The Role of Videostroboscopy in Diagnosing Chronic Dysphonia

ABSTRACT

While videostroboscopy is a well-established procedure, its integration as a routine component of voice assessment has not been as readily embraced. Consensus exists regarding the efficacy of using rigid fiberoptic telescopes to attain a clear, enlarged visual representation that can be recorded and employed for pre- and post-treatment comparisons, documentation, teaching, and research. Nonetheless, certain doubts persist concerning the extent to which videolaryngoscopy and/or videostroboscopy can alter the diagnosis and treatment outcome of patients with voice disorders when compared to indirect laryngoscopy. A study involving eighty-four individuals with dysphonia who underwent videolaryngoscopy with and without stroboscopic examination revealed that videostroboscopy had a significant impact on the diagnosis and treatment of numerous patients. Particularly, it proved most advantageous in cases where functional dysphonia and vocal fold paralysis were originally diagnosed through indirect laryngoscopy. The enhanced visibility and magnification afforded by rigid fiberoptic telescopes during videolaryngoscopy, coupled with the comprehensive assessment of glottic closure, mucosal wave, and amplitude characteristics provided by stroboscopic examination, facilitated the identification of subtle vocal fold abnormalities that would have otherwise been overlooked using indirect laryngoscopy.

KEYWORDS: Videostroboscopy, Laryngoscopy, Dysphonia, Vocal cord

INTRODUCTION:

The human voice has always been serving as the conduit for orators, prophets, and poets, as well as a tool for actors and singers. Any disruption in vocal function can impair this capacity and, consequently, impact one's quality of life.

Vocal production involves vibration of the vocal cords under tension generated by exhaled air, whi ch is modified by articulation and speech resonance.[1] Any deviation from this physiological process results in dysphonia, defined as an alteration in pitch, intensity, timbre, or vocal effort that impairs communication, as per the 2018 guidelines. [2]

Although dysphonia is common, data on the prevalence of vocal complaints is limited. Studies suggest that up to a third of the population may suffer from dysphoria, with higher rates in women and people over 85.[3]A variety of assessment methods exist, from perceptual judgment and instrumental analysis to laryngoscopy and videoendoscopy. The latter, although considered a reference, is subject to the skill and experience of the physician, which led our study to evaluate the importance of videoendoscopy in the diagnosis of chronic dysphonia.[4]

METHODS:

A prospective study was carried out in the ENT department affiliated to the university hospital center of Casablanca. Over a timespan of 1 year, from November 2021 to November 2022, 84 patients were included. Approval for the study was obtained from the institutional ethics committee, and all participants gave written informed consent before the study was conducted.

Inclusion criteria included patients with chronic dysphonia (lasting more than 3 weeks) who had undergone flexible laryngoscopy. Data collected for this study covered demographic details such as age, gender, duration of dysphonia, occupation and dysphonia-related medical history. In terms of clinical information, the dataset included various pathologies identified by videotroboscopy and conditions with inconclusive flexible laryngoscopy. The study also explored the distribution of various vibratory parameters, such as glottic closure, vibratory amplitude, mucosal wave, vocal cord symmetry and vibratory periodicity.

RESULTS:

The study included 44 males (52,5%) and 40 females (47,5%) with a sex ratio of 0,90. We found a prevalence in the age group between 31 and 40, ranging from a minimum age of 25 to a maximum of 68. Smokers in our serie count for more than 47% while chronic alcohol consumption was present in 10 patients (10,4%). Only 13% of our patients work in professions requiring significant vocal strain such as teaching, call center operators and market vendors. The average duration of dysphonia in our patients was between 3 to 4 months.

Our serie was composed of benign anomalies, constituting 73% of cases, while malignant tumors accounted for 23.8%, and leucoplakia for 2.3%. Among the benign anomalies, functional dysphonia was found in 15.4% of our patients, followed by laryngitis at 13%, paralysis at 12%, nodules at 9.5%, polyps at 8.3%, cysts at 8.3%, and only 2.3% each for sulcus vocalis, granuloma, and Reinke's edema. While flexible laryngoscopy was performed on all patients, the findings were either normal or inconclusive in 26 patients (31%). A total of 13 cases (15%) of functional dysphonia were definitively diagnosed only through videostroboscopy. For all cases of Sulcus vocalis (2 cases), Reinke's Edema (2 cases), and leucoplakia (2 cases), laryngoscopy was inconclusive, and the diagnosis became evident only through videostroboscopy. In 62.5% of nodules cases (5 out of 8), 43% of cyst cases (3 out of 7), and 28.5% of polyp cases (2 out of 7), detection occurred exclusively through videostroboscopy.

Vocals cords motility was evaluated and found to be asymmetrical in 44 cases (52,38%), symmetrical in 31 cases (36,9%) and inconclusive in 7 cases. Table 1 demonstrates the distribution of Pathologies According to Vocal Cord Symmetry.

Pathology	Symmetrical	P%	Asymmetrical	P%	Inconclusive	P%
Malignanttumor	0	0%	13	65%	7	35%
cyst	2	28,5%	5	71,5%	0	0%
Nodule	7	87,5%	1	12,5%	0	0%
Polyp	1	14,3%	6	85,7%	0	0%
Paralysis	3	30%	7	70%	0	0%
Laryngitis	8	72,7%	3	27,3%	0	0%
leucoplasia	0	0%	2	100%	0	0%

Reinke'sedema	0	0%	0	0%	2	100%
Dysfunctionaldysphonia	8	61,5%	5	38,5%	0	0%
Granuloma	2	100%	0	0%	0	0%
Sulcus vocalis	0	0%	2	100%	0	0%
Total	31		44		9	

Table 1: Distribution of pathologies according to vocal cord symmetry

Amplitude of vibrations and mucosal wave were analyzed among our patients.All malignant tumors, cysts, paralysis, laryngitis, Reinke and Sulcus edema showed decreased amplitude and mucosal wave impairment.More than 70% of polyps and nodules showed normal vibration amplitude. Concerning dysfunctional dysphonias, 61.5% had a reduced vibration amplitude compared to 38.4% with a normal vibration amplitude. The increase in vibration amplitude was not observed in any patient in our study.The absence of mucosal wave was found in all malignant tumors, both cases of reincke's edemas and of sulcus vocalis.

Glottic closure was observed to be incomplete in the majority of patients (85.9%), with 18 cases exhibiting an hourglass-shaped architecture of the vocal cords attributed to cysts, polyps, and nodules. Additionally, one case of functional dysphonia displayed an anterior glottal gap, while 14 cases presented with a posterior glottal gap, including vocal cord cysts, malignant tumors, and dysfunctional dysphonia. Complete glottic closure was noted in 16 cases. Analysis of phase symmetry revealed periodic vibrations in 87% of nodules, 72.7% of laryngitis cases, and 61.5% of dysfunctional dysphonia cases. Non-periodical vibrations were observed in 44 patients, including cases of paralysis (70%), polyps (85.7%), cysts, dysfunctional dysphonia, laryngitis, leukoplakia, and nodules. Assessment of this parameter was not feasible in nine cases, primarily involving malignant tumors and Reincke's edema.

DISCUSSION

Comparing our findings with other studies in the field, we observe both similarities and significant differences in terms of age distribution. For instance, the study conducted by Nader Saki et al.[5] on 113 patients revealed an age range from the 2nd to the 9th decade, with an average age of around 56 years. Kaushik et al.'s study of 80 patients showed a higher prevalence in the 5th decade[6]. Our study was conducted on 84 dysphonic patients and revealed a prevalence in the fourth decade.A male predominance was observed in Nader Saki et al.'s study, with 72% being male and 27.3% female[5]. Conversely, Zacharias et al. found a higher percentage of females at 65.6% compared to 34.4% males[7]. Our series comprised 44 males and 40 females, showing no significant difference between the sexes.

Lyberg-Ahlander et al. noted a high prevalence of voice disorders among teachers (19.3%) and service professionals (18.8%)[3]. Rajput and Poriya found that 51% of individuals worked in vocally demanding professions, while Guss et al. reported 16% of new dysphonic patients were voice professionals[6], [7]. Hernandez Sandemetrio et al. highlighted vocal strain (44%) and smoking (52%) among patients, while Byeon found 21% smokers and 72% alcohol consumers monthly [8], [9]. In terms of symptom duration, Banjara et al. noted 44% of patients with dysphonia for less than three months, compared to our series, where 21.5% reported symptoms for 3-4 months.In our series, similar findings emerged, with 15% of patients engaged in vocally demanding professions, while 85% were in other occupations. Additionally, 45% of patients were smokers, 16% had a history of alcohol consumption, 24% had a history of vocal strain, and 13% suffered from gastroesophageal reflux disease.

In a study by Kaushik et al. on 80 patients, various vocal cord disorders were predominant, including paralysis, paresis, nodules, polyps, and malignant tumors[6]. Sandemetrio et al. found vocal cord edema to be prevalent at 25%, followed by polyps at 21.8%[8]. Our study, like others, showed a prevalence of benign anomalies at 73%, including functional dysphonia (15.4%), laryngitis (13%), paralysis (12%), nodules (9.5%), polyps (8.3%), cysts (8.3%), and less commonly, sulcus (2.3%), granuloma (2.3%), and Reinke's edema (2.3%), with a smaller proportion of malignant tumors and leukoplakia.

Flexible laryngoscopy is the primary method for evaluating vocal cords in cases of dysphonia, offering a comprehensive assessment of potential pathologies. Nevertheless, its ability to detect certain anomalies may be limited in some cases when compared to stroboscopy. Rasheed et al. and Saki et al. observed changes in diagnoses, with nodules misdiagnosed as intracordal cysts or polyps[5], [9]. Kaushik et al. detected conditions exclusively through videostroboscopy, such as Sulcus Vocalis and precancerous lesions[6]. In our series, 15% of cases, excluding functional dysphonias, were conclusively diagnosed solely through videostroboscopy, indicating its superiority in detecting these lesions.

The distribution of pathologies based on the symmetry of the vocal cords is important in understanding various vocal cord disorders. Studies by Banjara et al. and Sellapampatti et al. revealed that bilateral conditions like vocal cord paralysis, acute and chronic laryngitis, vocal nodules, and sulcus vocalis have a statistically significant relationship with symmetric vocal cords, as these conditions typically affect both vocal cords simultaneously[10], [11]. Unilateral conditions such as cancers, polyps, unilateral paralysis, and cysts show a statistically significant association with asymmetric vocal cords, as they primarily affect one vocal cord [7]. Similarly, studies by Al helo et al. and Ahmed M. Rasheed found that nodules tend to exhibit symmetric vocal cords, while cysts or polyps typically cause vocal cord asymmetry[9], [12]. In our study, a high percentage of malignant tumors, cysts, polyps, sulcus, and leukoplakia displayed asymmetrical vocal cord vibrations, while nodules, laryngitis, and functional dysphonias predominantly showed symmetric vocal cord vibrations.

CONCLUSION:

Videostroboscopy has improved or even changed the diagnosis of vocal pathologies, with varying percentages across different studies. It enables more precise diagnosis of benign laryngeal pathologies such as nodules, cysts, sulcus vocalis, and polyps compared to traditional laryngoscopy. The efficacy of videostroboscopy in diagnosing chronic dysphonias surpasses that of video laryngoscopy. By enhancing the diagnostic precision of vocal pathologies, videostroboscopy also aids in therapeutic decision-making for dysphonic patients**.**

CONSENT

As per International Standards or University Standards, Patient written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per International Standard or University Standards written ethical approval has been collected and preserved by the authors.

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