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Research Article

TREATMENT OF MAXILLARY SINUS CYSTS: LITERATURE REVIEW

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Mirzayev S.P.
Tashkent Medical Academy, Uzbekistan

Jabborov N.N.
Tashkent Medical Academy, Uzbekistan

Akhmedov S.E.
Tashkent Medical Academy, Uzbekistan

Botirov A.J.
Tashkent Medical Academy, Uzbekistan

Abdullaev U.P.
Tashkent Medical Academy, Uzbekistan

Akhundjanov N.A.
Tashkent Medical Academy, Uzbekistan

ABSTRACT

In recent decades, inflammatory diseases of the nose and paranasal sinuses have firmly taken first place in the overall structure of morbidity of ENT organs, both in the analysis of visits to the clinic and in the group of patients undergoing treatment in inpatient settings. Cysts of the paranasal sinuses are one of the most common diseases in clinical practice.

KEYWORDS

Maxillary sinus cyst, paranasal sinuses, mucous membrane.

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INTRODUCTION

The author's review focuses on the following topics: periapical inflammatory processes, inflammatory changes in the mucous membrane of the maxillary sinus, sinusitis, cysts, causes of odontogenic sinusitis, differential diagnosis of periapical inflammatory processes, endodontic treatment or apical surgery [2].

1. Periapical inflammatory processes. Inflammatory changes in the mucous membrane of the maxillary sinus.

According to foreign studies (presented in the Journal of Endodontics, Oral & Maxillofacial Surgery, Clinical Oral Investigations):

- "Inflammation in the periapical tissues can affect the sinus mucosa both in the presence and absence of perforation of the cortical plate of its floor."

- "Infectious agents and inflammatory mediators can spread through the medullary spaces, blood and lymphatic vessels into the maxillary sinus."

– "Inflammatory changes in the mucous membrane of the maxillary sinuses occur in 70-80% of cases of periapical inflammatory processes of molars and premolars of the upper jaw."

- "The most common of these changes are inflammatory thickening of the sinus mucosa (77-83%) and sinusitis (35%)."

Inflammatory processes in the pulp and periodontium of the chewing teeth can affect the integrity of the bottom of the maxillary sinus and the condition of the mucous membrane, causing inflammatory changes in it [3-6]. The spread of periapical inflammation into the maxillary sinus was first described by Bauer in 1943. He conducted a study of cadavers using microscopy of sections of dentoalveolar segments with the adjacent part of the sinus [1]. The study showed that inflammation in the periapical tissues can affect the sinus mucosa both in the presence and absence of perforation of the cortical plate of its floor. Infectious agents and inflammatory mediators can spread through the bone marrow spaces, blood and lymphatic vessels into the maxillary sinus [7].

Studies by Ariji et al report a high prevalence (70-88%) of inflammatory changes in the maxillary sinus associated with apical periodontitis of the chewing teeth of the upper jaw [8-14]. According to Lofthag-Hansen et al., the most common of these changes are inflammatory thickening of the sinus mucosa (77-83%) and sinusitis (35%).

Longhini and co-authors' data are interesting. According to their observations, patients who

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underwent up to three maxillofacial surgeries maintained sinusitis for three to 15 years until the elimination of odontogenic causes. Moreover, all these years, patients were under the observation of dentists, but no connection between apical infection and sinusitis was found [15].

According to Spanish colleagues published in 2010, among the most common odontogenic causes of sinusitis are:

- peri-apical inflammatory processes of the lateral teeth of the upper jaw - 46% (21% of teeth after endodontic treatment);

- removal of infected tissue or filling material during endodontic treatment - 8%. Thus, about 50% of odontogenic sinusitis are associated with teeth that require or have previously undergone endodontic treatment. Speaking of group dental involvement, it should be noted that the most frequent inflammatory processes in the jejunum are caused by the first molar (about 40%), the second molar (27%), the second premolar (6%), and the first premolar (2.5%). In this case, the first molar is most often caused by the celestial root, the second molar by the anterior maxillary root, and the first premolar by both roots [1].

2. What do the literature data suggest about the role of endodontics in the complex treatment of maxillary sinus diseases?

Two studies published more than 40 years ago indicated that 30% and 70% of patients experienced complete endodontic hypertrophy within one year of endodontic treatment. Meanwhile, tooth removal caused complete restoration of the mucous membrane within 11 months in 80% of cases. There are also descriptions of individual clinical cases of restoring the healthy state of the mucous membrane after endodontic treatment [15-18]. All of these studies had an observation period of one year or more.

One of the latest research on this topic was conducted by Nurbakhsh and co-authors. During this study, 30 upper jaw teeth (four first premolars, six second premolars, 15 first molars, and five second molars) and maxillary sinus were examined. In 24 out of 30 sinuses, inflammatory changes were detected (80%). A decrease in the thickness of the hypertrophied mucous membrane to the norm (less than 3 mm) within three months after endodontic treatment was observed in 30% of cases and amounted to 41% to 89% of the initial values. In 30% of cases, a less pronounced decrease in mucosal thickness occurred (9% to 14%). In other cases, no significant decrease in mucosal thickness was observed. This may be due to the short observation period [19].

According to various authors, the prevalence of cysts ranges from 15% to 45%. Knowing that the success of conservative treatment of apical periodontitis is about 80%, it is reasonable to assume that in some cases,

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cysts can be treated conservatively. However, according to Ramachandran Nair P. N., Pajarola G., Schroeder, true epithelial cysts persist after conservative treatment [20-24].

Therefore, differential diagnosis of cysts from granules is of great importance for choosing between surgical and conservative treatment options.

For the first time, the use of CT for differential diagnosis of radicular cysts and granules was described by Trope et al. In his research, he examined eight teeth with near-peak inflammatory lesions [25-29]. Seven out of eight foci had fuzzy contours and uniform density, similar to the density of soft tissues. One focus in the center had homogeneous lighting of low density in the center. Histologically, this site turned out to be a cyst, while the other seven were granules.

In one of the recent works, Aggarwal and co-authors used CT to differentiate the diagnosis of true granulomatous cysts. They were able to determine density values in Hounsfield units for these formations. The study examines 12 clinical cases [30]. In each case, a computer scan was performed and further surgical treatment with a histological examination was performed.

Two lesions were identified as granules, the remaining 10 as cysts. However, HU values greater than 40 are characteristic of granules, and from -20 to 20 are characteristic of cysts.

Therefore, CLT can be an adequate minimally invasive method for differential diagnosis of apical periodontitis.

Recently, thanks to the development of modern diagnostic equipment and augmentation systems, surgical methods for treating near-peak inflammatory lesions are becoming increasingly widespread [31-35].

The teeth of the chewing group that do not require endodontic treatment are candidates for such treatment and should be removed only if it is impossible to do so. The difficulties of surgical treatment of such teeth are related to their location in the distal parts of the oral cavity, which determines the difficulties in obtaining adequate access and close proximity to the maxillary sinus [29].

Apicalctomies of the upper jaw molars and premolars are accompanied by complications characteristic of apicalctomies of any localization. Specific complications include perforation of the maxillary sinus and introduction of foreign bodies/materials into the sinus.

Ericson et al. obtained a perforation of the bottom or wall of the maxillary sinus in 18% of cases during apical rectomy of 159 molars and premolars of the maxillary sinus. According to these authors, the introduction of foreign bodies into the lumen can cause thickening of the Schneider membrane and sinusitis.

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Friedman et al. received a perforation in 11.8% of cases during apiclectomy of 94 upper molars.

Persson reports perforation in 44% of cases. Despite this, the treatment outcome is 78%. They did not establish a correlation between the successful outcome of treatment and the perforation of the Schneider membrane.

Ioannides et al. underwent 47 operations on the upper jaw in 14.8% of cases. According to these authors, the presence of perforation does not affect the formation of peri-apical bone and the success of treatment [22].

Rud et al. performed 200 apiclectomies of the first molars of the upper jaw, averaging 50% of the cases were perforated. Despite this frequency of perforations, sinusitis was registered in only two cases [20].

Freedman Horowitz, in a study of 440 patients who underwent apical removal of 472 upper jaw teeth, reports membrane perforation in 10.4% of cases (23 in the second molars and two in the first premolars). However, no cases of sinusitis or mucosal hypertrophy were observed.

Penarrrocha et al. in a study of 50 clinical cases received a perforation in three cases, a radiographic picture of bone tissue restoration in 46 cases, and no bone tissue restoration in four cases. The authors did not find a connection between the perforation of the maxillary sinus and the success of treatment.

CONCLUSIONS

1.Endodontic treatment of periapical inflammatory lesions leads to an improvement in the condition of the maxillary mucosa in an average of 60% of cases.

2. Considering the prevalence of root cysts from 15% to 45%, it can be assumed that in these cases, the treatment is done with granules and granulating lesions.

3.For differential diagnosis of periapical inflammatory processes, it is advisable to use low-FOV CLCT.

4.To evaluate treatment outcomes, a long observation period (up to one year) is necessary.

5.In cases of ineffective endodontic treatment, apical surgery is the method of choice.

6. At the same time, the appearance of a perforation of the maxillary sinus does not affect the success of treatment.

7. In case of ineffective apical surgery, tooth removal is recommended.

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