

Eustachian tube patulous vs obstruction (R611)

ID: 611.1

Interactions between the middle ear and the eustachian tube in causing symptoms of patulous ET

Presenting Author: **Manohar Bance**

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Learning Objectives: 1. Understand the relationship between PET symptoms and the transfer function of the middle ear 2. Review methods to test ET function 3. Review interventions that might be used at the middle ear level to treat symptoms of PET.

The eustachian tube can cause a variety of distortions in hearing, and the middle ear. At one end, failure of opening can result in negative middle ear pressure, which initially affects the low-frequencies, and may cause symptoms suggestive of fullness in the ear. At the other end, a ET that is open all the time can cause autophony, and also a sensation of fullness. In between are syndromes where the ET transmits sound more than normal, and if the ear is able to respond to these, then they might cause symptoms of autophony. Particularly, this is so with ears that have “floppy segments” in the TM. There is a complex interaction between which comes first, the autophony, which then causes various behavioural changes such as sniffing, to attenuate the response of the middle ear, and which then cause the eardrum to loose rigidity, or whether the eardrum loss of rigidity comes first, perhaps from childhood infections, which then causes autophony and behavioural responses such as sniffing.

We will review our experience with testing for abnormal transmission of sound through the ET, and our experiences with manipulation of the TM to reduce the symptoms of PET, as well as other middle ear interventions.

doi:10.1017/S0022215116001262

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ID: 611.2

Patulous Eustachian tube (PET) and the failure of the Eustachian tube to open (FETTO): diagnosis and management

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Learning Objectives: Round Table (PET vs FETTO)

Introduction: The importance of PET in otology has long been underestimated. We have achieved some contributions on PET as follows.

Methods and Results:

1. We have developed a new technique to diagnose PET using the sitting CT (Kikuchi T, et al. Otol Neurotol, 2007; 28:199–203; Kikuchi T, et al. ORL J Otorhinolaryngol Relat Spec. 2009; 71:312-6.).
2. Development of a specially designed silicon plug (Kobayashi Plug) for intractable cases (Sato T, et al. Acta Otolaryngol 2005; 125:1158-63). It is introduced from the myringotomy site, and was effective for about 80% of the 250 ears in which other treatments were unsuccessful (Kikuchi T, et al. in preparation)
3. High incidence in middle ear cholesteatomas: Patulous condition of the Eustachian tube is identifiable in about 30% of middle ear cholesteatomas (Magnuson:1978, Kobayashi:1996, Ohta:2009) and the incidence is higher than 50% if tested after optional myringostomy. The interview on sniffing habit is very important but not enough to pick up all the cases with patulous condition of the ET. In addition to thorough questionnaires, sniff test with optional myringostomy is useful for preoperative diagnosis of PET or Eustachian tube closing failure (Asawapittayanont P, et al. submitted).
4. ‘Masked Patulous Eustachian Tube’: We have proposed the concept of ‘masked patulous Eustachian tube’ (Masked PET) (Kobayashi T et al: Tohoku J Exp Med. 2009; 218:317-24) frequently found in middle ear diseases causing conductive hearing loss, such as cholesteatomas, otosclerosis, and perforations of the tympanic membrane, etc. In this condition, symptoms of PET are concealed due to the hearing loss and appears after improvement of hearing by surgery (Hasegawa J, et al.: Acta Otolaryngol. 2006; 126:577-80; Kawase T, et al: Otol Neurotol. 2006; 27:600-3; Hori Y, et al:Otol Neurotol. 2006; 27:596-9).

Discussion: I will discuss the topics of this session, differentiation between PET and FETTO, based on the above mentioned personal experience.

doi:10.1017/S0022215116001274

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ID: 611.3

Obstructed vs Patulous Eustachian Tube. How to Avoid Treating the Wrong One and Making it Worse

Presenting Author: **Cuneyt Alper**

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Learning Objectives: Symptoms of ETD may be confusing to the patient and the physician evaluating the condition. Obstructed ET may have symptoms of aural pressure, otalgia, popping, snapping, hearing loss, tinnitus, disequilibrium, and even vertigo. Patients with patulous ET may complain of aural pressure, otalgia, fullness, autophony of breathing or voice and habitual sniffing. Although there is a certain degree of overlap of the symptoms, a careful history taking should be able to differentiate these two conditions. However the main and absolute difference is in the findings in examination and testing. While continuously patulous ET has pretty straightforward symptoms and findings, the semi-patulous ET, with a very low ET opening pressure and closing pressure, or the ET that intermittently becomes patulous may be more difficult to diagnose and differentiate from the obstructed ET.

There are exciting new developments regarding the examination, testing and treatment of ETD. More recently, a number of new surgical procedures to improve the ETD are described. Naturally, the surgical treatment methods for obstructed versus patulous ET are different, while former aims widening the ET lumen, the latter needs to tighten it. If the type of ETD is not accurately diagnosed, there is greater chance for a diagnostic error. If a treatment for reducing the ET resistance is applied to a patulous or semi-patulous ET, the condition will worsen. Although less likely, if a procedure to increase the ET resistance is applied to an ET with obstruction, condition will get worse.

Differentiation of patulous versus obstructed ETD can be made with otoscopy, otomicroscopy, otoendoscopy, Valsalva, Toynbee, sniffing, tympanometry, 9-step test, inflation and deflation test, sonotubometry, forced response test, tubomanometry and pressure chamber tests. Tests can accurately differentiate patulous ET and ET obstruction, risk of worsening of the patulous or obstructive ETD with surgical interventions may be prevented.

doi:10.1017/S0022215116001286

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ID: 611.4

Endoscopic Repair of Patulous Eustachian Tube

Presenting Author: **Brian Rotenberg**

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Western University

Learning Objectives: At the end of this presentation the audience will understand the various methods available to repair a patulous Eustachian tube via endoscopic techniques.

Patulous Eustachian tube remains a vexing problem for both patients and surgeons. The degree of impairment patients have can severely impact their quality of life. In this presentation I will review transnasal endoscopic repair techniques that have been developed to treat PET, including an in depth discussion of surgical steps and a critical analysis of the results. Some

promising new potential therapies will also be reviewed. In collaboration with other panelists we will present both interesting and representative cases, and encourage audience interaction.

doi:10.1017/S0022215116001298

Free Papers (F612)

ID: 612.1

Surgical management of congenital middle ear cholesteatoma

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Learning Objectives:

Objectives: To analyze the clinical features and surgical findings in 29 cases of congenital cholesteatoma of the middle ear.

Methods: 29 patients (30 ears) who underwent surgery for congenital cholesteatoma between September 2012 and January 2016 were involved in this retrospective study. The otoscope examination, HRCT and audiogram were routinely done before surgery. The location and type of cholesteatoma, the surgical procedures, and the results were evaluated. Patient who had prior middle ear diseases were excluded.

Results: Of these 29 patients, the median age was 12 years (ranged from 3 to 54 years old). Hearing loss was complained of as a main symptom, and conductive hearing loss was found in 26 cases with the AB-gap were about 35.8 dB HL pre-operation. Two of these patients were misdiagnosed as secret otitis media in other hospital. Nine (30%) patients had closed-type cystic masses, while other 21 (70%) had open-type lesions. Canal wall down technique was performed in 20 cases, while Canal wall up in 1 cases, and Trans-canal approach was applied in 9 cases of which the lesion was limited in the mesotympanum. The erosion of the ossicular chain was found in 28 cases during the surgery. Ossicular chain reconstruction were done in 21 cases (TORP13, PORP 3, Cartilage 5), and the hearing thresholds were improved satisfied after more than 1 year follow up.

Conclusions: Congenital cholesteatoma of middle ear was a rare disease and usually delayed to be diagnosed in clinical practice. Conductive hearing loss was the most common symptom of these patients. There were different clinical features between the open-type and the closed-type lesion, which reflect a distinct pathogenesis. Surgery was the best choice when the middle ear congenital cholesteatoma was identified.