontal sinusitis, after the second surgical intervention performed in our clinic, we would have expected a normal functionality of the drainage. However, the endoscopic examination and computed tomography that were performed during the last hospitalization revealed a blockage of the frontal sinus ostium. Although treatment for MRSA was imposed after etiological diagnosis during the second surgical intervention, we suspect that the virulence of this bacterium determined the reappearance of the pathology due to the lack of the sinus drainage. We thought that the patient had a low immunity, but the immunologic tests contradicted this hypothesis.

We considered that the most important reasons for the recurrent pathology were an inefficient drainage as well as the infection with MRSA. In consequence, the therapeutic decision consisted in an endoscopic large and complete drainage (modified Lothrop) of both frontal sinuses and treatment for the MRSA infection (Figure 3).



**Figure 3** . Intraoperative view of both frontal sinuses (70° endoscopic)

The most important question that arises is whether or not the relapsing inflammation mucosa from the frontal sinus recess is determined by the presence and persistence of an infection with MRSA, which obviously leads to the recurrent pathology.

## CONCLUSIONS

In case of recurrent and complicated frontal rhinosinusitis, we have decided that the optimal therapeutic solution consists of the normal drainage and sinus ventilation, which ensures the integrity of the mucociliary clearance and avoids recurrences. In such cases, the follow-up is very important, during which endoscopic, bacteriological and imagistic examinations need to be performed.

In case of reappearance of the inflammatory sinus pathology during the infection with MRSA, the therapeutic plan must necessarily include a complete, efficient and stable drainage of the frontal sinus (Draf III procedure), but also an efficient treatment against MRSA.

The purposes of a treatment for frontal sinusitis are the eradication of the sinus pathology, the preservation of the normal sinus physiology and the existence of a low morbidity rate together with an increased cosmetic effect.

**Conflict of interest:** The authors have no conflict of interest.

**Contribution of authors:** All authors have equally contributed to this work.

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