Occult laryngeal pathology in a community-based cohort

TODD R. REULBACH, MD, PETER C. BELAFSKY, MD, PhD, P. DAVID BLALOCK, MA, JAMES A. KOUFMAN, MD, and GREGORY N. POSTMA, MD, Winston-Salem, North Carolina

BACKGROUND: Little information is available regarding the prevalence of laryngeal pathology in adults.

PURPOSE: To estimate the prevalence of occult laryngeal pathology in a community-based cohort of adults over 40 years of age.

METHODS: One hundred consecutive volunteers over age 40 with no history of voice disorders were enrolled. All completed a self-administered laryngeal symptom questionnaire and underwent a comprehensive head and neck examination including transnasal fiberoptic laryngoscopy.

RESULTS: The mean age of the cohort was 61 years. Vocal fold bowing (presbylaryngis) was present in 72% of the patients, and findings of laryngopharyngeal reflux were present in 64% of the cohort. In addition, other laryngeal pathology were identified in 21%. Only 12% had a completely normal laryngeal examination.

CONCLUSIONS: Occult laryngeal pathology is very common in persons over 40. Findings suggestive of laryngopharyngeal reflux are present in 64%, and vocal fold bowing is present in 72% of persons over 40. (Otolaryngol Head Neck Surg 2001;124:448-50.)

The adult voice is perceived to change with advancing age.¹ This more senescent voice is thought to result from multiple structural and functional changes that occur within the larynx as a normal part of the aging process. Structural changes may include atrophy of the intrinsic laryngeal musculature and ossification and degeneration of the cartilaginous portions of the larynx.²³ Functional changes often include increased dryness and stiffness of the vocal fold mucosa as a result of both decreased glandular secretion as well as reduced elastin production.⁴⁻⁶ Most elderly people adjust for these gradual degenerative changes by using compensatory hyperfunctional voicing techniques (supraglottic contraction) and/or by improving breath support.⁷ However, the risk for eventual voice and swallowing decompensation is high, and it has been estimated that approximately 12% of the elderly have some degree of vocal dysfunction.⁸

There is no accepted definition of what constitutes the normal aging voice, and little information is available regarding the prevalence of laryngeal pathology within this age group. This study was done to determine the prevalence of occult, or subclinical, laryngeal abnormality within an adult community-based cohort.

METHODS AND MATERIALS

Prior approval for this study was obtained from the medical center’s Institutional Review Board, and informed consent was obtained from all subjects. Over a 3-month period, 100 subjects were enlisted from 2 sources: patients coming to the otolaryngology clinic for nonvoice and nonswallowing-related complaints and spouses of otolaryngology patients. All subjects who had any medical history of laryngeal disease, laryngeal surgery, or a diagnosis of gastroesophageal reflux were excluded. Persons who were mildly symptomatic but had never been diagnosed with a voice disorder were included.

All subjects completed a questionnaire on the frequency and severity of the following symptoms: hoarseness, vocal fatigue, odynophonia, globus pharyngeus, dysphonia, chronic throat clearing, excessive throat mucus, heartburn, and cough. Symptoms were graded as follows: (1) rarely, (2) occasionally, (3) often, or (4) most of the time. Demographics, tobacco and ethanol history, and information regarding medical and surgical history were also elicited.

Each subject underwent a comprehensive head and neck examination and transnasal fiberoptic laryngoscopy (TFL). TFL was performed using a Pentax or Olympus flexible fiberoptic laryngoscope coupled to a camera and videorecording system. Each TFL examination was then evaluated and graded by the authors for evidence of presbylaryngis, hyperfunctional muscle tension patterns, findings suggestive of laryngopharyngeal reflux (LPR), and evidence of any other laryngeal pathologic conditions.

The presence of vocal fold bowing was determined by evaluating the gap between the vocal folds at the point of...
vocal process-to-vocal process contact before the initiation of any compensatory laryngeal contraction. The degree of bowing was graded on a continuum. “Mild” presbylaryngis represented less than a 1 mm gap of glottal insufficiency. “Moderate” presbylaryngis was determined to be a 1 to 2 mm gap, whereas “severe” denoted a gap greater than 2 mm.

RESULTS

The mean age of the 50 male and 50 female subjects was 60.9 years (range, 40 to 85 years). Fourteen subjects were smokers. All subjects denied regular alcohol use. In terms of laryngeal symptoms, one or more symptoms were experienced “most of the time” by 4 subjects and “often” by an additional 31 subjects. In decreasing order of frequency, the symptoms were excessive throat clearing (19%), heartburn or indigestion (10%), hoarseness (8%), troublesome cough (7%), globus (6%), dysphonia or odynophonia (6%), and vocal fatigue (3%).

On laryngeal examination, some degree of vocal fold bowing was present in 60% of female subjects and 84% of male subjects (Fig 1). Among the female subjects, the prevalence of moderate or severe vocal fold bowing was 12.5%. The prevalence of moderate or severe vocal fold bowing among the males was 44%. Sixty-four percent of subjects demonstrated 1 or more findings suggestive of LPR, 68% in males and 63% in females. In decreasing order of frequency, the LPR findings were ventricular obliteration (54%), posterior commissure hypertrophy (51%), subglottic edema (49%), vocal fold edema (44%), and arytenoid erythema (38%).

Fiberoptic examination also revealed other laryngeal pathologic conditions. Although the diagnosis was not confirmed with laryngeal electromyography, 11 subjects were suspected of having a unilateral vocal fold paresis based on decreased excursion of the vocal fold during maximal adduction/adduction maneuvers. Laryngoceles were present in 3 patients. Other clinical entities included nodules (2), varix (2), essential tremor (1), granuloma (1), and polyp (1). One laryngocoele and the granuloma were removed by endoscopic surgery.

DISCUSSION

Age-related histologic changes that occur in the larynx have been well-documented. Increased fatty and connective tissue infiltration occurs within the atrophying vocal muscles. Elastin fibers within the various layers of the lamina propria decrease significantly in number. The remaining fibers become disorganized and interconnected leading to decreased resilience of the lamina propria. The vocal fold epithelium also shows decreased elasticity due to atrophy and dysfunction of the laryngeal mucous glands.

These histologic changes result in gross structural abnormalities within the senescent larynx. Postmortem examination of 25 larynges with a mean age of 88.1 years showed a 76% occurrence of distinct vocal fold bowing/atrophy. In comparison, concurrent postmortem examination of 10 larynges with a mean age of 44.7 years showed no cases of vocal fold bowing or atrophy. Using mirror laryngoscopy, Honjo and Isshiki examined 40 men and women with a mean age of 75 years for evidence of vocal fold atrophy and glottal gap. Vocal fold atrophy was present in 67% of males and 26% of females, and glottal gap was seen in 67% of males and 58% of females.

Not surprisingly, our study confirms that the age-related change of vocal fold bowing, also known as presbylaryngis, is very common. Using TFL, 60% of female subjects and 84% of male subjects were found to have some degree of vocal fold bowing. Even though a large percentage of subjects had vocal fold bowing, all subjects within this study were relatively asymptomatic with respect to laryngeal or voice problems. These subjects with vocal fold bowing were able to maintain adequate vocal function through the use of hyperkinetic compensatory vocal techniques, specifically supraglottic muscle tension patterns (MTP). Use of these MTPs helps achieve laryngeal closure to correct for underlying glottal insufficiency.

The ability to identify presbylaryngis and the compensatory conditions (MTPs) that often suggest the presence of glottal insufficiency is extremely important. Once these conditions are identified, they may be monitored (if asymptomatic) or treated (if symptomatic), because the risk of decompensation in this population is high, particularly after an insult such as endotracheal intubation.
intubation or a stroke. Decompensation may lead to significant voice and swallowing problems, including life-threatening aspiration. Treatment modalities may include voice therapy to teach proper breath support, use of hearing aids to maximize hearing, and surgery aimed at correcting the glottal insufficiency.2,9,16,17

CONCLUSION

There are presently over 34,880,000 persons in the United States over the age of 65. This number is expected to nearly double by 2025, representing over 18% of the national population. As health care providers, we must have a thorough understanding of the prevalence of disease particular to the aging population so that we may better diagnose and treat disorders affecting this increasing population base. The prevalence of occult laryngeal pathologic conditions in the adult population (mean age, 60 years) is high. Seventy-two percent have evidence of presbylarynges, 35% report laryngeal symptoms, and 64% have evidence of LPR.

REFERENCES