Geriatric dysphonia and the most frequent diagnosis

Original Article

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Abstract

Introduction: Aging is associated with a decline in voice quality, predisposing older adults to social withdrawal and introversion. It is therefore increasingly important to better understand the magnitude of dysphonia among geriatric patients and what laryngeal alterations are most commonly associated with the symptom.
Objective: to determine the prevalence of dysphonia among elderly patients referred from primary care to otorhinolaryngology and evaluate the commonest laryngeal findings underlying this symptom.
Methods: patients aged 65 and older referred from Primary Care to the Otorhinolaryngology department of a tertiary center during 2019 and 2020 were enrolled in this retrospective observational study. The exclusion criteria were the absence of videostroboscopy report and/or video recording in the patient´s file,
Results: A total of 1304 patients were included in this study, with oto-neurologic symptoms as the main cause of referral (65%, n= 852), followed by Pharyngolaryngeal symptoms (17%, n=220) and Nasal symptoms (13%, n=167). The most prevalent findings were laryngopharyngeal reflux (44.81%, n=82), Presbylarynx (21.31%, n=39), vocal fold paresis or paralysis (5.46%, n=10), and vocal fold polyp (5.46%, n=10).
Conclusions: Geriatric dysphonia remains one of the common but undertreated health problems among the elderly, with this retrospective study cementing dysphonia as one of the main symptomatic complaints among geriatric patients. This enhances the need for a better preparation of otorhinolaryngologists for the evaluation and management of elderly patients presenting with dysphonia, recognizing the impact this symptom has on the day-to-day life of elderly patients.

Keywords: Geriatrics; Dysphonia; Presbyphonia; Presbylarynx; Reflux

Introduction

Over the last few decades, the optimization of healthcare services and the subsequent increase in average life expectancy, have led to a change of the world's demography, with the elderly population, defined as individuals

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aged 65 years and over, increasing from 524 million to 608 million between 2010 and 2015[1,2], with older people representing 22.1% of the Portuguese population. This demographic change translates into an increase in the number of older people seeking healthcare services. Otorhinolaryngology (ORL) is no exception, with hypoacusis, balance and voice changes, and sinusitis having a significant impact on these individuals' quality of life[3]. Among these changes, geriatric dysphonia remains a common and undertreated problem in the elderly[4,5]. Although the incidence of voice disorders in the elderly is estimated to be between 12% and 35%, according to the National Health Interview Survey of 2012 conducted in the US, only 10% of older people with voice problems sought care and, of these, only 22% were assessed by an otorhinolaryngologist[6].

The decrease in the vocal quality is associated with a decrease in the elderly individuals' ability to communicate, predisposing them to social isolation. Some authors have emphasized the importance of an adequate evaluation and early intervention to avoid the psychological and psychosocial impact associated with dysphonia in the geriatric population[5]. Thus, it is essential to recognize the magnitude of dysphonia in the geriatric population[5]. This study aimed to determine the prevalence of dysphonia among elderly patients referred for an ORL consultation, as well as the most common findings in laryngoscopic evaluation and the existence of ORL follow-up after the first evaluation.

Materials and Methods

This study was approved by the local ethics committee and was conducted according to the guidelines of the Declaration of Helsinki. A total of 1,304 patients aged 65 years and over, who were referred from primary healthcare to the ORL department of a tertiary center during 2019 and 2020, were included in this observational retrospective study. The data regarding the reasons for referral and demographic data were retrieved from the "P1" documents. The reasons for referral were subdivided into "otoneurological symptoms," "nasal symptoms," "laryngopharyngeal symptoms," "other head and neck symptoms," and "other reasons." The patients' clinical records were used to collect the data regarding the follow-up by ORL and laryngoscopic assessment, which was performed by rigid laryngoscopy, and all videostroboscopy recordings were independently evaluated by the first and second authors. All patients without recordings were excluded. The diagnosis of laryngopharyngeal reflux was considered when signs such as hypertrophy of the posterior commissure, endolaryngeal mucus, and arytenoid erythema were observed. Presbylarynx was considered when there was prominence of the vocal processes and/or bowing of the vocal folds and/or existence of a spindle-shaped glottal gap. Statistical analysis was performed using the SPSS version 24 (IBM Corp., Armonk, NY) software, and a p-value lower than 0.05 was considered statistically significant. Descriptive analysis of the patients' characteristics was performed using frequencies for qualitative variables and means and standard deviations for quantitative variables. Normal distribution was assessed using the Shapiro-Wilk test and skewness and kurtosis analyses. Differences between the groups were determined using the chi-square test for categorical variables and the t-test for independent samples or the Mann-Whitney test for continuous variables.

Results

Study population:

During 2019 and 2020, there were a total of 10,266 referrals from primary healthcare to an ORL department of a tertiary center, with 20% (n= 2,084) of these requests regarding patients aged 65 years and older. Of these, 37% (n= 779) were not evaluated in an outpatient consultation, with 75.2% (n=587) requiring complementary diagnostic tests, 16.7% (n= 130) missing the consultation, 4.2% (n= 33) already being followed, 3.2% (n= 27) giving up the appointment, and 0.2% (n= 2) dying before

Table 1
Study population

	Number of patients	Percentage	Mean age	Standard deviation
Women	697	53%	73.49	6.68
Men	607	47%	73.18	6.12
Total	**1304**	**100%**	**73.35**	**6.42**

the consultation. A total of 1,304 patients were thus included in this study, 53% of which (n= 697) were women, and 47% (n= 607) were men. The patients' mean age was 73.35 years (standard deviation [SD]= 6.42, interval of 65-101) (Table 1).

Otoneurological symptoms were the main reason for referral (65%, n= 852), followed by laryngopharyngeal symptoms (17%, 342) and nasal symptoms (13%, n=167) (Table 2). Hypoacusis was the most frequently reported symptom among all patients (45%, n= 590), followed by tinnitus (23%, n= 304), vertigo (16%, n= 213), and dysphonia (14%, n= 183). The most prevalent association of symptoms was nasal + laryngopharyngeal symptoms (n= 36) (Table 2).

Laryngopharyngeal symptoms:

All symptoms related to the pharynx and/or larynx were included in this group (Table 3). A total of 343 patients presented with laryngopharyngeal symptoms, of which both men (n= 171) and women (n= 172) comprised almost 50% each. The patients' mean age was 72.37 years (SD= 0.31). Dysphonia was the most frequently reported symptom by patients in this group (54%, n= 183), followed by globus pharyngeus (19%, n= 6), throat clearing (14%, n= 48), and dysphagia (12%, n=41) (Table 3), with 5% (n= 10) of patients reporting dysphonia with concomitant hypoacusis.

Laryngoscopic findings:

One or more laryngeal diseases that potentially contribute to the onset of dysphonia were found in 144 patients (78.69%). The most prevalent finding was the presence of signs of laryngopharyngeal reflux (44.81%, n= 82), presbylarynx (21.31%, n= 39), vocal cord paralysis or paresis (5.46%, n= 10), vocal cord polyps (5.46%, n= 10), and Reinke's edema (4.92%, n= 9) (Table 4), with no statistically significant differences in these laryngoscopic findings between men and women (Table 4). However, the mean age of patients with presbylarynx was statistically higher (74.56 years; SD= 0.85; $p<0.001$) than that of those with dysphonia without signs of presbylarynx. Further, the mean age of patients with polyps of the vocal cords (68.40 years; SD= 0.78) and Reinke's edema (69.11 years; SD= 1.17) was statistically lower than that of those with dysphonia due to other causes (Table 4). Other laryngoscopic

Table 2
Coexistence of symptoms

	Otoneurological symptoms	Nasal symptoms	Laryngopharyngeal symptoms	Other head and neck symptoms	Other
Otoneurological symptoms	852	20	25	2	-
Nasal symptoms	-	167	36	3	2
Laryngopharyngeal symptoms	-	-	342	5	-
Other head and neck symptoms	-	-	-	13	-
Other	-	-	-	-	19

Table 3
Laryngopharyngeal symptoms

	Number of patients (n)	% among patients with laryngopharyngeal symptoms (n= 342)	% among all patients
Dysphonia	183	54	14
Globus Pharyngeus	66	19	5
Throat clearing	48	14	4
Dysphagia	41	12	3
Odynophagia	30	9	2
Cough	28	8	2
Choking	19	6	1
Snoring	11	3	1
Pharyngitis	3	1	0
VC paralysis	1	0	0
Dyspnea	1	0	0

findings were as follows: cysts of the vocal cords (n= 3), nodules of the vocal cords (n= 1), granuloma of the vocal cords (n= 2), sulcus vocalis (n= 2), leukoplakia of the vocal cords (n= 4), fibrosis of the vocal cords (n= 1), laryngeal epidermoid carcinoma (n= 4), hemangioma (n= 1), and laryngeal tremor (n= 1). No relevant laryngoscopic findings were observed in 31 patients (16.94%; 15 men and 16 women).

Discharge vs follow-up

After the first ORL evaluation for dysphonia, 112 patients (61.20%) were discharged. The highest rate of discharge occurred in patients with presbylarynx (84.62%), followed by patients without laryngoscopic changes (83.87%).

Discussion

Phonation is one of the human functions affected by aging, with vocal dysfunction compromising the ability to communicate, which may lead to social isolation, anxiety, and depression in the elderly population[7]. The impact of vocal impairment on the elderly becomes even more important when considering the growing number of older people that remain professionally active, with communication being essential[7]. Therefore, studies on phonation in older people are extremely important. This study primarily aimed to determine the prevalence of dysphonia among the elderly referred for an ORL consultation. In this study, laryngopharyngeal symptoms made up the second most prevalent group of symptoms among the elderly referred for an ORL evaluation, followed by otoneurological symptoms, with dysphonia being the most common symptom within the group and the fourth most common symptom overall. The finding that dysphonia was the fourth main complaint is an indicator of the impact this symptom has on the elderly individuals' everyday activities, further emphasizing the importance of creating a greater awareness among otorhinolaryngologists regarding this symptom in older patients. The concomitant prevalence of dysphonia and hypoacusis was previously reported as being 10.5%, with 5% of the patients in this study reporting both symptoms[8]. This association of symptoms should be noted because hypoacusis increases the negative impact of dysphonia on the elderly patients' ability to communicate, increasing the risk of introversion and social isolation, with scores of depression being significantly higher in patients with both symptoms[6,8]. The synergistic effect warrants the need to evaluate

the presence of dysphonia and hypoacusis in older patients, especially in those who already present with one of these symptoms, especially considering that potentially effective treatments that exist for each symptom and that dysphonia should be approached as a potentially treatable condition[8,9]. Further, the study aimed to determine the most prevalent laryngoscopic findings in elderly patients with dysphonia. Scientific evidence on the most common laryngological changes in older patients with dysphonia is conflicting, with vocal cord paralysis, laryngopharyngeal reflux (LPR), and presbylarynx being the main causes of dysphonia in the elderly. In this study, signs of LPR were the most common finding[7,10,11,12]. The incidence of LPR increases with age because aging alters the anti-reflux barrier, leading to reduced acid clearance, and because the elderly have an increased predisposition to hiatal hernia or use of lower esophageal sphincter-relaxing drugs, such as nitrates, calcium channel blockers, or benzodiazepines[13]. However, the precise burden of this condition in the elderly remains unclear because LPR is associated with many symptoms, with less elderly people reporting retrosternal burning and regurgitation when compared to younger people[13,14]. Nevertheless, the findings of this study appear to confirm that LPR is one of the main causes of dysphonia in the elderly. Therefore, otorhinolaryngologists need to be better trained in the treatment of this condition to minimize the symptoms and prevent sequelae from untreated disease. Presbylarynx was the second most common laryngeal finding (signs of the condition were observed in 21.31% of patients) and was associated with a more advanced age. Although the prevalence obtained in this study is in line with previous studies, the real frequency of this condition remains controversial, with estimates ranging between 12% and 72%[7,15]. One explanation for this discrepancy may be the absence of accurate diagnostic criteria for this disease[16]. Several structural and functional changes, including prominence of the vocal processes, bowing of the vocal cords, and spindle-shaped glottal gap, have been associated with presbylarynx. Nonetheless, these signs may not be present simultaneously, and several older individuals exhibit prominence of the vocal apophyses and bowing of the vocal cords without glottic insufficiency during the occlusion phase of the vocal cords. As some authors only consider the diagnosis of presbylarynx when an spindle-shaped glottal gap is present, these patients are excluded from the diagnosis and may contribute to a lower prevalence and potential underdiagnosis of presbylarynx. Nevertheless, presbylarynx has been gaining importance as a cause of geriatric dysphonia. This study confirms that this condition is one of the main causes of dysphonia among the elderly[12,16]. This, together with the growing evidence indicating the existence of effective therapeutic options for the treatment of presbylarynx, emphasizes the importance of recognizing this condition and its management[12]. Among the other causes of dysphonia, the age of patients with nodules, polyps, and cysts of the vocal cords was statistically lower than that of those with dysphonia related to other causes, which is in line with previous studies showing a consistent reduction in these benign lesions with increasing age[7]. Although the cause of this reduction is still unknown, a change in the profile of voice use in the elderly may lead to less phonotrauma[7]. Head and neck tumors are the sixth most common cancers worldwide and affect the elderly disproportionately, with the prevalence of laryngeal cancers reaching their peak between the seventh and eighth decades of life, regardless of sex[17,18]. This is especially important for laryngeal disorders for which smoking is a major risk factor—Reinke's edema and leukoplakia[19,20]. Considering that the use of tobacco is the major risk factor for cancer of the larynx, older people who consume tobacco are at a higher risk of developing laryngeal cancer, with leukoplakia being associated with a higher risk of this disease with increasing age[20]. The percentage of patients with dysphonia and normal laryngoscopy findings is also relevant.

Although the larynx is the central organ of phonation, aging affects other systems involved in voice projection and modulation—such as the respiratory and neurological systems—with many diseases associated with dysphonia and multimorbidity being negatively associated with vocal changes, with one-third of cases having multiple causes[6]. In this study, the main combination of symptoms was between laryngopharyngeal and nasal symptoms. As sinonasal disease interferes with the phonation process, nasal symptoms probably lead to dysphonia without obvious laryngeal changes. Although it would be of interest to establish a correlation between dysphonia and specific nasal symptoms, these findings confirm that geriatric dysphonia is a multifactorial entity. Another possible explanation for this percentage is the lack of criteria for the diagnosis of presbylarynx, which may lead to the laryngoscopic findings being considered normal.

The third aim of this study was to investigate the follow-up of elderly patients with dysphonia after the first ORL evaluation, with 61.2% of patients being discharged. As expected, a significant number of older patients diagnosed with LPR, polyps of the vocal cords, changes in motility, and Reinke's edema had at least one subsequent consultation. The highest rate of discharge occurred among patients with presbylarynx (84.62%). This fact should, in time, lead otorhinolaryngologists to reassess the current follow-up of patients with presbyphonia and presbylarynx and change the paradigm that these changes are inevitable and have no effective therapeutic approaches . Thus, self-assessment questionnaires should be administered to better understand the patient's perspective and their clinical status and establish an adequate treatment plan. The effective treatment of presbyphonia requires a multidisciplinary approach, and speech therapy is typically the first-line treatment in the current rehabilitation protocol[21,22,23]. When an individual with presbyphonia does not demonstrate satisfactory progress with speech therapy, medical or surgical interventions may be required to optimize glottic closure[21]. Thus, subsequent consultations may be necessary for re-evaluation, and the rates of discharge after the first evaluation of patients with presbylarynx may decrease in the future. This study has some limitations. First, it was a retrospective study conducted in a single center, and the risk factors for dysphonia, such as comorbidities and medication, were not analyzed. Second, the laryngoscopic evaluation was performed by different physicians, which may have inevitably affected the laryngoscopic findings, although the recordings of the various laryngoscopic evaluations were analyzed by the authors. Nevertheless, this study is the first to determine the prevalence of dysphonia in elderly patients referred from primary healthcare for an ORL consultation and involved the collection of data over two consecutive years to allow the inclusion of a high number of patients. Additionally, all patients with laryngopharyngeal symptoms had a written laryngoscopic report and video-recorded evaluation that allowed access to the gold standard assessment of patients with dysphonia.

Conclusion

Geriatric dysphonia remains an undertreated problem in the elderly population and is one of the main complaints leading to a referral for an ORL consultation. The results of this study provide a better understanding of the changes associated with dysphonia in the elderly and can help improve the management approach for this potentially treatable symptom that has a significant impact on the patients' quality of life.

Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

Data Confidentiality

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

Protection of humans and animals

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the 2013 Helsinki Declaration of the World Medical Association.

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Availability of scientific data

There are no datasets available, publicly related to this work.

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