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Authors
Moshtaghi, Omid
Ghavami, Yaser
Mahboubi, Hossein
et al.

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Migraine-Related Aural Fullness: A Potential Clinical Entity

Omid Moshtaghi, MS[1]*, Yaser Ghavami, MD[1]*, Hossein Mahboubi, MD, MPH[1], Ronald Sahyouni, MS[1,2], Yarah Haidar, MD[1], Kasra Ziai, MD[1], Harrison W. Lin, MD[1], and Hamid R. Djalilian, MD[1,2]

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Abstract

In this case series, we set out to describe the clinical entity of isolated, prolonged aural fullness (AF) and its relationship with migraine. Patients with isolated, persistent AF for 6 months or more were included with all possible etiologies ruled out. Migraine dietary and lifestyle changes and medical migraine prophylactic therapy were prescribed to all. Eleven patients were included (mean age, 52 years). Six (54%) patients fulfilled International Headache Society criteria for migraine with or without aura. Changes in perceived sensation of AF using the visual analog scale and quality of life questionnaires resulted in a statically significant improvement ($P < .001$, 95% confidence interval [CI], 4.7 to 6.72, and $P < .001$, 95% CI, −5.3 to −2.7, respectively). As such, an improvement of isolated, prolonged AF with migraine lifestyle changes and prophylactic treatment may suggest an etiological association between migraine and prolonged aural fullness.

Keywords

aural fullness, aural pressure, ear pressure, ear fullness, migraine, migraine treatment

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An estimated 1.4% of patients present to otolaryngology clinics with aural fullness (AF).[1] Although a key symptom of many disorders, AF is generally regarded to be nonspecific with a variety of possible etiologies.[2-8] Persistent, idiopathic AF has a prevalence of 13.4%, and the second most common classification of patients with AF after eustachian tube dysfunction (ETD).[1] In this study, we retrospectively examined a cohort of patients who presented with isolated, prolonged AF. We aimed to (1) analyze these patients and examine migraine-related AF and (2) assess the impact of migraine treatment on AF severity.

Methods

After the University of California, Irvine internal review board approval, a retrospective chart review from 2013 to 2016 was performed to identify patients with a primary complaint of isolated AF. Inclusion criteria included (1) persistent AF for ≥6 months; (2) normal physical examination, no conductive or low-frequency sensorineural hearing loss, and normal tympanogram; (3) lack of improvement with manual nasal Valsalva or myringotomy; and (4) negative findings on either computed tomography (CT) or magnetic resonance imaging (MRI) to rule out superior canal dehiscence or tumor. Those who fulfilled Ménière's disease (MD) or vestibular migraine (VM) criteria, or reported autophony, were excluded. VM and migraine with or without aura were defined according to International Headache Society (IHS) criteria,[9] and MD was defined according to the American Academy of Otolaryngology—Head and Neck Surgery (AAO-HNS) criteria.[10] Patients initially suspected of having ETD were included if they failed a trial of daily autoinsufflation, antihistamines, or fluticasone nasal spray.

The primary outcome measure was AF severity based on responses to a visual analog scale (VAS) and quality of life (QOL) questionnaire.[11] The QOL survey addressed 3 domains: physical, emotional, and social well-being with a maximal score of 72. Surveys were administered after medical resolution of symptoms.

Patients were instructed to improve the consistency of their sleep hygiene and adhere to a strict migraine diet,

[1]Division of Neurotology and Skull Base Surgery, Department of Otolaryngology–Head and Neck Surgery, University of California, Irvine, Orange, California, USA
[2]Department of Biomedical Engineering, University of California, Irvine, Orange, California, USA
*These authors contributed equally to this manuscript.

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Corresponding Author:
Hamid R. Djalilian, MD, Division of Neurotology and Skull Base Surgery, Department of Otolaryngology–Head and Neck Surgery, University of California Irvine, 19182 Jamboree Rd, Otolaryngology-5386, Irvine, CA 92697, USA.
Email: hdjalili@uci.edu

Table 1. Tabulation of Demographics, Medical History, VAS, and QOL Questionnaire Outcomes in the Patient Cohort.

Age, y	Sex	Meets IHS Criteria for Migraine	Treatment	Duration of Symptoms Prior to Treatment, y	History of Myringotomy	Pre-VAS AF Severity	Post-VAS AF Severity	Pre-QOL Score	Post-QOL Score
28	M	Yes	120 mg verapamil	3	No	7	3	12	16
49	F	Yes	240 mg verapamil	6	No	7	1	15	20
41	F	Yes	120 mg verapamil	4	No	7	0	4	9
63	F	Yes	240 mg verapamil	3	Yes	8	4	8	9
31	F	Yes	120 mg verapamil	5	No	7	3	11	19
58	F	Yes	240 mg verapamil	4	No	7	1	17	19
52	M	No	240 mg verapamil	3	No	8	0	11	13
66	F	No	25 mg nortriptyline	5	No	6	2	8	15
49	F	No	240 mg verapamil	4	Yes	7	0	3	10
63	F	No	240 mg verapamil	5	No	8	2	8	8
70	F	No	50 mg nortriptyline	4	No	8	1	6	9

Abbreviations: AF, aural fullness; F, female; IHS, International Headache Society; M, male; QOL, quality of life; VAS, visual analog scale.

which avoids foods that can trigger migraines.[12,13] Nortriptyline and verapamil were first-line medications. Dosage was titrated until patients achieved symptomatic improvement or reduced if the medication was poorly tolerated. After symptomatic resolution for 3 months, the medications were sequentially tapered. Statistical analysis was performed using SPSS 18.0 (SPSS, Inc, an IBM Company, Chicago, Illinois).

Results

Eleven patients were included. The mean duration of AF symptoms was 4 years (range, 3-6 years), mean age was 52 years (range, 28-70 years), and 9 (81%) patients were female. Six (54%) patients met IHS criteria for migraine headache (**Table 1**), while the other 5 (46%) did not. Within the cohort, 2 (18%) patients had a history of myringotomy and tube placement without improvement. The other 9 had a myringotomy alone, which did not improve symptoms. Nine patients (82%) improved with verapamil. Two patients (18%) improved with nortriptyline. After treatment, symptomatic improvement was achieved on average 5 weeks after treatment (range, 2-6 weeks). Microscopic ear examination was normal in all patients.

AF severity (mean ± standard deviation) measured by VAS decreased from 7.2 pretreatment to 1.5 after treatment (95% confidence interval [CI], 4.7-6.7). Eight patients (73%) had a posttreatment VAS score between 0 and 2, indicating complete or near-complete resolution of AF symptoms.

Average QOL score increased from 9.3 pretreatment to 13.3 after treatment ($P < .001$; 95% CI, −5.3 to −2.7). Within each QOL domain, the scores changed by an average of 1.6 ($P = .005$; 95% CI, −3.0 to −0.3), 5.9 ($P = .07$; 95% CI, −8.6 to −3.2), and 4.5 ($P = .01$; 95% CI, −7.0 to −2.1) points for the mental, physical, and social domains, respectively. There were no statically significant differences between migraine headache and non–migraine headache groups with respect to changes in posttreatment AF severity or QOL outcomes ($P = .9$, 95% CI, −.70 to 3.2 and $P = .2$, 95% CI, −3.5 to 4.1, respectively). The most common migraine features associated with AF were visual motion sensitivity (91%), followed by head motion sensitivity (81%), sinus/facial pressure (81%) sensitivity to light (72%), and sensitivity to sound (72%) (**Table 2**).

Table 2. Prevalence of Symptoms and Clinical Features Related to Migraine among Patients with Isolated, Persistent Aural Fullness (n = 11).

Symptom Features	No. (%)
Visual motion sensitivity	10 (91)
Head motion sensitivity	9 (81)
Sinus pain, facial pressure, or headache when exposed to wind or air conditioner	9 (81)
Light sensitivity	8 (72)
Sound sensitivity	8 (72)
Motion sickness	8 (72)
Neck stiffness	7 (63)
History of ice cream headache	6 (54)
Fulfilled IHS criteria for migraine headache	6 (54)
Smell sensitivity	5 (45)
Weather change sensitivity	4 (36)
Mental confusion (head fog)	4 (36)
Family history of migraine	4 (36)
History of allodynia of scalp or face	4 (36)
History of chronic sinus headaches	4 (36)
Medication sensitivity	3 (27)
History of using medication for migraine	3 (27)
Family history of motion sickness	2 (18)
Family history of Ménière's disease	0 (0)

Abbreviation: IHS, International Headache Society.

Discussion

Our study reports the presence of migraine features in a cohort of patients with isolated, persistent AF who do not

meet all the IHS criteria for VM or migraine headache. Prior work first proposed that otalgia of unknown origin can be migraine related, and AF was seen in 42% of that cohort.[14] In our cohort, 54% of patients with AF met IHS criteria for migraine. This is higher than the prevalence of migraine in the general population of 14% and ambulatory otolaryngology clinic of 16%.[15,16] This provides further evidence of the relationship between AF and migraine. Managing AF that is isolated and persistent can be challenging, and in a minority of cases, no distinct underlying pathology can be identified. Commonly, dose escalation is necessary for achieving symptomatic control in the treatment of patients with classic migraine headache or VM, highlighting the difficulty in treating these patients.[13,17-19] In our cohort, 6 (54%) patients required dose escalation to achieve symptomatic control. Larger, prospective studies would help further characterize this group of patients with isolated AF with no VM.

Conclusion

In a subset of patients with AF, no underlying pathology can be identified on history, examination, and imaging. These patients could have a migraine-related etiology and could benefit from migraine therapy.

Author Contributions

Omid Moshtaghi, analyzed clinical findings, drafting the article, and final approval of the version to be published; **Yaser Ghavami**, analyzed clinical findings, drafting the article, and final approval of the version to be published; **Hossein Mahboubi**, analyzed clinical findings, drafting the article, and final approval of the version to be published; **Ronald Sahyouni**, analyzed clinical findings, drafting the article, and final approval of the version to be published; **Yarah Haidar**, analyzed clinical findings, drafting the article, and final approval of the version to be published; **Kasra Ziai**, treating physician, analyzed clinical findings, drafting the article, and final approval of the version to be published; **Harrison W. Lin**, analyzed clinical findings, drafting the article, and final approval of the version to be published; **Hamid R. Djalilian**, analyzed clinical findings, drafting the article, and final approval of the version to be published.

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