

REFERRED OTALGIA – A CASE SERIES

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ABSTRACT

Introduction: Referred otalgia is a challenging symptom, with the burden on the physician to identify the source. It is a pain originating outside the ear. This is caused by the complex nervous connections in the head and neck areas, the ear, the pharynx and the nose.

Aim: To study the possible aetiologies of referred otalgia and to formulate an appropriate management plan.

Materials and Methods: This prospective study was conducted on patients presenting to ear, nose, and throat (ENT) outpatient department in Sree Balaji Medical College and Hospital, Chennai, with complaint of ear ache either unilateral or bilateral from which patients who had referred otalgia were evaluated after taking an informed consent. The patient's details were recorded, and a detailed history of their complains was taken. A thorough clinical evaluation was done to know the possible aetiology

Results: Of 870 patients who presented with an ear ache, 103 (11.9%) patients had referred otalgia. The most common cause for referred otalgia from this study was found to be temporomandibular joint (TMJ) dysfunction in 38 (36.9%) patients, followed by dental problems in 32 patients (31.06%).

Conclusion: Referred otalgia has been a well-documented phenomenon in the ENT and neurosurgical literature. One has to be knowledgeable about the neuroanatomy and sensory innervations of the ear and the dermatomal sites in order to know the primary cause of the earache. TMJ disorders and dental causes for referred otalgia are very important factors and should always be evaluated for any such case.

Keywords: Referred, Otalgia, Ear ache.

INTRODUCTION

Otalgia can originate from pathologies inside the ear (primary otalgia) or can be a referred pain originating from outside the ear (referred otalgia) [1]. The ear receives its sensory nerves from six sources, and several other head and neck structures share a common nerve supply [2]. Thus, pathologies occurring in the neural network of cranial nerves V, VII, IX, and X and cervical spinal nerves C2 and C3 can be considered as possible etiologies of referred otalgia [3].

Referred pain is caused by nerve compression or irritation where the sensation of pain will generally be felt in the area of somatic dermatomal innervation. Therefore, it is imperative that the otolaryngologist have knowledge of the complex neuroanatomic innervation of the external and middle ear.

As there is no simple, single algorithm for identifying referred otalgia, and as the areas supplied by the above-mentioned nerves are extensive, the present study was conducted to identify the aetiologies of referred otalgia and to underline the need for increased attention to any possible dangerous etiologies and course of illness.

METHODS

This prospective study was conducted in the ENT out-patient department of Sree Balaji Medical College, Chennai, from February 2012 to February 2014. There were 870 patients who had presented with complaint of ear pain either unilateral or bilateral, out of which 103 patients were diagnosed with referred otalgia in whom ear examination was normal i.e. with an intact tympanic membrane, normal external auditory canal, and patent Eustachian tube function, and they were selected for the study after obtaining informed consent from them. Those who had previously undergone tonsillectomy or other head and neck surgeries and had later developed otalgia were excluded from the study.

A detailed history from the patient was collected, including age, gender, occupation, presenting complaint of earache and associated head and neck complains. History regarding radiation of pain from or to adjacent areas causing headache, neck pain, pain in the oral cavity such as tooth, gums, throat pain or any other facial pain was also obtained. A thorough clinical examination of ear, nose, throat with oral cavity examination including indirect laryngoscopy, and if required direct laryngoscopy and biopsy to rule out pharyngeal cause of referred otalgia in case of any malignancies involving tongue, pyriform fossa or other head and neck cancer was done. Those with dental complains or pain while chewing, with positive findings of dental caries or temporomandibular joint (TMJ) tenderness or subluxation and also in whom the clinical evaluation was inconclusive were subjected for orthopantomogram and dental consultation if necessitated and were asked to review. Patients with associated throat symptoms were evaluated accordingly, and radiographs were taken if necessary.

RESULTS

Of 870 patients complaining of ear ache, 103 (11.9%) cases were referred otalgia (Fig. 1). It was a symptom affecting most age groups, more commonly in the third and fourth decade (Fig. 2) with almost equal preponderance among both sexes with ratio of 1.1:1 (male:female). Fig. 3 shows the laterality of the symptom among the study population.

Out 103 cases studied, 38 patients had TMJ dysfunction, more commonly seen in women. 32 patients had associated dental disorders like, dental caries and decay, pulpal infection, and unerupted wisdom tooth who were treated accordingly and were asked to follow-up and were cured of their symptoms and were managed conservatively with a positive outcome during follow-up. 17 Patients were diagnosed with pharyngitis and 12 had earache due to aphthous ulcers present in the oral cavity mucosa, tonsil, soft palate and posterior 1/3rd of the tongue. We had encountered one case diagnosed with an elongated styloid

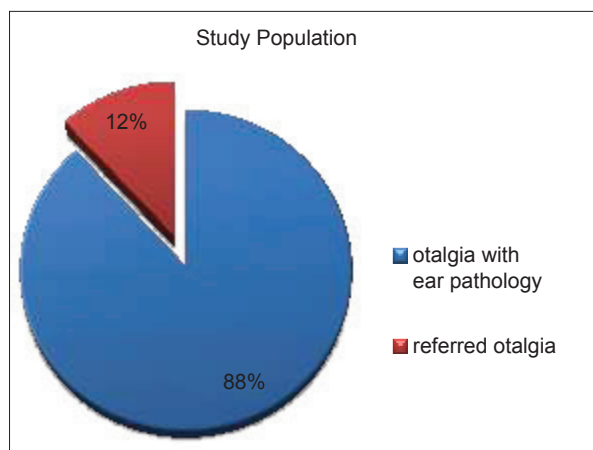


Fig. 1: The study population

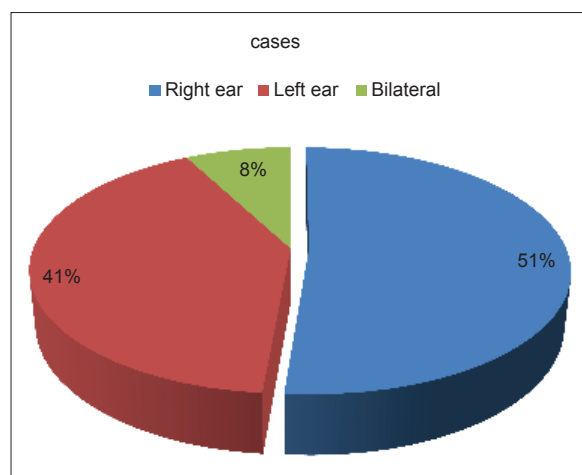


Fig. 3: The laterality of the symptomatic ear among the study population

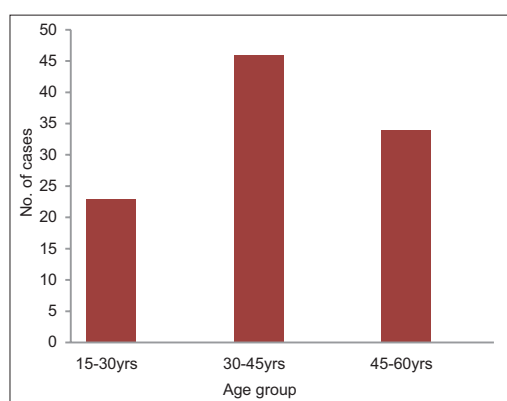


Fig. 2: The age distribution among the affected cases with referred otalgia

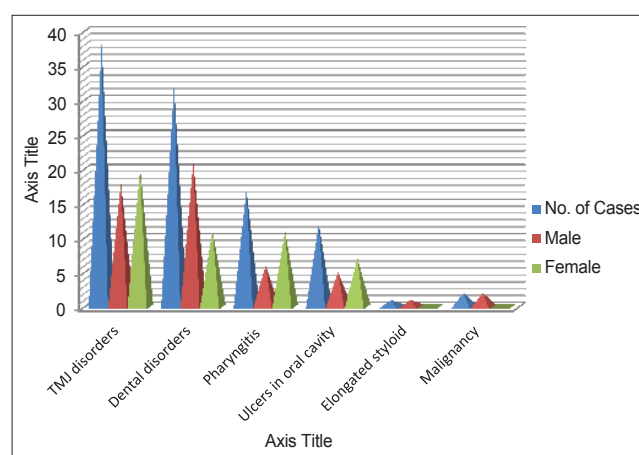


Fig. 4: The graphical representation of the incidence of the aetiologies of referred otalgia in the study population

process for whom symptom subsided following surgical management. Two cases of Ca hypopharynx had presented with ear ache as a primary symptom. There was a case of Bell's Palsy complaining of earache on the side of palsy. Fig. 4 graphically represents the various aetiologies in study population. Table 1 shows the preponderance and prevalence of the aetiologies of referred otalgia among both sexes.

DISCUSSION

TMJ and dental disorders are the most frequent causes of secondary or referred otalgia presenting to the ENT clinic, as proven from our study and together may account for more than 60% of referred otalgia. This was demonstrated by a previous study by the author jet propulsion laboratory, where the most common cause of referred otalgia with a normal-appearing ear was dental (74%) [4]. TMJ dysfunction syndrome is the most common dental cause of referred otalgia [5]. Is twice as common among women than among men and has environmental, physiological and behavioural causes [6]. The auriculotemporal nerve derived from the mandibular division of the trigeminal nerve courses with the superficial temporal artery anteriorly to the external ear supplies sensory afferents to the tragus, anterior auricle, anterior wall of the external canal, and anterior portion of the lateral tympanic membrane and hence referred pain from dental disorders or TMJ disease can be perceived as referred otalgia It is the length and extensive distribution of the auriculotemporal nerve that makes it to be most commonly involved in referred otalgia [7].

Jacobson's nerve, a derivative from the glossopharyngeal nerve, joins with the caroticotympanic branches from the sympathetic plexus to form the tympanic plexus. This plexus provides sensation to the

Table 1: The causes of referred otalgia with their order of preponderance among both sexes

Provisional diagnosis	Number of cases (%)		
	Total	Male	Female
TMJ disorders	38 (36.9)	18	20
Dental problems	32 (31.06)	21	11
Pharyngitis	17 (16.5)	6	11
Ulcers in tonsils, oral cavity	12 (11.7)	5	7
Elongated styloid	1 (0.9)	1	0
Ca hypopharynx	2 (1.9)	2	0
Bell's palsy	1 (0.9)	1	0
Total	103	54 (52.4)	49 (47.6)

TMJ: Temporomandibular joint

middle ear, upper eustachian tube, and medial surface of the tympanic membrane and otalgia can be due to any ulcers or lesions in the posterior 1/3rd of tongue, soft palate, tonsil, nasopharynx [7].

Otalgia referred from the facial nerve may occur following an outbreak of herpes zoster [7] (prior to vesicle eruption Arnold's nerve, the auricular branch from the vagus, divides into a superior and an inferior branch, which is joined by a small branch from the facial nerve. The inferior branch innervates the inferior and posterior aspects of the external auditory canal, up to the concavity of the concha, and finally

to the lateral surface of the tympanic membrane. thyroiditis, thyroid tumors, laryngeal carcinomas, and gastroesophageal reflux can present as referred otalgia secondary to involvement of the superior laryngeal nerve, which is also a branch of the vagus nerve [7]. The greater auricular and lesser occipital nerves are derivatives from C2 and C3 of the cervical plexus. They course over the sternocleidomastoid muscle to innervate the posterior auricle and the skin overlying the mastoid bone and parotid gland. Pathology of the cervical spine that may present as referred otalgia includes cervical spine degenerative diseases such as osteoarthritis, cervical facet syndrome, whiplash injury, and cervical meningiomas. Several neuralgias have been proposed as an etiology for referred otalgia.

Trigeminal (V) neuralgia is the most common cranial neuralgia, but there is no strong evidence to link it to referred pain in the ear. Geniculate (VII), glossopharyngeal (IX), vagal (X), sphenopalatine, and occipital neuralgias are much less common than trigeminal neuralgia but are more widely documented as causing referred pain.

Other causes of referred otalgia can also be pathologies of mouth, teeth, larynx, or thyroid gland, neck or the esophagus. Elongation of the styloid process or ossification of the stylohyoid ligament may produce otalgia [7].

In a study of 123 patients with ear pain, the most frequent cause of referred otalgia in 72 patients was TMJ dysfunction while most common was cervical spine degenerative disease [8]. In another study, the incidence of otalgia was found to be 33% in patients suffering from the carcinoma of the base of the tongue [9]. Bell's palsy can lead to the otalgia, which is considered referred otalgia as the ear examination is normal [10]. An enlarged styloid process [11] and metastases to the pharynx [12] have been identified as possible causes of referred otalgia.

According to our study the most common cause for otalgia is TMJ disorders (36.9%), followed by other dental disorders (31.06%), then pharyngitis (16.5%), oral cavity lesions or ulcers (11.7%), and the incidence of a case with elongated styloid, or Bell's Palsy and malignancy was very <2%.

In Behnoud *et al's* study, the most frequent etiology was reported to be the TMJ [13]. In Kim's study, tooth ache accounted for most cases of referred otalgia (50%).

In another study, the incidence of otalgia was found to be 33% in patients suffering from the carcinoma of the base of the tongue [9].

There was even a reported case of internal laryngocoele causing referred otalgia in a 74-year-old woman [14]. In another study, a patient complaining from otalgia was later found to suffer from nasopharyngeal carcinoma [12].

CONCLUSIONS

Referred otalgia has been a well-documented phenomenon in the ear, nose, and throat (ENT) and neurosurgical literature. One has to be knowledgeable about the neuroanatomy and sensory innervations of the ear and the dermatomal sites in order to know the primary cause of the earache. TMJ disorders and dental causes for referred otalgia are very important factors and should always be evaluated for any such case. Though most cases of otalgia can be managed conservatively and may not appear troublesome, one must never exclude the possibility of a hidden malignancy as it could be one of the first symptoms patient may present and thorough clinical examination is mandatory.

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