Using video contact endoscopy in the vocal fold lesion. 10 years critical review

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ABSTRACT

Early detection of the vocal fold malignancies is usually done using the flexible or rigid endoscopic exam. Video stroboscopy can be used to early detect an abnormal vibration of a portion from the vocal fold. Video contact endoscopy is an endoscopic technique that will provide the surgeon to observe histological modifications of the superficial layer and the superficial vascular network of the vocal fold. The authors started to use the contact endoscopy 10 years ago and try to have a critical point of view regarding this method. Observing the abnormal vessel patterns and histological characters will guide the surgeon to perform a targeted biopsy that will be used in early detection and follow up in patients with vocal fold malignancies.

Key words: contact endoscopy, early detection, laryngeal malignancies

INTRODUCTION

Video contact endoscopy is an optical method that was imagined in 1971 by a gynecologist named Hamou. At that time he performed a contact colposcopy. Because of the poor image of the endoscope the method was abandoned. In 2004 Mario Andrea and Oscar Diaz using Hamou idea introduced video contact endoscopy in otorinolaryngology (1,3).

First they performed a video contact endoscopy on the vocal fold and than on the other anatomical areas and nose, rhino pharynx, hypo pharynx.

We have started to use that technique in late 2004 when we performed a video contact endoscopy on a patient with premalignant lesion of the vocal fold.

Since than we have performed numerous video contact endoscopy of the vocal fold. After using video contact endoscopy for 10 year we would like to present a critical review of the method emphasizing on the strong and weak points.

The method was imagined to be used in early detection and follow up of the malignancies in head and neck tumors.

MATERIALS AND METHODS

We have started to perform video contact endoscopy of the vocal fold 10 years ago. The video contact endoscopy exam was performed under general anesthesia during direct microlaryngoscopy.

The working protocol consists in the following 4 operations.

After exposing the glottic plan using an operating laryngoscope we have to clean the vocal fold.

The next step is the use of methylene blue in order to color the surface of the vocal fold (2).

Then we have to wait for 3-4 minutes to obtain a optimal coloration of the epithelium.

We gently apply the video contact endoscopy rigid endoscope on the vocal fold. The rigid endoscope designed for contact endoscopy is an endoscope with 0 focal length and a microscope like adjustment that help to focalize the image. There are several types of contact endoscope; some of them are 50X or 150X magnification power and there are 0 and 30 degrees endoscopes.

After applying the contact endoscope on the vocal fold, we capture the image using a standard endoscopy camera and we project the obtained image on a monitor.

Using the contact endoscopy the surgeon is able to obtain a histological view but in vivo (4).

The main parameters that we are ale to analyze are: the uniformity of the cellular field, the ration between the nucleus and cytoplasm; the size and the shape of the cell.

Using the more powerful 150X contact endoscope more parameters can be examined as nuclear abnormalities.

The method was designed to observe mainly the cells and the histological modifications of the cellular field.

After 4 years of using the video contact endoscopy as designed by the authors of the method, we started to carefully observe the vascular network design of superficial layer.

Having in mind the angiogenesis theory which postulate that a 1 mm tumor will start to produce endothelial growth factor that will start the vascular neoformation we have started to move our focus from examining the cellular field modification to vascular abnormalities.

The normal vascular network for the vocal fold will be parallel with the margin of the vocal fold. When vascular abnormalities, as amputated vessels, disorganized vascular network, are detected we have performed targeted biopsy from that area.

We have compared our presumable diagnostic using video contact endoscopy with the histological finding after biopsy in order to determine the sensitivity and the specificity of the method.

RESULTS. DISCUSSION

The results concerning the sensitivity and the specificity of the method was calculated comparing the presumable diagnostic with the result of the biopsy.

We have calculate the sensitivity and the specificity of the method based on the histological findings of the cellular field and the results are: sensitivity 78% and specificity 81%.

Taking into account the vascular abnormalities of the superficial layer of vessels the sensitivity of the method was 91% and the specificity was 95%

CONCLUSIONS

We consider video contact endoscopy a useful technique in early diagnostic of the malignant lesions of the vocal fold. Observing the vascular network modification of the vessels from the superficial layer of the vocal fold has improved the sensitivity and the specificity of the method (*figures 1, 2*).

Figures 1, 2

Video contact endoscopy does not replace the biopsy.

It will help the surgeon to perform targeted biopsy from the areas with vascular network modifications.

Observing the vascular network modifications is easier to be seen by the surgeon. The histological modifications needs a surgeon with great knowledge of histology and require a longer learning curve.

Using video contact endoscopy combined with narrow band imaging light that enhance the vascular network characters will increase the sensibility and specificity of the method, but further studies needs to be performed.

The main disadvantage of the method is that it can be only be performed under general anesthesia at the level of the vocal fold.

Video contact endoscopy is a simple, rapid,

repeatable, noninvasive examination performed with standard equipment, but there is a learning curve associated with its use.

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