Abstract

Objectives
To evaluate a picture of Narrow Band Image (NBI) examination for a diagnosis of LPRD using the image processing analysis objectively.

Methods and Materials
Five patients who underwent NBI were utilized. Three patients were LPRD patients and two patients were non-LPRD patients. We performed image processing for pictures after NBI examination by using the application software of a perfect translation invariance complex wavelet transform complex discrete wavelet transform (PTI-CDWT) developed at Toyohashi University of Technology and MATLAB® (The MathWorks, Inc.). We looked into the feature of nasopharyngeal mucosa physical changes which were detected by PTI-CDWT and analyzed by MATLAB®.

Results
Images with LPRD showed many round opaque dots consistent with round wavelet transform mostly. On the contrary, Images without LPRD represented small number of linear line and any other area showed nothing feature. Morphological operation by MATLAB® distinguished the difference of nasopharyngeal mucosa physical exchange between LPRD and Non-LPRD.

Conclusion
Though LPRD is a common disease for otolaryngologist, it may not be still a definite diagnosis like GERD so far. We have presented a correlation between LPRD and nasopharyngeal mucosa examination as mackerel cloud pattern at AAOHNS annual meetings. We showed possibility of image processing to diagnose LPRD with PTI-CDWT last year. Images which were implemented morphological operation by MATLAB® may show representative for each nasopharyngeal mucosa physical change. MATLAB® characterized images which were modified by using PTI-CDWT. To use PTI-CDWT and MATLAB® is not only useful to diagnose LPRD but may have possibility to develop image diagnosis or analysis instrument.

Methods and Materials

◆ Five patients who underwent NBI examination were utilized. Three pictures were LPRD patients and Two pictures were non-LPRD patients.

◆ All pictures after NBI examination were performed image-processing with the application software of a perfect translation invariance complex wavelet transform complex discrete wavelet transform (PTI-CDWT) developed at Toyohashi University of Technology and analyzed with MATLAB® application software (The MathWorks, Inc.).

◆ We looked into the feature of nasopharyngeal mucosa physical changes which were detected by PTI-CDWT (Figure 1 to 5) and analyzed by MATLAB® morphological operation (Figure 6 to 10).

Introduction

◆ First of all, I would like to modify and correct it with presentation, as submitted abstract is different.

◆ LPRD (Laryngopharyngeal reflux disease) is very common disease. However, LPRD is still hard to diagnose due to poor objective findings without specific features with fiberscope examination of larynx.

◆ We have reported a specific correlation between nasopharyngeal mucosa epithelial change and LPRD patients by using NBI (Narrow band imaging) examination at AAOHNS.

◆ NBI is getting more recognized as an early cancer detection tool but also NBI has a possibility for diagnosis of benign disease such as inflammation and capillary disease as well.

◆ Analysis of NBI digital pictures focused on morphological changes of nasopharyngeal mucosa epithelial underlined one feature of LPRD with the perfect translation invariance complex wavelet transform complex discrete wavelet transform (PTI-CDWT). PTI-CDWT advocates an image processing such as noise reduction, enhancement, and detetion.

◆ To analyze NBI digital pictures, we studied NBI digital pictures which were represented nasopharyngeal mucosa of LPRD with MATLAB® application software.

Discussion

◆ We have presented a correlation between LPRD and nasopharyngeal mucosa examination as mackerel cloud pattern through NBI examination. Image processing which were implemented morphological operation by MATLAB® showed representative for a status of nasopharyngeal mucosa physical change. MATLAB® characterized images which were modified with PTI-CDWT. We are currently finding out the best way to deal with the loss of image processing information on part of light reflex of NBI pictures. However, a utilization of PTI-CDWT and MATLAB® is not only useful to diagnose LPRD but may have possibility to develop image diagnosis or analysis instrument.

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References