

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Inflammatory Diseases of Frontal Sinuses in The Presence of Ostiomeatal Complex Deformation.

TA Mashkova, LS Bakulina, AI Nerovny, and AB Maltsev*.

Department of Otorhinolaryngology of Voronezh State Medical University named after N.N. Burdenko, Voronezh, Russia.

ABSTRACT

We have studied clinical and anatomic features of frontal sinusitis cases in 229 patients aged from 14 to 78. 48.8% of patients were diagnosed with acute form and 51.2% - with chronic form. 17.4% of patients had catarrhal frontal sinusitis, 61% - exudative (purulent) one and 21.6% had a mixed form of it. A comparison study of peculiarities of the clinical course of frontal sinusitis cases with the data of micro- and endorhinoscopy, computed tomography of the paranasal sinuses and the information obtained by probing the frontal sinuses made it possible to distinguish four groups of anatomical variants of ostiomeatal complex structure and to determine their role in the development and progression of these diseases. 26.8% of patients of first and second groups were diagnosed with local damage to frontal sinuses. A polypathia of frontal sinuses was observed in 79.9% of patients of third group and in 95.9% of patients of fourth group. Follow-up study after conservative treatment without the use of invasive methods in 1 to 3 months showed that the pneumatization of the frontal sinuses is not fully restored. In the presence of grade II and III ostiomeatal complex deformation, the defined deformation was corrected in 42% of patients using endoscopic equipment. Disease relapse in case of patients' follow-up within the period from 6 months to 5 years was 3.8%.

Keywords: frontal sinus, ostiomeatal complex deformation, frontal sinusitis, diagnostics, treatment.

**Corresponding author*

INTRODUCTION

Inflammatory pathology of paranasal sinuses becomes increasingly important nowadays, both socially and medically. It is not so much connected with the rising incidence of sinusitis cases both in our country and abroad as rather with the fact that, in spite of any success in sinusitis etiopathogenesis study and introduction of the latest achievements in science and technology to diagnostics and treatment practice, the number of sinusitis progressions to chronic form as well as their recurrings keeps growing. The amount of postsurgical relapses remains high and ranges from 15% to 40%.

Consequently, the inflammatory pathology of paranasal sinuses is currently the subject of extensive study by various specialists, including immunologists, pathologists, pharmacologists, etc.

However, multiple works cover the issue in a standard and generalized way. Frontal sinus disorders are mostly not singled out of the total number of sinusitis cases. And the issues being considered in this respect mainly refer to prevention of sinusitis relapses after extranasal surgical treatment which results are unreliable and often unsatisfactory so far. These circumstances determine the relevance of issue of early diagnostics and the choice of adequate treatment of this disease.

Frontal sinus discharge outlet location on its lower wall is favourable both for its ventilation and exudate discharge in case of inflammation.

However, there is a number of anatomic structure variations of the lateral wall and the upper parts of nasal cavity which may predispose to frontal sinus ventilation and drainage disorders in case of the slightest changes of the mucous membrane and thus contribute to inflammation development and its transition into a chronic condition [1-6].

Traditional methods of sinusitis cases diagnostics such as rhinoscopy and radiography often do not give a complete picture of the nature of the disease, for which reason the patients do not get the full pathogenetic treatment for a long time, and the process becomes chronic.

The use of micro- and endorhinocopy methods when examining patients helps to obtain more precise information about the ostiomeatal complex structure and the nature of changes in the frontal sinus [3, 7, 8].

MATERIALS AND METHODS

We have studied clinical and anatomic features of frontal sinusitis cases in 229 patients aged from 14 to 78, receiving medical treatment in Otorhinolaryngology Clinic of Voronezh State Medical University named after N.N. Burdenko.

48.8% of patients were diagnosed with acute form and 51.2% - with chronic form. 17.4% of patients had catarrhal frontal sinusitis, 61% - exudative (purulent) one and 21.6% had a mixed form of it.

A comparison study of peculiarities of the clinical course of frontal sinusitis cases with the data of micro- and endorhinocopy, computed tomography of the paranasal sinuses and the information obtained by probing the frontal sinuses made it possible to distinguish four groups of anatomical variants of ostiomeatal complex (OMC) structure and to determine their role in the development and progression of these diseases.

The first group included the patients having no OMC deformation. The patients with grade I OMC deformation which manifested itself in paradoxical curvative of middle tribunate towards the lateral wall of the nasal cavity up to contact with its elements were referred to the second group. The third group included the patients with excessive pneumatization of uncinat process and ethmoid bulla as well as paradoxically curved or bullously changed middle tribunate - grade II OMC deformation. The fourth group included patients with mixed deformation of OMC elements and nasal septum in projection of middle nasal passage occluding agger nasi by over 50%.

According to our research data, the frequency of observed variations of ostiomeatal complex structure was as follows: the first group - 6.1%, the second one - 11.8%, the third one - 39.3%, the fourth one - 42.8%.

26.8% of patients of first and second groups were diagnosed with local damage to frontal sinuses. A polypathia of frontal sinuses was observed in 79.9% of patients of third group and in 95.9% of patients of fourth group.

Control follow-up study of group II and III patients after conservative treatment without the use of invasive methods (puncturation, trephinopuncture, extranasal opening) in 1 to 3 months showed that the pneumatization of the frontal sinuses is not fully restored. In patients of the fourth group the treatment of sinusitis concurrent with frontal sinusitis had a temporary effect only.

These circumstances have resulted in the use of endonasal drainage of affected sinuses through natural orifice as a method of diagnostics and treatment of inflammatory diseases of frontal sinuses.

Endonasal probing and flushing of frontal sinuses followed by medicine introduction according to E.A. Landsberg was used for frontal sinusitis treatment in 82.3% of patients.

In the presence of grade II and III ostiomeatal complex deformation, after frontal sinuses probing the long-lasting inflammatory changes developed not only in the anterior middle nasal passage, including the front end of the middle turbinate, but also in mucosa of relevant parts of the nasal septum. These changes aggravated deformation and blocked the fronto-nasal communication. Deficient mucosa reaction to anemisation prevented repeated probing and natural drainage of frontal sinuses which extended period of treatment. To improve conditions for natural exudate outflow and frontal sinuses venting as well as endonasal treatment, the defined ostiomeatal complex deformation was corrected in 42% of patients in the form of uncinata process resection, opening of anterior ethmoidal air cells, resection of anterior end of the middle turbinate and its mobilization using endoscopic equipment and surgical microscope. Upon detection of polyposis in the area of natural ostia of sinuses the scope of surgical procedures extended to pansinusotomy.

The developed procedures for examination and treatment of patients with inflammatory diseases of the frontal sinuses and the detailed study of anatomic features of ostiomeatal complex increase the efficiency of treatment of this disease, reduce the standard period of inpatient treatment from 13 - 23 bed-days to 7 - 9 bed-days and ensure stability of long-term results.

According to our research, the disease relapse in case of patients' follow-up within the period from 6 months to 5 years was 3.8%.

CONCLUSIONS

- The performed research confirms the key role of anatomic changes of ostiomeatal complex in development, progression and nature of inflammatory diseases of the frontal sinuses;
- The obtained results indicate the necessity of more extended corrective surgical treatment in the OMC area using micro- and endoscopic equipment to improve the efficiency of diagnostics and treatment of frontal sinusitis cases and to prevent their recurrence.

REFERENCES

- [1] M.V. Miloslavsky. Frontal Sinuses (Anatomical and Topographic and Craniological Study). // Doct. dissert.- M., 1903.- 192 p.
- [2] S.Z. Piskunov, F.N. Zavyalova, I.S. Guryev, V.S. Piskunov. Peculiarities of Pathologic Process in Paranasal Sinuses Depending on Ostium Location and Size. // Rus. Rhinology.- 1999.- No. 2.- P. 16-19.
- [3] S.Z. Piskunov, V.V. Kharchenko, V.S. Piskunov. Clinical Relevance of Some Anomalies of Nasal Cavity and Paranasal Sinuses. // Rus. Rhinology.- 2000.- No. 4.- P. 8-10.
- [4] Caughey R.J., Jameson M.J., Gross C.W., Han J.K. Anatomic risk factors for sinus disease: fact or fiction? // Am J Rhinol. 2005 Jul-Aug;19(4):334-9.



- [5] Lee D., Brody R., Har-El G. Frontal sinus outflow anatomy. // Am J. Rhinol.- 1997.- Vol. 11.- №4.- P. 283-285.
- [6] Rudert H. Mikroskop- und endoskopgestützte Chirurgie der entzündlichen Nasennebenhöhlenerkrankungen. Der Stellenwert der Infundibulotomie nach Messerklinger. // HNO.- 1988.- Vol. 36.- №12.- P.475-482.
- [7] Srivastava M., Tyagi S. Role of Anatomic variations of Uncinate Process in Frontal Sinusitis // Indian J Otolaryngol Head Neck Surg. 2016 Dec;68(4):441-444. Epub 2015 Dec 19.
- [8] Shi J.B., Xu G., Yang Q.T., Wang T., Chen H.X., Wen W.P. Transnasal endoscopic frontal surgery for chronic frontal sinusitis // Zhonghua Er Bi Yan Hou Ke Za Zhi. 2004 Feb;39(2):108-11.