

INTRODUCTION

Tympanic membrane perforations (TMP) are frequent events leading to evaluation in the emergency department, primary care office, and otolaryngology office. Despite specific warning labels on cotton applicator packaging on the risk of ear injury with personal use, the use of these products to perform self-cerumenectomy is ubiquitous. The objective of this study was to analyze the mechanism of injury of traumatic TMP for patients presenting to the emergency room.

MATERIALS AND METHODS

The National Electronic Injury Surveillance System (NEISS) was searched for ear-related injuries with analysis of incidence, age, and gender; and specific injury diagnoses, and mechanisms over the last five years.

RESULTS

From 2010 until 2014, there were 950 case entries recorded or 4,914 estimated emergency department (ED) visits for TMP. The majority of injuries occurred in patients ≤ 18 years old (63.4%), with children less than six years of age, the most at risk (34.8%). There was a male to female ratio of 1.49:1. Instrumentation including foreign bodies within the ear canal was noted in 60.6% of cases. Of these, q-tips were specifically noted in 45.3%. While foreign bodies and instrumentation represented the majority of TMP in the 0-5, 6-12, 37-54, and 55+ age groups, head trauma from water and other strikes to the head was the major cause of TMP in the 13-18 and 19-36 age groups.

DISCUSSION

Traumatic tympanic membrane perforations (TMP) are a frequent cause of visits to the emergency department and otolaryngologists. Trauma such as foreign bodies, forceful blows to the ear, and blast injuries are well known causes leading to perforations of the ear drum. Blasts and water injuries may result in a sudden rise in pressure in the external auditory canal, which is translated to the tympanic membrane, and may result in the tearing of the ear drum¹. Even though perceived as a common and non-lethal injury by the physician, it is important to remember the burden on the patient. Complications of a traumatic TMP include conductive hearing loss, tinnitus, and even middle ear infections. Therefore, it is important to review the demographical information, as well as, the most common causes leading to traumatic TMP.

This is the first study of its kind to analyze the incidence and mechanism of traumatic TMP on a national level in the US. Analyzing the data over the last 5 years, our results indicate that males were more commonly affected with a male to female ratio of 1.49:1 (Table 2). Furthermore, evaluating the population in terms of age, it was noted that pediatric patients (<18 yrs) had the highest percentage of cases (63.4%). Similar findings were also reported in single institutional reviews by Hemple et. al.² and Jellinge et. al.³ who noted a predominance of males and younger patients sustaining such injuries in their population.

Moreover, our study also highlighted that the most common mechanism of traumatic TMP was foreign body instrumentation (Figure 1), with Q-tip (45%) and hair-pin (11%) being the most common objects (Figure 2). Other studies^{2,3,4} covering TMP have reported that blunt trauma, such as slaps and blows were the most common cause of traumatic TMP. These results indicate the importance of patient education that should be provided by the physician. The NEISS database provides a large source of cases to review demographical trends in rarely reported injuries such as traumatic TMP, and has showed tremendous value in previous analysis^{5,6}.

CONCLUSIONS

Traumatic TMP represent a common cause of evaluation in the emergency room. Despite common warnings on risks of injury to the ear drum with cotton tip applications (q-tip) usage, it is still a major cause of traumatic perforations. Other mechanisms also play an important role in the teenage and young adult population.

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TABLE 1

Age Range (years)	Number of Cases	% of Cases
0-5	331	34.8%
6-12	158	16.6%
13-18	113	11.9%
19-36	224	23.6%
37-54	91	9.6%
55+	33	3.5%

TABLE 2

Gender Distribution

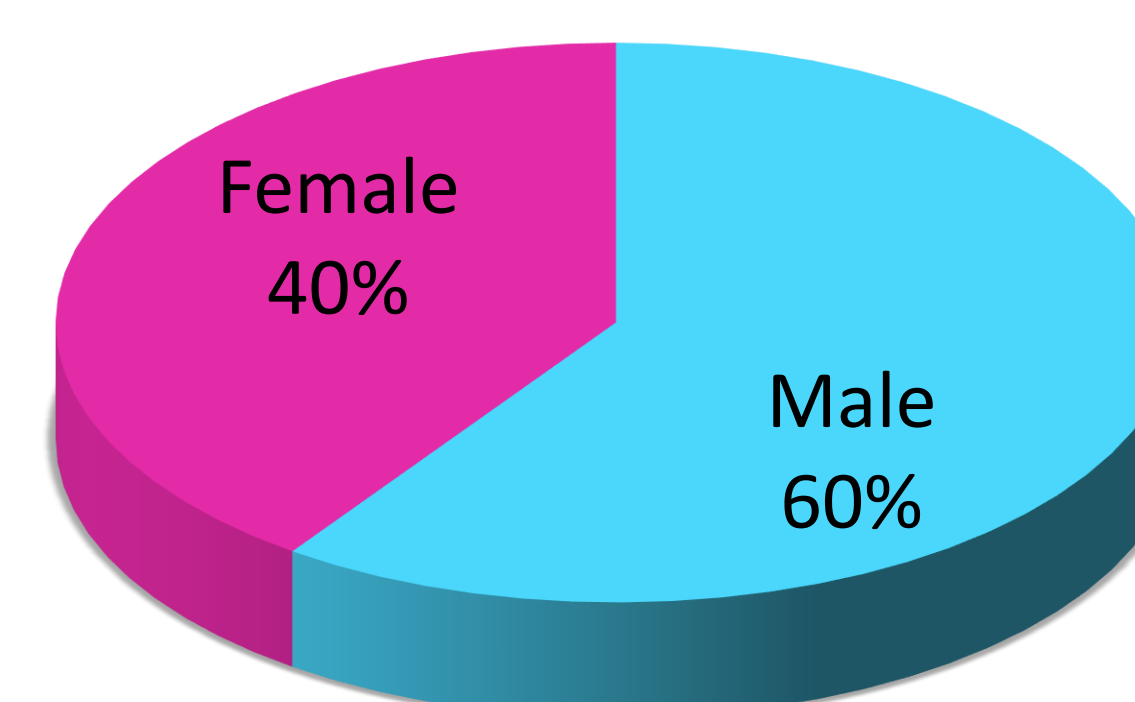


FIGURE 1

Mechanism of Injury

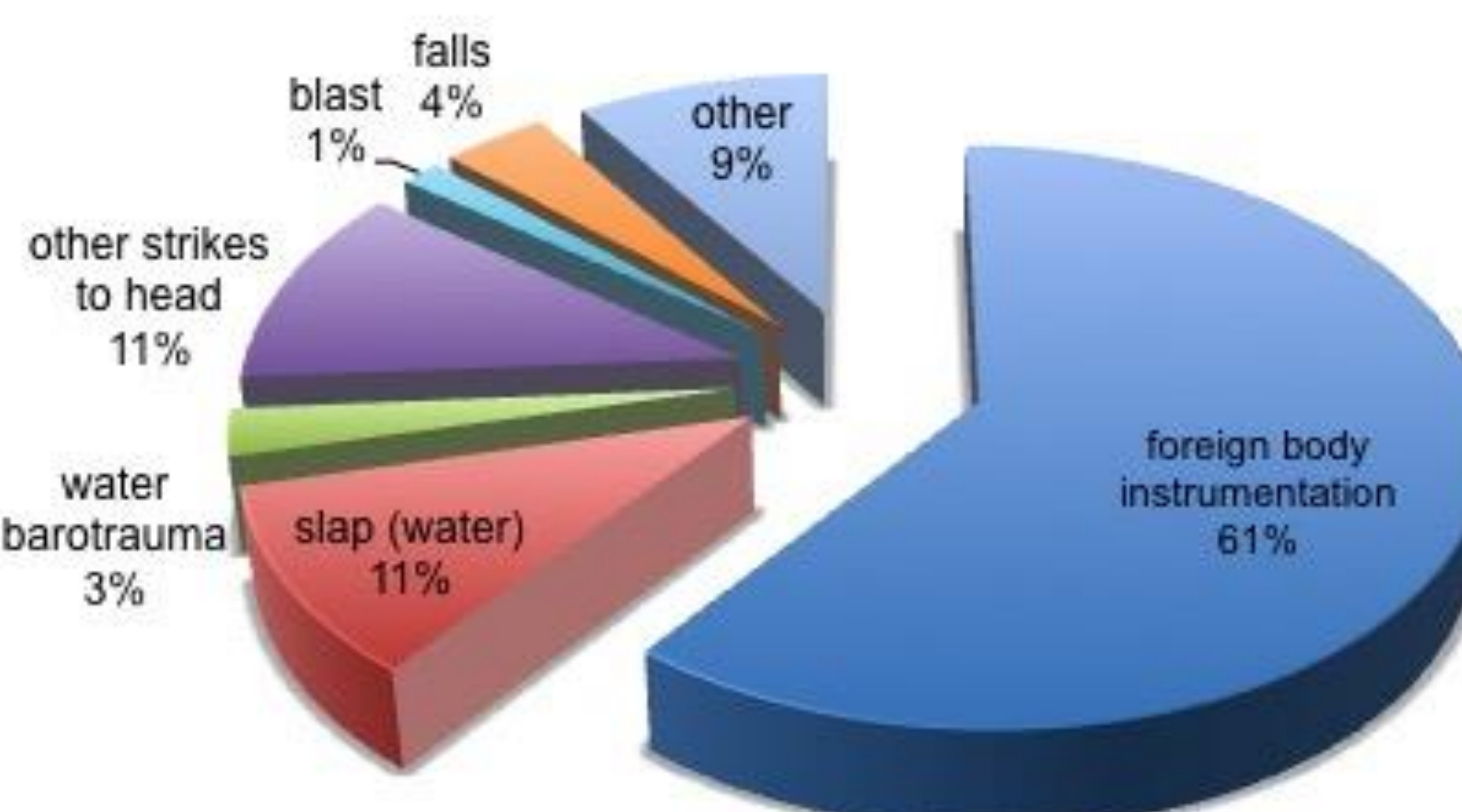


FIGURE 2

Type of Foreign Body Instruments Causing TMP

