CASE STUDY

A case of providing a surgical treatment for patient with silent sinus syndrome

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ABSTRACT

This article presents a case report of patient with silent sinus syndrome. This syndrome is characterized by reduction in size of sinus with accumulation of pathological content inside it due to obstruction of osteomeatal complex, development of enophthalmos and resorption of bone walls. Such process occurs because of hypoventilation of maxillary sinus and followed by development of chronical maxillary sinusitis. Except generally accepted clinical observations, computer tomography scan of paranasal sinuses and endoscopic endonasal examination are essential for the verification of this syndrome in patients. We believe that in order to prevent sinus collapse it is necessary to provide a surgical treatment which involves making a vide antrostoma through endoscopic approach and correction of middle nasal turbinate and other intra-nasal structures especially those who are located near to osteomeatal complex. This will provide normal conditions for ventilation of middle nasal meatus. Appropriate postoperative examination and care is also required for successful recovery.

KEY WORDS: silent sinus syndrome, middle nasal turbinate, endoscopic antrostomy

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INTRODUCTION

Silent sinus syndrome (SSS) is a pathological condition which occurs due to obstruction of osteomeatal complex and results in development of enophthalmos. This disease is characterized by reduction in size of sinus with accumulation of pathological content inside it. First it was described by Montgomery W.W. in 1964 [1]. He analyzed two clinical cases of enophthalmos and diplopia which were associated with maxillary sinus collapse. Later this disease was described by other authors. Term "Silent sinus syndrome" was first applied by Soparker C.N. et al. in 1994 after examining 19 patients with similar symptoms [2].

The etiology and pathogenesis of this syndrome are still not fully understood. The most widespread explanation for its development is the theory of obstruction of the osteomeatal complex (OMC) [3]. The ostia of the maxillary, ethmoid, and frontal sinuses; middle meatus; infundibulum; uncinate process; and anterior ethmoid cells are the anatomical structures that form the OMC [4]. Its main function is to provide aeration and mucus clearance for the paranasal sinuses. Different anatomical variations of the OMC and its obstruction can influence the volume of the maxillary sinus. Collapse of the middle nasal meatus, altered anatomical structure of the middle nasal turbinate and lateralization of the uncinate process are leading to occlusion. As a result, secretions accumulate inside the maxillary sinus (MS) and ciliated epithelium cannot transport them toward the sinus opening [5]. These secretions are resorbed, causing a vacuum effect that leads to hypoventilation of the MS. Under such conditions, negative pressure is formed, causing the walls of the MS to migrate inward. These circumstances also contribute to bone thinning and remodeling due to increased osteoclast activity. Hypooxygenation inside the MS creates an anaerobic environment favorable for bacterial growth and the development of bacterial sinusitis. Second theory of SSS pathogenesis is erosion which occurs due to chronic inflammation. Cytokines inhibit the replication of osteoblasts and collagen synthesis which is facilitating the osteopenia process. The third theory concerns maxillary sinus hypoplasia [6].

Also there are publications of SSS, which occurred in frontal [7], and ethmoid sinuses [8]. The last was the result of traumatizing during nasal swab test. According to Annino DJ Jr and Goguen LA (2008), the diagnosis of SSS requires such criteria as: no history of previous chronic rhinosinusitis, enophthalmos or trauma, during last 6 month no episodes of acute rhinosinusitis, computer tomography (CT) scan which proves maxillary

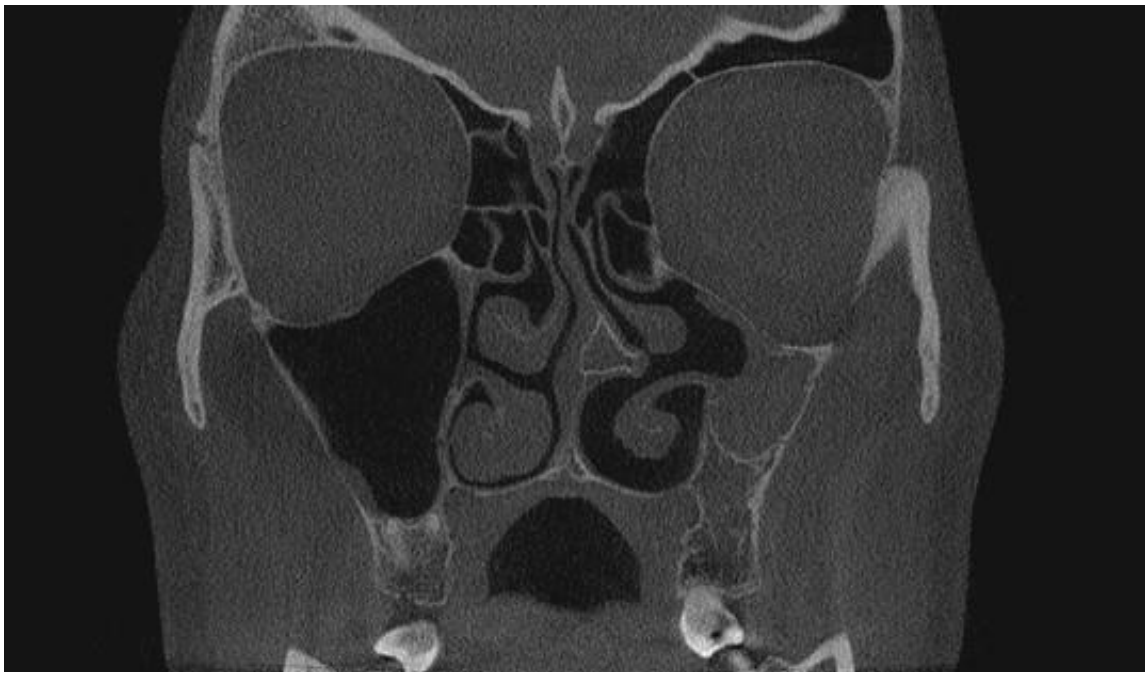

Fig. 1. CT scan of patient in frontal projection of paranasal sinuses. Left silent sinus syndrome. Deviation of nasal septum and lateratization of middle nasal turbinate
Picture taken by the authors

roof remodeling, and no documented congenital deformity or anatomic anomalies of the sinus of orbital cavity [9]. Deviation of nasal septum, lateralization of middle nasal turbinate, narrowed infundibular passage, and abnormal nasal anatomy are factors that facilitate the development if this disease [10]. Magnetic resonance imaging (MRI) is nor mandatory of establishing diagnosis, but may also be helpful. The displacement of eyeball inferiorly and the inferior rectus muscle descendence along with the globe are signs of SSS [11].

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At medical center "LORIMED" LLC were treateated 32 patients with unilateral SSS. The criteria's for establishing this diagnosis are radiological and ophthalmological [12]. All patients, except generally accepted clinical observations, was performed a CT scan of paranasal sinuses and endoscopic endonasal examination. Patient's complaints: deformation of the face (sagging of the cheek on the affected side), periodic pain in projection of sinus or teeth, rhinorrhea mainly from the same half of the nose. Some patients complained of asymmetry of the eyeballs.

CT scans showed increased radiolucency of the MS cavity, retraction of its walls with decreased volume, deepening of the molars, retraction of all sinus walls toward the lumen, expansion of the middle nasal meatus, deformation of the uncinate process, and demineralization of the sinus walls. In some patients, compensatory enlargement of the orbit, thickening of its lower wall, and deviation of the nasal septum toward the affected sinus were observed.

Endoscopic examination showed discharges of different consistence from middle nasal turbinate and its abnormal localization, distorted uncinate process and in some patient deviation of nasal septum in direction of affected sinus were determined.

Endoscopic endonasal antrostomy with widening OMS and exclusion of pathological content were performed in all patents. In order to prevent the collapse middle nasal meatus and closing of antrostoma in some patients was performed fixation of middle nasal turbinate by stitching it to nasal septum. Except endonasal antrostomy it was also performed septoplasty and vasotomy of inferior nasal turbinate in patients who

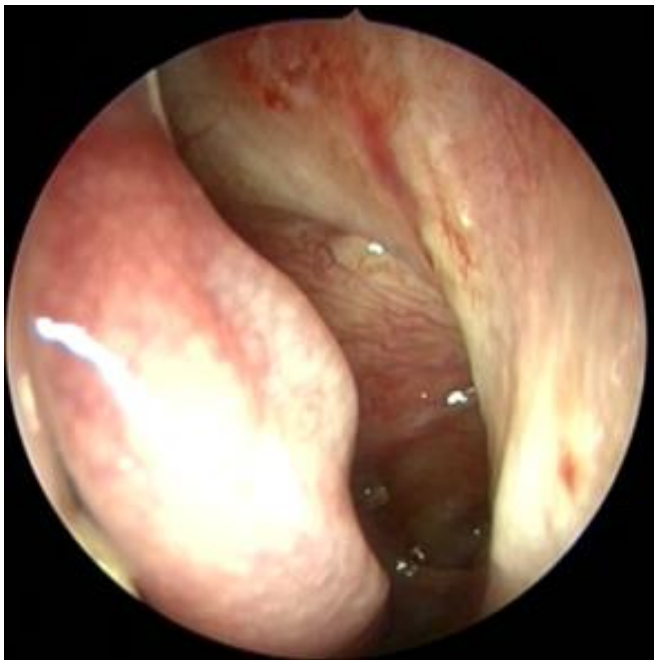

Fig. 2. Endoscopic endonasal examination of patient on the 14th day after surgery. Antrostoma and middle nasal turbinate which is stitched to nasal septum
Picture taken by the authors

had problems with nasal breathing or deviated nasal septum obstructed the way to affected sinus. Postoperative examination and care lasted during 3 month. Based on our case report we will describe our methods of surgical treatment in patients with this pathology.

CASE REPORT

In July 2024 a 30-year-old female visited an otolaryngologist with complaints of headache, bilateral nasal obstruction, purulent rhinorrhea, and fever over 37.8 °C. Considers herself sick for two weeks and had been using decongestants. She denied trauma, congenital anomalies, and previous episodes of acute or chronic rhinosinusitis. Conservative treatment was prescribed: amoxicillin 1 g twice daily for 7 days, mometasone 2 sprays in each nostril twice daily for 7 days, and ibuprofen 400 mg twice daily for 5 days. No drug allergies were identified. After days after treatment patient felt better, but still had complaints on nasal obstruction and slight pains in the area of left MS. On CT scan increased radiolucency of left MS cavity and retraction of its walls with a decreasing of its volume were observed. Patient was referred on surgical treatment. A diagnosis was established: Deviation of nasal septum to left with disorders of nasal breathing. Left silent sinus syndrome (Fig. 1).

Endoscopic endonasal antrostomy with septoplasty was performed, and the middle nasal turbinate was fixed to the nasal septum. Surgery was performed under general anesthesia. Patient had no complaints on the 14th day after surgical treatment. During the endoscopic examination – mucus-lining pale pink, pure, antrostoma is functional, middle nasal meatus is vide and nasal breathing is free (Fig. 2).

On the 30th day after surgery a control CT scan was performed (Fig. 3).

The patient's general condition was good, with no complaints and no need for further follow-up.

The pathology of SSS is widely discussed but remains insufficiently understood due to its rarity. Proper classification, definition, differential diagnosis, and accurate treatment remain important clinical issues. Other pathologies such as paranasal sinus hypoplasia, facial deformities, trauma-related cases, surgery-related

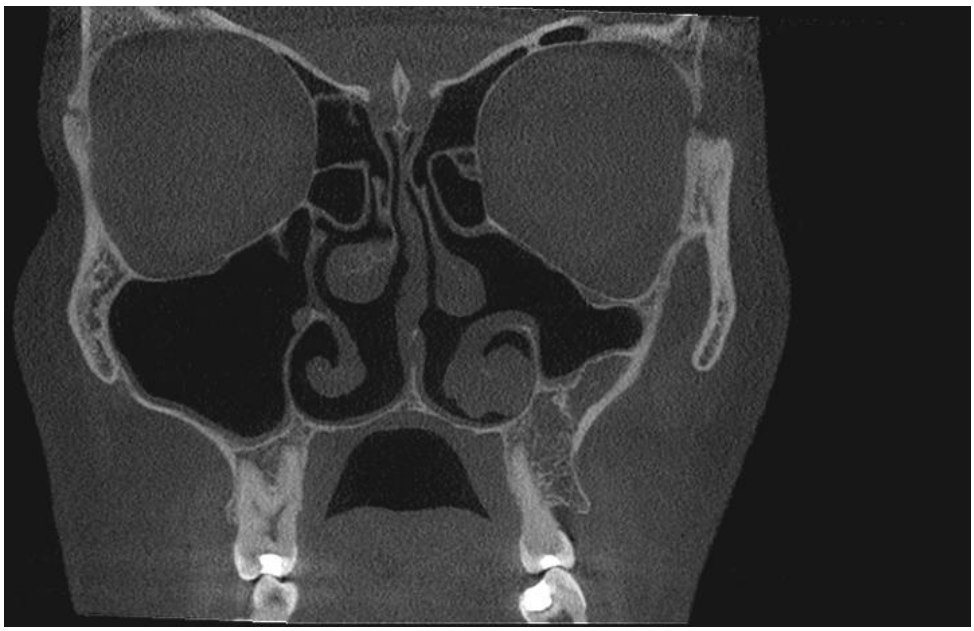

Fig. 3. CT scan of patient on the 30th day after surgery in frontal projection of paranasal sinuses. Vide middle nasal meatus, functional antrostoma and pneumatized maxillary sinus
Picture taken by the authors

changes, and others must be considered in the differential diagnosis [13].

CT is essential for establishing the final diagnosis. Reduction of maxillary antrum volume with wall retraction, complete opacification of the affected sinus, and lateralized uncinate process are typical signs.

Because of its clinical variability, SSS patients may initially present to specialists in other fields. Multidisciplinary collaboration between ophthalmologists, maxillofacial surgeons, and otolaryngologists is essential for proper management [14].

The main surgical goal is to restore proper MS ventilation and OMC patency. Endoscopic antrostomy and correction of intranasal structures, when necessary, are sufficient to restore MS drainage and reduce sinus-related symptoms. Older methods such as the Caldwell–Luc procedure are now rarely used.

CONCLUSIONS

Basic conditions that necessary for prevention of sinus collapse are surgical treatment which involves making an antrostoma through endoscopic approach and providing normal conditions for ventilation of middle nasal meatus. In order to achieve that, we need to perform resection of uncinate process with reverse punch or shaver to minimize the damage of mucosal membrane of antrostoma. Correction of middle nasal turbinate or stitching it to nasal septum prevents collapse middle nasal meatus. Septoplasty or correction of other intra-nasal structures especially those who are located near to osteomeatal complex are important requirements for ventilation of all nasal cavity and especially affected sinus. Appropriate postoperative examination and care make a significant contribution in success of surgical treatment.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

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