INTRODUCTION

I would like to announce this abstract is different from presentation at first. We change and correct it with presentation.

Laryngopharyngeal reflux disease (LPRD) is very common disease and LPRD may lack of specificity and sensitivity of diagnostic examinations. Therefore, a diagnosis of LPRD can be taken into consideration on the basis of a combination of diagnostic signs and symptoms.

Narrow band imaging (NBI) is not only widely recognized as a powerful tool of diagnosis for early cancers but also worked for diagnosis of benign disease due to potential capability as well.

We reported a specific feature which nasopharyngeal epithelial round cells were modulated capillary cells raised among LPRD patients by using NBI at AAO HNS annual meeting last year.

Wavelet transform has developed in image processing. As image processing application requiring a detail edges and directions, one feature detection method is the two-dimensional discrete wavelet transform (DWT) which decomposes the signal and image into each frequency component using low-pass and high-pass filters.

Perfect translation invariance complex wavelet transform (PTI-CDWT) can detect more directions and frequency of ESSG number 7.

Total patients: 48  Female: 30, Male: 18
Average age of patients was 58.4 years old
Nasopharyngeal epithelial cell with NBI showed a specific feature which nasopharyngeal epithelial round cells were modulated capillary cells raised among LPRD patients.
Recorded picture was transformed to PTI-CDWT (Figure 2).
Level 3 image was extracted from previous image (Figure 3).
Finally, inverted wavelet analysis (IPTI-CDWT) was implemented. IPTI-CDWT image was reconstructed to be closer to the original picture (Figure 4).
Image processed image was next analyzed to detect area ratio by using imageJ (figure 5).
On FSSG examination, more than 8 of total score of all patients were 39. According to number 7 question of FSSG, most patients represent more than frequency 2 (sometimes). Especially, the area ratio showed more than 0.7 in frequency 3 and 4 (table and chart).

METHODS AND MATERIALS

Examination was carried out with NBI system (VISERA CLV-S40Pro, OLV 101H, ENF-V3, ENF Type VQ Olympus, Tokyo, Japan), which contains standard and NBI filters.

We have 48 patients who underwent NBI using FSSG. A blue light with the help of special narrow band filters enables enhanced imaging of the superficial tissue structures.

Pictures were taken at least 2 locations; nasopharynax and larynx. All pictures were saved as digital picture (Figure 1).

We performed image processing pictures after NBI examination by using the application software of PTI-CDWT which was developed at Toyohashi University of Technology.

Pictures recorded by NBI imaging examination were stored in PC to develop PTI-CDWT analysis.

In PTI-CDWT, a picture was divided into 3 group. Top left picture represents original picture. We selected level 3 category to transform by using inverted PTI-CDWT as close to the original picture as possible (Figure 3).

We analyzed the area ratio of recorded pictures by using ImageJ software, version 1.47 (National Institutes of Health, Bethesda, MD). ImageJ is a public domain Java image-processing program.

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Original image of nasopharynx was used as whole area (256 x 256 pixels). A given area by green line was selected, which seems to be a specific feature in nasopharyngeal epithelial round cells, was measured by ImageJ. Selected area (pixels) was divided by whole area. We calculated the ratio.

Subjects answered according to the frequency of patients symptoms were scored as follows: never=0; occasionally=1; sometimes=2; often=3; and always=4. Generally, when total score of FSSG is more than 12, it is considered to indicate probable Gerd. Number 7 (Do you have an unusual (e.g. burning) sensation in your throat?) of FSSG is related to LPRD symptom.