Frequency and Clinical Characteristics of Tympanic Membrane Perforation Outpatients at Dr. Hasan Sadikin General Hospital in 2011–2013

Veronika Ratih M,[1] Sally Mahdiani,[2] Fenny Dwiyatnaningrum[3]
[1]Faculty of Medicine Universitas Padjadjaran, [2]Department of Otorhinolaryngology–Head and Neck Surgery Faculty of Medicine Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital Bandung, [3]Department of Anatomy and Biology Cell Faculty of Medicine, Universitas Padjadjaran

Abstract

Background: Tympanic membrane perforation is a hearing problem that has become a health problem in the society. In Indonesia, there are only a few studies regarding tympanic membrane perforation. This study was aimed to observe the frequency and clinical characteristics of tympanic membrane perforation patients.

Methods: This was a descriptive study performed from August to September 2014. The data was taken retrospectively from medical records of tympanic membrane perforation patients at Dr. Hasan Sadikin General Hospital from January 2011 to December 2013.

Results: Of 579 tympanic perforation patients, there were only 214 medical records met the inclusion criteria. The frequency of tympanic membrane perforation patients increased in 2011 it was 28%, in 2013 it was 37.6%. The number of male patients (53.3%) was higher than female patients'. Most patients were in productive age (83.2%). Most patients came with the chief complaint of discharge from ear (36.4%) and the most common etiology was infection (84.1%). Otological examination showed that most patients had unilateral perforation (73.8%). Based on the size of perforation, central perforation (52.3%) was the most common otological finding. From audiogram, most patients had conductive hearing loss (41.5%) with moderate degree of hearing loss (30.4%). Most patients were treated by medications (64.5%).

Conclusions: The frequency of tympanic membrane steadily increases with clinical characteristic mostly in male patients in productive age admitted with chieft complain of discharge of ear. The most common etiology is infection. Majority of patients have unilateral central perforation that cause conductive hearing lost. **[AMJ.2016;3(1):43–8]**

Keywords: Clinical characteristic, hearing lost, tympanic membrane perforation

Introduction

Hearing abnormality and deafness are still prevalent and have become a major problem in Indonesia. Globally, World Health Organization (WHO) estimated that 250 million (4.2%) of world populations suffered from hearing abnormality in 2000, 75–140 million (30–56%) of them were in South–East Asia.[1] One of the etiologies of hearing disturbance is tympanic membrane (TM) perforation.2 Incidence of TM perforation in the world is still unknown. However, according to the study conducted by Kaftan et al.[3] in Germany, the prevalence of chronic TM perforation was 0.45%. In England, United Kingdom[4], Study of Hearing found that the prevalence of TM perforation in adult was 4.1%.

Hearing disturbance has already become a health problem in society.[1] However, there is no available data yet regarding the prevalence or incidence of TM perforation in Indonesia, especially in West Java.Thus, the researcher is interested to do a study about the frequency of TM perforation. Moreover, the clinical characteristics of patients are also important to be studied. This study was conducted to observe the frequency and clinical characteristics of TM perforation, including the risk factors of perforation, clinical manifestations, audiogram results, and also the management.

Methods

This was a quantitative-descriptive study

Correspondence: Veronika Ratih M, Faculty of Medicine, Universitas Padjadjaran, Jalan Raya Bandung-Sumedang Km.21, Jatinangor, Sumedang, Indonesia, Phone: +6285624248322 Email: veronika.ratih@gmail.com

performed at Otorhinolaryngology–Head and Neck Surgery (ORL-HNS) Polyclinic of Dr. Hasan Sadikin General Hospital. Data was taken retrospectively from patients' medical records. The method used was total sampling . This study was approved by ethical committee of Dr. Hasan Sadikin General Hospital.

Frequency was determined by the number of TM perforation patients at ORL-HNSPolyclinic of Dr. Hasan Sadikin General Hospital from January 2011 to December 2013. The distributions and clinical characteristics of patients were observed from the medical records of TM perforation patients at ORL-HNS Polyclinic of Dr. Hasan Sadikin General Hospital from January 2011 to December 2013 which fulfilled the inclusion criteria. The inclusion criteria were medical records which contained patient's identity, etiology, clinical manifestations, result of examination, and management. The missing and incomplete medical records were excluded from this study.

Among 579 TM perforation patients, 214 patients' data (36.96%) were included in this study. Patient's sex, age at presentation, chief complains, etiology, side of perforation, size of perforation, audiogram, comorbid diagnosis, and management were documented. According to Badan Kependudukan dan Keluarga Berencana Nasional (BKKBN), the age groups were classified into young age (0–14 years old), adult/productive age (15–64 years old), and old age (≥ 65 years old). Chief complaints consisted of hearing loss, tinnitus, discharge from ear, clogged ear, and ear pain. Etiologies were classified into infection, trauma, failure of operation, and malignancy. Side of perforation was divided into unilateral (one side) or bilateral (both sides). According to Bluestone (2007), size of perforation was classified into central perforation (< 25%), subtotal perforation (25–50%), and total perforation (>50%).5 The type of hearing loss was determined by using audiogram that was classified into conductive hearing loss (CHL), sensorineural hearing loss (SNHL), and mixed hearing loss (MHL). The degree of hearing loss was divided into normal, mild, moderate, severe, and profound. Management was divided into pharmacotherapy, operative, mixed (pharmacotherapy and operative), and education. After being collected, the data was analyzed by computer.

Results

In 2011–2013, the amount of outpatients at ORL-HNS of Dr. Hasan Sadikin General Hospital was 15,253 patients, 579 of them (3.8%) were diagnosed of having TM perforation. The frequency of TM perforation patients increased from 2011 to 2013.

Based on sex, the amount of male patients was higher than female patients. Most patients were in adult age (83.2%). The youngest patient was 9 months old while the oldest patient was 92 years old.

Mostly, the patients' chief complain was discharge from ear (36.4%).There were 4.7% of patients who reported other complains, such as itchy ear, nasal congestion, ear bleeding, sore throat, and lump in the ear . Most perforations were caused by infection (88.3%). During 2011–2013, there was no perforation caused by malignancy. Based on the side of perforation, 158 patients (73.8%) had TM perforation on one side of ear (unilateral). Among them, 78 patients had perforation on the right ear (49%) and 80 patients (51%) had perforation on the left ear. Based on the size of perforation, most patients had central perforation (52.3%). The result of this study showed that there were 42.5% of TM perforation patients with comorbid diagnosis, most of them were CSOM and AOM. Most TM perforation patients were treated by pharmacotherapy (64.5%).

Table 1 Distribution of TM Perforation Patients Based on Sex and Age Group

Characteristics	**Number of Patients** (n=214)
Sex	
Male	114 (53.3%)
Female	100 (46.7%)
Age Group	
Young age (0–14 years old)	18 (8.4%)
Adult age (15–64 years old)	178 (83.2%)
Old age (≥ 65 years old)	18 (8.4%)

Table 2 Clinical Characteristics of TM Perforation Patients

Characteristics	Number of Patients (n=214)
Chief Complaint	
Hearing loss	45 (21%)
Tinnitus	37 (17.3%)
Discharge from ear	78 (36.4%)
Clogged ear	25 (11.7%)
Ear pain	19 (8.9%)
Others	10 (4.7%)
Etiology	
Trauma	25 (11.7%)
Infection	180 (84.1%)
Failure of operation	9 (4.2%)
Side of perforation	
Unilateral	158 (73.8%)
Bilateral	56 (26.2%)
Perforation's size	
Central	112 (52.3%)
Subtotal	77 (36%)
Total	25 (11.7%)
Comorbid	
Pharyngitis	1 (0.5%)
Lymphadenopathy	1 (0.5%)
Mastoiditis	2 (0.9%)
OE	2 (0.9%)
AOM	16 (7.5%)
CSOM	41 (19.1%)
Otomycosis	1 (0.5%)
Otosclerosis	1 (0.5%)
Post mastoidectomy	5 (2.3%)
Post tympanoplasty	4 (1.9%)
Rhinitis	9 (4.2%)
Tonsilitis	2 (0.9%)
Tumor	3 (1.4%)
There was no comorbid diagnosis	126 (58.9%)
Management	
Pharmacotherapy	138 (64.5%)
Operative	23 (10.7%)
Education	24 (11.2%)
Mixed	29 (13.6%)

Note: *OE: Otitis Externa, AOM: Acute Otitis Media, CSOM: Chronic Suppurative Otitis Media

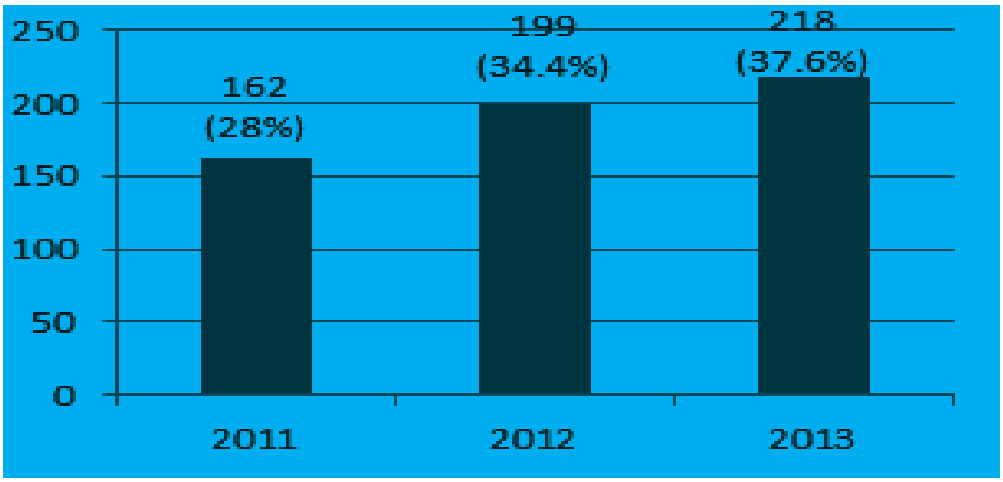

Figure 1 Frequency of TM Perforation Patients in 2011–2013

Among 214 TM perforation patients, 164 of them (76.6%) performed audiometry examination. Based on the type of hearing loss, 114 patients (69.5%) suffered from hearing loss. Most patients had conductive hearing loss (41.6%). and moderate hearing loss (30.4%).

Discussions

The frequency of TM perforation patients increased from 2011 to 2013. This result indicated that the increase of ear infection in society due to most perforations were caused by ear infection.[2]

Based on sex, male to female ratio was 1.14:1 This characteristic was considered relatively same as the previous study performed by Pannu et al.[2] in India that showed that 52% of the patients were male and 48% were female. The percentage of male patients slightly outnumbered the female patients.[2] The study performed by Sarojamma et al.[6] in India also stated that the amount of female TM perforation patients (58%) was higher than the males.

Table 3 Audiogram of TM Perforation Patients

Characteristics	Number of Patients (n=164)
Type of hearing loss	
Normal	50 (23.4%)
CHL	89 (41.6%)
SNHL	5 (2.3%)
MHL	20 (9.3%)
Audiometry was not performed	50 (23.4%)
Degree of hearing loss	
Normal	50 (23.4%)
Mild	18 (8.4%)
Moderate	65 (30.4%)
Severe	23 (10.7%)
Profound	8 (3.7%)
Audiometry was not performed	50 (23.4%)

Note: * CHL: Conductive Hearing Loss, SNHL: Sensorineural Hearing Loss, MHL: Mixed Hearing Loss

Most TM perforation patients were in productive age group (83.2%). The TM perforation could affect patient's quality of life, caused hearing loss and reduced their productivity.[7] The result was different from the study performed by Olowookere et al.[8] in Nigeria which stated that 50% of the TM perforation patients were children.

Most patients often complained of discharge from ear (36.4%). Discharge from ear was caused by CSOM.[9] Clogged ear was caused by fluid accumulation in middle ear. Moreover, the patients also complained of hearing loss. Hearing loss was caused by the disturbance of sound wave conduction. Other chief complaints, such as nasal congestion and sore throat, were caused by other diseases such as rhinitis, tonsillitis, or pharyngitis. Pannu et al.[2] also reported that the most common chief complaints were hearing loss and discharge from ear. Allergic rhinitis, bacterial tonsilitis and pharingistis were risks of factor for developing complicated tympanic membrane.

The TM perforation was mostly caused by infection. The infection could be caused by CSOM, AOM, or OE. Besides infection, another common etiology was trauma. TM trauma could be caused by high pressure when diving or flying and could also be caused by temporal bone trauma. This study was similar with the study conducted by Pannu et al.[2] that stated 84% of TM perforation was caused by infection and 16% was caused by trauma. After surgery, some patients still had TM perforation. This was caused by failure of TM grafting.

Based on the side of perforation, most patients had unilateral perforation. Pannu et al.[2] also reported that 80% of patients had unilateral perforation. Olowookere et al.[8] also stated that most patients had unilateral perforation. Intact TM in another ear helped the patients to hear. Patients with bilateral perforation would have more severe hearing loss.

Based on the size of perforation, the most common was central perforation. This study was similar to the study performed by Pannu et al.[2] which stated that 47% of patients had small size perforation, 34% had medium size perforation and 19% had large size perforation. Olowookere et al.[8] also stated that 60.6% of patients had central perforation. The size of perforation also has role in hearing loss. The larger the size of perforation, the degree of hearing loss would be more severe.[10]

There were 42.5% of TM perforation patients who had comorbid. The most common comorbid were CSOM and AOM. Middle ear infection and pressure caused by pus production could cause perforation.[11] Upper respiratory tract infection, such as rhinitis or pharyngitis could cause middle ear infection and, eventually, caused TM perforation. Most patients were treated by pharmacotherapy. The patients were given antibiotic to stop fluid production in the ear and keep the ear dry.[4]

Surgical treatments consisted of tympanoplasty and mastoidectomy. Tympanoplasty was performed in 48 patients and mastoidectomy was performed in 4 patients. Some patients were only given education because there was no indication for antibiotic usage or surgical intervention. Central perforation and traumatic perforation would usually heal spontaneously, so surgical intervention was not needed.[12] Some patients were indicated to be given surgical intervention, but the patients rejected because of economic aspect.

Based on audiogram, there were 69.5% patients with hearing loss, Most patients had conductive hearing loss. It happened because the perforated TM caused the disturbance of sound wave conduction. Cross–sectional study conducted by Ibekwe et al.[13] concluded that 59% of TM perforation patients had conductive hearing loss. However, some patients suffered from sensorineural hearing loss. The occurrence of sensorineural hearing loss could be affected by age. Neuron degeneration of cochlear nerve in old people caused sensorineural hearing loss.[14] There were 30.5% patients without hearing loss. This happened because most patients had central perforation. Moreover, 23.4% of patients did not perform audiometry examination. Actually, this examination was very important to detect patient's hearing loss but some patients did not perform this examination because of their limited budget.

Based on the degree of hearing loss, most patients had moderate hearing loss. This result was similar with the study performed by Maharjan et al.[15] in Kathmandu. The study concluded that 52.9% of the patients had moderate hearing loss. In the other hand, Pannu et al.[2] and Sarojamma et al.[6] stated that most patients suffered from mild hearing loss. Frequently, the patients with severe and profound hearing loss were accompanied by chronic infection such as CSOM.

As the conclusion, there were 579 tympanic membrane perforation outpatients during 2011–2013 and chief complaint of most of patients in productive age group was discharge from ear. The perforation was mostly caused by

infection. The proportion between unilateral and bilateral perforation was 7:3. More than a half of patients had central perforation. The most common comorbidity at diagnosis was CSOM. Most patients were treated by pharmacotherapy.

Most TM perforation was caused by infection. Thus, infection prevention by giving education to society should be performed to increase their personal hygiene. For supporting examination, 23.4% of the patients did not perform audiometry examination because of economic aspect. Simple and more affordable examinations such as turning fork test (Rinne and Weber test) were suggested. Moreover, some patients rejected surgical interventionbecause of the expensive cost. Thus, this study suggests the society to join universal health coverage, so all people are able to get a standardized health service.

From this study, only 36.86% of data could be used as the subjects of study because of missing or incompletemedical record. Medical record should be written completely and should be kept systematically.

References

1. Kementerian Kesehatan Republik Indonesia. Rencana strategis nasional penanggulangan gangguanpendengaran dan ketulian untuk mencapai soundhearing 2030. Jakarta: Biro Hukum dan Organisasi Kementerian Kesehatan Republik Indonesia; 2006. p. 4.
2. Pannu KK, Chadha S, Kumar D, Preeti. Evaluation of hearing loss in tympanic membrane perforation. Indian J of Otolaryngol HeadNeck Surg. 2011;63(3):208–13.
3. Kaftan H, Noack M, Friedrich N, Völzke H, Hosemann W. Prevalence of chronic tympanic membrane perforation in the adult population. HNO. 2008;56(2):145–50.
4. Hamilton J. Chronic otitismedia in childhood. In: Gleeson M, editor. Scott–Brown's otorhinolaryngology, head and necksurgery. 7th ed. London: Hodder Arnold; 2008. p. 912–26.
5. Bluestone CD, Klein JO. Otitis media in infants and children. 4th ed. Shelton: W B Saunders; 2007.
6. Sarojamma, Raj S, Satish HS. A clinical study of traumatic perforation tympanic membrane. IOSR J Dent Med Sci. 2014;13(4):24–8.
7. Speets A, Wolleswinkel J, Cardoso C. Societal costs and burden of otitis media in Portugal. J Multidiscip Health. 2011;4:53–62.
8. Olowookere S, Ibekwe T, Adeosun A. Patterns of tympanic membrane perforation in Ibadan: a retrospective study. Ann Ib Postgrad Med. 2008;6(2):31–3.
9. Kolo E, Salisu A, Yaro A, Nwaorgu O. Sensorineural hearing loss in patients with chronic suppurative otitis media. Indian J Otolaryngol Head Neck Surg. 2012;64(1):59–62.
10. Mehta RP, Rosowski JJ, Voss SE, O'Neil E, Merchant SN. Determinants of hearing loss in perforations of the tympanic membrane. Otol Neurotol. 2006;27(2):136–43.
11. Shaikh N, Hoberman A, Kearney DH, Yellon R. Tympanocentesis in children with acute otitis media. N Engl J Med. 2011;364(2):1–3.
12. Al-Juboori AN. Evaluation of spontaneous healing of traumatic tympanic membrane perforation. Gen Med. 2014;2(1):1–3.
13. Ibekwe TS, Nwaorgu OG, Ijaduola TG. Correlating the site of tympanic membrane perforation with hearing loss. BMC Ear Nose Throat Disord. 2009;9(1):1–4.
14. Engle JR, Tinling S, Recanzone GH. Age–related hearing loss in rhesus monkeys is correlated with cochlear histopathologies. PLoS one. 2013;8(2):9–12.
15. Maharjan M, Kafle P, Bista M, Shrestha S, Toran K. Observation of hearing loss in patients with chronic suppurative otitis media tubotympanic type. Kathmandu Univ Med J. 2009;7(4):397–401.