THE INVOLVEMENT OF INFECTIOUS DENTAL DISEASES INTO THE MAXILLARY SINUS INFLAMMATION

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Keywords: odontogenic maxillary sinusitis, bacteriology, pathology.
INTRODUCTION

Maxillary sinusitis is an inflammatory process and/or an infection of bacterial, fungal or viral origin, developed in the maxillary sinus. Microbial pathology may be isolated or associated with other processes that affect one or more adjacent sinuses.

This study has aimed to deepen knowledge maxillary sinusitis of dental cause in terms of clinical, bacteriological and pathological characteristics, seeking determination of significant correlations between clinical parameters, epidemiological and bacteriological studied and their prognostic role.

MATERIALS AND METHODS

RESEARCHED MATERIAL

Maxillary sinusitis is an inflammatory process and/or an infection of bacterial, fungal or viral developed in the maxillary sinus. Microbial pathology may be isolated or associated with other processes that affect one or more adjacent sinuses.

The study method used was the clinical and statistical, retrospective, based on a combined analytical and descriptive research, represented by an biostatistics examination and mathematical variables studied in relation to the disease. I studied the complex problem of dental infectious pathology correlated with the maxillary sinus in a study group of 127 patients diagnosed with odontogenic maxillary sinusitis, selected amongst patients with inflammatory rhinosinusitis pathology, admitted to the County Hospital Craiova ENT clinic in 2006-2010.

METHODS USED IN RESEARCH
For the study we investigated the clinical and statistical observation sheets, retrospective and current of patients diagnosed with acute and chronic maxillary sinusitis.

The bacteriological study has aimed to identify key bacterial strains, aerobic and anaerobic, which cause suppurative process in the maxillary sinus. To highlight the anaerobic bacteria, the PhD has used a specific protocol and special environments, being very well known that in contact with air, these bacterial species are rapidly destroyed. I have established now that generally odontogenic sinusitis is caused by microbial associations: aerobic + aerobic, anaerobic + aerobic or anaerobic + anaerobic. Most often, bacteriological examination revealed the presence of Staphylococcus.

Histopathological study included a total of 47 cases of odontogenic maxillary sinusitis selected from patients admitted and operated in the ENT Clinic of the Emergency County Hospital Craiova, in a period between 2006-2010.

The biological material collected, represented by fragments of sinus mucosa was fixed in 10% neutral formalin solution and then included in paraffin buffered with sodium phosphate and a pH of 7.2-7.4. With the help of the microtome (HM350 Microm) equipped with a special cutting (Section Transfer System, STS, Microm) was made 5 micron thick sections that were stained with hematoxylin-eosin.

We noted the presence of chronic inflammatory infiltrate present in most patients, but also eosinophilic infiltrate, which raises the suspicion of an initial rhinogenic chronic sinusitis.

CHAPTER 3.1. Epidemiological study of patients diagnosed with odontogenic maxillary sinusitis
We studied the complex problem of dental infectious pathology correlated with the maxillary sinus in a study group of 127 patients diagnosed with odontogenic maxillary sinusitis, selected among rhinosinusitis patients with inflammatory pathology, admitted to the County Hospital Craiova ENT clinic in 2006-2010.

For data processing was used Microsoft Excel (Microsoft Corp., Redmond, WA, USA) with XLSTAT suite for MS Excel (Addinsoft SARL, Paris, France). The parameters investigated for subjects in this study were stored in Excel files.

**DISCUSSION**

The structure lot included 78 female patients and 49 male patients, the percentage being 61.42% women and 38.58% men.

From the cases under study revealed that females are more frequently affected by odontogenic maxillary sinusitis than male patients.

In terms of distribution by age group, 24 cases were patients aged between 16-24 years, 26 patients aged between 25-34 years, 33 patients aged between 35-44 years, 19 patients between 45 - 54 years, 16 patients between 55-64 years and 9 patients between 65-80 years.

The largest number of patients belonging to the age range of 35-44 years, while the minimum number is found in the range of 65-80 years.

Regarding the area of origin, patients were classified in all classes, from both urban and rural. We observed significantly higher addressability of rural patients (54.33%) than those in urban areas (Table 4, graphs 4a and 4b). We must not ignore the fact that the dental pathology and the sinus may be present in rural areas due to the poor hygiene while in the urban areas, the causes being pollution, stress and lifestyle.

The analysis of survey sheets we found that there is not a big difference between the number of patients with maxillary sinusitis (regardless of etiology), in terms of
clinical form. Thus, during the five years studied, the distribution of patients with maxillary sinusitis, depending on the clinical form was as follows:

<table>
<thead>
<tr>
<th>Year of study</th>
<th>Acut</th>
<th>Cronic</th>
<th>Total sinuzitis</th>
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<tr>
<td>2006</td>
<td>147</td>
<td>108</td>
<td>255</td>
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<td>2007</td>
<td>142</td>
<td>121</td>
<td>263</td>
</tr>
<tr>
<td>2008</td>
<td>139</td>
<td>102</td>
<td>241</td>
</tr>
<tr>
<td>2009</td>
<td>118</td>
<td>114</td>
<td>231</td>
</tr>
<tr>
<td>2010</td>
<td>98</td>
<td>67</td>
<td>165</td>
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Distribution of maxillary sinusitis patients hospitalized in ENT Craiova, depending on the clinical form, during 5 years.

We gave great importance to proper diagnosis of odontogenic maxillary sinusitis clinical form - acute or chronic. We found that the patient presents acute odontogenic maxillary sinusitis if the symptoms started after a dental infection or tooth extraction without the patient ever to present a history of episodes of unilateral mucopurulent rhinorrhea. For diagnosis of chronic maxillary sinusitis symptoms we considered necessary to be lasting longer than 3 months.

In terms of clinical anatomical shape, most patients with odontogenic maxillary sinusitis were hospitalized due to orbitofrontal complications to their eyes. Regarding the patients that where diagnosed with chronicodontogenic maxillary sinusitis most of them had suppurative form.
CHAPTER 3.2 Bacteriological study of nasal-sinus secretion in patients diagnosed with odontogenic maxillary sinusitis

RESULTS

From the 56 patients who have sinus secretion harvested and we have managed to reveal the germs involved in the disease process, we identified the following strains:

- Staphylococcus aureus
- α-hemolytic streptococci
- Streptococcus pneumonia
- Haemophilus influenzae
- Escherichia coli
- Peptostreptococcus spp
- Prevotella

Bacterial sinus secretion exam revealed either a single germ or pathogen or microbial associations (2 or 3 sinus secretions pathogens isolated from the same patient). We found that most patients with odontogenic maxillary sinusitis showed microbial associations - 36 (64.28%).

Gram stained smear analysis revealed the presence of Gram-positive aerobic species presence and Gram-negative and anaerobic species - gram-positive cocci (Peptostreptococcus spp) and Gram-negative bacilli (Prevotella).

DISCUSSIONS

We have noticed that most often the presence of germ associations, associations both aerobic and anaerobic + aerobic germs. Anaerobic bacteria associations have identified several strains of Peptostreptococi.

The presence of microbial associations is very important to know because while the patient presents himself to the doctor, after following antibiotic treatment outpatient, the treatment that we are going to recommend should also include metronidazole or to carry out direct generation quinolones IV, which are active and anaerobes.
CHAPTER 3.3 Histopathological study of sinus mucosa in patients diagnosed with odontogenic maxillary sinusitis

RESULTS

The study included 47 patients who underwent radical cure Caldwell-Luc.

Histopathological study of sinus mucosa allowed us to observe the presence of cellular infiltrates as following:

- The existence of a microscopic respiratory type epithelium, often ulcerated, subjacent dense collagen stroma with mixoid areas alone or combined hyalinisation areas;

- The presence of infiltrated diffuse lymphocyte plasma cell infiltration or focal subepithelial, periglandular, presence of lymphocyte plasma cell infiltration demonstrates the existence of chronic inflammation of the sinus mucosa

- The presence of eosinophilic infiltration with or without a limfoplasmocitar infiltrated;

- The presence of a chronic infiltrate xantogranulomatos.

DISCUSSION

We found that most sinus mucosa fragments analyzed showed changes characteristic of chronic inflammation: the abundance of inflammatory cells - neutrophils, macrophages, plasma cells.

In all cases studied, whether the clinical diagnosis was of suppurative odontogenic maxillary sinusitis acute or chronic the histopathological examination revealed the presence of a chronic inflammatory infiltrate. This shows that, often, the patients ignore the chronic sinusitis, they can not specify anamnestic, chronic purulent rhinorrhea episodes there.
CONCLUSIONS

Study of 127 cases of maxillary sinusitis of dental question selected in 2006-2010 allowed the following observations:

1. Our study analyzed hospitalized patients with odontogenic maxillary sinusitis in ENT Craiova between 2006-2010. At this time in the clinic were hospitalized a total of 1155 patients with a diagnosis of sinusitis of which 127 were diagnosed with odontogenic maxillary sinusitis, which is 10.99%;

2. Batch structure included 61.42% female patients and 38.58% male patients, the ratio female / male was 1.59:1, it shows that women are more prone to develop this type of pathology;

3. In terms of distribution by age groups, the largest number of patients belong to the age range of 35-44 years;

4. Regarding the area of origin, we see significantly higher addressability of rural patients (54.33%) than those in urban areas.

5. In terms of clinical forms, patients with odontogenic maxillary sinusitis showed: 69 (54.33%) acute form and 58 (45.66%) as chronic odontogenic sinusitis.

6. In terms of clinical anatomical shape, we’ve noticed that almost half of patients with acute odontogenic maxillary sinusitis were hospitalized for orbito-ocular complications of the suppurative process - 32 (46.38%). We have not noticed the presence of maxillary sinusitis complications in patients hospitalized for chronic form of the disease.

7. Looking at the average age of patients diagnosed with acute odontogenic maxillary sinusitis we noticed a small amount - 34.13 years - compared with the value obtained for patients with chronic odontogenic maxillary sinusitis - 48.14 years. Using non-parametric Mann-Whitney test we obtained a value of $p = 7.13 \times 10^{-9} < 0.05$, significantly lower than the maximum threshold for high statistical significance equal to 0.001. Thus, we can say with 99.9% confidence that the median age for patients with acute and chronic odontogenic sinusitis differs.
8. In terms of the region where the maxillary infectious process was found, we determined that the left maxillary sinus was more commonly affected - 70 patients (55.12%).

9. In terms of teeth involved in the pathological sinus process disease, I noticed that the first molar is the 1st, with an overall incidence of 55.12% (alone or in combination with adjacent teeth), therefore, 70 patients had odontogenic maxillary sinusitis pathology because of this tooth. At No. 2 is the 2nd molar with an incidence of 32.28% (41 patients) followed by the 2nd premolar with 25.98% (33 patients).

10. Regarding the number of teeth involved in the development of odontogenic maxillary sinusitis, we found that most of them were caused by a single tooth - 91 patients (71.65%). They were followed by those caused by 2 teeth - 24 (18.90%) and those determined by three teeth - 12 (9.45%).

11. The observed dental pathology were consisted in dental affections of untreated dental caries, which, have progressed to the pulp, followed by a pulpo-periapical disease.