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ARSTRACT

Objectives: Multiple laryngeal papillomatosis has a high rate of recurrence after surgery. Narrowband imaging (NBI) is a novel optical enhancement technology used for the diagnosis. This is the first report to date to indicate the availability of the combination of laryngomicro surgery and videoendoscopic surgery for laryngeal papillomatosis using NBI technology.

Methods: The patients were a 34-year-old man and a 30-year-old man. Both cases underwent surgery in another hospital. However, due to recurrence, they were subsequently referred to our department for further evaluation. Examination in our outpatient clinic revealed papilloma-like mucosal changes, and recurrent multiple laryngeal papillomatosis was diagnosed in both cases.

Results: In laryngomicroscopic surgical findings, the presence of papillomas was confirmed by NBI, and the papillomas were removed using an XPS® Micro Debrider and a CO2 laser. Using the NBI system, the border between the normal mucosa and the papillomas could be clearly identified, allowing precise resection. Two months later, CO2 laser resection using a laryngeal flexible endoscope under topical anesthesia was undertaken in an outpatient setting for recurring or remaining papilloma lesions. Further treatment on the lesions has been carried out several times to date using NBI. The lesions have now been eradicated without further recurrence.

Conclusion: Herein we reported two cases of multiple laryngeal papillomatosis those were treated by tumor resection using NBI. Clearer identification of the tumor border was obtained by this technique, thus allowing minimally invasive resection. This paper demonstrates the applicability of the NBI system to the identification and resection of laryngeal papillomatosis.

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INTRODUCTION

Laryngeal papillomatosis is the most frequent form of benign laryngeal tumor ^{1,2} and is classified into two types; juvenile papilloma and adult papilloma. The adult papilloma is usually solitary, whereas the juvenile papilloma is often multiple and, generally speaking, recurrent or multiple papillomatosis is intractable. Multiple laryngeal papillomatosis has a high rate of recurrence after surgery, and it is currently difficult to completely eradicate lesions.

In multiple papillomatosis, Human Papilloma Virus (HPV) type-6 and type-11 are involved in the tumor formation, and the tumors typically locate on the vocal folds, vestibular folds, the laryngeal surface of the epiglottis and the subglottis ³⁻⁵.

The standard treatment is surgical intervention; although the effectiveness of adjuvant systemic therapy using IFN- α has been reported ⁶. The basic surgical procedure involves microlaryngeal CO2 laser surgery. It is important to resect only tumor lesions, and keep normal lesions for preventing from dissemination of papillomas. As much as possible, surgery should aim at the resection of all tumors, however, some thought must be given to the preservation of vocal function. Thus, total resection of recurrent or multiple papillomatosis is difficult as it requires frequent surgical intervention.

Narrowband imaging (NBI) is a novel optical enhancement technology used for the diagnosis of superficial lesions. By filtering the light spectrum to narrow bands, NBI provides enhanced images of the mucosal microstructure and vasculature, and also provides high-contrast images of the mucosal vasculature in the early stages of head and neck cancer ^{7,8}. In recent years, some papers have reported that the NBI view was more beneficial in recognizing the superficial lesions of esophagus, oropharynx, hypopharynx, stomach, colon, urinary bladder and uterus than conventional videoendoscopic view ⁹⁻¹².

We performed tumor resection by the combination of laryngomicro surgery and videoendoscopic surgery for laryngeal papillomatosis using NBI. The lesions have now been eradicated without further recurrence. This paper presents two cases of laryngeal papillomatosis resected with a NBI view. There have been no reports to date to indicate the availability of the combination of laryngomicro surgery and videoendoscopic surgery for laryngeal papillomatosis using NBI technology. The use of the NBI system allowed the clear identification of the involved mucosa and satisfactory resection of the observed lesions.

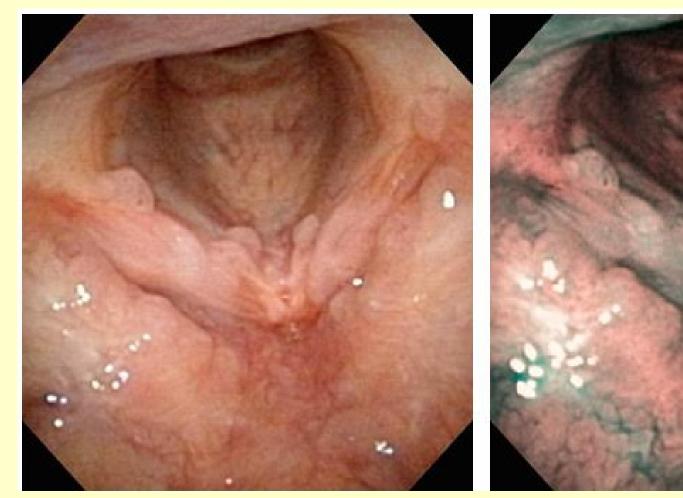
Surgical treatment of laryngeal papillomatosis using NBI

Case 1

A 34-year-old man with two months of hoarseness visited our clinic. Examination by laryngeal flexible endoscopy using NBI (CLV-S40Pro, ENF-V2, OLYMPUS) revealed papilloma-like mucosal changes, and multiple laryngeal papillomatosis was diagnosed (Figure 1A, 1B) Laryngomicroscopic findings under general anesthesia, obtained using a conventional technique, confirmed mucosal changes (Figure 1C). NBI enhanced the identification of papillomas on the vestibular folds (Figure 1D). The papillomas were removed from the right vocal fold and bilateral vestibular folds using an XPS® Micro Debrider and CO2 laser (LEZAWIN CH S, J.MORITA). Two months later, CO2 laser resection using a laryngeal flexible endoscope under topical anesthesia was undertaken in an outpatient setting for recurring or remaining papillomalesions on the right vocal cord, vestibular folds and laryngeal ventricle. After several operations, the lesions have been eradicated without further recurrence (Figure 1E, 1F).

Figure 1 Endoscopic image of the larynx: Case 1

Preoperative endoscopy in outpatient clinic A: conventional view B: NBI view

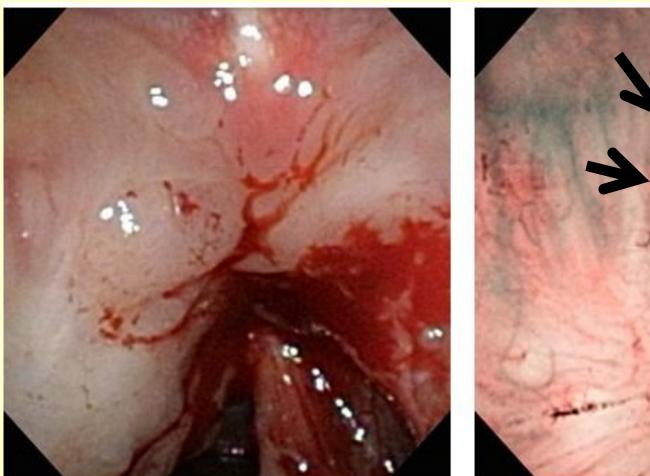


A: conventional technique confirmed irregular surface on the bilateral vocal folds, vestibular folds and laryngeal ventricle.

B:NBI confirmed the presence of papillomas. NBI was useful in the identification of papillomas on the vestibular folds.

C: conventional technique

Endoscopy during operation C: conventional view D: NBI view

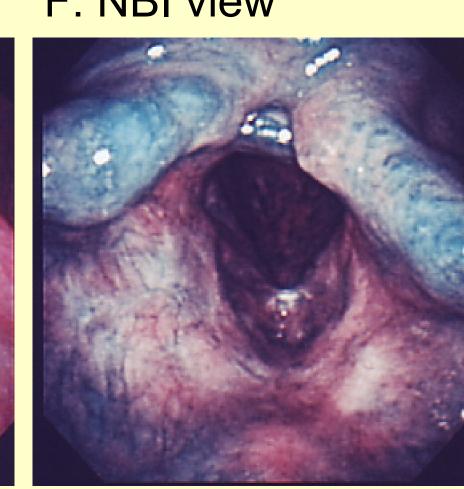


confirmed irregular surface on the vestibular folds. D: The NBI view showed both clearly demarcated brownish area and scattered brown spots. The border between the normal mucosa and the papillomas was obvious.

Arrows: The border between the normal mucosa and the papillomas could be clearly identified.

Postoperative endoscopy in outpatient clinic E: conventional view F: NBI view





E:A conventional technique confirmed scar on the vestibular

-: NBI confirmed no presence of papillomas.

Case 2

A 30-year-old man with five months of hoarseness visited our clinic. Examination by laryngeal flexible endoscopy using NBI revealed papilloma-like mucosal changes, and multiple laryngeal papillomatosis was diagnosed (Figure 2A, 2B) Laryngomicroscopic findings under general anesthesia confirmed mucosal changes (Figure 2C). NBI was useful in the identification of papillomas on the vestibular folds and the posterior surface of the epiglottis (Figure 2D). The papillomas were removed using an XPS® Micro Debrider and CO2 laser. However, the posterior surface of the epiglottis could not be treated, because its anatomical location impedes laryngomicroscopic surgical views. Two months later, outpatient CO2 laser resection using a laryngeal flexible endoscope under topical anesthesia was undertaken for the remaining lesions on the posterior surface of the epiglottis. The lesions have been eradicated without further recurrence (Figure 2E, 2F).

Figure 2 Endoscopic image of the larynx: Case 2

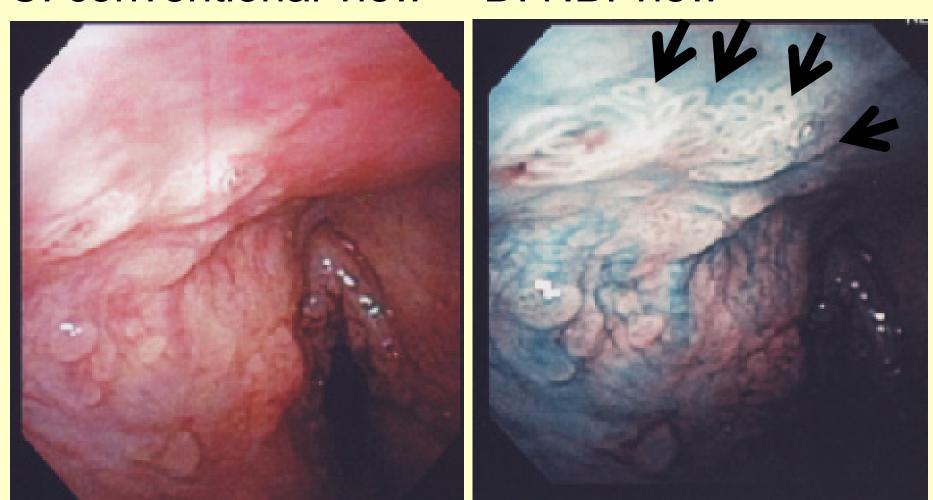
Preoperative endoscopy in outpatient clinic A: conventional view B: NBI view



A: A conventional technique confirmed irregular surface on the bilateral vocal folds, vestibular folds and laryngeal ventricles. B: NBI confirmed the presence of papillomas. NBI was useful in the identification of papillomas on the vestibular folds and the posterior surface of the epiglottis.

Arrow: The papillomas could be clearly identified in area of vestibular folds.

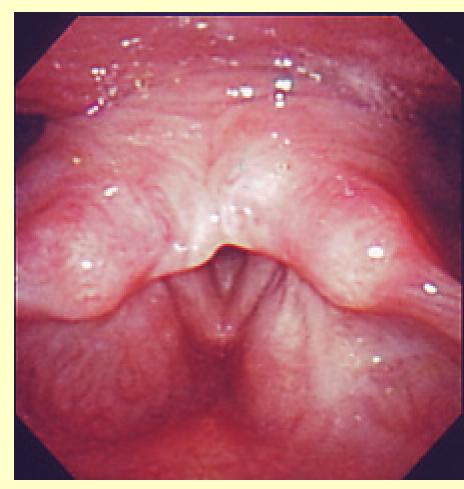
Endoscopy during operation C: conventional view D: NBI view



C: A conventional technique confirmed irregular surface on the vestibular folds and the posterior surface of epiglottis. D: The NBI view showed both clearly demarcated brownish area and scattered brown spots. The border between the normal mucosa and the papillomas was obvious.

Arrows: The border between the normal mucosa and the papillomas could be clearly identified in the posterior surface of epiglottis.

Postoperative endoscopy in outpatient clinic E: conventional view F: NBI view





: A conventional technique confirmed no presence of papillomas. F: NBI confirmed no presence of papillomas.

Adult laryngeal papillomatosis is usually solitary and requires a single treatment; however, malignant cases are sometimes observed ¹³. Cases of recurrent multiple papillomatosis, such as that reported herein, are also known, and most are found to be intractable. In cases of a multiple papillomas, HPV 6 and 11 are involved in tumor formation ³⁻⁵, and virus infection in the seemingly normal tissue around the tumors is known to occur, and it is important to keep in mind that it is the spread of this virus in the surgical intervention that leads to recurrence.

With regard to treatment, surgical intervention is standard, though effective adjuvant therapy with IFN- α ⁶, I3C (Indole-3-cabinol) ^{14,15}, the antiviral agent cidofovir ^{16,17} and so on has been reported. The current standard treatment for the tumors is total resection. The use of a cold instrument and CO2 laser ablation techniques under a microscope has been reported for resection of superficial squamous cell carcinoma of the oropharynx and hypopharynx under assistance of NBI ¹⁸. This is a first report to date to indicate the availability of the combination of laryngomicro surgery and videoendoscopic surgery for laryngeal papillomatosis using NBI technology. In our present cases, we operated under the guidance of a conventional microscope, and the NBI scope was useful for confirmation of the presence of tumors and delineating their margins. CO2 laser resection using a laryngeal flexible endoscope under topical anesthesia with NBI in an outpatient setting will allow us to resect the recurring or remaining papilloma lesions as a minimally invasive procedure. Laryngomicro surgery under general anesthesia, because of the difficulty of anatomical location from laryngomicroscopic surgical views, led to result that the posterior surface of epiglottis could not be

In NBI, light absorption depth is confined to the superficial mucosa because the bandwidth is filtered to highlight vasculature and glandular structures ¹⁹. By this method, changes in the blood vessels in the superficial mucosa in the early stages of cancer can be recognized and, in recent years, it has been reported that the use of NBI has allowed the identification of superficial lesions of the oropharynx and hypopharynx as well as the minimally invasive resection of the mucosal lesions with NBI view ^{7,18,20}. We performed microlaryngoscopic surgery for adult multiple laryngeal papillomatosis with NBI view, and found satisfactory tumor resection possible with only minimal invasiveness. The lesions were more clearly visualized using NBI than by a conventional videoendoscope. Further, clearer identification of the lesion borders allowed for effective laser ablation. Post-operative problems associated with laryngeal papillomatosis include scarring and tumor dissemination. In the current cases, the use of NBI during surgery allowed the excision margins to be kept as small as possible and the use of a Micro Debrider allowed the satisfactory excision of the tumor. Thus, the possibility of post-operative scarring or tumor dissemination was reduced. ___________

Herein we reported two cases of adult onset multiple laryngeal papillomatosis that was treated by the combination of laryngomicro surgery under general anesthesia and videoendoscopic surgery under local anesthesia using NBI technology. Clearer identification of the tumor border was obtained by this technique in allowing minimally invasive resection. Although further considerations should be given to reduce the numbers of surgical procedures, our results suggest that the combination of laryngomicro surgery and videoendoscopic surgery using NBI technology could be a useful treatment option for the laryngeal papillomatosis.

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DISCUSSION

CONCLUSIONS

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