

ENT

Case Study of **NBI** (Specific Wavelength Light) **Endoscopy**

Supervisors:

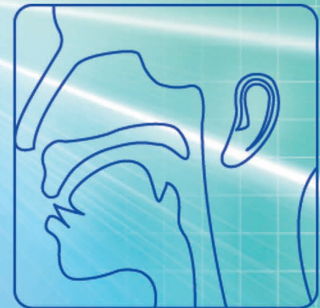
Akihito Watanabe, M.D.

Department of Otorhinolaryngology, Keiyukai Sapporo Hospital

Masahiro Fujita, M.D.

Director, Department of Clinical Pathology, Keiyukai Sapporo Hospital

Dr. A. WATANABE



NBI

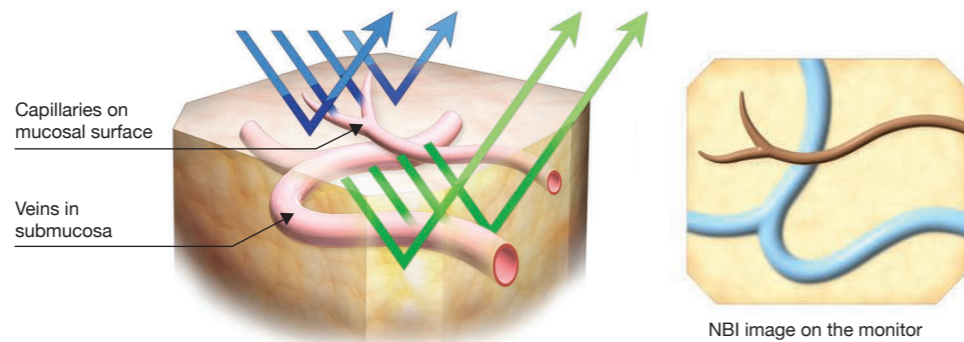
Narrow Band Imaging

Contents

What is NBI ?	2
Oropharynx Cancer (Posterior Wall)	4
Oropharynx Cancer (Posterior Wall)	5
Hypopharynx Cancer (Right Pyriform Sinus)	6
Hypopharynx Cancer (Right Pyriform Sinus)	6
Hypopharynx Cancer (Right Pyriform Sinus)	7
Hypopharynx Cancer (Left Pyriform Sinus)	8
Hypopharynx Cancer (Left Pyriform Sinus)	8
Hypopharynx Cancer (Left Pyriform Sinus)	9
Hypopharynx Cancer (Left Pyriform Sinus)	9
Hypopharynx Cancer (Left Pyriform Sinus)	10
Hypopharynx Cancer (Left Pyriform Sinus)	11
Hypopharynx Cancer (Left Pyriform Sinus: Elevated Type)	12
Hypopharynx Cancer (Posterior Wall)	13
Supervisor's Note	13

Narrow Band Imaging™

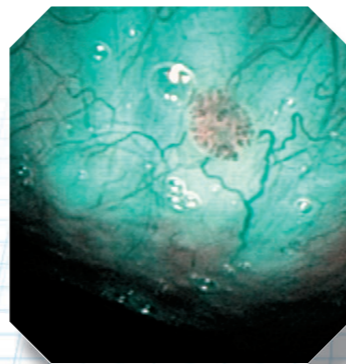
NBI is an optical image enhancement technology that enhances the visibility of vessels and other tissue on the mucosal surface. Narrow-band illumination, which is strongly absorbed by hemoglobin and penetrates only the surface of tissues, is ideal for enhancing the contrast between the two. As a result, under narrow-band illumination, capillaries on the mucosal surface are displayed in brown on the monitor, and veins in the submucosa are displayed in cyan.



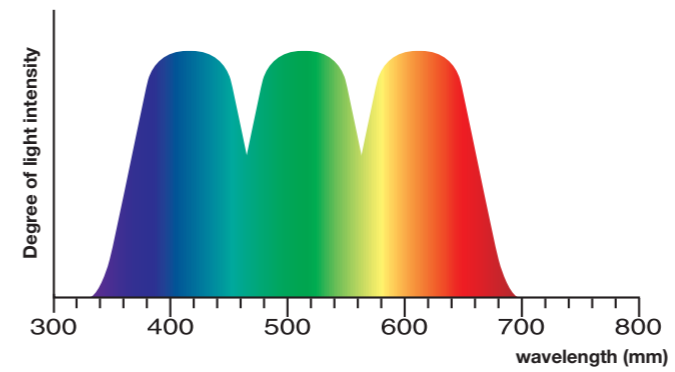
Conventional image



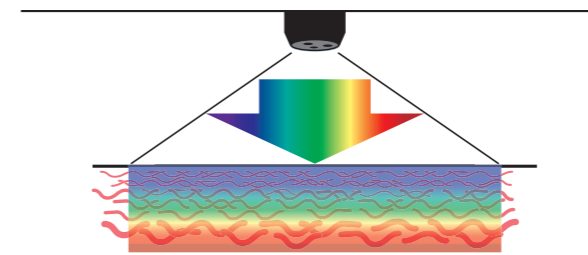
NBI image



Conventional White Light

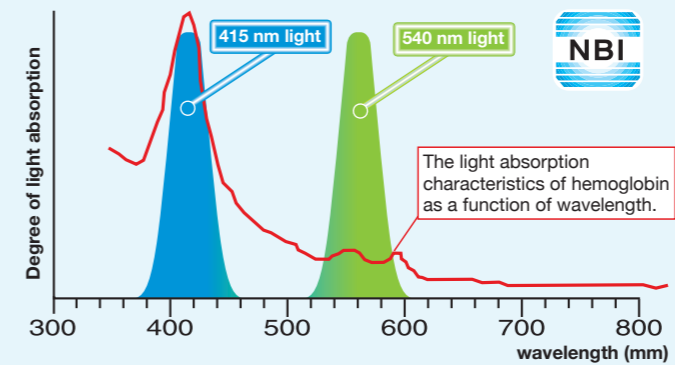


White light is composed of an equal mixture of RGB wavelengths.

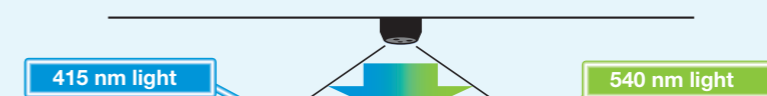


Short wavelengths have shallow penetration characteristics whereas long wavelengths penetrate deeper into the mucosa.

Narrow Band Imaging™ -NBI



The narrowband light is composed of two specific bands that are strongly absorbed by hemoglobin.



Short wavelengths penetrate only the superficial layers of the mucosa.
→ Absorbed by capillary vessels in the surface layer of mucosa.

Longer wavelengths penetrate deeper compared to 415 nm light.
→ Absorbed by blood vessels such as veins, which are located deeper than capillary vessels in the surface layer of the mucosa.

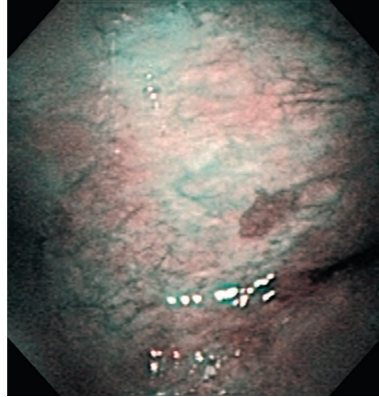
Oropharynx Cancer (Posterior Wall)

Aged 54, male

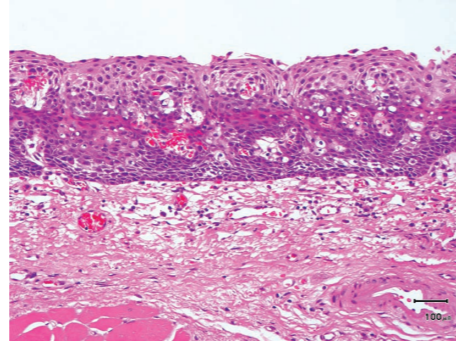
▼ white light



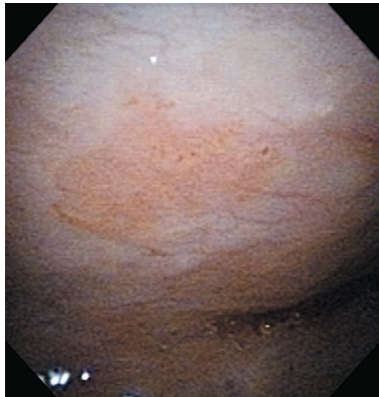
▼ NBI



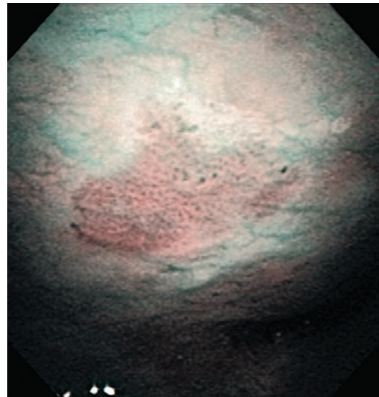
▼ pathology



▼ white light (close-up view)



▼ NBI (close-up view)



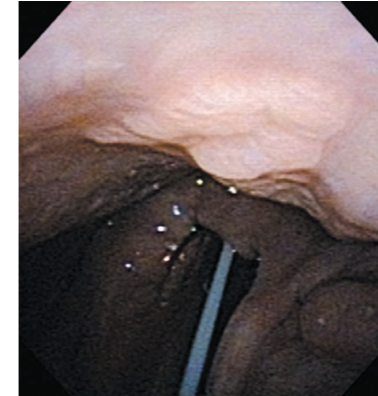
Comment:

The lesion was detected in the oropharyngeal posterior wall in a laryngopharyngoscopic NBI examination during follow-up after treatment of a carcinoma in the floor of the mouth. It was recognized under NBI as a lesion with a brownish area, and the close-up view additionally showed scattered brown dots. In the conventional white light image, the same area was seen as a reddening lesion. The lesion was 5 x 3 mm and located on the back of the soft palate, and was diagnosed as a carcinoma in situ.

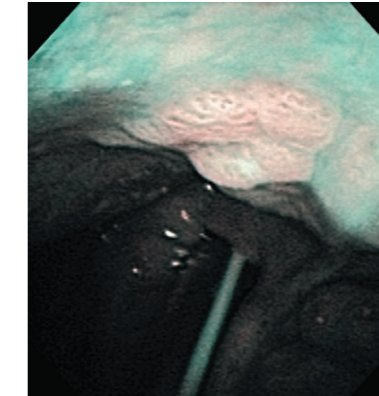
Oropharynx Cancer (Posterior Wall)

Aged 72, male

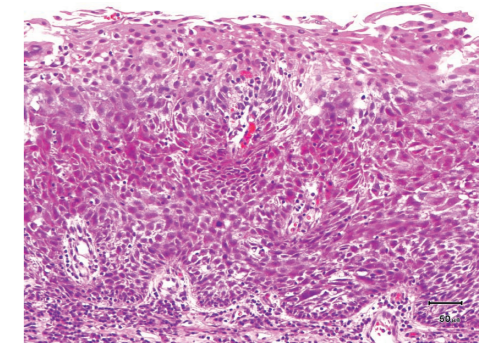
▼ white light



▼ NBI



▼ pathology



Comment:

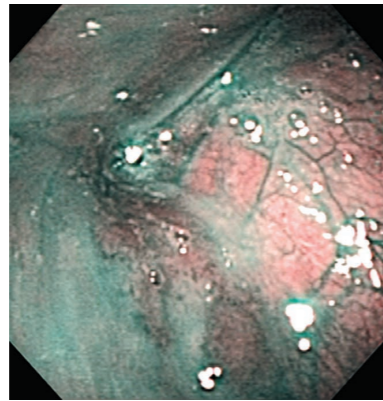
The lesion was detected on the oropharyngeal posterior wall in a periodic laryngopharyngoscopic NBI examination after an esophageal carcinoma surgery. The NBI image showed a brownish, slightly-elevated lesion. In the conventional white light image, the same area was recognized as a slightly-whitish elevated lesion. The lesion was treated with endoscopic mucosal resection and diagnosed as a squamous cell carcinoma in situ.

Hypopharynx Cancer (Right Pyriform Sinus) Aged 57, male

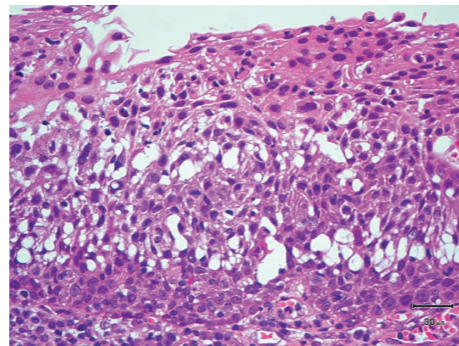
▼ white light



▼ NBI



▼ pathology

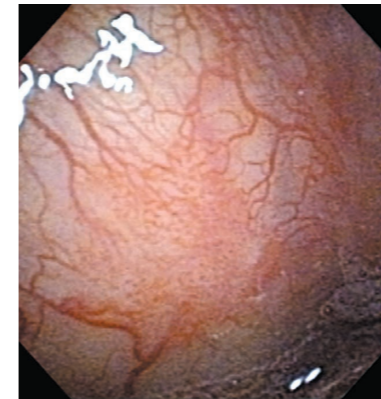


Comment:

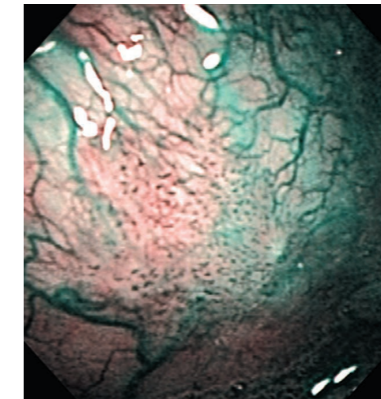
The lesion was detected on the right pyriform sinus in a head/neck cancer screening with NBI laryngopharyngoscopy before an esophageal carcinoma surgery. The NBI image showed an irregular shaped brownish lesion. In the conventional white light image, a slight reddening was observed but the boundary was hard to identify. The lesion was 9 x 6 mm, treated with endoscopic mucosal resection and diagnosed as a carcinoma in situ.

Hypopharynx Cancer (Right Pyriform Sinus) Aged 58, male

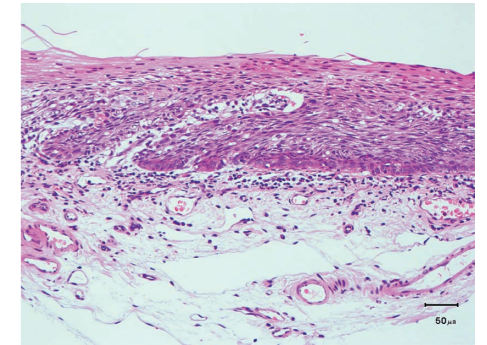
▼ white light



▼ NBI



▼ pathology

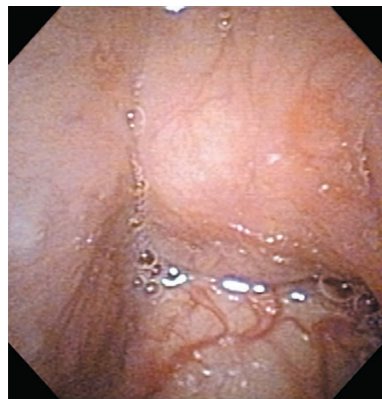


Comment:

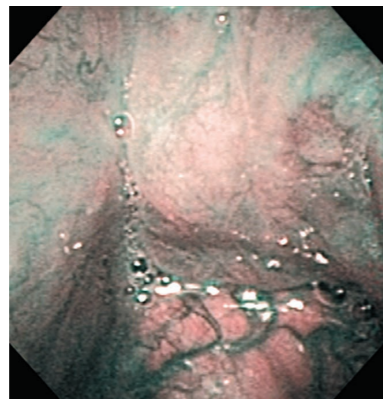
The lesion was detected in the right pyriform sinus in a periodic laryngopharyngoscopic NBI examination after an esophageal carcinoma surgery. The NBI image showed scattered brown dots. In the conventional white light image, reddening was observed in the same area but scattered dots were hard to identify. The lesion was 7 x 5 mm, treated with endoscopic mucosal resection, and diagnosed as a carcinoma in situ.

Hypopharynx Cancer (Right Pyriform Sinus) Aged 45, male

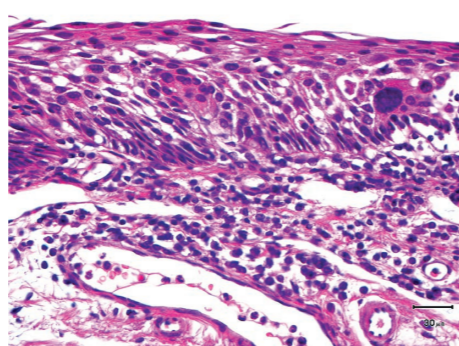
▼ white light



▼ NBI



▼ pathology



Comment:

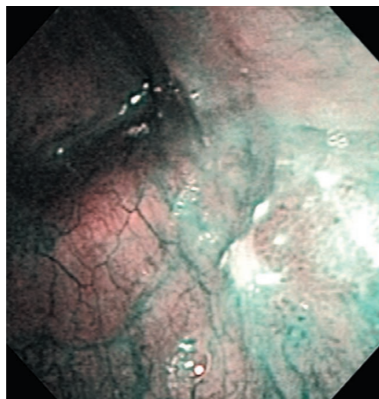
The lesion was detected on the right pyriform sinus in a head/neck cancer screening with NBI laryngopharyngoscopy before an esophageal carcinoma surgery. The NBI image showed it as a well demarcated relatively depressed brownish lesion. In the conventional white light image, a slight reddening was observed in the same area. The lesion was treated with endoscopic mucosal resection and diagnosed as a carcinoma in situ.

Hypopharynx Cancer (Left Pyriform Sinus) Aged 60, male

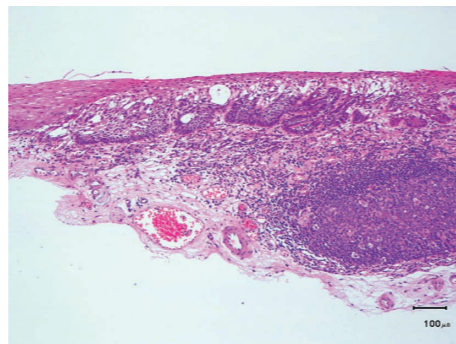
▼white light



▼NBI



▼pathology

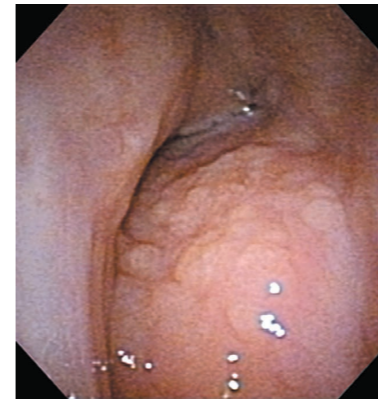


Comment:

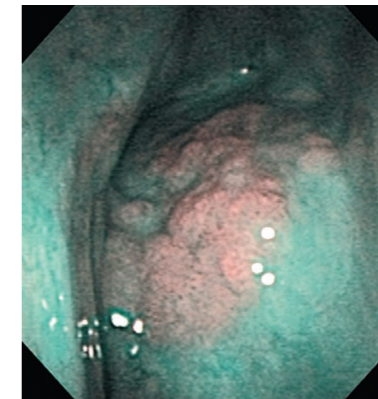
The lesion was detected in a periodic laryngopharyngoscopic NBI examination after an esophageal carcinoma surgery. The NBI image showed scattered brown dots within the brownish lesion. In the conventional white light image, slight reddening was observed in the same area. The lesion was treated with endoscopic mucosal resection, and diagnosed as a moderately-differentiated squamous cell carcinoma mostly remaining in the epithelium.

Hypopharynx Cancer (Left Pyriform Sinus) Aged 64, male

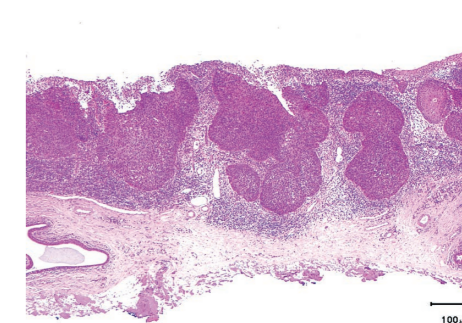
▼white light



▼NBI



▼pathology



Comment:

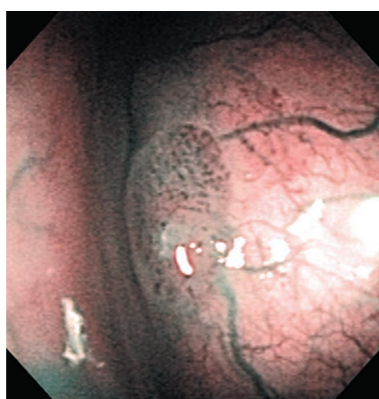
The lesion was detected in the left pyriform sinus in a head/neck cancer screening with NBI laryngoscopy before an esophageal carcinoma surgery. The NBI image showed a well demarcated slightly-elevated brownish lesion. In the conventional white light image, a lesion with uneven surface was observed but the boundary was hard to identify. The lesion was treated with endoscopic mucosal resection, and diagnosed as a moderately to poorly-differentiated squamous cell carcinoma.

Hypopharynx Cancer (Left Pyriform Sinus) Aged 62, male

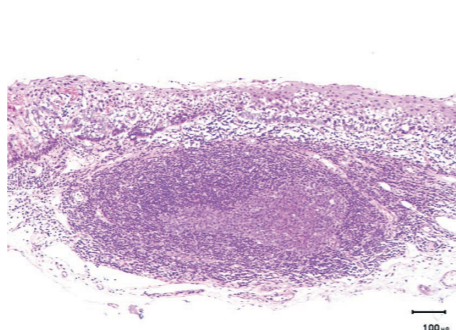
▼white light



▼NBI



▼pathology



Comment:

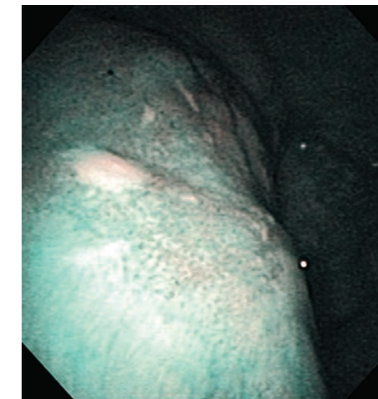
The lesion was detected in the left pyriform sinus in a head/neck cancer screening with NBI laryngopharyngoscopy before an esophageal carcinoma surgery. The NBI image showed a demarcated brownish lesion that was accompanied with scattered brown dots. With the conventional white light image, a slight reddening lesion was observed in the same area. The lesion was as small as 3 mm in diameter, and was treated with endoscopic mucosal resection, and diagnosed as a carcinoma in situ.

Hypopharynx Cancer (Left Pyriform Sinus) Aged 64, male

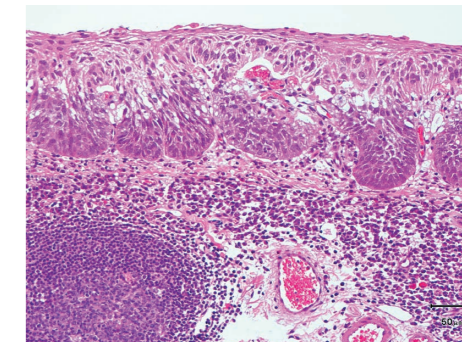
▼white light



▼NBI



▼pathology



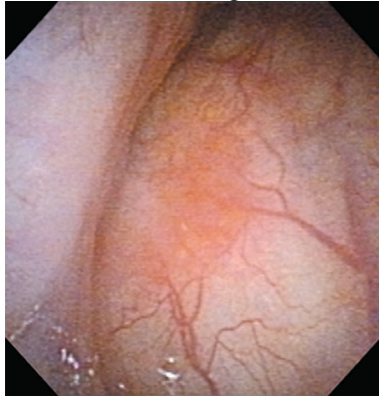
Comment:

The patient visited us with a chief complaint of abnormal sensation in the pharynx and the lesion was detected in the left hypopharynx in a laryngopharyngoscopic NBI examination. The NBI image showed a well demarcated brownish lesion on the left pyriform sinus with scattered brown dots. In the conventional white light image, the same area was observed as a slight reddening. The lesion was treated with endoscopic mucosal resection and diagnosed as a squamous cell carcinoma.

Hypopharynx Cancer (Left Pyriform Sinus)

Aged 61, male

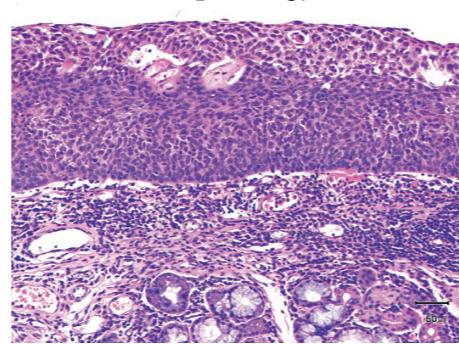
▼ white light



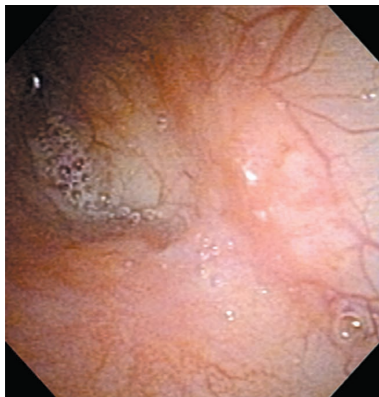
▼ NBI



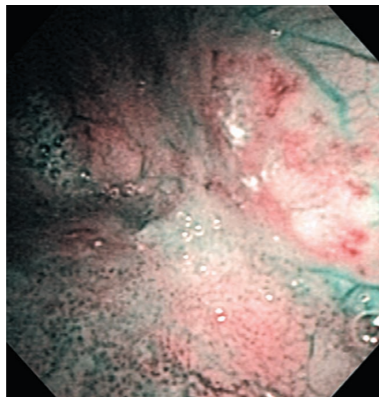
▼ pathology



▼ white light (close-up view)



▼ NBI (close-up view)



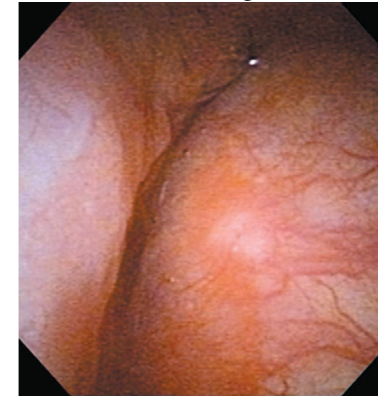
Comment:

The lesion was detected in the left pyriform sinus in a head/neck cancer screening with NBI laryngoscopy before an esophageal carcinoma surgery. It was recognized under NBI image as a lesion with a brownish area, and the close-up view showed scattered brown dots within the lesion as well. Under the conventional white light, the same area was recognized as a reddening lesion, but the demarcation was less defined compared to the NBI image, and the scattered dots were hard to identify even with the close-up view. The lesion was treated with endoscopic mucosal resection, and diagnosed as a carcinoma in situ.

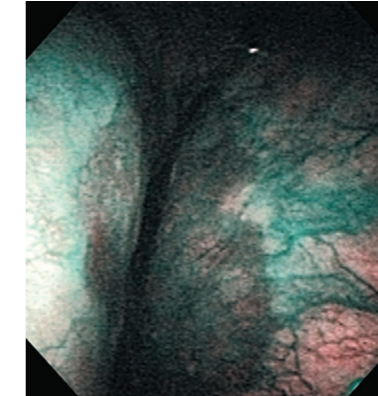
Hypopharynx Cancer (Left Pyriform Sinus)

Aged 58, male

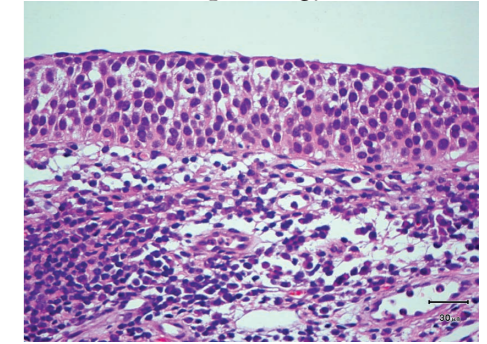
▼ white light



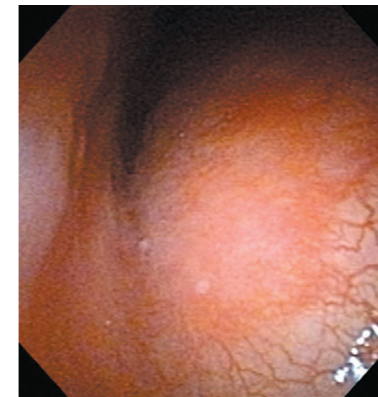
▼ NBI



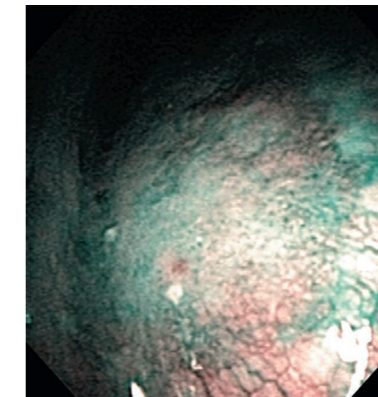
▼ pathology



▼ white light (close-up view)



▼ NBI (close-up view)



Comment:

The lesion was detected in the left pyriform sinus in a periodic laryngopharyngoscopic examination after an esophageal carcinoma surgery. The NBI image showed a well demarcated brownish lesion in the left pyriform sinus. In the conventional white light image, a reddening lesion was observed in the same area but demarcation was less defined compared to the NBI image. The lesion was treated with endoscopic mucosal resection, and diagnosed as a moderately-differentiated squamous cell carcinoma.

Hypopharynx Cancer (Left Pyriform Sinus: Elevated Type) Aged 80, male

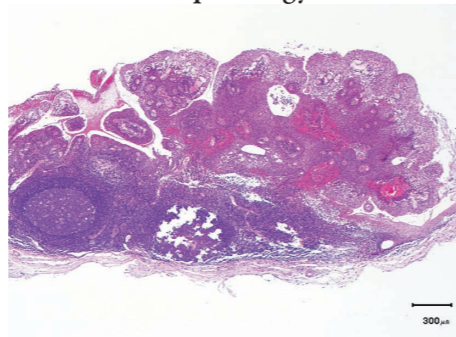
▼ white light



▼ NBI



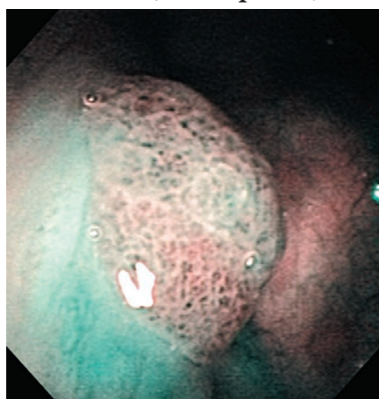
▼ pathology



▼ white light (close-up view)



▼ NBI (close-up view)

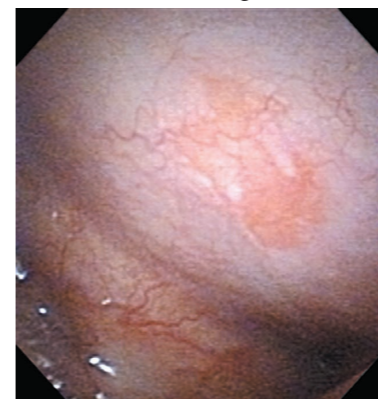


Comment:

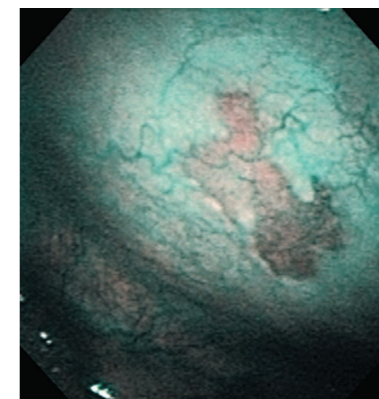
The patient visited us with a chief complaint of abnormal sensation in the pharynx and the elevated lesion was detected on the left pyriform sinus in a laryngopharyngoscopic NBI examination. The NBI image showed a brownish elevated lesion with scattered brown dots. In the conventional white light image, it was recognizable as a reddish elevated lesion. The lesion was treated with endoscopic mucosal resection, and diagnosed as a squamous cell carcinoma in situ.

Hypopharynx Cancer (Posterior Wall) Aged 62, male

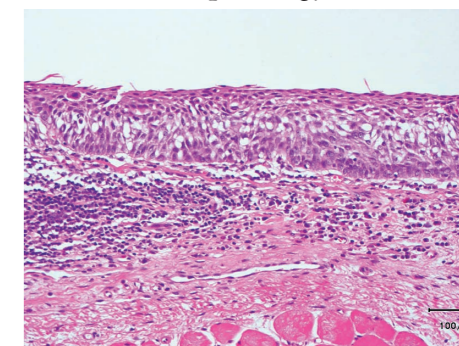
▼ white light



▼ NBI



▼ pathology



Comment:

The lesion was detected in the right side of the posterior wall of the hypopharynx in a head/neck cancer screening with NBI laryngopharyngoscopy before an esophageal carcinoma surgery. The NBI image showed a well demarcated brownish lesion with irregularly shaped border. As subepithelial blood vessels were visible in the lesion, it was expected that the lesion remained within the epithelium or that the subepithelial infiltration was minimal. With the conventional white light image, the area was recognized as a slight reddening lesion. The lesion was 7 x 4 mm, treated with endoscopic mucosal resection, and diagnosed as a carcinoma in situ.

Supervisor's Note

All of the endoscopic images shown in this booklet were captured using VISERA Rhino-Laryngo videoscope Olympus ENF Type V2 (manufactured by Olympus Medical Systems, Corp.). This scope has a thin design to enable nasal insertion, but it cannot be used for suction or water feeding due to lack in a suction channel. Since diagnoses of lesion in the pharynx, particularly the hypopharynx, are sometimes difficult due to accumulation of mucus such as saliva, we had the patients at our hospital swallow water immediately before endoscopic examination to rinse the saliva and eliminate the chance that superficial cancers might be overlooked.

Akihito Watanabe, M.D.
Department of Otorhinolaryngology, Keiyukai Sapporo Hospital

Disclaimer: Any content or information ("Content") presented herein is illustrative in nature and does not guarantee or represent specific information, outcomes, or results. Olympus Corporation, its subsidiaries, affiliates, directors, officers, employees, agents, and representatives (collectively "Olympus") does not represent to or warrant the accuracy or applicability of the Content. Under no circumstances shall Olympus be liable for any costs, expenses, losses, claims, liabilities, or other damages (whether direct, indirect, special, incidental, consequential, or otherwise) that may arise from, or be incurred in connection with, the Content or any use thereof.

Published by OLYMPUS MEDICAL SYSTEMS CORP.

Printed in Japan R537UE-0509