



Unusual Tympanic Perforation

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Abstract

Traumatic perforations occur most often following a slap, the most frequent in the literature (72.9%) and a few rare times in a singular manner (5.2%). Our objective was to describe the epidemiological-clinical spect as well as the therapeutic management of cases of tympanic perforation of unusual origin. We identified 5 patients with a sex ratio of 3/5, an average age of 28 years, the average consultation time was 7 weeks. The most frequent associated signs were tinnitus and hypoacusis in 4 patients. The mechanisms of action varied: cotton swab 40%, stethoscope tip, suction of the external ear canal and gunshot respectively 20%. After 6 months of monitoring, 2 perforations persisted associated with moderate conductive hearing loss. Type 1 tympanoplasty was performed under general anesthesia in one case and local anesthesia in the other. The palisade technique was used intraarticularly in one patient and retro auricularly in the other. In conclusion, eardrum perforations can occur unexpectedly, they are quite often avoidable, hence the importance of raising awareness among the population. Most often with a good prognosis, treatment can be surgical in order to restore anatomical and hearing functions.

Keywords: Traumatic tympanic perforation; Rare etiology; Hypoacusis; Tympanoplasty

Introduction

The eardrum is said to be perforated when the tympanic membrane ruptures, creating communication between the outer and middle ear. Histologically, the tympanic membrane comprises 3 layers of tissue in its lower portion, called the pars tense, and 2 layers in its upper portion, called the pars flaccida, making the latter a fragile zone, often the site of perforations, particularly infectious ones. The tympanic membrane plays a key role in hearing [1,2,3]. The pathogenesis of traumatic tympanic perforation is not fully understood and, if left untreated, can lead to hearing loss or permanent

tympanic perforation. Traumatic tympanic perforations occur most frequently as a result of slapping, the most common type of injury reported in the literature (72.9%), with a few rare singular cases (5.2%). Depending on an etiology, extent and duration of the perforation, different symptoms may be encountered, and thus different treatments proposed, ranging from monitoring and medication to surgery [4]. In terms of surgical management, the aim of tympanic perforation closure is to restore the columellar effect and reduce the risk of infection. Numerous surgical techniques, known as myringoplasty or type I tympanoplasty, have been developed for this

purpose. The most classic is myringoplasty using underlay graft interposition (under the mucous layer of the tympanum), described in 1956 by Zollner and Wallsten [5]. Our aim was to describe the epidemic-clinical aspect as well as the therapeutic management of cases of tympanic perforation of unusual origin.

Cases Presentation

Case 1: 25-year-old female patient seen in an ENT consultation for purulent otorrhea following tympanic perforation following cotton-tipped ear plug use ((the hand was accidentally jostled while cleaning the ear canal with the cotton swab), which had been evolving for 6 months, associated with hypoacusis and tinnitus. On otoscopy, the perforation was single, subtotal and non-marginal. Pure tone audiogram showed moderate conductive hearing loss. Treatment was initially medical, based on antibiotic therapy with amoxicillin + clavulanic acid at a dose of 1g three times a day for 5 days and floxacillin ear drops for 5 days. As the perforation persisted, we opted for a type 1 tympanoplasty via the retro auricular route under general anesthetic. Postoperative recovery was straightforward, and hearing was restored one month later.

Case 2: 24-year-old housewife, seen for post-sucking tinnitus in the right ear 48 hours previously, associated with unilateral right hypoacusis and otalgia. Otoscopy revealed a central punctiform perforation. The tonal audiogram showed a mild conductive hearing loss. After monitoring, complete healing of the tympanic mem-

brane was obtained 3 weeks later, as was the disappearance of the hypoacusis.

Case 3: Male physician presented with sudden onset of otalgia on the right, associated with homolateral tinnitus after using a stethoscope 30 min previously. Otoscopy revealed a central perforation with a small hematoma (Figure1). Tonal audiogram showed almost normal hearing. After monitoring, spontaneous healing of the tympanic membrane was obtained 1 month later, as was disappearance of the tinnitus.

Case 4: 38-year-old teacher, seen for otorrhea following cotton swab use 2 months previously, associated with hypoacusis. Otoscopy revealed an inferior perforation with homolateral otorrhea. Tonal audiogram showed mild conductive hearing loss. The treatment received was medical, based on antibiotic therapy: amoxicillin + clavulanic acid at a dose of 1g three times a day for 5 days, and floxacillin ear drops for 7 days. Given the persistence of the perforation, we opted for a type 1 tympanoplasty via an intracanal route under local anesthetic. Postoperative recovery was straightforward, and hearing was restored 6 weeks later.

Case 5: Constable, aged 30, seen for hearing loss following exposure to loud noise, gunshot while reloading his weapon, associated with permanent tinnitus, the perforation was anteroinferior. Spontaneous healing occurred 1 month later, while functional signs persisted (Figure1).



Figure 1: Tympanic perforation post sucking.

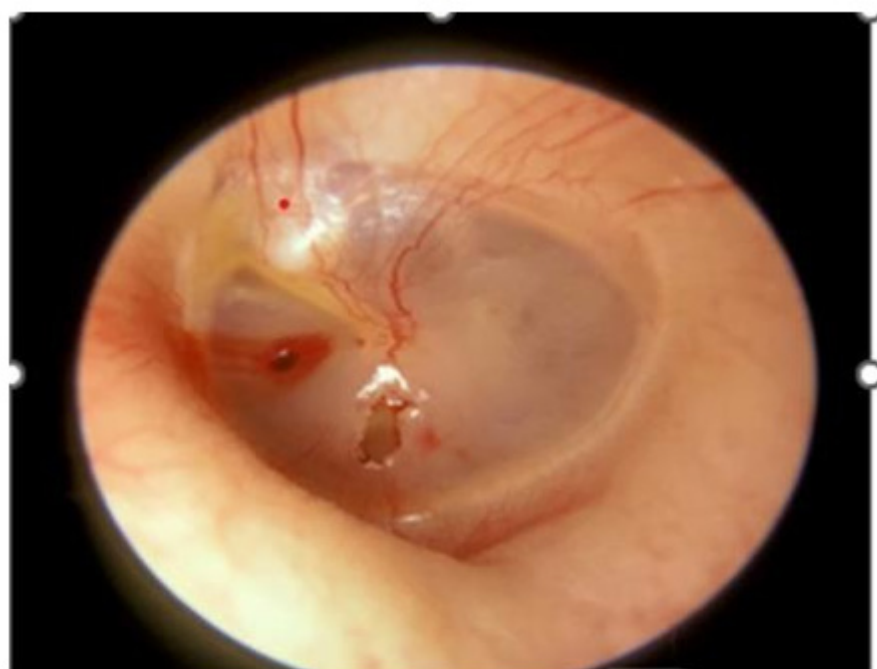


Figure 2: Tympanic perforation post using stethoscope.

Discussion

Tympanic membrane perforations can occur as a result of trauma, acute or chronic infection. Those of traumatic origin are most often due to aquatic accidents, e.g. scuba diving, sports accidents, following a strong explosion or violence, e.g. a slap to the ear. Aetiologies such as those reported in our study (suction, cotton swabs, weapon handling) are usually rather anecdotal. We found 5 patients with a sex ratio of 3:2, relatively similar to those found in studies by several authors on post-traumatic perforations, e.g. 2:1 in favor of men in Nigeria, while a study of almost 1,000 patients in the USA showed that men suffered traumatic rupture more frequently than women, with a ratio of 1.49:1. We did, however, find a study carried out in Turkey with contradictory results, i.e. a sex ratio in favor of women. Given the panoply of results in favor of a male predominance, we too will conclude that it is a male predominance.

The mean age was relatively similar to ours: 26.75 +/-14.6 years in another study of 80 participants. Tympanic membrane rupture can occur at any age. It is mainly observed in the younger population when associated with acute otitis media. Trauma becomes a more likely cause of tympanic perforation as the patient's age increases [1,4,6,7,8]. The most frequent associated signs were tinnitus and hypoacusis in 4 patients, although all patients reported the onset of sudden, severe otalgia at the onset of the trauma, symptoms that are fairly constant in these cases, as attested by the literature [9]. The perforation is medium-sized (56.2%), unique [93.8%] and non-marginal, probably due to its traumatic origin. The size of the perforation has been extensively studied by several authors, and is divided into small, medium and large perforations.

The assessment of perforation size may be biased, as it has been done solely with the aid of a headlamp, in the absence of more elaborate otoscopic means in our practice [10]. Conductive hearing loss was the most common (79.2%). Hearing loss does not depend on the location of the perforation. It is most often conductive, due to the fact that the inner ear is generally better preserved [6,7,11,12].

The time taken to consult a specialist ranged from 48 hours to 6 months: the earlier the incident, the greater the intensity of the pain, and the longer it took when it occurred at a low level or was ephemeral. It was in the latter case that we observed cases of superinfection. This complication was most often the reason for the absence of spontaneous closure. The mechanisms of action were quite variable; in the literature, in low-income areas comparable to our context, as an etiology of post-traumatic perforation we most often encounter foreign bodies, slaps, rarely suction or blast cases [10,13]. The majority of perforations had healed spontaneously after one month (60%), with rates as high as 93.33% [3,5,8,15]. After 6 months' monitoring, two perforations remained relatively unchanged from the literature (33.3%) [9,13]. This was probably due to superinfection and the addition of chronic otitis media, as well as the relatively long consultation period after the onset of otorrhea, with patients preferring self-medication and/or recourse to traditional treatment, facts regularly observed in our context.

The treatment then recommended for persistent tympanic perforations was surgery. Surgery is rarely (5%) required in cases of post-traumatic perforation, especially as healing is usually spontaneous, and several other therapeutic proposals exist, such as the use of ofloxacin combined with gelatin sponge patching, human

acellular dermal allografts or the use of paper patches [14,16,17]. In view of the chronic infectious complication, we opted for type 1 tympanoplasty performed retro-auricularly under general anesthesia in one patient, who presented with a large perforation and was rather pusillanimous. In the second case, the trans-canal approach was used under local anesthetic, as the patient was rather demanding and reluctant to undergo general anesthesia, and the perforation was posterior. Follow-up was marked by recovery of around 60% of hearing 2 months after surgery.

Conclusion

Tympanic perforations can occur unexpectedly, and are often preventable, hence the importance of raising public awareness. Most often with a good prognosis, they can be treated surgically to restore anatomical and auditory function.

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