

Keratoses of the Larynx

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Abstract

Laryngeal keratosis is a rare condition characterized by irregular areas of thickening and cornification of the laryngeal mucous membrane. Much controversy exists regarding its etiology, treatment and terminology. Some authors interchange the term 'keratosis laryngis' with that of 'leukoplakia' of the larynx. There are however, others who believe that these terms are not inter-related. This paper made an attempt to describe some of the characteristic features of the disease by describing a case report to emphasize the acoustic parameters of voice before and after the medication.

Key words: Keratosis, Leukoplakia, Case history, Acoustic parameters, Medication.

Hyperkeratosis of the larynx is a localized form of epithelial hyperplasia characterized by white 'leucoplakic' raised patches on the vocal folds. It is considered a clinically premalignant lesion that develops into invasive carcinoma in about 7-20% of cases (García, Aranzábal, Salas, Olano & Guimera, 1996). The condition is rare and occurs more commonly in men. Although its causation is often unclear, sometimes it resembles and is associated with some chronic inflammations of the larynx. There is a hyperplastic change in the epithelium, leading to excessive cornification, together with extension of the papillae into the corium, the basement remaining intact.

Etiology

Little is known about the cause of this disease although many theories have been postulated. Some of them include: (a) use of tobacco, (b) excessive use of alcohol, (c) vocal abuse, (d) chronic postnasal discharge with laryngeal irritation, (e) Syphilis, (f) dietary deficiencies with low vitamin A and B intake, (g) virus infection, and (h) mycosis.

Signs and symptoms

Some of the clinical features include: (a) hoarseness which is gradual in onset and persistent in nature, (b) occasionally associated with cough, dyspnea and stridor, (c) white raised patches that appear on one or both vocal cords. The anterior and middle thirds are usually involved. These

patches may involve one side only, but more often they are irregularly bilateral in distribution. There is no ulceration but one may observe strict demarcation between normal mucosa and the borders of involved tissue. Mobility of the cords is not impaired. The condition is considered pre-cancerous and 'carcinoma in situ' frequently supervenes. Histopathologically, one finds the laryngeal epithelium thickened, elevated, and keratinized but the basement membrane is unchanged.

Treatment

Both medical and surgical techniques are usually employed. Intensive vitamin A, B and C therapy is prescribed and cures have been described following their employment, in conjunction with laryngeal stripping procedures. Simpson, Robin, Ballantyne, & Groves (1967) reported that vitamin A control the rate of growth of epithelial structures. But, it tends to persist in spite of conservative treatment. Complete voice rest along with exclusion of alcohol, tobacco, and spicy food is considered useful. Studies on the voice parameters in laryngeal keratosis are limited. This study describes the acoustic characteristics of voice in an individual with hyperkeratosis of the larynx before and after medication.

Case history

A 52 years old male reported to AIISH clinic with the complaint of pain in throat for fifteen

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days. He reported of pain while speaking and was unable to increase loudness. Excessive cough was also reported for fifteen days. The severity of the problem was reportedly more in morning. He had no difficulty in swallowing solids or liquids.

Voice evaluation

Quantitative analysis

The quantitative analysis of voice was done by using Vaghi software (VSS, Bangalore), MDVP (Kay Elemetrics, New Jersey) and Electroglottograph (EGG). The results indicated higher habitual frequency in phonation, reading and speaking, reduced frequency and intensity range. Abnormal extent and speed of fluctuations in intensity and frequency, reduced maximum phonation duration in condition 1 (before medication) compared to condition 2 (after medication). MDVP showed abnormality in frequency, intensity and perturbation related measures in condition 1 compared to condition 2. Table 1 shows the measures in both conditions. Figure 1 shows the MDVP results in condition 1 (a) and condition 2 (b).

Parameters	Condition 1	Condition 2
Fundamental frequency (Fo)		
/a/	135 Hz	124 Hz
/i/	148 Hz	128 Hz
/u/	136 Hz	127 Hz
Reading Fo	145 Hz	130 Hz
Speaking Fo	140 Hz	126 Hz
Frequency range	108-216 Hz	102-228 Hz
Intensity range	88-105 dB	70-110 dB
Extent of Fluctuation in		
-Intensity	2.52 dB	1.25 dB
-Frequency	3.19 Hz	2.51 Hz
Speed of Fluctuation in		
-Intensity	4.50 %	2.31 %
-Frequency	12.5 %	3.87 %
Maximum phonation duration		
/a/	15 sec	17 sec
/i/	12 sec	15 sec
/u/	14 sec	13 sec
/s/	12 sec	12 sec
/z/	10 sec	12 sec
EGG measures		
-Open Quotient (OQ)	59 %	54.11 %
-Closed Quotient (CQ)	41 %	45.89 %
MDVP	frequency, intensity and perturbation related measures affected	Normal

(Condition 1 = before medication; Condition 2 = after medication)

Qualitative analysis

The qualitative analysis revealed high pitch, soft severe hoarseness voice in condition 1. The diagnosis was clinically normal voice in condition 2.

Laryngeal examination

Endoscopy revealed the presence of white patches on both vocal folds. Figure 2 (a) shows the endoscopic image of Keratosis larynx. The white patches were

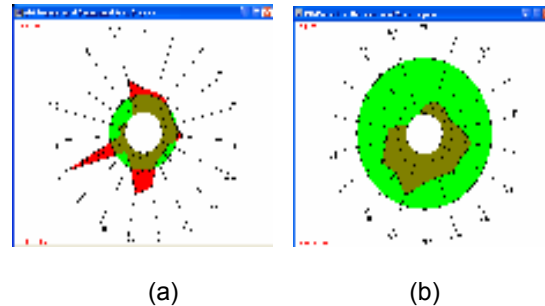


Figure 1: (a) Results of MDVP parameters in condition 1; and in condition 2; (b) (beyond green circle indicates abnormal).

analgesic (Emanzen D, for seven days) and Cobadex CZS for fifteen days was prescribed along with voice rest.

White patches

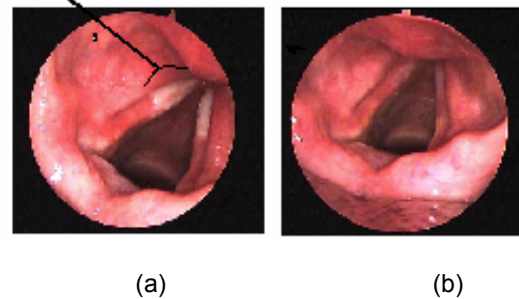


Figure 2: a) view of the Keratosis larynx in condition 1; b) view of larynx in condition 2 (after medication).

After fifteen days of medication, the case came for re-evaluation. The quantitative and qualitative voice parameters were measured in condition 2 which revealed that the acoustic parameters improved. Also, laryngeal endoscopy was done where white patches were not seen on the vocal folds. Figure 2 (b) shows the endoscopic image of larynx after medication.

Discussion

The results revealed several points of interest. First of all, F_0 was high in condition 1 compared to condition 2. Owing to the keratosis in the anterior portion of the vocal folds, the patient may be using only the posterior part of the vocal folds for vibration resulting in high F_0 in condition 1. Reduced MPD and increased open quotient indicate that the vocal folds were open for longer time in condition 1 compared to condition 2. That is probably, the vocal folds did not close completely or the closure was not symmetrical as indicated by abnormal perturbation values. All these can be attributed to the presence of keratosis. Grossman & Mathews (1976) quoted Reimann's theory that keratosis is "a disease of shedding of the superficial layers. These cells do not differentiate as do normal cells, but stick together, pile up and produce the islands called as keratinized because of an excess of keratin in the cell". In this case, the disease may be in the initial stage that may spread in the epithelial level of the vocal folds. Henceforth it was controlled by the drug before it progressed to the other layers of vocal folds. The composition of 'cobadex czs' consisted of multivitamins and chromimum zinc. According to Simpson, Robin, Ballantyne, & Groves (1967), the rate of growth of epithelial structures are controlled by the vitamin A. It can be interpreted in this case that the disease might be caused due to dietary deficiencies with low vitamin A and B intake.

Conclusions

Early diagnosis of laryngeal keratosis, a precancerous lesion, is important since it has the

possibility of becoming malignant change. It is believed that laryngeal keratosis progressed to carcinoma in situ or invasive carcinoma through the stage of epithelial proliferation and epithelial dysplasia. The acoustic aspects of voice in keratosis larynx are abnormal as like other organic dyaphonias. The quantitative and qualitative measures of voice improve with medication unless the disease has progressed towards the other layers of vocal folds. Generalization of the results are uncertain because of single case study and the lesion size, shape, extent may vary.

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