

## THE MANAGEMENT OF LARYNGEAL DYSPLASIA AT OBESE PATIENT

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*The aim of this study is to focus on the problems raised by laryngeal dysplasia in the obese patient emphasizing on the anesthesiologist point of view. The method consists in reviewing our clinical observations concerning the obese patients with laryngeal dysplasia. The authors have in view to formulate some considerations to be applied in current clinical practice. The results consist in some considerations with a high degree of clinical applications by the team formed by the ENT (Otorinolaryngology) team and the anesthesiologist.*

**Key words:** laryngeal dysplasia, obesity, anesthesiology.

### INTRODUCTION

Laryngeal dysplasia, a common clinical concern, represents a **precancerous stage**. Laryngeal cancers represent almost 1-2% of all malignancies diagnosed worldwide and almost 3% of male cancers in Europe, with a incidence male/female of 6:1<sup>1-4</sup>. The survival of the patient depends of the stage of the disease, therefore is very important to realize the early detection of the tumors development in order to apply the suitable therapy. The laryngeal dysplastic lesions range between 2 and 10 cases per 100,000 population and usually manifests themselves during the second half of life<sup>5</sup>. The risk factors include smoking, alcohol indulgence, environmental exposure. The patients commonly present a history of sore throat, dysphonia, dysphagia. The initial microscopic change in laryngeal dysplasia is considered to be the in the basal layer of the epithelium and the development of the lesions is made gradually until it reaches the surface<sup>7, 8</sup>. In order to correctly diagnose a laryngeal dysplasia, there are some schemes of classifications based on the hystopatological characteristics<sup>3</sup>.

Squamous cell hyperplasia characterized by the increased cell number in the spinous layer or/and in the parabasal/basal cell layers. The aspects show regular stratifications and no cellular atypia<sup>6</sup>.

In **mild dysplasia** the architectural modifications are limited to the lower third of the epithelium, cell atypia<sup>4,6</sup>.

**Moderate dysplasia** is characterized by architectural disturbances that extend to the middle third of the epithelium, with predominant nucleoli, but without any abnormal mitoses. In **severe dysplasia**, the lesions include architectural disturbance with associated cytological atypia, important nuclear abnormalities with

bizarre nuclei. Mitoses are present in the epithelium and atypical mitoses may be found. This stage has a high risk to develop in a carcinoma in situ.

**Carcinoma in situ** is characterized by architectural abnormalities, cytological atypia, atypical mitosis<sup>6</sup>. It is not always possible to recognize the morphological changes. The above description corresponds to the operational classifications very useful in practice classifications of laryngeal dysplasia<sup>3</sup>. This classification recognizes four grades of Epithelial Hyperplastic Lesions of the Larynx:

-simple and abnormal hyperplasia are considered benign categories,

-atypical hyperplasia (risky epithelium) potentially,

-carcinoma in situ actually, malignant lesions<sup>2,3</sup>.

**The diagnosis of these laryngeal lesions** include physical examination, the history of the symptoms, and indirect laryngoscopy which can be complemented by a flexible fiber or rigid endoscope that allows the observation of the larynx even under difficult conditions of anatomy or in patients with an uncontrollable gag reflex. The examination should be made both in respiration and phonation. The examination provides general information of the site of the lesion, its length and also the proper mobility of the vocal folds.

Another method of diagnosis is based on the electronic video system which can provide high quality color images of the lesions compared with normal anatomy<sup>10</sup>.

**Narrow band imaging** is an endoscopic technique which offers information about the tissue characteristics using narrow bandwidth filters in a sequential red, green and blue illumination systems. The filter is placed in the optical system of the illumination. The used wavelengths are of 415 and 540 nm. The wavelength of 415 nm corresponds to the peak absorption spectrum of

hemoglobin to emphasize the image of capillary vessels on surface mucosa<sup>11</sup>. Superficial lesions are identified by changes in the color tone and irregularity of surface mucosa during endoscopic examination<sup>11</sup>.

Another method of diagnosis is based on **video-contact endoscopy**. It provides detailed magnified images of the live epithelium, using a modified glass rod lens endoscope placed on the surface of the tissue. This technique allows in vivo and in situ visualization of the superficial layer of the laryngeal epithelium after staining with methylene blue<sup>8,10</sup>. During direct microlaryngoscopy under general anesthesia, multiple mucosal biopsies for histological examination, which can lead to the diagnosis of carcinoma in situ, can be performed.

Obese patients with or without associated endocrine disorders (diabetes mellitus) represent a difficult category to be taken in care due to the problems concerning general anesthesia and the difficult intubation. Another difficult point concerning the obese patient with laryngeal dysplasia is a mixed problem between the team consisting in ENT surgeon and anesthesiologist.

The aim of this article was to focus on the problems raised by laryngeal dysplasia in the obese patient emphasizing on the anesthesiologic point of view. An evaluation of the anesthesiology and intubation techniques (orotracheal, nasotracheal) which facilitate a better exposure of the glottic plane of the obese patient with a modified anatomic conformation (short, thick, stiff neck, macroglossia)<sup>9</sup>.

## MATERIAL AND METHODS

A comprehensive review of the medical literature about the management of the anesthesiology in obese patient with laryngeal dysplasia. We completed these data with our clinical observations in order to identify the main difficulties concerning laryngeal microsurgery in the obese patients. This led us to the following questions and possible answers:

1. Which is the value of body mass index in the obese patients with laryngeal dysplasia?

Answer: to calculate pharmacologic medications per body mass/weight and to see if there are any frequent or specific lesions in the vocal folds.

2. Which is the external conformation of the neck region?

Answer: orotracheal intubation difficulties

3. Which is the conformation of the mandible, oral cavity, the tongue and the velar region?

Answer: orotracheal intubation difficulties and calculating Malampatti scale.

4. Which is the conformation, dimensions and the position of the larynx?

Answer: orotracheal intubation difficulties.

5. Which are the type of lesions in the larynx?

Answer: laryngeal dysplasia (see the upper quoted classifications).

6. Which is the most properly intubation tube?

Answer: laryngeal microsurgery at the level of the glottic plane asks for an as small as possible intubation tube. Its

dimension should allow the ENT surgeon to work in a very reduced anatomically space (glottis with laryngeal dysplasia)

7. Which is the most properly intubation procedure?

Answer: a good exposure of the larynx during intubation procedures allows a gentle maneuver in order to preserve the integrity of the vocal folds and not to produce hemorrhage<sup>7,9</sup>.

8. Which are the most relevant blood tests concerning the type of obesity and the type of the metabolic disease? What are the related comorbidities (cardiac, pulmonary, vascular, neurologic and renal pathology, anticoagulant chronic treatment)? Calculating the anesthetic risk<sup>1,7</sup>.

Answer: the control of the general anesthesia during the operation, the control of the postoperative status

9. Which is the most efficient attitude of the team formed by the ENT surgeon and anesthesiologist during the operation and postoperative period?

Answer: the tasks of the ENT surgeon, the tasks of the anesthesiologist, the collaboration between the two specialists upper quoted

10. Which are the main challenges for the ENT surgeon concerning laryngeal dysplasia in obese patients?

Answer: identifying some specific aspect of the lesion or of the degree of laryngeal dysplasia in obese patients

## RESULTS AND DISCUSSIONS

The results consist in some considerations with a high degree of clinical applications by the team formed by the ENT team and the anesthesiologist.

According to the above 10 questions and their answers we reached the following answers:

1. The anesthesiologist must calculate BMI using the proportion between weight (in kilos) and body surface (square meters). Morbid obesity has a BMI larger than 33 and is frequently associated with sleeping obstructive apnea syndrome (SOAS). As a marker of this problem magnitude BMI is larger than 27,8 in male and 27,3 in female at over 34 million of US citizens<sup>2</sup>

Considering the analysis of the cases with obese patients having laryngeal dysplasia we identified the following clinical situations which needed oro-tracheal intubation using an optic fiber and/or even tracheotomy<sup>5</sup>:

-the patients with obesity or morbid obesity  
-patients with Pickwick Syndrome (obesity associated with SOAS and cardiac pathology)

-patients with severe medical conditions associated with obesity (severe dismetabolic syndromes, cardiac stents and anticoagulant medication), vascular and neurologic involvement.

Considering these severe clinical situations the anesthesiologist must be informed concerning the pharmacological dosage (ideal weight/actual weight), the interactions between metabolic pathways of the drugs and to prevent the adverse reactions.

Also the anesthesiologist and the ENT surgeon must have in view the intubation with the help of an optic fiberscope in obese patients with laryngeal dysplasia.

2. A short and thick neck, increased cervical spine rigidity and a modified skull neck shaft must alert the anesthesiologist concerning difficult intubation.

3. There are different anatomical conformations of the mandible and of the oral cavity. The anesthesiologist must score the type of the oropharyngeal isthmus according to Malampatti score.

4. In obese patients having laryngeal lesions we are often confronted with an infantile larynx (small larynx with an omega-shaped epiglottis). This type of larynx is very difficult to intubate for anesthesiologist and for the ENT surgeon to work inside the larynx during microlaryngoscopy. This is a very difficult problem during the surgical procedure because the glottis has approximately 7-11 mm from anterior commissure to the posterior commissure and 5-8 mm between the two vocal apophysis of the arytenoids(6). The surgical team has to take into account that in this area the intubational tube occupies unfortunately 1/3 of the space.

So the operating field is diminished by "the competition" between the ENT surgeon and the anesthesiologist.

5. In the operating field, during microlaryngoscopy with general anesthesia and during the modern diagnostic procedures (videocontact endoscopy, narrow band imaging) the ENT surgeon must appreciate: (1) the presence of hypertrophic lesions of the vocal folds epithelium; (2) the presence and the position of the keratin as an exophitic mass or plaque; (3) the vascularization of a lesion which is susceptible to be malignant (carcinoma in situ); (4) the stage of the premalignant lesion.

6. The ENT surgeon must communicate during the operation with the anesthesiologist concerning:

- the position of the intubation tube (sometimes it must be moved to the anterior commissure in order to work in the posterior one) in order to create the necessary space for surgical procedure inside the larynx

- so the so called "competition" between ENT surgeon and the anesthesiologist concerning the glottis must always have an academic solution for removal of the laryngeal dysplasia and for the benefit of the patient

7. Despite of the difficulties created by a lot of factors above mentioned (external neck conformation, short, thick, narrow neck, limited mouth opening, small laryngeal inlet, cervical spine rigidity, narrow tubular organs/SOAS, modified skull-neck shaft, small glottis with high lesional risk for oro-tracheal intubation) there are some technical opportunities created to facilitate the oro-tracheal intubation: (1) oro-tracheal intubation by the help of the fiber-optic system (2) the exposure of the larynx by means of an intubation system with TV monitor;

When these modalities cannot solve the problem of orotracheal intubation the anesthesiologist must stop the procedure of general anesthesia and postpone the patient. In limited situations, but considered to be at a very high risk or during a failed orotracheal intubation a tracheostomy must be taken into account especially when

the trials of the anesthesiologist to intubate the patient had no results. In such situations a laryngeal edema can appear and the obstructive laryngeal syndrome must lead to severe hypoxia.

8. An anesthesiologist shall be responsible for determining the medical status of the patient. He must develop plan of anesthesia after physical examination (evaluation of the upper airway- thyromental distance, aperture opening, ability to flex and extend neck, evaluation of the cardiovascular system- auscultation of the heart, peripheral pulses, blood pressure, of the pulmonary system- auscultation for rales and wheezing), blood tests, pulmonary function tests, electrocardiogram<sup>1</sup>. The most relevant blood tests for the obese patient with laryngeal dysplasia seems to be the following: complete blood count and hemoglobin concentration, coagulation, electrolytes, urinary analysis, transaminases, glucose<sup>7,9</sup>.

9. Depending on known or unknown comorbidities suggested by the clinical examinations and the anamnesis the anesthesiologist must develop a large range tests necessary for the obese patient during microlaryngoscopy.

10. The ENT surgeon and the anesthesiologist must communicate preoperatively and share their tasks during the operation and postoperative period 0-24h.

<b>Diagnosis challenges in obese patients with laryngeal dysplasia</b>
Clinical exam(history of case,inspection,palpation of the neck,indirect laryngoscopy)
Videofibrosocopy with chip on the tip/with NBI
Videostroboscopy
Cervical ultrasonography-cervical lymph nodes
CT. MRI (pre-epiglottic; paraglottic!)
Microlaryngoscopy with general anesthesia
Interooperative rigid optic endolaryngeal evaluation:0,30,45,70°
Interooperative NBI
Contact videoendoscopy
Biopsy +Imunohistochemical exam
Evaluation of endocrine,respiratory,cardiac status
Anesthesiologic evaluation (including BMI and related problems)

**Table 1.** Diagnosis challenges in obese patients with laryngeal dysplasia

No specific lesions of the laryngeal dysplasia in the obese patient were noticed. The laryngeal dysplasia has the same aspect in obese patients as in nonobese patients, so there are no specific laryngeal lesions connected with obesity. Some specific problems appear connected with the process of scarring following the surgical procedure.

We also have to underline the easy bleeding aspect of the vocal fold in patients with anticoagulant medication. We cannot state any relations with any metabolic medication, statins for instance. The anesthesiologist and the ENT surgeon must identify the risk factors generating laryngeal dysplasia (smoking and alcohol abuse, gastroesophageal reflux disease). They must also have in view the causes of the obesity, its complications and associated risk factors.

## CONCLUSIONS

There are many difficulties concerning oro-tracheal intubation in obese patients with laryngeal dysplasia. The ENT surgeon and the anesthesiologist must form a surgical team with specific tasks during the operation and postoperatively. There are no specific lesions in obese patients with laryngeal dysplasia comparing with the normal-weighted patients with laryngeal dysplasia. There is also a "competition" at the level of the glottis between the ENT surgeon and the anesthesiologist. The diagnose of laryngeal dysplasia involves a complex protocol even when very modern optical techniques are used (narrow band imaging, video-contact endoscopy). Both obesity and laryngeal dysplasia involve a long follow up and a very good communication between anesthesiologist, ENT surgeon and metabolic diseases specialist.

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