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Incidence of traumatic tympanic membrane perforation due to age, gender and causative agents

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Abstract
Introduction: Traumatic tympanic membrane perforation may be due to direct or indirect source: 1) Inserting of object in to the ear canal for example cotton swabs or accidentally insertion. 2) Concussion caused by an explosion or open handed slap across the ear. 3) Head trauma, sudden negative pressure, barotraumatic, latrogenic perforation, the sign and symptoms are sudden severe pain, sometimes followed by bleeding, hearing loss and tinnitus. Diagnosed by sign and symptoms and otoscopy and audiometry.
Objective: The aim of this article is to study traumatic tympanic membrane perforation.
Method and Material: This research is an article review and included several articles which were published in most famous journals, google, pubmed, henari, medical text books and etc. up to date journals.
Result: In this research we included several articles regarding traumatic tympanic membrane perforation in patients from 6months to 70 years, the average prevalence of TTMP was found 37% and most of the incidence was between 35-50 years.
Conclusion: Traumatic tympanic membrane perforation is an uncommon injury that is under reported. There is the need to indicate on alternative punitive measure among students and security agent's unskilled removal of foreign body. Early identified evaluation and referral of patients reduces the attendant morbidity.

Keywords: Trauma, incidence, ear, tympanic membrane, perforation

Introductions
Traumatic Tympanic Membrane perforation is an unusual case between Ear and Throat patient and it can be occurred at any age. The cause of Traumatic Tympanic membrane perforation is trauma upon tympanic membrane due to various Causes and it caused Loss of hearing with different degree according to perforated location and its Size. Different signs and symptoms of it's should take place whenever the middle and internal ear are exposed into trauma or not. Tympanic membrane is a thin membrane with gray color which separated external ear from middle ear and its weight is almost 12-14 mg, its thickness is 0.1 up to 0.15 mm and so its thickness in children is more than adult. When tympanic membrane is located between middle ear and external ear meatus and it formed 45 degree angle [1]. The length of tympanic membrane from anterioposterior aspect is 8-9 mm and from superoinferior aspect is 9-10 mm. the total surface of tympanic membrane is almost 85mm. the surface of tympanic membrane which vibrates is 55mm and the environment of tympanic membrane which located at annulus tympanicus structurally is made of fibrocartilage and its movement is restricted. The environment of tympanic membrane is composed from three layers as follows, external layer of epithelial, middle layer of fibrosis and internal layer of mucous membrane which covered the inside part of middle ear [2]. The tympanic membrane is from anatomically structure it is so thin and it could be perforated according to various agents and pressures. The different causes of tympanic membrane perforation are as follows:

1. Traumas due to misusage of instruments such as hairs' pin, matches stick, ear cleaning and so on which are used for drainage of foreign bodies from ear in an unexpertisely way and it could be perforated the tympanic membrane.
2. Trauma by fisting of hands upon ear and suddenly changing of tension and pressure in meatus of ear also could be caused perforation of tympanic membrane.
3. Changing of liquid pressure during ear lavage.
4. Head trauma due to temporal bone fracture.

5. Baro trauma due to changing of atmospheric pressure among swimmers. Traumatic tympanci membrane perforation could cause abruptly ear pain (otalagia), unusual ear bleeding (ottorhea) and loss of hearing into different degrees of mild, moderate and severe [3].

If perforation is only present in tympanic membrane, so according to wideness and location of perforation it can cause loss of hearing with different degrees (10-25 db), if the bones of ear lost it continuity in this case the loss of hearing degree will be 40db and consequently if the internal ear is damaged, the loss of hearing degree will be more than 40db. Beside of loss of hearing, dizziness and tinnitus also will be present and The ear discharge initially bloody and later due to secondary infection interfering, if it was not treated it will be purulent. The diagnosis of traumatic tympanic membrane is approved by signs and symptoms that mentioned in the above. Beside otoscopy is also helpful showing of location and perforated size of tympanic membrane. In addition to Audiometry determines the loss of hearing degree [4]. The treatment of traumatic tympanic membrane perforation is related to patient immediate coming back into a health facility and if the patient is coming back immediately into a health facility in this case we could not interfere in the ear and we clean and suction the coagulated blood from ear and also we could not use ear drops and we dry the ear. If the perforation of tympanic membrane is so wide in this case in a specialized center of ear the operation of ear is performed. Antimicrobial therapy is prescribed for interfering of infections and if after treatment the perforation is not closed and loss of hearing is more than 25db and ear of the patient is dry and clean, in this case we perform Myrinoplasy procedure for repairing of tympanic membrane [5]. If the bones of hearing are dislocated, Myrinoplasy should select and consequently the main mentionable point is that incidence of trauma by fisting of hands in left ear two times more than right ear. In a study which was performed in Ilorin University of Ilorin Teaching Hospital in Nigeria upon 64 patients which came back into this hospital by hiding history of traumatic tympanic membrane perforation due to different causes and age of the patients were from six months up to fifty years old. The average age of them thirty years old the patient of under-five ages (7.9%), the patient between 21-34 years old (29.7%) and patient of more than 35 years old (37.7%). The ratio of male and female was 2.5:1. The usual causes of traumatic tympanic membrane perforation was fisting of hands upon ear (23.5%) and followed by traffic accidents (35.9%). 23.5% of the traumatic patient was due to fisting of hands such as 30.5% of traumatic patient was due to fisting of security workers and 17.4% of traumatic patient was due to fisting of senior students upon Junior students or fisting of teachers upon students. Suddenly deafness was visible among 95.3% of the patient. The most patients were recovered by medical and conservative treatments and only 7.8% of the patients were performed myringoplasty. The 64 patients who suffered from traumatic tympanic membrane, in 36 patients the trauma was in left ear and in 28 patients the trauma was in right ear. It means that infestation of left ear than right ear was more due to trauma and fisting of hands. 95% of the patients had suddenly loss of hearing, 52% of the patients had complained from tinnitus, 37.5% of the patients suffered from chronic supurative otitis media and 7.8% of the patients had performed the Myringoplasty operation for repairing of their tympanic membrane [6]. In another study which performed in otolaryngology Department of Yiwu Hospital Of Wenzhou Medical College in Zhejiang city of china country from 2007 up to 2011 founded that 641 patients were came back from Ear trauma into Emergency Department of the above hospital and 320 patients were male and 321 patients female. The average age of the patients were 34 years old and 554 patients had comprehensive trauma, 55 patients had came back from bomb exploration, 32 patients due to misusage of instruments which entered in unexpertisely way into ear, 3% incidence of traumatic tympanic membrane was due to hands fisting by sister, brother or husband and wife, 4% incidence of traumatic tympanci membrane was due to hands fisting of teachers of school upon students, 12% of incidence of traumatic tympanic membrane was due to hands fisting by classmates in school, 7% incidence of trauma of tympanic membrane was due to hands fisting by Local police and 22% incidence of traumatic tympanic membrane was due to fighting in streets and subway. from 641 patients that were had ear trauma, 137 persons did not come for follow up and the rest 504 patients which had tympanic membrane perforation spontaneously repaired their tympanic membrane. Those patients which had wet perforated tympanic membrane and recovered by medical treatment, in 7 patient Myringoplasty was performed and in 2 patient cholestatoma were established, in one patient tympanosclerosis initiated and in one patient facial palsy established [7]. Finally we can say that comprehensive trauma especially hands fisting in domestic and police conflicts was the essential cause of ear perforation. In one another study which was performed in otolaryngology Department of Indiana Unidersity School of Medicine, founded that signs and symptoms of disease was suddenly otalagia, otorrhea, loss of hearing with different degrees according to various locations, tinnitus and dizziness exhibited the infestation of internal ear. Most of them recovered spontaneously and if the perforation was so wide and un-continuity of hearing bones was present in this case advised surgery [8]. In one another study which was performed in SKIMS Medical College And Hospital Department Of Otorhinolarvngology of Indian country in Jamo and Kashmir cities in January 2010 up to 2014 founded that numbers of the patients infestated into tympanic membrane perforation were 350 patients, 231 patients were male and 119 ones were female. The incidence of tympanic membrane perforation was seen at any age especially at middle age it was more. From 350 patients, 94 patients had right ear infestation, 249 patients had left ear infestation and 7 patients had infestation of both right and left ears. According to its etiology 243 patients had compression trauma, 88 patients had instrumental trauma and 19 patients had explorative trauma. Tinnitus was the most spreadable complaints of the patients; loss of hearing, ear disorder, bleeding and dizziness also existed. 217 patients had loss of hearing (20-35 db), 77 patients had loss of hearing less than 20db, 28 patients had loss of hearing less than 35 db and loss of hearing at range of 28db was not felt. Complete remission was got at duration of 2-6 weeks in 172 patients (49.1%), at duration of 7-9 weeks in 112 patients (20.32%) and at duration of 10-12 weeks in 35 patients. Complete remission was seen in 319 patients (10.9%) and in only 8 patient myringoplasty had performed. Burning of the perforated margins of the ear with

Trichloroacetic acid in 14 patients also performed because of tympanic membrane repairing. Finally it is mentionable that hands fisting, administering of instruments in unexpertiseable way, traffic accidents and exploration were the main causes of tympanic membrane perforation [9]. In one another survey study which was performed in Department Of ENT –HNS Government Medical College Florida USA in 22 of July 2015 up to 27 April of 2016 founded that 4% of United States of Americas' students had traumatic tympanic membrane perforation. In another survey study in USA almost 3% of children by administering of ventilation tube had recovered, however the incidence of traumatic tympanic membrane perforation in all population of USA currently did not study. Author, Even said, that exact numbers of patients of traumatic tympanic membrane perforation which passed Tympanoplasty procedure were 150000 -180000 [10]. In one another study which was performed in otolaryngology Department of Iti State University Teaching Hospital Ado Akiti State Nijeria and Department Of Surgery Ent Unit Fedral Medical Centre Lokoga NIGERIA in 2018 upon 592 patients who had traumatic tympanic membrane perforation, founded that 368 male (69.9%) and 161 (30.4%) female were included in this study and ratio of male than female was 2:1. the incidence of tympanic membrane perforation was 7.8% in this study and the most patients by examining had complained from ear pus (81.5%), tinnitus (55.7%), otalagia (72.8%), 28.4% of the patients of tympanic membrane perforation had left one side perforation due to acute suppurative otitis media (43.9%). Deafness of conductive way was seen in 61.6% of the patients and deafness of nerve receptors was seen in 25.3% of the patients. The most significant complication of tympanic membrane perforation is loss of hearing (52.6%) and in 425 patient's conservative treatment and in 167 patients surgical treatments were performed [11].

Objective

The aim of this article is to find the incidence of traumatic tympanic membrane perforation which caused loss of hearing and defect.

Method and Material

This research is an article review and included several articles which were published in most famous journals, google, pubmed, henari, medical text books and etc. up to date journals.

Result

This Article Review research included several international articles, Textbooks and popular internet sites were used regarding traumatic tympanic membrane perforation in patients from 6months to 70 years, the average prevalence of TTMP was found 37% and most of the incidence was between 35-50 years. In a study which was performed in Nigeria country in Ilorin University in 2009 patients between 6 months up to 70 years were included in this study. in this research founded that most of the patients due to age that had tympanic membrane perforation were above 35 years old (37.7%). the ratio of male and female was 2.5:1. The usual causes of Ear trauma were hands fisting (23.5%) because of fighting of security workers, family fighting, fighting among students and hands fisting of students by theirs teachers. Totally 95.3% of the patients had abruptly deafness and most of the patients had recovered by medical treatment and only 7.8% of them required surgical treatment. Traumas which pounded upon ear, 36 patients had left ear trauma, 28 patients had right ear trauma and it exhibited that ratio of trauma was more in left ear than right ear. 95% of the patients had loss of hearing, 52% of the patients had tinnitus, 37.5% of the patients had chronic suppurative otitis media and 7.8% of the patients had surgery operation. In one another study which was performed in otolarynlgology department of Yiwu Hospital of Wenzhou Medical College in china country in 2007 up to 2011 upon 641 of patients were faced into tympanic membrane perforation and ratio of male and female were 1:1. The average age of them 34 years old. Most of the patients had comprehensive trauma (554), 55 patients had explorative trauma, 32 patients had misusage of instruments into ear and 52% of the patients had came back due to hands fisting, 45.16% of the patients had recovered by medical treatment and 7 patients had passed surgery operations. In this research the average age is also 35 years old and ratio of male and female was 1:1 and most of the patients had came back to hospital due to hands fisting and finally most of them had recovered by medical treatment. In another research which was performed in Indian University School of Medesan, founded that most of the patients had recovered by medical treatment and only a few of the patients that had wide perforation or uncontinuity of hearing bones had passed surgical treatment. The incidence of tympanic membrane perforation was above of 40 years old. In a study which was performed in SKIMS Medical College And Hospital of India country in Jamo and Kashmir cities in 2010 up to 2014 upon 350 patients which had tympanic membrane perforation and the ratio of male and female was 2:1 and infestation degree was more at middle age.249 patients had left ear infestation, 94 patients had 94 patients had right ear infestation and 7 patients had both right and left ears infestation. According to the etiology of tympanic membrane perforation 243 patients had comprehensive trauma, 88 patients had misusage of instruments into ear trauma and 19 patients had explorative trauma.217 patients had loss of hearing (20-35db), 28 patients had loss of hearing above than 35 db, 77 patients had loss of hearing less than 20db and 28 patients had loss of hearing did not felt. 49% of the patients had recovered spontaneously or by medical treatment and 8 patients had passed surgical operation. In another study which was performed in otolaryngology department of Government Medical College in Florida State of USA in 2015 up to 2016 founded that 4% of United States of Americas' students had traumatic tympanic membrane perforation. In another survey study in USA almost 3% of children by administering of ventilation tube had recovered, however the incidence of traumatic tympanic membrane perforation in all population of USA currently did not study. Author, Even said, that exact numbers of patients of traumatic tympanic membrane perforation which passed Tympanoplasty procedure were 150000-180000.In one another study which was performed in otolaryngology Department of Iti State University Teaching Hospital Ado Akiti State Nijeria and Department Of Surgery Ent Unit Fedral Medical Centre Lokoga NIGERIA in 2018 upon 592 patients who had traumatic tympanic membrane perforation, founded that 368 male (69.9%) and 161 (30.4%) female were included in this study and ratio of male than female was 2:1. The incidence of

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Discussion

This research was performed by Article Review method and in this study discussed about tympanic membrane perforation and its incidence according to its causative agents, signs and symptoms and treatment from authorized international articles and its result was contrasted with literatures that mentioned in the above [12] in a study which was performed in Nigeria country in Ilorin University in 2009 patients between 6 months up to 70 years were included in this study. In this research founded that most of the patients due to age that had tympanic membrane perforation were above 35 years old (37.7%). the ratio of male and female was 2.5:1. (13) The usual causes of Ear trauma were hands fisting (23.5%) because of fighting of security workers, family fighting, fighting among students and hands fisting of students by theirs teachers. 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The most significant complication of tympanic membrane perforation is loss of hearing (52.6%) and in 425 patient's conservative treatment and in 167 patient's surgical treatment were performed [23].

Conclusion

From the above studies concluded that tympanic membrane perforation according to its causative was the main factors of comprehensive trauma due to pounding upon head and ear and at second degree hands fisting upon ear by wife, husband, daughter and brother. Trauma due to hands fisting by local police, traffic location and conflicts between students and teachers. The high incidence of traumatic tympanic membrane was existed in left ear, infestation of right ear is little and rarely both of ears were infested. Trauma due to exploration and misusage of instruments into ear in an unexpertiesley way were respectively located in third and fourth grades. Most of the patients due to ear traumas had abruptly loss of hearing that recovered after conservative therapy and a few percentages of the patients had passed surgical treatment. According to gender, mentioned in the above that male and female infested ratio was 2:1. According to age due to the above mentioned studies in middle age the incidence of traumatic tympanic membrane perforation was more. According to location perforation was more central and minor that recovered by medical treatment. Rarely required surgical operation.

Tinnitus and dizziness were present in all different causes of traumatic tympanic membrane.

Recommendations

1. Forbidding from deafness and hearing defects the security workers should use specific guidelines included disadvantage of hands fisting for preventing of deafness and hearing defects.
2. Suggest from all clinics, hospitals and media to announce the risks due to hands fisting in family members, conflicts between schools students and teachers and students or other subway conflicts for preventing trauma due to hands fisting upon ears.
3. Suggest from all people of our country for not using of instruments that irritate the tympanic membrane of themselves.
4. Suggest from all health workers for preventing of unexpertisely and non professional interfering into their ears.
5. Advise for all patients that their ears faced into suddenly trauma, did not interfere in their ears, did not use ear drops, dry their ears and referred into specialized center of otolaryngology.

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