Pneumatic Otoscopy and Tympanometry for diagnosis of

Middle Ear Effusion with OME: a meta-analysis

Submitted for partial fulfillment of Master Degree
in Otorhinolaryngology

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2018


قال الله تعالى:
وقل رب زدني علما
(طه:114)

Acknowledgements

First and foremost, I feel always indebted to ***Allah*** *the Most Beneficent and Merciful.*

I would like to express my sincerest gratitude and appreciation to **Prof. Dr.Ossama Ibrahim Mansour,** *for his constructive suggestions and motivations during the planning and development of this research work.*

I would like to express the deepest appreciation to my **Assistant Prof.Dr.Hesham Abdelaaty Abdelkader Elsersy** *for his patient guidance, insightful comments, unceasing encouragement and useful appraisals of this research work.*

I would also like to thank **Dr.Anas Mohammed Askoura,** *for his excellent guidance, valuable advice and assistance in keeping my progress on schedule.*

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List of Abbreviations

Abbr.	Full-term
OME	Otitis media with effusion
AOM	Acute otitis media
MEE	Middle ear effusion
SOM	Secretory otitis media
ET	Eustachian tube
CHL	Conductive hearing loss
TM	Tympanic membrane
TPP	Tympanogram peak pressure
HZ	Hertz
NHS	Newborn Hearing Screening
EAM	External auditory meatus
MFT	Multiple frequency tympanometry
AAO-HNSF	American Academy of Otolaryngology-Head and Neck Surgery Foundation
NICE	National Institute for Health and Care Excellence
DaPa	Decapascals
I^2	I-square
DOR	Diagnostic odds ratio
FEM	Fixed-effects method
REM	Random-effects method
CI	Confidence interval
SROC	Summary receiver-operating characteristic
AUC	Area under the ROC curve
SE	standard error
LR+	Likelihood ratio positive
LR-	Likelihood ratio negative

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INTRODUCTION

Introduction

Otitis media with effusion (OME) is one of the commonest diagnoses in ENT practice. It is defined as a collection of fluid in the middle ear without signs or symptoms of acute ear infection. OME has many causes. The common causes include viral upper respiratory infection, acute otitis media (AOM) and chronic dysfunction of the Eustachian tube. The presence of fluid in the middle ear decreases tympanic membrane and middle ear function, leading to affection of hearing and occasionally pain from the pressure changes **(Roberts et al., 1997).** OME is variable in duration and severity. Many cases of OME resolve spontaneously within 3 months, but 30-40% of cases have recurrent episodes, and 5-10% of cases last more than 1 year **(Stool et al., 1994).**

Studies suggest that AOM is often over-diagnosed, and antibiotics are prescribed unnecessarily. Diagnosis of acute otitis media depending on acute symptoms of infection such as acute tympanic membrane inflammation and presence of middle ear effusion (MEE) **(Saeed et al., 2004).**

Non-invasive techniques as pneumatic otoscopy and tympanometry are the primary diagnostic tools for OME. Pneumatic otoscopy can be used to assess tympanic membrane mobility and visualize it. Also we can confirm the diagnosis of OME by tympanometry **(Lee, 2010).**

Myringotomy is the gold standard for identifying MEE, can be used to evaluate the performance of noninvasive techniques in predicting of MEE presence **(Ababii et al., 2013).**

Pneumatic otoscopy can differentiate surface abnormalities from true middle ear effusion, Inter-observer variability may be a factor in the accuracy of diagnosis by pneumatic otoscopy. When pneumatic otoscopy is inconclusive, tympanometry can be used to improve diagnostic accuracy. Tympanometry can also objectively assess tympanic membrane mobility for patients who are difficult to examine or do not tolerate insufflation **(Rosenfeld et al., 2016).**

There is more than one study questioning what is the best technique for detection of otitis media with effusion; pneumatic otoscopy or tympanometry. When pneumatic otoscopy and tympanometry were used in conjunction, the predictive accuracy did not increase significantly. Pneumatic otoscopy and tympanometry are simple and reliable techniques of predicting the presence or absence of otitis media effusion **(Toner & Mains, 2005).**

OBJECTIVE

Objective

To study the clinical trials in a Meta-analytical form, in order to compare the efficacy of pneumatic otoscopy and tympanometry in the diagnosis of middle ear effusion with OME.

Review of Literature

Review of Literature

Chapter 1: **Otitis Media with Effusion (OME)**

A. Background:

Otitis media with effusion (OME) is characterized by an effusion of the middle ear **(See figure 1)** that may be either mucoid or serous. Symptoms commonly involve hearing loss or aural fullness but typically do not involve pain or fever. In children, hearing loss is generally mild, especially detected with a tympanogram and pneumatic otoscopy. Serous otitis media is a specific type of otitis media with effusion caused by transudate formation due to a rapid decrease in middle ear pressure in comparison to the atmospheric pressure. The fluid in this case is watery and clear. Understanding the difference between otitis media with effusion and other forms of middle ear infection is important. Otitis media is a generic term, by definition it is an inflammation of the middle ear without any specific etiology or pathogenesis. Because all pneumatized spaces of the temporal bone are contiguous, inflammation of the middle ear may involve inflammation in the other 3 spaces: the mastoid, perilabyrinthine air cells, and the petrous apex **(Higgins, 2017)**.

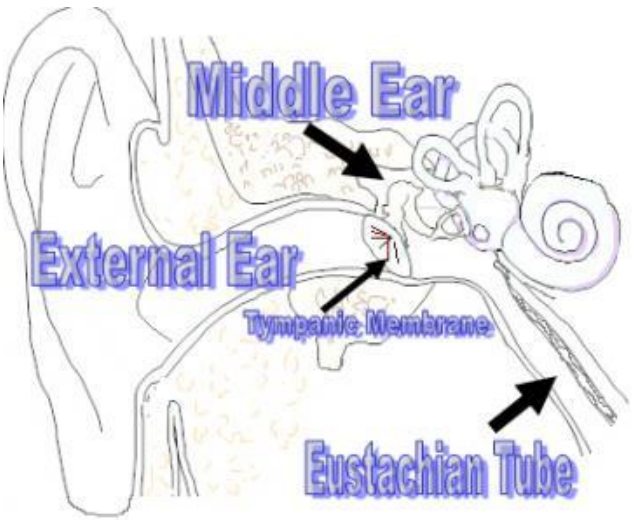

Figure (1): Anatomy of the external and middle ear **(Higgins, 2017)**.