

Chronic Secondary Otalgia: Multidisciplinary Evaluation and Relationship with Cervical Spine Disease

Keywords: Cervical spine; Chronic secondary otalgia

Abstract

Objective: We developed an algorithm to evaluate secondary otalgia and examined the role of cervical spine disease in chronic secondary otalgia. Otalgia may arise from the ear itself (primary) or may indicate pathologies outside the ear (secondary). Secondary otalgia is a common and complex symptom.

Material and methods: We evaluated the etiological factors in 224 patients diagnosed with secondary otalgia from the perspectives of an otolaryngologist, neurologist, and dentist. We recorded data on the pathogenesis of the otalgia, patient age and gender, pain localization and period, and test results.

Results: The most frequent causes of chronic secondary otalgia were cervical spine disease (n=110, 49.5%), temporomandibular joint disorders (n=72, 32.1%), and dental pathologies (n=49, 21.9%). Of the patients, 31.3% (n=70) had more than one etiology. The most frequent pathology of cervical spine disease was cervical disc disease (n=90, 40.2%).

Conclusion: On considering secondary otalgia, it must first be separated into acute versus chronic. Cervical spine disease is the most common cause of chronic otalgia, but it is necessary to consider the possible existence of more than one pathology and request routine neurological and dental consultations.

Introduction

Otalgia can be classified as otological (primary; otogenic) and non-otological (secondary; referred) [1]. Over half of the patients with otalgia have secondary Otalgia [2,3].

The ear has a complex innervation involving the 5th, 7th, 9th, and 10th cranial nerves and 2nd and 3rd cervical plexus nerves. The first symptom of any pathology of these nerves may be secondary otalgia. The most frequent causes are dental pathologies, Temporomandibular Joint Disorders (TMD), Cervical Spine Disease (CSD), sinusitis, and tonsillitis/pharyngitis. Less commonly, various pathologies of the tongue and oral cavity, larynx, neck, thyroid, lungs, and heart may cause secondary otalgia. Consequently, secondary otalgia is an important symptom [3-6].

In a literature review of secondary otalgia, we found that no study separated it into acute versus chronic and all previous research approached otalgia in the same way. Only one study specifically considered CSD [3]. We believe that secondary otalgia needs to be evaluated separately as acute and chronic, as is done for all medical symptoms. Therefore, we evaluated chronic secondary otalgia using a multidisciplinary approach and determining its relationship to CSD.



Mazlumoglu MR^{1*}, Kuduban O², Duksal T³, Cetin A⁴ and Sagsoz ME⁵

¹Otolaryngology Clinic, Hinis Sehit Yavuz Yurekseven State Hospital, Turkey

²Otolaryngology Clinic, Training and Research Hospital, Turkey

³Neurology Clinic, Hinis Sehit Yavuz Yurekseven State Hospital, Turkey

⁴Dentistry Clinic, Hinis Sehit Yavuz Yurekseven State Hospital, Turkey

⁵Department of Biophysics, Ataturk University, Turkey

*Address for Correspondence

Mazlumoglu MR, Otorhinolaryngology Clinic, Hinis Sehit Yavuz Yurekseven State Hospital, Erzurum, Turkey, Tel: +90 542 435 5835; Fax: +90 0442 327 3632; E-mail: dr.mazlumoglu@gmail.com

Submission: 24 April, 2017

Accepted: 17 May, 2017

Published: 25 May, 2017

Copyright: © 2017 Mazlumoglu MR, et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Materials and Methods

The study was conducted at Hinis State Hospital and Erzurum Region Education and Training Hospital, Erzurum, Turkey between May 2015 and January 2016, with approval of the regional ethics committee. We carried out a prospective clinical study.

The study enrolled 224 patients who visited otolaryngology clinics complaining of otalgia for more than 3 months in whom the otalgia was identified as secondary.

Patients presenting to the otolaryngology clinic with otalgia were first evaluated to determine if they had primary otalgia. Patients in whom primary otalgia was not identified underwent endoscopic evaluation of the nasal and oral cavities, oropharynx, nasopharynx, hypopharynx, and larynx. The neck and thyroid were examined. Imaging was obtained as deemed necessary. Then, each patient was referred to the neurology and dentistry clinics, where they underwent physical examinations, direct radiography, Computed Tomography (CT), and Magnetic Resonance imaging (MR) to identify dental, temporomandibular, and CSD conditions. Any patients who did not complete the evaluations at all three clinics were excluded from this study.

To accept CSD as an etiological factor in otalgia, we included pathologies above the C4 level. We classified these pathologies as cervical disc disease, osteo-degenerative changes, and other pathologies (stenosis, Chiari malformations, rheumatic diseases, etc.). Patients in whom no etiological factor was identified were diagnosed with psychogenic otalgia. We analyzed patient age and gender, pain localization (right, left, or bilateral), pain duration, any identified pathologies, and the results of diagnostic tests. The analyses were performed using SPSS 20 (IBM, Armonk, NY, USA).

Results

The 224 patients enrolled this study included 148 women and 76 men (female/male ratio = 1.9). The age average of the patients was 41±18 (range 7-75) years, 87% (n=195) were adults and 13% (n=29) were children. The pain was bilateral in 65.1% of the patients (n=146), in the right ear in 17.9% (n=40), and in the left ear in 17% (n=38) (Table 1). The average duration of the otalgia was 11.2 months.

Chronic secondary otalgia was frequently seen in women and the middle-aged, but rarely in children. The pain was more often bilateral, and when unilateral there was no statistical difference (p<0.05) between right and left otalgia.

The most frequent etiological factors in chronic otalgia were CSD (49.1%), TMD (32.1%), dental pathologies (21.9%), and chronic sinusitis (9.4%). More than one pathology was identified in 31.3% of the patients (Table 2).

For the patients with CSD, cervical disc disease was found in 81.8%, osteodegenerative disease in 46.3%, and other pathologies (stenosis, Chiari malformation, and somatological diseases) in 19%. More than one pathology of the cervical spine was found in 47.2% of the patients (Table 3). Of the patients identified with CSD, 81.6% underwent MRI and 18.4% CT.

When we examined the relationship between etiological factors and age, the average age was 45.5 years for CSD, 38.5 years for TMD,

Table 1: Demographics and localization.

	Frequency	Percent (%)
Child	29	13
Adult	195	87
Male	76	33,9
Female	148	66,1
Bilateral	146	65,1
Right	40	17,9
Left	38	17

Table 2: Etiological factors.

	Frequency	Percent (%)
Cervical spine disease (CSD)	110	49,1
Temporomandibular joint disorders (TMD)	72	32,1
Dental Pathology	49	21,9
Chronic Sinusitis	21	9,4
Myofascial Pain Syndrome	6	2,7
Head and Neck Tumors	3	1,3
Long Styloid Process	2	0,9
Psychogenic	9	4
Multiple Pathologies	70	31,3

Table 3: Distribution of cervical spine diseases.

	Frequency	Percent (%)
Cervical Disc Disease	90	81,8
Osteodegenerative Disease	51	46,3
Other Cervical Spine Disease	21	19
Multiple Pathologies	52	47,2

and 34.2 years for dental pathologies. Elderly patients are at a higher risk of CSD.

Discussion

The most frequent etiological factors in chronic secondary otalgia were CSD, TMD, dental pathologies, and chronic sinusitis.

The identification of primary otalgia is much easier than that of secondary otalgia and primary otalgia generally results from infections, tumors, and trauma involving the outer and middle ear. Primary otalgia is much more frequent in males than in females and more frequent in children than in adults. In comparison, secondary otalgia is much more frequent in females and adults [1-8]. We found that chronic secondary otalgia was much more frequent in females and adults.

In previous clinical studies of secondary otalgia, the most frequently reported causes were TMD and dental pathologies [4,7-12]. Kuttilla et al. found that the most frequent cause was TMD for women and recurrent neck pain for men [4]. Sumitha et al. identified TMD in 36.9% of secondary otalgia and dental pathologies in 31.06% [11]. In comparison, Taziki et al. found dental pathologies in 62.8% of their patients. Jaber et al. specifically examined cervical pathologies and found that the most frequent causes were CSD, TMD, and dental pathologies that order, the same order that we identified. Although Kuttilla et al. found that the most frequent cause of secondary otalgia in men was recurrent neck pain, they did not provide details. None of these studies involved routine dental and neurology consultations; none classified the symptoms as acute or chronic; and none searched for more than one etiological factor at the same time. Our study had each patient evaluated by an otolaryngologist, dentist, and neurologist and enrolled only patients with chronic otalgia; we also considered multiple etiologies. The prospective nature of this study also makes it superior to the other studies.

Less commonly, pathologies of the paranasal sinuses, pharynx, tongue, oral cavity, neck, thyroid, esophagus, heart, and lungs may cause secondary otalgia and otalgia may be the first symptom of malignancy of this area [13,14]. Rarely, myocardial infarction, lung cancer, pyriform sinus fistula, tonsillitis, laryngocele, cervical spine meningioma, a laryngeal foreign object, or an ossifying stylohyoid ligament may cause secondary Otaglia [15-20]. Of our patients, 9.4% had chronic sinusitis. Myofascial pain syndrome, a long styloid process, and head-neck malignancies were among the rare causes we identified in our series.

Otaglia should be managed using the following algorithm. In any patient presenting with otalgia, primary and secondary otalgia should be separated. This requires an otological examination and in certain cases, primary otalgia has to be eliminated by temporal bone CT. Then, the patient should be asked about the specifics of the pain, dental symptoms, concomitant nasal symptoms, previous surgery, upper aero digestive symptoms, and symptoms originating from the neck. Next, a detailed physical examination, including the neck, cervical spine, and temporomandibular joint, should be carried out, as well as endoscopic examinations of the nasal and oral cavities, teeth, oropharynx, nasopharynx, hypopharynx, and larynx. In some cases, areas that are not easily evaluated in the physical examination must be evaluated with CT or MR [15,21,22]. Finally, depending on

the etiology of the secondary otalgia, referral to an otolaryngologist or related specialist is recommended [5,21]. We believe that there are additional steps that must be added to this algorithm.

Our findings were noteworthy in that CSD was the most frequent cause of chronic secondary otalgia and more than one etiology was frequently identified. Therefore, we believe that it is important to first separate secondary otalgia into acute and chronic and to routinely consult a neurologist and dentist.

References

1. Paparella MM, Shumrik DA, Gluckman JL (1991) *Otolaryngology*. Philadelphia: WB Saunders Co, 1237-1242.
2. Neilan RE, Roland PS (2010) Otagia. *Med Clin North Am* 94: 961-971.
3. Jaber JJ, Leonetti JP, Lawrason AE, Feustel PJ (2008) Cervical spine causes for referred otalgia. *Otolaryngol Head Neck Surg* 138: 479-485.
4. Kuttilla SJ, Kuttilla MH, Niemi PM, Le Bell YB, Alanen PJ, et al. (2001) Secondary otalgia in an adult population. *Arch Otolaryngol Head Neck Surg* 127: 401- 405.
5. Charlett SD, Coatesworth AP (2007) Referred otalgia: a structured approach to diagnosis and treatment. *Int J Clin Pract* 61: 1015-1021.
6. Kim SH, Kim TH, Byun JY, Park MS, Yeo SG (2015) Clinical Differences in Types of Otagia. *J Audiol Otol* 19: 34-38.
7. Reiss M, Pausch NC, Reiss G (2002) Etiology and diagnosis of otalgia. *Wien Med Wochenschr* 152: 613-617.
8. Yanagisawa K, Kveton JF (1992) Referred otalgia. *Am J Otolaryngol* 13: 323-327.
9. Kim DS, Cheang P, Dover S, Drake-Lee AB (2007) Dental otalgia. *J Laryngol Otol* 121: 1129-1134.
10. Taziki MH, Behnampour N (2012) A study of the etiology of referred otalgia. *Iran J Otorhinolaryngol* 24: 171-176.
11. Sumitha R, Joseph NA (2015) Referred otalgia - a case series. *Asian. J Pharm Clin Res* 8: 343-345. Leonetti JP, Li J, Donzelli J (1997) Otagia in a normal appearing ear. *Otolaryngol Head Neck Surg* 117.
12. Shah RK, Blevins NH (2003) Otagia. *Otolaryngol Clin North Am* 36: 1137-1151.
13. Scarbrough TJ, Day TA, Williams TE, Hardin JH, Aguero EG, et al. (2003) Referred otalgia in head and neck cancer: a unifying schema. *Am J Clin Oncol* 26: 157-162.
14. Kuo YW, Chen KY, Chang YL, Lee LN, Yu CJ (2008) Small-cell lung carcinoma presenting with otalgia and hearing impairment. *J Clin Oncol* 26: 4690-4692.
15. Gibbs CM, Nichols FC, Kasperbauer JL, Jensen EA, Farrugia G (2004) Meal-induced dysphagia and otalgia secondary to a pyriform sinus fistula. *Dig Dis Sci* 49: 1560-1562.
16. Kim KS (2013) Referred otalgia induced by a large tonsilloolith. *Korean J Fam Med* 34: 221-223.
17. Danish SF, Zager EL (2005) Cervical spine meningioma presenting as otalgia: case report. *Neurosurgery* 56: E621.
18. Lau D, Watson D (1998) Referred otalgia: an unusual presentation of a laryngeal foreign body. *Hosp Med* 59: 161.
19. Riley N (1996) An unusual cause of otalgia--an ossified stylohyoid ligament. *Ir J Med Sci* 165: 139.
20. Visvanathan V, Kelly G (2010) 12 minute consultation: an evidence-based management of referred otalgia. *Clin Otolaryngol* 35: 409-414.
21. Chen RC, Khorsandi AS, Shatzkes DR, Holliday RA (2009) The radiology of referred otalgia. *AJNR Am J Neuroradiol* 30: 1817-1823.