

Original Article

Traumatic Rupture of Tympanic Membrane: A Study of 70 Cases

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Abstract

Objective: To find out the causes and pattern of traumatic rupture of tympanic membrane (TM) and their prognosis.

Methods: This was a cross sectional study and carried out in the Department of Otolaryngology-Head & Neck Surgery, Tairunessa Memorial Medical College & Hospital, Boardbazar, Gazipur, in a period of 18 months from January 2011 to December 2013 among those had traumatic ruptured tympanic membrane attending in our hospital. 70 cases were taken and the data were collected by interviewing the cases as per questionnaire from history, examinations & investigation reports.

Results: This study showed people of 21-30 years (65.5%) are mostly affected and males (36) were more affected than females (34) and housewives (34.5%) were commonest group of people. 88.5% of cases the cause of rupture is slapping and 42% cases slapped by her own husbands. From this study we got left ear was involved in (60)85%of cases. It needs 22-28 days in 57.14% of cases to heal the membrane. Almost all 94.5% of cases it heals spontaneously.

Conclusion: It needs early diagnosis, no intervention and no entry of water. In most cases they heal spontaneously the ruptured TM.

Key words: traumatic rupture, tympanic membrane, slapping.

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Introduction

Tympanic membrane is a thin semi translucent, pearly white membrane situated between external ear and middle ear. It is lying obliquely in the medial end of the external auditory canal, with the angle of 55° forming major part of the lateral wall of the middle ear^{1,2}. It measures approximately 10 mm in vertical diameter and 5 mm in horizontal diameter. It is oval in shape and its inner surface is convex. It transmit sound wave to the ossicles of middle ear² Peripheral part of the tympanic membrane is thicker and rounded (except in the upper part) known as annulus tympanicus. The annulus tympanicus is attached at its circumference to tympanic sulcus. This tympanic sulcus end

in a notch known as the notch of Rivinus in the upper part. Tympanic membrane consists of three layers except in the upper part; outer cuticular layer which is continuous with skin, middle fibrous layer has both circular and radial fibers and inner mucosal layer which is continuous with the middle ear mucosa. Tympanic membrane consists of two parts; 1) pars tensa which is the larger part below the malleolar folds and has all the three layers, 2) pars flaccida which is a triangular area above the malleolar folds is thin and devoid of fibrous tissue and annulus. Usually the pars tensa is the common site of rupture.

For normal hearing an intact tympanic membrane is needed. It can be ruptured by different means like increase in ear pressure while slapping, faulty technique of cleaning the ear, while removing foreign body from ear, forceful syringing, blast, traveling in a non-pressurized air craft sudden fluid compression while diving and associated with head injury.

It is sometime associated with injuries of the ossicular chain and inner ear. It is a source of great concern for otorhinolaryngologists to restore completely the functional integrity of tympanic membrane and associated structures^{3,4}.

Usually the patient presents with a history of trauma followed by pain, deafness and sense of blockage of ear. Sometimes there may be associated blood stained discharge and tinnitus. On examination, perforation was noticed mostly in pars tensa of tympanic membrane with irregular and congested margins. Fresh bleeding or blood clot is seen in the canal and sometimes associated subconjunctival hemorrhage is found. Tuning fork tests and audiometry shows a conductive deafness. In the next page figure shows normal tympanic membrane and ruptured membrane (Figure 1, 2).

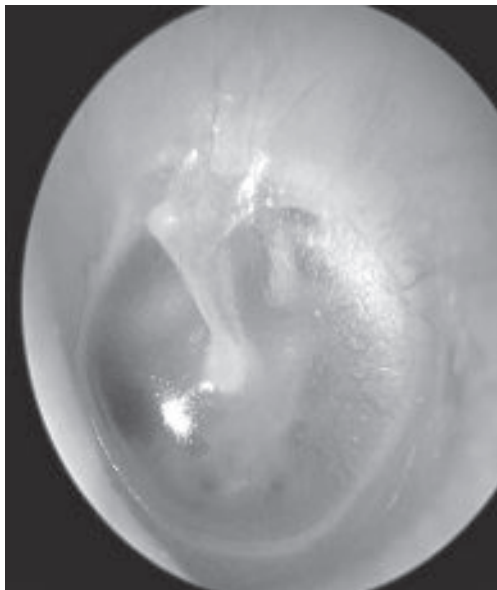


Fig.-1: Normal membrane

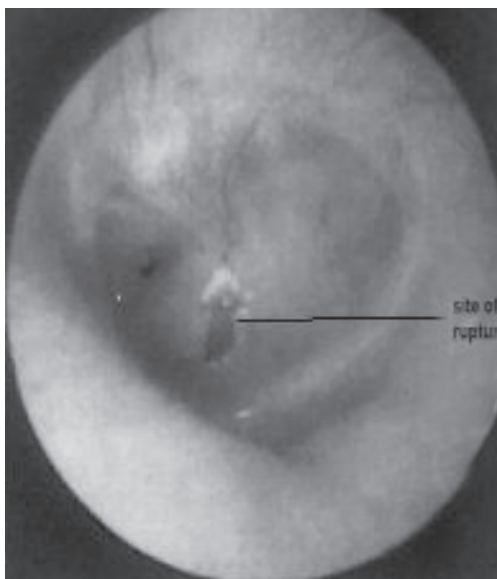


Fig.-2: Ruptured membrane

Methods

The cross sectional prospective study was carried out in the department of Otolaryngology- Head & Neck Surgery, Tairunnessa Memorial Medical College & Hospital, Boardbazar, Gazipur, in a period of 18 months from January 2011 to December

2013, clinically and otoscopically proved 70 cases of traumatic ruptured TM patients was take. Data was collected by interviewing the patients in a questionnaire for with history, examinations & investigation reports of the patients.

Results

Table-I
Age distribution

Age	No of patient(70)	Percentage (%)
0-10	2	2.85
11-20	12	17.14
21-30	46	65.7
31-40	10	14.24
>41	00	00

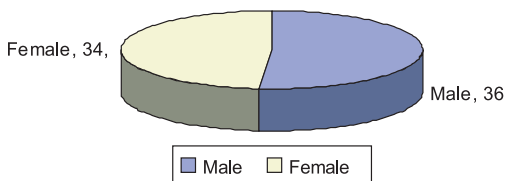


Fig.-3: *Distribution of sex (N=70)*

Table-II
Distribution of profession (n=70)

Name of profession	No of patient	Percentage (%)
Housewife	24	34.8
Garment Worker	18	25.7
Student	12	17.1
Businessman	06	8.5
Service holder	06	8.5
Day labour	04	5.7

Table-II
Etiology of rupture TM

Aetiology	No of patient	Percentage (%)
Slapping	62	88.5
Faulty technique of ear cleaning	08	11.4
Others	01	1.4

Table-IV
Trauma(slapping) given by

Name of C/F	No of patient	Percentage (%)
Husbands	30	42.8
Superintendent	10	14.2
Misceants	06	8.5
Friends	10	14.2
Elder brother	12	17.1
Father	02	2.8

Table-V
Distribution of co-morbid traumatic injury

Name of disease	No of patient	Percentage (%)
subconjunctival hemorrhage	4	5.7
Fracture facial bone	2	2.8
Head injury	1	1.4

Table-VI
side of involvement

Side of involvement	No of patients	Percentage (%)
Right ear		
Pars tensa	10	15
Pars flaccida	00	00
Left ears		
Pars tensa	70	85.0
Pars flaccida	00	00

Table-VII
Degree of hearing loss

Degree of hearing loss(dB)	No of patient	Percentage (%)
<25	02	2.8
26-35	49	70
36-40	19	27.14
>41	00	00

Table-VIII
Distribution of time taken to heal

Time taken (days)	No of patient	Percentage (%)
8-14	04	5.7
15-21	19	27.1
22-28	40	57.14
29-35	07	10

Table-IX
Distribution type of healing

Type of healing	No of patient	Percentage (%)
Spontaneous	66	94.2
Healing by intervention	4	5.7

Discussion

Traumatic rupture of tympanic membrane is one of the common ENT problems in our country and it is more common in people of lower economic class. The incidence of traumatic perforation was reported to be higher among the young, active females, Lindeman (1987), Kirstenson (1992), and Berger (1994).

In this series, 65.7% of the patients were in the age group of 21-30 years. Next common age group is 11-20 years and 17.14% of the total patient in this age group, followed by

31-40 years of age group is 14.24%, 0-10 years of age group is 2.85% and surprisingly none of the ruptured TM had above forty. Sarojamma et al showed that 72% of the patients were in the age group of 18-40 years. Out of this, the maximum incidence (48%) was among 21-30 years age group. This study shows slightly higher male predominance, (34 female & 36 male) (figure-1).

The present study reveals that housewives (34.8%) are common group of people who are affected and followed by garments workers (25.7%), students(17.1%), and by service holders (8%), businessman (8%) and day labors (5.7%).

This study shows that majority of the cases the cause of rupture is slapping (88.5%), and the other one is faulty technique of ear cleaning (11.4%). The slapping is done by husbands (42.8%) followed by superintendent of institute (14.2%), miscreants (8.5%), friends (14.2%), elder brother (17.1%), father (2.8%). Sarojamma et al⁷ showed the most common etiology for traumatic perforation of tympanic membrane was injury caused due to slapping (50%).

From this study we got left ear was involved in 85% of cases because slapped by right hand and right ear was 14.2% and from this study it is clear that rupture is solely in the pars tensa of TM. Hedegaard et al⁶ showed that Ninety-nine percent of the ruptures were localized to the pars tensa (63% to the anterior part of this structure) and typically had the shape of a minor tear.

Time taken to heal the TM is 22-28 days in 57.14% of cases but it also heals within 15-21 days in 27.1% cases. Sarojamma et al⁷ showed average time taken for healing by the uninfected cases was 34.78 days. The shortest time taken was 21 days and the longest was 75 days, Korkis (1946) reported 29.4 days and 38 days as the mean time

taken for healing in the case of uninfected and infected perforations respectively.

In majority 70% of cases had 26-35 dB conductive hearing loss and 27.14% cases 36-40 dB but no case had more than 41 dB loss. Sarojamma et al⁶ showed majority of patients (62%) had conductive hearing loss of 26-35dB, 22% of patients had with d" 25dB loss.

It is very interesting to mention that 94.2 %(66) of the ruptured TM heals spontaneously with conservative treatment and only 5.7%(4) of cases need intervension. Sarojamma et al⁷ showed that overall healing rate achieved by conservative treatment was 75%, Berger (1994) reported 94.8% spontaneous healing.

Conclusion

Traumatic rupture of tympanic membrane is one of the common injuries that happen domestically and outside that remain under-reported. Many a times the patient became hearing handicap. Although traumatic TM perforations have good prognosis, it is necessary to induce patients with profuse explanations for possible complications to visit the out-patient clinic until the wound has healed completely^{7,8}.

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