

Surgical Modalities in Treatment of Otitis Media with Effusion

Essay

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✍ **Rehab Said Hussein**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك يا معلم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

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List of Abbreviations

AOM	: Acute otitis media
BET	: The balloon dilation Eustachian tuboplasty
CBF	: Ciliary beat frequency
LAM	: Laser myringotomy
CHT	: Cross-hatching technique
CLCs	: Charcot-Leyden crystals
CSF	: Colony stimulating factor
COME	: Chronic otitis media with effusion
CWD	: Canal wall down
CWU	: Canal wall up
ET	: Eustachian tube
HIF	: Hypoxia-inducible factor
IFN	: Interferon
IgA	: Immunoglobulin A
IL	: Interleukin
IQ	: Intelligent quation
RSV	: Respiratory syncitial virus
LVP	: Levator veli palatini
MACS	: Mastoid air-cell system
OM	: Otitis media
OME	: Otitis media with effusion
PCD	: Primary ciliary dyskinesia
PCR	: Polymerease chain reaction
PRRs	: Pattern-recognition receptors

List of Abbreviations

RIG	:	Retinoic acid-inducible gene
RSV	:	Respiratory syncytial virus
SP	:	Surfactant protein
TLRs	:	Toll-like receptors cytoplasmic
TM	:	Tympanic membrane
TVP	:	Tensor veli palatini
VEGF	:	Vascular endothelial growth factor
VT	:	Ventilation tube

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Introduction

Otitis media with effusion (OME) is defined as the presence of effusion behind the intact tympanic membrane (TM) without symptoms of acute infection. Pathogenesis of OME is multifactorial and represents the interactions between environmental, social, anatomical, infectious factors and allergy (*Niedzielska, 2006*).

OME is an important cause of transient, moderately to severe hearing loss during the first months of life which is a critical period for development of the auditory system. Active treatment should be considered if spontaneous resolution does not occur to prevent any delay in language acquisition and to exclude any underlying sensorineural hearing loss (*Boudewyns et al., 2011*).

The most important principle in treating OME is ventilation of the tympanic cavity. CO₂ laser myringotomy achieves this through a self-healing perforation in which its diameter roughly determines the duration of transtympanic ventilation. Laser myringotomy competes with ventilation tube (VT) insertion in the treatment of OME. It may be a useful alternative in the surgical management of secretory otitis media (*Benedikt et al., 2002*).

The pneumatic spaces within the mastoid represent an "air reservoir" which can be drawn upon during periods of Eustachian tube (ET) dysfunction and buffer the middle ear against the development of negative pressures. So in treatment of recurring otitis media with VTs, the attic and mastoid can be extensively involved, necessitating atticomastoidectomy and the creation of new pathways for attic aeration (**Palva, 2000**).

For 3 or more than 3 times repeated VT insertion, patients more than 2 years of refractory secretory otitis media were treated with mastoidectomy and VT placement, it resulted in expanded middle ear and mastoid air cell volume, good drainage of the tympanic membrane VT and ear lesion was cleaned (**Long et al., 2011**).

In case of recurrent OM in children, especially when tube insertion is ineffective, intact canal wall mastoidectomy combined with facial recess opening can be adopted to clear the lesions thoroughly, and to establish long-time and effective ventilation of ET, tympanic cavity, tympanic antrum and mastoid (**Zhang et al., 2010**).

Dysfunction of the ET seems to be the etiologic origin for development of otitis media with effusion. Surgical interventions in the middle ear generally treat the sequelae

of the tube dysfunction but not the dysfunction itself ***(Sedlmaier et al., 2009).***

Chronic negative pressure due to ET dysfunction leads to irreversible mastoid disease. Attempts to improve impaired tube function have recently included laser surgery and balloon tuboplasty. ET dysfunction does not only mean blockage but can also include abnormal patencies of the ET ***(Pau, 2011).***

Laser Eustachian tuboplasty is safe and efficacious in the treatment of intractable ET dysfunction. Further study will be necessary to determine whether laser Eustachian tuboplasty is a suitable alternative to repeated tympanostomy tube placement in selected patients ***(Poe, 2003).***

Similar to sinus surgery, initial studies of partial resection of inflamed mucosa from within the cartilaginous (ET) have demonstrated efficacy and safety in the treatment of medically refractory otitis media with effusion. Balloon dilation of the cartilaginous ET was investigated as a possible treatment modality for otitis media ***(Poe et al., 2011).***

Although OME became less prevalent with age, important sequelae (severe atrophy, severe tympanic membrane retraction, hearing loss, cholesteatoma, and

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The aim of this review is to highlight surgical treatment of otitis media with effusion especially mastoidectomy and ET surgery in recurrent and resistant cases.

Surgical Anatomy

The tympanic cavity extends from the tympanic membrane to the oval window and contains the bony conduction elements of the malleus, incus, and stapes (*Khan et al., 2013*).

Fairly persistent landmarks, within the tympanic cavity, are the cochleariform process, the round window and the tubal orifice. Orientation should start from these structures (*Hildmann and Sudhoff, 2006*).

The cochleariform process (Fig. 1) lodges the tendon of the tensor tympani. It is located just medial to the neck of the malleus, antero-superior to the oval window, and just inferior to the tympanic segment of the facial nerve (*Sanna et al., 2006*).

The round window is located in the postero-superior aspect of the medial wall of the tympanic cavity (Fig. 1). It may be totally absent or its niche merely represented by a small tract filled with fibrous tissue. Inspection of the round window by facial recess approach is governed by the angles subtended by both the round window niche and membrane, also by the diameter and depth of the niche (*Stewart et al., 1981*).