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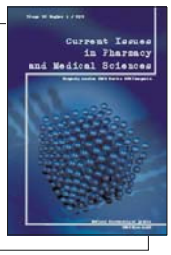

Mucous retention cyst of the maxillary sinus – minimally invasive treatment with use of piezosurgery. Case report

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ABSTRACT

Paranasal sinus mucoceles are chronic, benign, mucous filled cystic lesions caused by obstruction of sinus ostia. Mucoceles are usually seen in the frontoethmoidal region. Maxillary sinus retention cysts are rare amongst paranasal sinus mucoceles. We present one such case of a 63-year-old woman, whose maxillary sinus mucocele revealed during radiological examination, was treated with the use of piezosurgery. In this article we also present the beneficial aspects of the ultrasound unit, that allows for precise removal of bone with minimal risk of injury to underlying soft tissues. It allows more successful and more complication-free surgical result for a less experienced surgeon that could be especially beneficial for preparation of the Schneider's membrane. Furthermore, it gives minimal operative invasion as well as provides less bleeding intra- and postoperative.

Keywords: mucocele, mucous retention cyst, maxillary sinus, piezosurgery

INTRODUCTION

Benign mucosal cyst of the maxillary sinus results from the accumulation of mucus within the soft tissue that lines the sinuses as a result of obstruction of a duct or gland within the epithelial layer [3]. Traditionally two-third of mucoceles occurs in the frontal sinus and one-third in the ethmoid sinus. Maxillary sinus mucoceles are extremely rare but a varying incidence from 1,4 to 11% has been reported and it is usually discovered incidentally on plain radiograph or computed tomography of the sinuses or on panoramic radiography [3,7]. Radiographically, the cyst is a rounded, dome shaped, soft tissue mass, most commonly situated on the floor of the maxillary sinus. Usually it contains yellowish clear fluid [3]. Expansion from pressure as fluid continues to be produced within the mucocele, inflammation leads to remodeling and erosion of bone, changing the bony architecture. Eventually, the mucocele can expand out of the sinuses into neighboring structures such as facial soft tissues, orbit or cranial vault [5]. In most cases the cyst is asymptomatic, but in more advanced stages the following symptoms might appear: headache or facial pain in the frontal (47%), orbital (21%), cheek (21%) or nasal area (11%), nasal discharge (13%), nasal obstruction (10%), sinusitis (10%) as well as dizziness (5%) [3]. The etiology is varied.

The management of mucoceles is surgical. The various options include drainage, marsupialization and excision [6]. Regardless of the treatment method, the planning and carrying out the surgery in this area demands particularly rigorous preoperative diagnostic and then maximally atraumatic proceeding. Piezosurgery technique has been successfully used for this type of treatment.

Piezosurgery is a relatively new technique of bone surgery, that recently gain popularity in implantology, periodontics and oral surgery. The piezosurgery device produces specific ultrasound frequency modulation (22000-35000Hz). The unit serves extreme precision and safety as well as micrometric cutting thus allows to selectively cut the mineralized bone structures. Moreover the device causes less bleeding during and after the operation and the healing process is shorter. Due to aforementioned advantages, ultrasound device could be utilized in the wide range of surgical procedures e.g.: impacted tooth extraction, elevation of the Schneider's membrane, bone splitting or expansion of the ridge, preparing bone bed and bone sampling, corticotomy not to mention cistectomy [2,9].

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The paper presents a rare case of a mucocele of the maxillary sinus. The course and methods of treatment were described.

CASE REPORT

A 63-year-old female patient presented with complaints of intermittently benign pain of right cheek and right sided nasal partial obstruction for 2 months duration. Examination of the oral cavity did not reveal any abnormalities. The overlying skin and mucosa were free.

An orthopantomogram (Fig. 1) revealed an opacified two third of the right maxillary sinus.

Fig. 1. Orthopantomogram showing the lesion in right maxillary sinus.

On the basis of medical interview and physical examination the decision to surgically treat

the lesion was made. The patient agreed to undergo the procedure. Under anesthesia, a Caldwell-Luc's antrostomy was done. The cortical plate was excised (Fig. 2) with the use of piezosurgery unit Surgysonic, the antral cavity was cleared of the fluid filled sac (Fig. 3, Fig. 4) and then sent for histopathological examination. The initially excised cortical plate was then repositioned to its origin site and fixed with resorbable sutures (Fig. 5). The PRP (Platelet Rich Plasma) membranes were placed and

Fig. 2. Cortical plate cut with piezosurgery device

Fig. 3. Cystic lesion during removal

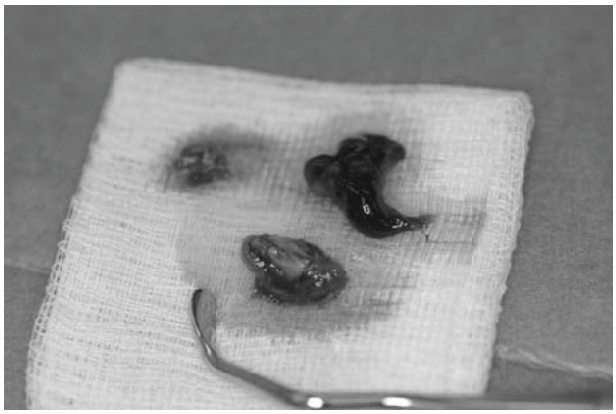

Fig. 4. Extirpated mucocele

Fig. 5. Repositioned cortical plate after cistectomy

the wound was surgically sutured. The course of healing was normal. The sutures were removed after 8 days. Histopathological report was consistent with the diagnosis of mucocele.

DISCUSSION

Various etiology of the mucoceles have been reported based on clinical observations and experimental studies. An obstruction of the drainage of any of the sinuses that leads to retention of their secretions is thought to be the primary cause. The possible causes of obstruction are: un-

known (39.3%), recurrent infection in the postoperative cavity (28.6%), dental origin (10.7%), atypical neuralgia (10.7%) and after a sinus surgery (10.7%) [8]. Other factors that can influence the development of the retention cyst could be trauma, infection, allergy, procedures in the nose, congenital anomalies and neoplasms [1,3,6,7].

Due to the length and tortuosity of the nasofrontal duct that drains the frontal sinus, it is most prone to obstruction. It explains the higher incidence of frontal mucoceles [6]. Maxillary antral mucoceles have an incidence of only 1,4-9,6% according to Hadar et al. and 3-10% according to Sreedharan et al. [3,7]. Retention cysts within the maxillary sinus can arise from inflammation of the sinus lining, such as the secretory duct becomes obstructed, and have been observed in up to 14% of people living in industrialised environments. Mucociliary function is impaired when the paranasal sinuses are exposed to high dose of radiation in radiotherapy, such as the patient may be predisposed to chronic rhinosinal disease [1].

Mucoceles predominantly occur in the 3rd or 4th decades of life, and only rarely in children. In children, the site depends on the stage of development of the paranasal sinuses [6].

Retention cysts commonly occur on the floor of the maxillary sinus. They are frequent coincidentally found on dental radiographs and cross-sectional imaging, and are often mistaken for sinister sinus disease or attributed to a dental etiology [1].

On the CT image the mucoceles appears as an airless, expanded sinus filled with homogeneous material. Sinus walls may be remodeled or completely deossified and eroded. The factors involved in this process include cytokines released from lymphocytes and monocytes, due to sinus obstruction and superimposed infection. The cytokine release stimulates fibroblasts to secrete prostaglandins and collagenases, which in turn stimulate bone resorption leading to expansion of the mucocele [8].

Mucoceles are usually sterile, pain may indicate infection. The contents may become contaminated and may develop as a pyocele secondary to the dental infection [8].

While frontal and fronto-ethmoidal mucoceles may present with nasal polyposis, proptosis, diplopia or a medial canthal swelling, sphenoidal or spheno-ethmoidal mucoceles can present as an 'apex orbitae' syndrome, retrobulbar neuritis or mimic sellar and parasellar masses. Headache is a common symptom with most mucoceles, but retro-ocular pain is considered to be characteristic of sphenoid sinus mucoceles [6].

Histologically, mucoceles may be primary or secondary. Primary ones are in fact mucus retention cysts while secondary ones are ''true'' mucoceles. They are lined with pseudostratified columnar epithelium, occurring when the sinus ostium is obstructed [8].

Management of maxillary sinus mucoceles include radical surgery or conservative surgery. Radical surgery entails the complete extirpation of the mucus membrane with obliteration or cranialization of the sinus cavity. Conservative surgery involves marsupialization of the mucocele with maintenance of adequate sinus drainage to minimize risk of recurrence. Depending on the extent of the mucocele, this might include either a simple sublabial approach or a lateral rhinotomy incision [5,8].

According to personal experience and other author's experience it could be firmly stated that during some surgical procedures, for instance cystectomy, the piezosurgery device serves a great facility. The ultrasound unit allows for precise removal of bone with minimal risk of injury to underlying soft tissues. The device enables micrometric cutting that depends on the microoscilation of the handpiece. It varies from 20 to 200μm, which is smaller than the width achievable with rotary instruments. Therefore it offers superior precision in cutting with no bone loss [2,4].

The use of piezosurgery reduces the risk of perforating of the Schneider's membrane due to the selective cutting that is limited only to the mineralized structures – bone. This is because of the ultrasonic frequencies that are used (25-29kHz), as the hard tissues and soft tissues are cut at a different frequency [9].

It allows more successful and more complication-free surgical result, could be especially beneficial for preparation of the Schneider's membrane during sinus lift procedure or relocating or preparation of the inferior alveolar nerve. Not only it gives minimal operative invasion, but also reduces traumatic stress, decreases post intervention pain and intra- and postoperative bleeding. Cutting with ultrasound unit does not conduct bleeding of bone tissue which serves good visibility of operating site and enables to lead the procedure very precisely. The reason for this is because the cavitation effect that creates bubbles from the physiological salt solution and these lead to implosion and generate the shock wave causing microcoagulation [2,4,9].

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