



# **Involvement of the larynx in some epithelial diseases**

*Thesis*

*Submitted for partial fulfillment of Master Degree in Phoniatics*

Presented by

**Sondos Ahmed Moataz Yakout Ali**  
*M.B., B.Ch*

Supervised by

**Prof. Dr. Mohamed Ali Saad Baraka**

*Professor of Phoniatics*  
*Faculty of Medicine, Ain Shams University*

**Prof. Dr. Jilan Fouad Nassar**

*Professor of Phoniatics*  
*Faculty of Medicine, Ain Shams University*

**Dr. Mariam Salah Shadi**

*Lecturer of Phoniatics*  
*Faculty of Medicine, Ain Shams University*

**Faculty of Medicine**  
**Ain Shams University**

**2017**



التأثير على الحنجرة في بعض أمراض الأنسجة الطلائية

رسالة

توطئة للحصول علي درجة  
مقدمة من  
الطبيبة/ سندس أحمد معتز ياقوت علي  
بكالوريوس الطب و الجراحة

تحت إشراف

**أ.د/ محمد علي سعد بركة**

أستاذ أمراض التخاطب

كلية الطب- جامعة عين شمس

**أ.د/ جيلان فؤاد نصار**

أستاذ أمراض التخاطب

كلية الطب- جامعة عين شمس

**د/ مريم صلاح شادي**

مدرس أمراض التخاطب

كلية الطب- جامعة عين شمس

كلية الطب

جامعة عين شمس

القاهرة ٢٠١٧

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا  
إلا ما علمتنا إنك أنت  
العليم العظيم

صدق الله العظيم

سورة البقرة الآية: ٣٢



## ACKNOWLEDGEMENT

*First and foremost thanks to **ALLAH**, the Most Merciful.*

*I wish to express my deep appreciation and sincere gratitude to **Prof. Dr. Mohamed Ali Saad Baraka**, Professor of Phoniatics, Faculty of Medicine, Ain Shams University, for his close supervision, valuable instructions, continuous help, patience, advices and guidance. He has generously devoted much of his time and effort for planning and supervision of this study. It was a great honor to me to work under his direct supervision.*

*I wish to express my great thanks and gratitude to **Prof. Dr. Jilan Fouad Nassar**, Professor of Phoniatics, Faculty of Medicine, Ain Shams University, for her kind supervision, indispensable advice and great help in this work.*

*I wish to express my great thanks and gratitude to **Dr. Mariam Salah Shadi**, Lecturer of Phoniatics, Faculty of Medicine, Faculty of Medicine, Ain Shams University, for her kind supervision, indispensable advice and great help in this work.*

*Last and not least, I want to thank all my family, my colleagues, for their valuable help and support.*

*Finally I would present all my appreciations to my patients without them, this work could not have been completed.*

## *Contents*

| <b>Subjects</b>                                      | <b>Page</b> |
|------------------------------------------------------|-------------|
| • List of Abbreviations .....                        | I           |
| • List of tables .....                               | II          |
| • List of Figures .....                              | III         |
| • Introduction .....                                 | 1           |
| • Aim of the Work .....                              | 4           |
| • Review of literature:.....                         |             |
| Chapter 1: Anatomy and physiology of the larynx..... | 5           |
| Chapter 2: Lipoid proteinosis (LP) .....             | 16          |
| Chapter 3: Tuberculosis .....                        | 27          |
| Chapter 4: Sarcoidosis .....                         | 49          |
| Chapter 5: Pemphigus Vulgaris (PV).....              | 68          |
| Chapter 6: Lichen Planus (LP).....                   | 75          |
| • Subjects And Methods.....                          | 89          |
| • Results .....                                      | 95          |
| • Discussion .....                                   | 107         |
| • Recommendations .....                              | 113         |
| • Summary .....                                      | 114         |
| • References .....                                   | 117         |
| • Arabic Summary.....                                | -           |

---

## *List of Abbreviations*

|              |                                    |
|--------------|------------------------------------|
| <b>LPr.</b>  | : Lipoid Proteinosis               |
| <b>ECM 1</b> | : Extra-Cellular Matrix protein 1  |
| <b>TB</b>    | : Tuberculosis                     |
| <b>MTB</b>   | : Mycobacterium Tuberculosis       |
| <b>BCG</b>   | : Bacille Calmette Guerin          |
| <b>WHO</b>   | : World Health Organization        |
| <b>ZN</b>    | : Ziehl Neelsen                    |
| <b>HIV</b>   | : Human Immunodeficiency Virus     |
| <b>CNS</b>   | : Central Nervous System           |
| <b>TBM</b>   | : Tuberculous Meningitis           |
| <b>MHC</b>   | : Major Histocompatibility Complex |
| <b>Th-1</b>  | : T Lymphocyte type 1              |
| <b>PV</b>    | : Pemphigus Vulgaris               |
| <b>LPI</b>   | : Lichen Planus                    |
| <b>CLPI.</b> | : Cutaneous Lichen Planus          |
| <b>GI</b>    | : Gastro-Intestinal tract          |
| <b>OLPI.</b> | : Oral Lichen Planus               |

## *List of Tables*

| <i>Table No.</i> | <i>Subject</i>                                                                           | <i>Page</i> |
|------------------|------------------------------------------------------------------------------------------|-------------|
| <b>Table (1)</b> | Different species of TB, principal hosts and humans as secondary hosts.                  | 29          |
| <b>Table (2)</b> | Percentages of different sites of the larynx being involved in lipoid proteinosis cases. | 99          |
| <b>Table (3)</b> | Percentages of the involved sites within the larynx in cases of sarcoidosis.             | 104         |
| <b>Table (4)</b> | Percentages of involved sites within the larynx in pemphigus vulgaris cases.             | 106         |

## *List of Figures*

| <b>Fig. No.</b>  | <b>Subject</b>                                                                                                                  | <b>Page</b> |
|------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>Fig. (1)</b>  | MRI sagittal section showing the larynx.                                                                                        | 5           |
| <b>Fig. (2)</b>  | Cartilaginous and fibroelastic structures of the larynx.                                                                        | 6           |
| <b>Fig. (3)</b>  | Lateral and posterior views of the larynx.                                                                                      | 11          |
| <b>Fig. (4)</b>  | Ultra structure of the vocal fold.                                                                                              | 13          |
| <b>Fig. (5)</b>  | Microanatomy of the vocal fold.                                                                                                 | 13          |
| <b>Fig. (6)</b>  | Schematic coronal section through the vocal folds, demonstrating mucosal wave propagation.                                      | 15          |
| <b>Fig. (7)</b>  | Beaded lesions over both eyelid margins.                                                                                        | 19          |
| <b>Fig. (8)</b>  | Many pitted acne-like scars involved the elbows.                                                                                | 19          |
| <b>Fig. (9)</b>  | Endoscopic picture of the larynx for 11 years old child showing irregular thickened vocal folds and arytenoids.                 | 21          |
| <b>Fig. (10)</b> | Cobblestone appearance of the oral mucosa.                                                                                      | 23          |
| <b>Fig. (11)</b> | Temporal lobe calcification                                                                                                     | 24          |
| <b>Fig. (12)</b> | Microscopic appearance of a well circumscribed, non-caseating granuloma composed of epithelioid cells with a single giant cell. | 31          |
| <b>Fig. (13)</b> | Detail of a Langhans giant cell with a peripheral horseshoe-like rim of nuclei and abundant eosinophilic cytoplasm              | 32          |
| <b>Fig. (14)</b> | Primary TB sequelae. This diagram outlines the possible outcomes following primary TB infection                                 | 33          |
| <b>Fig. (15)</b> | Irregularity of both vocal folds and ventricular bands.                                                                         | 40          |
| <b>Fig. (16)</b> | Irregular scars with papules (scrofuloderma).                                                                                   | 46          |
| <b>Fig. (17)</b> | Lupus Vulgaris of TB.                                                                                                           | 46          |
| <b>Fig. (18)</b> | Activated macrophages release mediators responsible for causing fibrosis.                                                       | 52          |
| <b>Fig. (19)</b> | Erythema nodosum of Sarcoidosis.                                                                                                | 55          |
| <b>Fig. (20)</b> | Edematous curled and swollen epiglottis in laryngeal Sarcoidosis.                                                               | 59          |
| <b>Fig. (21)</b> | An approach to the diagnosis of sarcoidosis                                                                                     | 61          |
| <b>Fig. (22)</b> | Stages of the classification system of Scadding.                                                                                | 63          |
| <b>Fig. (23)</b> | Sarcoid granuloma showing epithelioid                                                                                           | 65          |



## *List of Figures*

| <b>Fig. No.</b>  | <b>Subject</b>                                                                                                                                                                                                            | <b>Page</b> |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
|                  | histiocytes and lymphocytes on the periphery and a giant cell within the granuloma.                                                                                                                                       |             |
| <b>Fig. (24)</b> | Giant cell in Sarcoidosis.                                                                                                                                                                                                | 65          |
| <b>Fig. (25)</b> | Multiple ulcers on the soft palate in PV.                                                                                                                                                                                 | 69          |
| <b>Fig. (26)</b> | Ulcers on the cheek in PV.                                                                                                                                                                                                | 69          |
| <b>Fig. (27)</b> | Ulcers on the laryngeal surface of the epiglottis.                                                                                                                                                                        | 72          |
| <b>Fig. (28)</b> | Classic cutaneous lichen planus.                                                                                                                                                                                          | 79          |
| <b>Fig. (29)</b> | Nail in lichen planus.                                                                                                                                                                                                    | 80          |
| <b>Fig. (30)</b> | Oral Lichen Planus.                                                                                                                                                                                                       | 83          |
| <b>Fig. (31)</b> | Direct laryngoscopic view showing marked cicatrization of both false vocal folds and arytenoids                                                                                                                           | 86          |
| <b>Fig. (32)</b> | The number of patients included in the study diagnosed with different epithelial diseases and their percentage of the total number                                                                                        | 95          |
| <b>Fig. (33)</b> | Thickening and hypertrophy of both vocal folds with yellowish discoloration in case of LPr.                                                                                                                               | 97          |
| <b>Fig. (34)</b> | Hypertrophy of the right (the picture to the right) and the left (the picture to the left) vocal fold with yellowish discoloration in case of LPr (arrows).                                                               | 98          |
| <b>Fig. (35)</b> | Swollen arytenoids in case of LPr.                                                                                                                                                                                        | 98          |
| <b>Fig. (36)</b> | Interarytenoid mass and deposits in case of LPr.                                                                                                                                                                          | 98          |
| <b>Fig. (37)</b> | the different sites affected in the larynx in case of LPr.                                                                                                                                                                | 99          |
| <b>Fig. (38)</b> | Oedematous vocal folds that is more pronounced posteriorly, with hindered mobility leaving a small respiratory chink in a case of TB.                                                                                     | 101         |
| <b>Fig. (39)</b> | The laryngeal picture of a male diagnosed with tuberculosis and dysphonia, both during respiration and phonation, showing swollen vocal folds especially their posterior parts with unhealthy lusterless covering mucosa. | 101         |
| <b>Fig. (40)</b> | Oedematous epiglottis in case of sarcoidosis                                                                                                                                                                              | 103         |
| <b>Fig. (41)</b> | Interarytenoid granulation tissue in case of sarcoidosis                                                                                                                                                                  | 103         |
| <b>Fig. (42)</b> | Subglottic mass and irregularly hypertrophied vocal folds and arytenoids in case of Sarcoidosis                                                                                                                           | 103         |
| <b>Fig. (43)</b> | The different sites affected in the larynx in cases of sarcoidosis.                                                                                                                                                       | 104         |

---

---

## *✍List of Figures*

---

| <i><b>Fig. No.</b></i> | <i><b>Subject</b></i>                                             | <i><b>Page</b></i> |
|------------------------|-------------------------------------------------------------------|--------------------|
| <b>Fig. (44)</b>       | Erosions on the epiglottis in a case of PV                        | 106                |
| <b>Fig. (45)</b>       | Oedematous epiglottis in a case of PV                             | 106                |
| <b>Fig. (46)</b>       | Irregular vocal folds in a case of PV                             | 106                |
| <b>Fig. (47)</b>       | Hyperadducted ventricular bands during phonation in a case of PV. | 106                |

## **Introduction**

Voice is the carrier wave of the verbal communication. It is produced in the larynx by vibration of the mucosa of the vocal folds resulting in the production of the primary laryngeal sound (*Kotby and Baraka, 1978*).

Any disruption of the function of the voice is called dysphonia (*Kotby, 1986*). Dysphonia may occur as a result of fault in one or more of the following: the range of movement of the vocal folds, movement of the mucosa over the deeper structures, the coaptation of the vocal fold's edges, the timing between the closure of the vocal folds and the pulmonary exhalation, the motor force, the pulmonary breath control, and the tension of the vocal fold muscles (*Kotby, 1985*).

### **Classifications of the voice disorders (*Kotby, 1995*):**

- I. Organic causes:
  - 1- Congenital: as laryngeal web.
  - 2- Acquired: as traumatic, inflammatory, neoplastic, endocrinopathies, neurological disorders (as spasmodic dysphonia) and status post-laryngectomy.
- II. Non organic causes:
  1. Habitual: hyperfunctional childhood dysphonia, mutational dysphonia, hyperfunctional dysphonia,

hypofunctional dysphonia, phonasthenia,  
ventricular dysphonia.

2. psychogenic aphonia.

III. Minimal associated pathological lesions: this category include: vocal fold nodules, vocal fold polyp, vocal fold cyst, Reinke's edema and granulomas (contact and intubational).

### **Epithelial tissue diseases:**

Epithelial Tissue is a collection of closely packed, interconnected epithelial cells. The epithelial tissue makes of the epithelium, which covers the surfaces of organs and structures throughout the body. This includes the external surface of the body, which is the biggest organ, the skin (*Thomas et al., 2005*).

**Epithelial tissue diseases are classified into (*Thomas et al., 2005*):**

1-Skin diseases: as Dermatitis, Psoriasis, Lipoid Proteinosis, Sarcoidosis, Tuberculosis, mucocutaneous type Pemphigus Vulgaris and Lichen Planus.

2-Mucous membranes diseases: as mucosal form of Pemphigus Vulgaris and Disquamated Gingivitis.

3-Sweat glands diseases: as Hyperhidrosis and Chromhidrosis.

Some of these diseases may affect the larynx by affecting its morphology through affection of its the normal anatomy.

Lipoid Proteinosis, Tuberculosis, Sarcoidosis, Pemphigus Vulgaris and Lichen Planus are epithelial diseases affecting many organs including the larynx and the skin.

Here we are going to focus on these disease and their effect on the larynx, although being relatively rare diseases, the affection of the larynx is not rare and it may be the first presentation.

## **Aim of the work**

The aim of work is to review the literature and present some cases of epithelial diseases where the larynx is involved, in order to better understand the possible laryngeal presentations of such relatively rare conditions. This gives also a better understanding of the incidence of the laryngeal involvement in these diseases that should be taken in consideration in the diagnosis for better management of these diseases.

## **Anatomy of the larynx**

Anatomic orientations are used to help professionals communicate and provide landmarks for classifications and descriptions of various diseases (*Joy et al., 2006*).

Larynx is composed of Cartilages connected by ligaments and moved by muscles. The larynx is a 5-7 cm long structure. Its upper boundary starts at the tip of the epiglottis (the black arrow), opposite the 3<sup>rd</sup> to 4<sup>th</sup> cervical vertebra. The lower end is at the lower border of the cricoid cartilage (the white arrow), lies opposite the 6<sup>th</sup> cervical vertebra.



**Figure (1):** MRI sagittal section showing the larynx (*Joy et al., 2006*).

### **Laryngeal Cartilages:**

The structural rigidity of the larynx is provided by the three median (unpaired) cartilages:

The epiglottis, Thyroid cartilage and Cricoid cartilage.