

Evaluation of Pediatric Dysphonia: A Review Article

Khaled A Abdelbaseer^{1*}, Ali Helmy Bakri², Zaki F Aref³ and Mohammed Mohsen Mohammed⁴

¹Professor, Department of Pediatrics, South Valley University, Egypt

²Lecturer, Department of Pediatrics, South Valley University, Egypt

³Professor, ENT Department, South Valley University, Egypt

⁴Resident, Department of Pediatrics, South Valley University, Egypt

*Corresponding Author: Khaled A Abdelbaseer, Professor, Department of Pediatrics, South Valley University, Egypt.

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Abstract

Background: Dysphonia occurs frequently in children of both genders and has a wide range of causes. In their daily environment, children tend to strain vocal cords through shouting, or talking loudly without any control that result in voice disorders.

Aim: This review aimed to highlight the scope of dysphonia and its impact on children health.

Summary: The health related quality of life is vulnerable to be disturbed by presence of voice disorders in children. Social and emotional skills are greatly prohibited in children especially in boys. Vocal abuse is a prevalent etiology of vocal manifestation among children. Communication and social skills in addition to sense of self confidence may be negatively correlated with presence of pediatric dysphonia. In order to choose the best course of therapy for each individual patient, laryngoscopy is a key part of the diagnostic process since it helps to distinguish between different types of laryngeal lesions. Benign lesions like vocal cord nodules and intracordal cysts are the most frequently encountered on laryngoscopic imaging. The mainstay lines of treatment for children's are that directed that directed to the cause in addition to avoidance of harmful vocal habits. Vocal training is an integral part of chronic vocal disorder treatment in addition to speech therapy.

Keywords: Dysphonia, hoarseness, speech therapy, vocal nodules, vocal abuse.

Background

Research reports documented average incidence of pediatric voice disorders from 4.4% to 38% being highest among children aged 5 to 10 years. (1-3) It has a variable and diverse etiologies, that may be self-limited as acute viral laryngitis or life-threatening as tumors or laryngeal stenosis. (4) Dysphonia may be adversely impacted on the child's general health, communication, social and emotional development. Additionally, its drawbacks may extend to affect educational development, self-esteem and behavior in addition to hampering participation with peers in school activities. (5) Thus, proper diagnosis and treatment of childhood voice disorders is essential for educational achievement, emotional and social development in addition to physical health.

There are many causes for pediatric dysphonia including inflammatory, traumatizing, iatrogenic, congenital and functional conditions like emotional and psychological problems. (6) The most commonly encountered causes of hoarseness of voice in children include laryngeal papilloma, laryngeal web, polyp, cysts, and nodules. However, allergic or infectious laryngitis and laryngitis related to gastroesophageal reflux are frequently described. (7) Some researchers reported that nasal obstruction and allergic respiratory illnesses as a risk factor that can aggravate pediatric dysphonia. (8,9) The aim of this review is to delineate predisposing factors for dysphonia in children and highlight its impact on child's health in addition to importance of proper management.

Anatomical features that affect phonation in children

The anatomy and histology of the larynx in children are not in a fixed state. Changes in laryngeal structure and vocal cord length in addition to changes in pitch of voice indicate that the development and growth of larynx and the length of the vocal cord changes throughout childhood. (10) Intense vocal behavior exhibited by children tends to cause dysphonia. (11)

The most distinguishable feature that differentiates adult from the child's larynx is the position of larynx and size of epiglottis. The anatomical airway in children including the larynx has a much smaller diameter than that of adults. In newborns, the length of vocal cord folds averages between 2.5 and 3.0 mm. (12) The pediatric laryngeal growth continues throughout life till adulthood, with the length of vocal cord reaching 11 to 15 mm for women and 17 to 21 mm for men. Children have their larynx positioned more anteriorly, with a shorter both vocal folds and tract, in addition to vocal mucosa of more thickness up to the age of thirteen to sixteen years. (12,13) Another fundamental difference is the shape and pattern of the epiglottis in children being omega-shaped and elastic back to the tongue. Children and adults are not only differing anatomically, but respiratory function may differ between both sexes before puberty. Regarding fundamental frequency and its variation, lung pressure, and sound pressure are proved higher in children than adults. (14,15) Endoscopic evaluation of laryngeal vibration is necessary for the management of voice disorders; however, reports about quantitative evaluations of pattern of vocal fold vibrations are deficient, in spite of wide dissimilarities differences between pediatric and adult larynx. Experimental clues from assessments of aerodynamic properties and (16) electroglottographic properties, in addition to acoustic features (17), confirm the affection of vocal fold vibration by laryngeal structures.

Etiologies of Pediatric dysphonia

The occurrence of pediatric dysphonia has a variable range depending on the age, and assessment protocols. Higher prevalence was reported in male children aged 8 to 14 years. (18) A range between 6 to 23 percent was noticed for children aged 4 to 12 years (19,20) with more prevalence of behavioral dysphonia because of misuse or overuse of voice. Trauma to laryngeal mechanism is usually spotted in children and may induce laryngeal damage in the form of vocal fold edema and nodules. (20,21) Voice pattern may be also affected by presence of congenital malformations especially benign cysts of vocal cord. (22)

Children's dysphonia can be caused by other conditions like iatrogenic (e.g., injuries to the vocal fold by endotracheal intubation or long-term nasogastric tube) and functional causes. (23) Papilloma, webs, stenosis, polyps, and nodules of the larynx, as well as viral laryngitis are all organic causes of pediatric dysphonia. (24)

Gastroesophageal reflux, hearing defects and respiratory illnesses in addition to nasal and respirator allergy are other factors that have the potential to be impacted negatively on vocal manifestations. (25) Some children have dysphonia because of emotional difficulties, psychological trauma, or a dysfunctional parent-child connection notably with family conflicts and exaggerated expectations. Personality disorders, adjustment issues, or anxiety are common functional reasons of voice alterations in children and about 3% to 5% of kids may have features related to attention deficit hyperactivity disorder (ADHD). (26)

Impact of dysphonia on quality of life in children

Voice is essential for social connection and good verbal communication, and any disturbed production or quality may evoke serious health, companionable or emotional problems, and later academic underachievement. Pediatric dysphonia is diagnosed when children experienced in production of their usual voice. Vocal changes during childhood have a negative impact on self-confidence, social relationships, and psychological behavior of children. The seriousness of dysphonia on the life of children may be overlooked, taking in consideration that there are no other manifestations attributed to other body systems. (27,28) Early and proper detection of voice disorders is mandating delayed diagnosis may impair child's skills of communication for life. It can interfere with communication and education creating school and functional delay that can extend into adulthood. (29, 30) Failure of recognition of their voices by others can also induce negative effects on their feelings and well-being specially if received comments about remarkable difference between their voices and that of their peers. (29)

Diagnosis

Evaluation of the children with dysphonia starts by patient interviews and by pattern of presentation obtained by detailed history taking. Detection of laryngeal manifestations is a clue for presence of prediction of serious underlying disease that must not be overlooked. A meticulous otolaryngology examination should be considered. A thorough auditory perceptual assessment of voice should be estimated through both subjective and objective voice analysis measures, including perceptual evaluation of voice, and videostroboscopic imaging of vocal cord movement. a procedure using an endoscope with a small lit camera to view the larynx and vocal folds during vibration. Videostroboscopy is a video endoscopic examination for visualization of the larynx and detection of any structural or vibration abnormalities. In assessment of children with vocal disorders, analysis of effect voice disorders on children can be executed by the means of questionnaires like the Paediatric Voice-Related Quality of Life (pVRQOL) survey. (31) Another one is the Glottal Function Index questionnaire that detect pattern of vocal changes. (32)

Professionals of vocal assessment should keep in mind the possible pathologic associations that may underlie pediatric dysphonia, as this help later on steps of evaluation and management. It is mandatory to consider characters of child behaviour and pattern of voice based on the use of age specified protocols. (33)

Imaging studies specially the noninvasive laryngeal ultrasonography can diagnose laryngeal stenosis, subglottic hemangiomas, and vocal fold paralysis in addition to direct examination of subglottic space. (34) Computed tomography (CT) or magnetic resonance imaging (MRI) is advisable if laryngeal tumor is suspected. Additional benefit for CT scans is detection of any laryngeal stenosis. Tavares et al. (35) stated that videolaryngoscopic exam provides greater viewing, therefore giving better chance for diagnosing vocal folds nodules, and inflammatory mucosal thickening.

Management

The most common treatment methods are voice therapy, vocal counseling and surgery, taking into consideration the natural history of pathology and planning follow-up through the course of therapy. Therapeutic success is often the result of a combination of different treatment. (36) Speech and language specialists will identify possible ways of voice misuse that contribute to vocal cord damage, and guide to healthy habits to follow including avoidance of screaming. It may also include drinking enough water to keep your vocal cords well hydrated, and avoiding foods that may cause reflux, as this can also irritate the vocal cords. Speech and language therapy is typically the first-line treatment option for patients with dysphonia who do not otherwise meet indications for surgical intervention. Voice therapy is the preferred line of treatment for dysphonia caused by muscle tension and it is advised for its use in these disorders. Moreover, most laryngologists recommend voice therapy for hoarseness induced by benign vocal fold lesions in addition to medical treatment. (37)

Direct voice therapy comprises regular sessions designed to teach vocal function exercises that promote efficient breathing and reduce strain while voicing. Surgical removal of vocal cord nodules, polyps can help restoration of vocal cord proper function with caution to preserve the normal vibratory vocal cord (38).

Summary

Pediatric dysphonia can be caused by a wide range of factors, including inflammation, infection, congenital defects, neurological disorders, iatrogenic treatment, and functional impairment. In childhood, it may be negatively impacted on communicative and social skills, and self-esteem. Laryngoscopy is preferred investigation for diagnosis and treatment of benign laryngeal lesions as vocal nodules and cysts. The majority of treatment for children's voice issues follows a step-by-step method directed towards potentially harmful vocal habits. Vocal training is an integral part of chronic vocal disorder treatment in addition to speech therapy.

Recommendations

Parents and teachers should be informed about preventive strategies against voice disorders in order to teach children to rest voice, avoid misuse and practice appropriate and proper use. Furthermore, it is a priority that health care providers who face the dysphonic child firstly, be aware of with the trouble. Refer children to other health care professionals when medical/surgical or psychological evaluation and treatment are indicated and facilitate patient access to comprehensive services.

Conflict of Interest

The authors declare no conflict of interest.

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