

## Causes of dysphonia in patients above 60 years of age

### Altmış yaş üzerindeki kişilerde ses bozukluğu nedenleri

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**Objectives:** We evaluated the causes of hoarseness in patients above 60 years of age.

**Patients and Methods:** The study included 98 patients (40 females, 58 males; mean age 64 years; range 60 to 77 years) who presented with hoarseness. All the patients were examined by videolaryngoscopy. Temporary hoarseness secondary to respiratory tract infections was excluded.

**Results:** The most common cause of hoarseness was benign vocal fold lesions (28.6%) followed by malignant lesions (27.6%), vocal fold paralysis (25.5%), functional dysphonia (10.2%), and presbyphonia (8.2%). Laryngopharyngeal reflux was found in 13 patients (13.3%). Fourteen male and 11 female patients had paralysis of the recurrent laryngeal nerve. Malignancies that caused hoarseness without paralyzing the vocal folds were larynx carcinoma (n=18), hypopharynx carcinoma (n=8), and multiple malignancy (n=1).

**Conclusion:** Our data show that dysphonia develops due to disease processes associated with aging rather than to physiologic aging alone. Considering adverse influences of dysphonia on the quality of life of elderly population, efforts should be directed to elucidation of the cause and to performing appropriate treatment.

**Key Words:** Aged; aging/physiology; laryngeal diseases; laryngeal neoplasms; quality of life; vocal cord paralysis/diagnosis; vocal cords/physiopathology; voice/physiology; voice disorders/etiology/diagnosis/physiopathology; voice quality.

**Amaç:** Altmış yaş ve üzerindeki kişilerde ses bozukluğu nedenleri araştırıldı.

**Hastalar ve Yöntemler:** Çalışmaya ses bozukluğu ile başvuran 98 hasta (40 kadın, 58 erkek; ort. yaş 64; dağılım 60-77) alındı. Tüm hastalar videolaren-goskopi ile incelendi. Solunum yolu enfeksiyonlarına bağlı olarak ses bozuklukları gelişen olgular çalışmaya alınmadı.

**Bulgular:** Ses bozukluğuna en sık ses tellerinin benign (%28.6) ve malign lezyonlarının (%27.6) neden olduğu görüldü. Bunları sırasıyla ses teli paralizileri (%25.5), fonksiyonel disfoniler (%10.2) ve presbifoni (%8.2) izlemekteydi. Larengofarenjeal reflüye 13 hastada (%13.3) rastlandı. On dört erkek, 11 kadın hastada reküren larenjeal sinir paralizisi saptandı. Ses tellerinde paraliziyeye yol açmadan ses bozukluğuna neden olan malign hastalıklar, larenks kanseri (n=18), hipofarenks kanseri (n=8) ve multipl malignensi (n=1) olarak belirlendi.

**Sonuç:** Bulgularımız, ses bozukluğunun fizyolojik yaşlanmadan çok, yaşlanma sürecinde gelişen hastalıklara bağlı olarak geliştiğini gösterdi. Yaşlı kişilerdeki ses bozukluklarının hastanın yaşam kalitesi üzerindeki olumsuz etkilerini de göz önüne alarak, nedenin ortaya çıkarılması ve uygun tedavinin uygulanması önem taşımaktadır.

**Anahtar Sözcükler:** Yaşlılık; yaşlanma/fizyoloji; larenjeal hastalıklar; larenjeal neoplaziler; yaşam kalitesi; vokal kord paralizisi/tanı; vokal kord/fizyopatoloji; ses/fizyoloji; ses hastalıkları/etyoloji/tanı/fizyopatoloji; ses kalitesi.

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Hoarseness has always been a disturbing symptom for individuals. It may have a variety of organic, functional, or psychological causes. Elderly people are the fastest growing segment of the population, particularly in developed countries.<sup>[1]</sup> Therefore, understanding age-related diseases is important. The incidence of vocal dysfunction in the elderly is estimated to be 12%.<sup>[1]</sup> Communication in the presence of a hoarse voice is particularly difficult in advanced age because many of the accompanying peers are also likely to have significant hearing losses. Consequently, severe hoarseness may result in depression or social isolation in elderly persons.

Phonation with involuntary instability in intensity or at fundamental frequency is usually perceived as a hoarse voice,<sup>[2]</sup> which may be caused by a variety of organic, functional, or psychological conditions. In the absence of an obvious lesion such as carcinoma or vocal fold paralysis, the clinician must consider all possible factors, which include intrinsic physiologic effects of aging, pathologic effects of a systemic disease affecting phonation, a neurologic and anatomic degenerative process associated with aging, and finally local mucosal and rheologic alterations.<sup>[3]</sup>

Normally, production of the voice depends on the proper functioning of respiratory, cardiovascular, musculoskeletal, neurological, and psychosocial systems.<sup>[4]</sup> Since one or more of these conditions are often compromised with increasing age, changes in voice characteristics may occur.<sup>[4-7]</sup> However, even in individuals at the same chronological age, characteristics of the voice may vary due to different physical conditions.<sup>[8]</sup>

The relative high incidence of medical problems in elderly population is not surprising.<sup>[9]</sup> Systemic diseases affecting pulmonary and cardiac reserve may also influence the ability of patients to sustain a phonatory function.<sup>[3]</sup> Therefore, a thorough examination of the voice and other medical conditions is necessary to distinguish voice problems caused by vocal abuse or pathologies from those associated with normal aging.<sup>[10]</sup>

The objective of this study was to determine the causes of hoarseness in individuals older than 60 years of age.

#### PATIENTS AND METHODS

We evaluated 98 patients (40 females, 58 males; mean age 64 years; range 60 to 77 years) who pre-

sented with hoarseness to the outpatient clinic and phoniatrics office of our otorhinolaryngology department between May-December 2002.

All the patients were examined by videolaryngoscopy with a rigid scope of 70° (Karl Storz, Germany). Temporary hoarseness secondary to respiratory tract infections was excluded. Laryngopharyngeal reflux, if found, was noted as a concomitant pathology.

#### RESULTS

Current or former smokers accounted for 87% of the study group, 58% being current smokers with a mean of 20 cigarettes a day.

The most common cause of hoarseness was benign vocal fold lesions (28.6%) followed by malignant lesions (27.6%), vocal fold paralysis (25.5%), functional dysphonia (10.2%), and presbyphonia (8.2%) (Table I). Laryngopharyngeal reflux was found in 13 patients (13.3%).

Fourteen male and 11 female patients had paralysis of the recurrent laryngeal nerve. In males, involvement was on the left in 11 patients, on the

TABLE I  
DISTRIBUTION OF ETIOLOGIES OF HOARSENESS

Diagnosis	LPR	Male	Female	Total	%
Vocal fold paralysis	2	14	11	25	25.5
Functional dysphonia	2	3	7	10	10.2
Presbyphonia	0	6	2	8	8.2
Malignant lesions	6	21	6	27	27.6
Benign laryngeal lesions	3	18	10	28	28.6
Total	13	58	40	98	100.0

LPR: Laryngopharyngeal reflux.

TABLE II  
ETIOLOGIES FOR THE PARALYSIS OF  
THE RECURRENT LARYNGEAL NERVE

Etiology	Male	Female
Thyroid surgery	–	7
Bronchus carcinoma	7	–
Pneumonectomy	2	–
Idiopathic	3	2
Mamma carcinoma	–	1
Esophagus carcinoma	2	1
Total	14	11

TABLE III

## BENIGN LESIONS ASSOCIATED WITH HOARSENESS

	Male	Female
Reinke's edema	6	4
Contact granuloma	3	0
Vocal fold cyst	1	2
Vocal fold polyp	2	1
Chronic laryngitis	6	3
<i>Total</i>	18	10

right in two patients, and bilateral in one patient; in females, on the left in three patients, on the right in five patients, and bilateral in three patients. The etiologies that caused paralysis of the recurrent laryngeal nerve are shown in Table II.

Malignancies that caused hoarseness without paralyzing the vocal folds were larynx carcinoma (n=18), hypopharynx carcinoma (n=8), and multiple malignancy (n=1). The distribution of benign vocal fold lesions causing hoarseness is shown in Table III.

## DISCUSSION

Causes of dysphonia considerably vary in reported series in the elderly.<sup>[1,3,9,11]</sup> In a study of 393 patients, Lundy et al.<sup>[9]</sup> found that the most common causes of dysphonia in persons older than 65 years of age were vocal fold bowing and vocal fold paralysis. Another study reported vocal fold paralysis and central neurologic diseases as the most common causes in people above 60 years of age.<sup>[3]</sup> Hagen et al.<sup>[11]</sup> demonstrated that 47 consecutive patients over age 60 with dysphonia had presbylaryngis as the most common etiology, none of whom being diagnosed previously by the referring institutions.

*Benign vocal fold lesions*

In our study, there were no cases of pedunculated vocal polyps or vocal nodules, which are typically associated with vocal strain,<sup>[3]</sup> suggesting that benign vocal fold lesions seem to arise from other causes seen in older patients.<sup>[9,11]</sup> In the pathogenesis of Reinke's edema, smoking appears to be the most dominant etiologic factor, while aging itself and a history of vocal abuse also seem to contribute to the condition.<sup>[12]</sup> Woo et al.<sup>[3]</sup> reported that inflammatory conditions of the larynx commonly coexisted with benign and malignant vocal fold lesions. Other authors pointed out the association between benign

and malignant laryngeal conditions and gastroesophageal reflux disease.<sup>[13,14]</sup> It is important to realize that signs of reflux laryngitis are not confined to the posterior commissure. Inflammatory signs are usually spread all over the larynx, leading to edema and hyperemia of the vocal folds. Although these inflammatory findings are very common, they are not specific to laryngeal reflux disease. The most common finding seen only in the reflux group is the granulation of the posterior pharyngeal wall.<sup>[15]</sup> Koufman et al.<sup>[16]</sup> found that laryngopharyngeal reflux was present in 50% of patients with laryngeal and voice disorders. Ahuja et al.<sup>[17]</sup> reported that gastroesophageal reflux disease gave rise to symptoms of chronic laryngitis, dysphonia, chronic sore throat, chronic cough, constant throat clearing, and granuloma of the true vocal folds. In our study group, there were no kissing nodules, but surprisingly, 10.7% of the patients (3/28) with benign laryngeal lesions had vocal polyps.

*Malignant lesions*

Although hypopharyngolaryngeal cancer was shown as the most common cause of dysphonia in 121 patients above 70 years of age,<sup>[11]</sup> several studies documented larynx carcinoma in the first place among malignancies causing hoarseness, followed by hypopharynx carcinoma.<sup>[1,3,11]</sup> In our study, larynx carcinoma with an incidence of 66.7% was also the most important factor among malignant causes of hoarseness, without paralyzing the vocal fold(s). This may have a causal relationship with high rates of smoking, tobacco chewing, and alcohol consumption among Turkish people.

*Paralysis of the inferior laryngeal nerve*

The long and singular course of the inferior laryngeal nerve renders it very vulnerable to infiltration by tumors of various locations.<sup>[18]</sup> Since the left recurrent laryngeal nerve travels a longer way than its right counterpart, it is likely that the former is more vulnerable to injury from external factors. In particular, mediastinal and pulmonary lesions should be considered in the occurrence of left vocal fold palsy. Gauri et al.,<sup>[19]</sup> examined neurological manifestations of bronchogenic carcinoma in 50 cases and found that recurrent laryngeal nerve paralysis (20%) was the most common thereof. According to Woo et al.<sup>[3]</sup> peripheral vocal fold paralysis is primarily due to lung neoplasms in the elderly. In case of esophageal malignancies, it is not sur-

prising that the patient may develop vocal fold paralysis during disease-specific investigations. Tachimori et al.<sup>[20]</sup> reported vocal fold paralysis in 5% of patients with intrathoracic esophageal carcinoma. This is because the esophagus is in close proximity to the route of the recurrent laryngeal nerve.

On the other hand, since the frequency of thyroid surgery is higher in females,<sup>[9,21]</sup> vocal fold paralysis associated with this surgery is more likely to be seen in females than in males. In our patient group, there were seven female patients in whom thyroid surgery was an etiologic factor for the development of paralysis of the recurrent laryngeal nerve.

#### *Functional dysphonia*

Functional dysphonia refers to impairment in voice production without a mucosal or neurogenic disease of the larynx.<sup>[22]</sup> Thus, dysphonia is the product of altered laryngeal physiology during phonation. It is widely accepted that laryngeal muscle tension predisposes to this kind of dysphonia.<sup>[23-25]</sup> This functional misuse may either be due to psychogenic problems, which produce similar dysphonia in younger persons, or to failure to compensate age-related changes in the laryngeal structure, such as atrophy or polypoid changes in the vocal folds.<sup>[11]</sup> Functional dysphonia has been implicated as the second most common cause of dysphonia in the elderly,<sup>[11]</sup> however, other studies place different weight on this factor.<sup>[1,3,9]</sup> In our study, it was the fourth etiologic cause with 10.2%.

#### *Presbyphonia*

Characteristics of voice undergo peculiar changes throughout aging in both sexes.<sup>[26]</sup> Acoustic characteristics associated with aging include a higher fundamental frequency, higher variability in the fundamental frequency and intensity, increased jitter, and a greater spectral noise in males, while a lower fundamental frequency, an increased variation in the fundamental frequency, and increased jitter in females.<sup>[27]</sup>

In males, thinning of a vocal fold due to atrophic changes predominates, contributing to an overall increase in vocal pitch. However, in females, the vibratory mass is increased by edematous thickening of the vocal cord cover; hence, decreased vocal pitch. Decreases in sex hormone levels occurring concomitantly with menopause account for this change. All these changes may lead to alterations in

the fine motor control of laryngeal vibratory activity.<sup>[9]</sup> According to Murty et al.,<sup>[28]</sup> aging process results in slowing of the opening of the vocal folds. This may account for individual differences in voice quality in the elderly. Increased vocal intensity has also been reported with aging.<sup>[9]</sup>

There is no consensus on the incidence of presbyphonia in the elder population. Some authors reported that development of presbyphonia is the most common cause of dysphonia in the elderly.<sup>[11]</sup> Lundy et al.<sup>[9]</sup> found similar results and suggested that vocal fold bowing and vocal fold paralysis were the most common etiologies of hoarseness in people above 65 years of age. However, two studies demonstrated very low rates for presbyphonia, being in six and two out of 151 and 121 patients, respectively.<sup>[3,11]</sup> In our study, the incidence of presbyphonia was also very low (8.2%) when compared with other etiologic factors. It is clear that the diagnosis of age-related dysphonia should be considered after any other condition is ruled out by a comprehensive inquiry.<sup>[3]</sup>

Our data show that dysphonia develops due to disease processes associated with aging rather than to physiologic aging alone. Considering adverse influences of dysphonia on the quality of life of elderly population, efforts should be directed to elucidation of the cause and to performing appropriate treatment.

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