



## Multiple Laryngeal Polyposis; A Newly Introduced Entity: Update

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### Authors' contributions

*This work was carried out in collaboration between all authors. Author HA designed the study, wrote the protocol, and wrote the first draft of the manuscript. Authors SE and HB managed the literature searches, analyses of the study performed data analysis and managed the endoscopic examinations. Surgical management managed by authors HA and SE. All authors read and approved the final manuscript.*

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### ABSTRACT

**Introduction:** Vocal fold polyps are caused by inflammation caused by stress or irritation. Laryngeal polyp may be a single polyp or more than one polyp affecting one vocal fold or both folds, translucent to red raspberry colored mass.

**Materials and Methods:** The study group consisted of 40 patients, 32 males and 8 females. The mean age of the patients was 33 years; with a range of 23-55 years, suffering primarily from long standing dysphonia and were diagnosed by an otolaryngologist (Flexible naso pharyngo laryngoscope after application of painless topical anesthesia and rigid endoscopy) and voice pathologist through videostroboscopic analysis. First group, 20 patients had reinke's edema. Second group, 12 patients had unilateral multiple vocal fold polyps. Third group, 8 patients had bilateral vocal fold polyps.

**Results:** First group Reinke's edema produces a deep, husky sounding voice, it is most commonly caused by tobacco/smoke exposure, but may also be aggravated by gastric reflux, second group,

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unilateral multiple or diffuse vocal fold polyps caused by intense intermittent voice use/abuse and the third group, bilateral vocal fold polyps and we found that its main etiology is abuse of voice and negligence of medical consultation for long time that leads to more trauma and development of more polyps.

**Conclusion:** Reinke's edema, unilateral or bilateral multiple vocal cord polyps are a group of benign pathology can be collectively known as multiple laryngeal polyposis. It is a newly mentioned terminology, introduced by authors to describe collectively a picture of appearance of more than one polyp affecting either one or both vocal folds or the picture of classic Reinke's edema.

*Keywords: Laryngeal polyposis; Reinke's edema; hoarseness of voice.*

## 1. INTRODUCTION

Vocal fold polyps and Reinke's edema develop in the Reinke's space. Vocal fold polyps represent a localized reaction while Reinke's edema represent a diffuse reaction [1]. Vocal fold polyps are localized lesions that usually appear single or in pairs at the midpoint of the vibratory portion of the vocal fold, where the shear forces of phonatory vibrations is greatest. In contrast to vocal fold polyps, Reinke's edema results from smoking and appears as pale watery filled bags attached to the superior surface and margins of both vocal folds [2]. Vocal fold polyps have a broad spectrum of appearance, from haemorrhagic to edematous, pedunculated to sessile and gelatinous to hyalinized. Vocal fold polyps typically involve the free edge of the membranous part of the vocal fold but may also be found along the superior and inferior borders. Vocal fold polyps are believed to result from phonotrauma, however, they are also recognized to arise from a single episode of hemorrhage [3].

Abuse of voice is the principal factor in the development of vocal fold polyp. Vocal fold polyps may represent the product of continued trauma during various stages of healing from vasodilatation and edema to deposition of collagen and tissue remodeling. Interruption of this sequence through recurrent or repeated trauma leads to development of polyp [4]. Vocal polyps may result from herniation of submucosal tissue through weak areas in the epithelial basement membrane [5].

Kleinsasser [6] and Loire [7] suggested that chronic smoking leads to development of Reinke's edema as it result in edema, vascular congestion and venous stasis which leads to diffuse polypoid changes in the lamina propria.

There has been an ongoing confusion among pathologists in their attempt to accurately identify lesions of Reinke's space. Nodules, polyps and

Reinke's edema fall in the same basket and differentiation between them relies largely on the clinical description of the pathologic specimen by the operating surgeon than on their distinct pathologic features. By revising the pertinent literature, the need for an establishment of the aforementioned term still remains and is further stressed out, as confusion among the various pathologic descriptions of these lesions still exists [8].

The aim of this study is to clarify this new terminology and to find out the possible pathogenesis which may explain its nature.

## 2. PATIENTS AND METHODS

This study was done on 40 patients. The patients were selected from Otolaryngology service in Mansoura University Hospital, Egypt, who complain of hoarsness of voice. The study was conducted in the period of January 2008 to December 2014. Complete history taking and thorough endoscopic examination using rigid videotele-laryngoscopy was done to all patients.

Videostroboscopy may be performed with either rigid or flexible telescopes. During this exam a microphone is placed on the patient's neck to pick up the voice frequency. A strobe light that is slightly desynchronized to the voice frequency is then flashed at the larynx. The vocal fold histology includes multiple layers with different mechanical properties, and a mucosal wave is produced during phonation. The desynchronized strobe light captures different stages of the laryngeal vibration and its image on video appears as a mucosal wave in slow motion. Videostroboscopy may be necessary to describe the nature of a lesion, with important effect on treatment course, indications for surgery, and prognosis. The patients were treated by microlaryngosurgery. Postoperatively, the patient instructed to have realistic expectation of post-surgical improvement, good vocal habits,

maximized medical treatment of related disorders, good speech behavior aided by speech therapist (period of strict post-operative voice rest, gradual return to maximal voice use and follow-up videostroboscopy to guide voice use with surgical recovery).

### 3. RESULTS

The study group consisted of 40 patients, 32 males and 8 females. The mean age of the patients was 33 years; with a range of 23-55 years. The patients were classified into three groups (Table 1). Group 1: Includes 20 patients with Reinke's edema 16 males and 4 females. All patients are chronic smokers. Four patients are voice abusers. Pathology showed fluid collection (edema) in superficial lamina propria of vocal folds (Reinke's space) (Fig. 1). Group 2: Includes 12 patients with unilateral multiple or diffuse vocal fold polyps, 8 males and 4 females. All patients are voice abuser and 4 patients are smokers. History of hoarseness of voice is present for more than 4 years in all patients and stridor in four patients. Pathology showed an intact epithelium overlies an edematous stroma, which contains proteinaceous material within the interstitium (Fig. 2). Group 3: Includes 8 patients with bilateral vocal fold polyps. All patients are males. All patients are voice abuser. Two patients are smokers. Hoarseness of voice for more than 4 years is present in all patients. Pathology showed an intact epithelium overlies an edematous stroma, which contains proteinaceous material within the stroma. The stroma may be vascularized, myxoid or fibrinoid (Fig. 3).



**Fig. 2. Unilateral multiple vocal fold polyps**



**Fig. 3a. Bilateral multiple vocal fold polyps**



**Fig. 1. Bilateral Reinke's edema**



**Fig. 3b. Bilateral multiple vocal fold polyps**

**Table 1. Etiologic factors associated with the three groups**

	<b>Group 1 (20) Reinke's edema</b>	<b>Group 2 (12) unilateral vocal cord polyps</b>	<b>Group 3 (8) bilateral vocal cord polyps</b>
Smoking	20(100%)	4(33.3%)	2 (25%)
Voice abuse	8 (40%)	12(100%)	8 (100%)

**4. DISCUSSION**

Laryngeal polyposis is a newly mentioned terminology, introduced by the authors, to describe collectively a picture of appearance of more than one polyp affecting either one or both vocal folds. In our study, laryngeal polyposis includes:

- 1- Bilateral diffuse polyposis affecting both vocal folds (Reinke's edema).
- 2- Unilateral multiple or diffuse polyps affecting one vocal fold.
- 3- Bilateral vocal fold polyps affecting both vocal folds.

Bastin [9] mentioned the term bilateral diffuse polyposis to describe Reinke's edema. Both vocal fold polyps and Reinke's edema develop in the Reinke's space. Vocal fold polyps represent a localized reaction in the Reinke's space while Reinke's edema represents a diffuse reaction [1].

In our study we found that the possible etiological factor for bilateral vocal fold polyps and unilateral diffuse or multiple vocal fold polyps are abuse of voice and negligence of phonosurgery for long time as all patients are voice abuser for more than 4 years. This coincides with Kambic [10] and Bouchayer et al. [4] as they found that vocal polyps represent the product of continued trauma during various stages of healing, interruption of this sequence through recurrent or repeated trauma leads to development of polyps.

Moore et al. [11] said that vocal fold polyps are the product of vocal abuse and with long standing vocal fold polyp and misuse of voice a reaction appear on the opposite vocal fold. Kleinsasser [6] also found that 10% of vocal fold polyps are bilateral. Lucian [12] said the vocal fold polyps are likely the product of a local hemorrhage resulting from phonotrauma or biophysical stresses upon the vibratory tissues of the vocal fold caused by voicing.

In the Reinke's edema we found that chronic smoking is the most constant factor in all patients as we found that all patients are chronic smokers and voice abuse occur in only 40% of cases.

Agree with us Lucian [12] who said that shear forces of phonatory vibrations are greatest. In contrast to vocal fold polyps, Reinke's edema results from smoking and appears as pale watery filled bags attached to the superior surface and margins of both vocal folds.

Vocal fold polyps have a broad spectrum of appearance, from haemorrhagic to edematous, pedunculated to sessile and gelatinous to hyalinized. Vocal fold polyps typically involve the free edge of the membranous part of the vocal fold but may also be found along the superior and inferior borders. Vocal fold polyps are believed to result from phonotrauma; however, they are also recognized to arise from a single episode of hemorrhage [3]. Reinke's edema results from chronic smoking and are not found in persons who have never smoked. It may represent a specialized tissue reaction to thermal insult. Although gastroesophageal reflux and heavy voice abuse worsen the condition, they do not cause it.

On the other hand, Bastin [9] said that chronic smoking and a degree of vocal abuse are required to develop Reinke's edema. Chronic smoking and voice abuse result in edema and vascular congestion and venous stasis. These changes cause diffuse polypoid changes in the lamina propria. Chronic smoking, gastroesophageal reflux and vocal abuse cause excessive myxomatous tissue in the lamina propia [13].

Hustel et al. [14] said that Reinke's edema is associated with smoking, gastroesophageal reflux and vocal abuse. Laryngeal epithelium lacks defense comparable to esophageal epithelium making it more susceptible to injury from acid reflux and thermal effect of smoking. Smoking cessation and antireflux treatment will often arrest the progression of this condition.

Hantzakos et al. [8] 2009 propose the term "exudative lesions of Reinke's space" to include Reinke's edema, polyps and nodules. These lesions share common histological features, which are located in the Reinke's space and whose macroscopic appearance is largely

dependent upon the presence and duration of certain causative factors.

At least 9.7% of vocal fold polyps might resolve without surgery. Conservative treatment should be considered as an option for selected patients with smaller and more recent-onset polyps [15].

The classification of the vocal cord polyp according to the clinical shapes of vocal cord polyps has clinical significance for the treatment. Some vocal cord polyps of edematous type, vascular type and hemorrhagic type can be cured with voice therapy. The vocal cord polyps of fibrous type and amyloid type need treatment with phonomicrosurgery [16].

After careful histological evaluation, no definitive histological distinction can be made between laryngeal nodules and polyps, data showed no distinction between the two entities when compared for the presence of edema, fibrin, inflammation, and amyloid like material. A statistically significant difference was found in the size of the specimen and the presence of telangiectasias. Based on these data, a biopsy larger than 0.3 cm could be a polyp and a biopsy less than 0.3 cm could be a nodule [17].

Important points to improve rehabilitation from surgery: the patient should have realistic expectation of post-surgical improvement, good vocal habits, maximized medical treatment of related disorders, good speech behavior aided by speech therapist, period of strict post-operative voice rest, gradual return to maximal voice use, the results indicate that the acoustic analysis, could be used in the objective monitoring of treatment effects among subjects with benign vocal fold lesions [18]. So, follow up videostroboscopy to guide voice use with surgical recovery is recommended. Our suggestion is not evidence based and we are calling phonosurgeons to criticise this new term and propose appropriate decisions.

A recent study demonstrated that expression of both matrix metalloproteinases (MMP-2 and MMP-9) were significantly higher in benign vocal fold lesions (BVFL) groups comparing to the control group. However, generally, no significant differences were revealed among expressions of both MMP-2 and MMP-9 in subgroups of benign laryngeal lesions. Furthermore, the study demonstrated significant differences of MMP-2 and MMP-9 expressions between BVFL and

glottic SCC with the latter having higher scores [19].

## 5. CONCLUSION

Laryngeal polyposis is a newly mentioned terminology, introduced by authors to describe collectively a picture of appearance of more than one polyp affecting either one or both vocal folds and the picture of classic Reinke's edema whether accompanied or not by multiple polyps on top.

Laryngeal polyposis is a newly introduced term that includes: unilateral multiple or diffuse vocal fold polyps, bilateral vocal fold polyps.

The principle etiology of reinke's edema is smoking; the principal cause of bilateral vocal fold polyps and unilateral diffuse polyposis is abuse of voice and negligence of early phonosurgery.

Reinke's edema does not go away on its own, the cause of Reinke's edema needs to be identified and treated before treatments directed at the voice disorder (such as voice therapy or surgery) are considered.

## CONSENT

All patients had given their informed consent. All authors declare that written informed consent was obtained from all patients.

## ETHICAL APPROVAL

The authors have obtained all necessary ethical approval from Mansoura University committee.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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