Voice Disorders: Etiology and Diagnosis

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Summary: Objectives. Voice disorders affect adults and children and have different causes in different age groups. The aim of the study is to present the etiology and diagnosis dysphonia in a large population of patients with this voice disorder.for dysphonia of a large population of dysphonic patients.

Methods. We evaluated 2019 patients with dysphonia who attended the Voice Disease ambulatories of a university hospital. Parameters assessed were age, gender, profession, associated symptoms, smoking, and videolaryngoscopy diagnoses.

Results. Of the 2019 patients with dysphonia who were included in this study, 786 were male (38.93%) and 1233 were female (61.07). The age groups were as follows: 1–6 years ($n = 100$); 7–12 years ($n = 187$); 13–18 years ($n = 92$); 19–39 years ($n = 494$); 41–60 years ($n = 811$); and >60 years ($n = 335$). Symptoms associated with dysphonia were vocal overuse ($n = 677$), gastroesophageal symptoms ($n = 535$), and nasosinusal symptoms ($n = 497$). The predominant professions of the patients were domestic workers, students, and teachers. Smoking was reported by 13.6% patients. With regard to the etiology of dysphonia, in children (1–18 years old), nodules ($n = 225$; 59.3%), cysts ($n = 39$; 10.3%), and acute laryngitis ($n = 26$; 6.8%) prevailed. In adults (19–60 years old), functional dysphonia ($n = 268$; 20.5%), acid laryngitis ($n = 164$; 12.5%), and vocal polyps ($n = 156$; 12%) predominated. In patients older than 60 years, presbyphonia ($n = 89$; 26.5%), functional dysphonia ($n = 59$; 17.6%), and Reinke's edema ($n = 48$; 14%) predominated.

Conclusions. In this population of 2019 patients with dysphonia, adults and women were predominant. Dysphonia had different etiologies in the age groups studied. Nodules and cysts were predominant in children, functional dysphonia and reflux in adults, and presbyphonia and Reinke's edema in the elderly.

Key Words: Dysphonia–Voice disorders–Etiology–Epidemiology–Hoarseness.

INTRODUCTION

About 10% of the general population presents with voice disorders, and among voice professionals, the proportion reaches 50%.[1–3] Children and adults are equally affected; however, the causes are different according to the age groups.

In early childhood, a frequent cause of dysphonia is acute viral laryngitis. The infection may progress to the trachea affecting the tracheobronchial tree. The manifestations are usually self-limited and rarely progress into bacterial laryngotracheal bronchitis.[4] In children older than 4 years, vocal nodules predominate among the causes for dysphonia. These lesions are phonotraumatic, directly related to vocal overuse. The peak incidence is between 5 and 10 years, mostly in boys, receding after adolescence.[4–7] The treatment of choice is voice therapy.[8]

The second cause of dysphonia in childhood is vocal cyst. Cysts are classified as epidermal or mucosal. Epidermal cysts are congenital and may be attached to the vocal ligament, worsening voicing even more. The intensity of voice involvement is related to the size of the cyst, requiring, in many cases, surgical removal.[9,10]

Laryngeal papillomatosis is also frequent in children and accompanied by progressive dysphonia and respiratory discomfort.[11] Verrucous lesions implant in the vocal cords and may involve also the supraglottic or the subglottic region and the trachea. Lesions of laryngeal papillomatosis are always recurring and they need repeated surgical removal. Adjuvant treatment with intralesional cidofovir has proved efficient; however, most authors report their experience with the drug in adults.[12] A recent systematic review that evaluated the benefits of cidofovir in the treatment of laryngeal papillomatosis included 15 randomized studies in adults and only four in children and found no difference between the drug and placebo.[13] Therefore, the benefits of cidofovir remain questionable.

Among adults, the causes of dysphonia are many, including—besides the ones previously mentioned—laryngeal trauma (mechanical, thermal, or chemical trauma); inflammations or infections (due to smoking, virus, bacteria, or reflux laryngitis); leukoplakia, endocrine, rheumatic, or neoplastic causes (benign or malignant); neurological, psychological, or emotional causes; and medication. Cancer of the vocal folds is an important cause of dysphonia in patients who smoke; videolaryngoscopy is mandatory in all smoking patients with vocal symptoms for longer than 15 days. This topic deserves a special article and will not be discussed in this paper. Other important causes of dysphonia in adults include papilloma, cysts, hemangioma, sulcus, vocal polyps, and Reinke's edema.[14–17]

Even though the literature presents many publications with epidemiologic data on dysphonia, few studies analyze large populations of adults, children, and elderly patients with this voice disorder. Additionally, rare diagnoses such as vocal sulcus and mucosal bridges have little mention in studies of children with voice disorders, and have been diagnosed more often. Thus, the

Accepted for publication September 29, 2015.

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Journal of Voice, Vol. ■■, No. ■■, pp. ■■-■■
0892-1997

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http://dx.doi.org/10.1016/j.jvoice.2015.09.017

purpose of this study is to analyze the causes and epidemiological data of a large population of adults and children with voice disease.

METHODS

To analyze the etiology and diagnosis of dysphonia, this study included patients with voice disease who sought treatment in the ambulatory of the Botucatu Medical School between 2004 and 2014. Patients were included in the study in the chronological order of arrival at the ambulatory for voice disorders. All patients underwent videolaryngostroboscopy to confirm the diagnosis of dysphonia with a rigid telescope 70°, 8 mm (AZAP, Germany), or nasofibroscopy (3.5 mm in diameter, Olympus, Japan) and videostroboscopy(Atmos Inc., Germany). Patients diagnosed with acid laryngitis or psychogenic dysphonia were submitted to multidisciplinary assessment, including measurement of pH levels and examination by a gastroenterologist and a psychologist.

The diagnosis of presbyphonia was established in patients aged more than 60 years who showed the following having vocal symptoms: vocal fatigue, decreased vocal range, and low and breathy voice. The videolaryngoscopy of these patients did not identify organic laryngeal lesions, but showed atrophy of the vocal folds, prominence of vocal apophysis, bowed vocal folds, and vocal tremor.

All patients included in this study were evaluated by a speech pathologist.

The following parameters were analyzed: age, gender, profession, associated symptoms (vocal overuse, gastroesophageal symptoms, and nasosinusal symptoms), smoking, and laryngeal diagnoses. The project was approved by the Ethics in Research Committee of the Botucatu Medical School.

This study included only patients with predominant symptoms of dysphonia who were treated in the Voice Disease ambulatory. Only one laryngeal diagnosis was considered per patient (the most relevant); the patients with uncertain diagnoses were excluded, as well as patients with laryngeal cancer, and those treated in other sites such as the emergency department or wards. Some patients had their diagnoses confirmed during microsurgery.

The results were presented in tables and charts and submitted for statistical analyses. The chi-square test was used to compare the parameters studied, using the 5% level of significance.

RESULTS

Age group and gender

Of the 2343 medical records initially selected, 324 were excluded because they were incomplete. Thus, 2019 patients were included in the study, of which 786 were male (38.93%) and 1233 were female (61.07%), distributed in age groups as shown in Table 1. Children aged between 1 and 18 years corresponded to 18% of the population, with a predominance of boys. Of the cases, 64% were adults aged 19–60 years (472 men and 833 women), and 16% were 60 year olds or older.

TABLE 1.
Age and Gender

	Gender		
Age (Years)	Male *N*	Female *N*	Total *N* (%)
1–6	62	38	100 (4.96)
7–12	112	75	187 (9.26)
13–18	39	53	92 (4.55)
19–39	194	300	494 (24.47)
41–60	278	533	811 (40.16)
>60	101	234	335 (16.60)
Total	**786 (38.93)**	**1233 (61.07)**	**2019 (100.00)**

Note: $P < 0.0001$.

Smoking

Only 275 patients (13.62%) reported smoking, and 35 (1.70%) had stopped smoking. All of them are adults.

Associated symptoms

The associated symptoms were vocal overuse ($n = 677$; 33.53%), gastroesophageal symptoms ($n = 535$; 26.5%), and nasosinusal symptoms ($n = 497$; 24.61%).

Profession

Among the professions, domestic employees, students, and teachers were the most prominent (Table 2).

Laryngeal diagnoses

The laryngeal diagnoses are presented in Table 3 and Figures 1–6, where they appear by age group and gender. In 379 children, with ages ranging from 1 to 18 years (19%) (Figures 1–3), vocal nodules predominated, being diagnosed in 225 patients (59%), followed by vocal cysts ($n = 39$; 10.3%), and acute laryngitis ($n = 26$; 6.8%). There were 1305 adult patients aged between 19 and 60 years (64.6%) (Table 3; Figures 4–6), and among them the main laryngeal diagnoses were functional dysphonia ($n = 268$;

TABLE 2.
Profession

Profession	*N* (%)
Domestic worker	577 (28.57)
Student	351 (17.38)
Teacher	295 (14.61)
Retired	289 (14.31)
Sales person	192 (9.50)
Vendor	93 (4.60)
Singer	49 (2.43)
Nurse	18 (0.90)
Bank worker	17 (0.84)
Secretary	16 (0.80)
Preacher	14 (0.70)
Telemarketing operator	10 (0.50)
Others	98 (4.86)

Note: $P < 0.0001$.

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