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Case Report

THE ROLE OF TC-CONE BEAM 3D IN DIAGNOSIS OF MUCOUS RECIRCULATION SYNDROME: CASE REPORT.

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Abstract

The Mucous Recirculation Syndrome is a possible cause of chronic rhinosinusitis. It is a condition of abnormal circuit of mucous that comes out of a paranasal sinus through the natural ostium but that will enter again into the sinus cavity through an accessory ostium. The Mucous Recirculation Syndrome is usually diagnosed through nasal endoscopy. We described a case in which endoscopic evaluation was not enough for diagnosis because of the particular shape of the nasal septum which prevented exploration from the middle meatus. CT 3D cone beam (CBCT), conversely, give a comprehensive vision of the lateral wall of the nasal cavity allowing us to achieve a diagnosis. It is the first cases in literature that describes the use of CBCT in study of lateral nasal wall.

Key word: accessory maxillary ostium, sinus TC-cone beam 3D, mucous recirculation syndrome, muco-ciliary clearance.

Introduction

Mucous recirculation (MRS) syndrome, first described in 1978 by Messerklinger[1], is one of the causes of chronic rhinosinusitis. It is a condition of aberrant mucous secretions recirculation usually between the natural and accessory sinus ostium.[2-3]

Normally, thanks to the activity of hair cells, mucous secretions are driven into the nasopharynx and swallowed. In case of MRS, secretions outgoing from the natural ostium are carried back inside the paranasal sinus through an accessory ostium.

Patel et al. in a work of 2014 evaluated some studies on MRS and has identified 5 mucosal re-circulation routes. He estimated that: in 62% of cases the re-circulation takes place between natural maxillary ostium and its accessory (natural or surgical) ostium; in 32% of cases the re-circulation takes place between the middle meatus antrostomy and under meatusantrostomy, and in the remaining minority of cases the re-circulation takes place through the drilling process hooked or among the natural sphenoid ostium and sfenoidotomy.

Patients affected by MRS may have nasal obstruction, post nasal drip and they may be subject to recurrent episodes of sinus flogosis[4]. We usually suspect this condition when typical symptoms of rhinosinusitis persist despite prolonged medical treatment, especially in those patients that underwent antrostomia[1]. Endoscopic evaluation can provide in many cases the direct vision of the accessory ostium and mucosal recirculation. However sometimes this is not enough. In this case we wanted to highlight the importance of CT-cone beam 3D in the diagnosis of MRS.

Case report

O.P., man, Caucasian, 45 years old, in good general health. In his medical history he indicates surgery in childhood to remove leftantro-choanal polyp. Not related allergies. He arrived at our Center complaining of post-nasal drip and chronic cough which he has treated, without benefit, with different therapies (including cyclical administration of topical steroids and nasal treatment with PPI). We initially subjected the patient to endoscopy of VADS which showed septal deviation to the right, compensatory hypertrophy of the inferior turbinate on the left and large left antrostomy. We have not encountered any significant findings to the left nasal cavity while the septal deviation prevented a regular evaluation of the right middle meatus. Nasopharynx, as oropharynx and hypopharynx, were free from neoplasm; larynx seemed to have normal morphology and motility. We subjected the patient to rhinomanometry with evidence of increased inspiratory resistances to the left to 150 Pa. We then performed decongestion test by means of topical administration of Xylometazoline and repetition of the examination after about 15 minutes. We observed normalization of the values of resistance. We performed cytology sampling from the mucosa of the right inferior turbinate method "Scraping". The coloration of the sample was obtained by MGG method. We evaluated 50 fields at 1000x magnification. We observed a significant increase in neutrophils associated with bacterial populations organized in biofilms. We found no eosinophils or mast cells. We have observed rare lymphocytes. The findings lay the framework for rhisinusitis. We have therefore submitted the patient to facial cone beam CT scan (CBCT) without contrast. During the execution of the examination the patient stands in the upright position for about 14 seconds. The effective radiation dose is 76 µSv, about 20 times lower than the radiation dose of a traditional CT. The examination therefore is quick and minimally invasive. We got axial, coronal and sagittal scans, and finally we made a reconstruction of the 3D images. We found a slight thickening of the right maxillary sinus mucosa at the alveolar process. We also noticed the presence of accessory ostium in the middle meatus at the area of the posterior fontanelle with evidence of mucous secretion near the accessory ostium . This image is particularly explanatory in 3D reconstruction (Figure 1) . Both clinical and radiological findings led us to make a diagnosis of MRS. The patient was therefore proposed to functional endoscopicsinonasal surgery.

Discussion

It is believed that the volume of the maxillary sinus is usually 10-15 ml and that its communication with the region of the middle meatus is ensured by an ostium, generally elliptical shape, whith an average of 6 mm in length and with a diameter of 3-6 mm[5]. The ostium embryologically coincides with spill point of the maxillary sinus from the nasal mucosa during the first 2-3 months of embryonic development. It is placed inside Infundibulum Ethmoidalis generally at the rear third of the Hiatus Semilunaris[6]. Through the ostium and thanks to

mechanisms of diffusion and convection it is guaranteed sinus ventilation and gas exchange. There are numerous studies that link sinus diseases with improper sinus ventilation and other, in turn, stressed the relationship between correct ventilation and good functioning of the hosts sinus. These considerations lead us to conclude that the malfunction of the hosts can lead to a disease of the sinuses. The presence of an accessory ostium (natural or post-surgery) alters the normal balance of the sino-nasal ventilation and predisposes to the onset of chronic inflammation[5]. When it occurs a recirculation of mucous between the natural and accessory ostium this condition is called "Mucous Recirculation Syndrome". They leads to the transport of pathogenic microorganisms within the sinus[7], favoring recurring or chronic infections, nasal blockage and post - nasal drip[4]and cough. In the diagnosis of MRS, Patel et al. considers endoscopic vision of accessory ostium or recirculation mucousnecessary and enough[4]. However, we must consider that such studies refer to forms of recirculation mucous in patients undergoing sinonasal surgery and then with high visibility of the lateral wall of the nasal cavity. In our view, in certain patients, especially those not yet treated surgically and with particular anatomical conditions (for example, as in the case described, a marked septal deviation), this type of diagnostic approach might not be exhaustive. That's why, although still unclear the role of CT in the diagnosis of MRS[8], we still want to emphasize its role. In our opinion in these patients CT scan should necessarily support the nasal endoscopy since this, alone, can't guarantee a good view of the middle meatus. In this regard, we find particularly indicated the use of CBCT, thanks to its speed, its high definition of images and its low radiation dose. The case described is the first in literature that show the lateral nasal wall thanks to the use of CBCT. Through 3D images, we were able to observe the presence of mucous material output from accessory ostium and to demonstrate the presence of a MRS.

References

1) Patel A, deShazo RD, Stringer S. Diagnostic criteria for a curable form of chronic rhinosinusitis: the mucous recirculation syndrome. Am J Med. 2014 Jul;127(7):586-91
2) Yanagisawa E, Yanagisawa K. Endoscopic view of recirculation phenomenon of the maxillary sinus. Ear Nose Throat J.1997;106:1214-1217
3) Kane KJ. Persistent sinusitis from recirculating mucus after inferior turbinectomy. IntCongr Ser. 2003;82:61-63
4) Matthews BL, Burke AJC. Recirculation mucous via accessory ostia causing chronic maxillary sinus disease. Otolaryngol Head and Neck Surg. 1997; 117:422-423.
5) Hood CM1, Schroter RC, Doorly DJ, Blenke EJ, Tolley NS. Computational modeling of flow and gas exchange in models of the human maxillary sinus. J Appl Physiol. 2009Oct; 107(4):1195-203.
6) Prasanna LC, Mamatha H. The location of maxillary sinus ostium and its clinical application. Indian J Otolaryngol Head Neck Surg. 2010 Oct;62(4):335-7.
7) Machedo P, Saleh H, Torrego A, Arbery J, MacKay I, Durham SR, Chung KF. Post-nasal drip and chronic cough: an open interventional study. J.rmed. 2009; doi: 10.1016
8) Chung SK, Cho DY, Dong Hj. Computed tomogram findings of mousus recirculation between the natural and accessory ostia of the maxillary sinus. Am J Rhinol. 2002;16(5):265-268

Figures

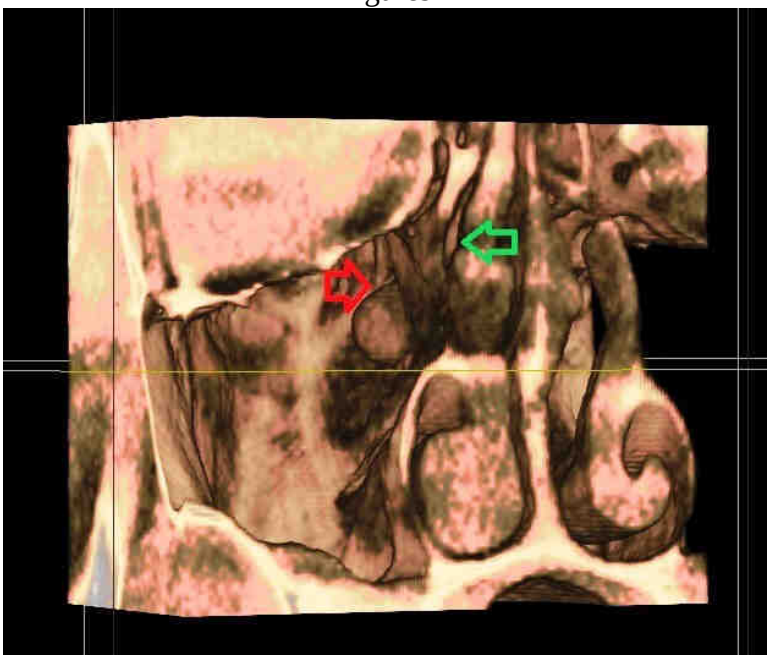

Figure 1: This is a coronal view obtained by 3D reconstruction of lateral wall of middle meatus. The green arrow shows the natural ostium of right maxillary sinus, the red arrow show the accessory ostium with mucous recirculating.