Precancerous and cancerous lesions of the larynx manifest significant neoangiogenesis as epithelial and subepithelial microvascular changes. There is no doubt that histological verification is absolutely indicated for cases with a high possibility of malignancy. On the other hand, other lesions (e.g. leukoplakias, etc.) can remain stable for months or even years, and a conservative treatment or watch-and-wait policy benefits those with a low malignancy risk. Sometimes it is very difficult to establish what patients and lesions should be histologically examined or not under general anesthesia because changes in the neoangiogenesis architecture typical for malignant lesions are not evident in the white light. That is why advanced endoscopic methods called “biologic endoscopy” (e.g. NBI, autofluorescence, contact endoscopy with vital tissue staining, confocal endomicroscopy etc.) are used to detect those changes. NBI (Narrow Band Imaging, Olympus Corp., Tokyo, Japan) has a wide application in otorhinolaryngology for preoperative and perioperative workup and is effective for the follow-up of patients with ENT cancer after surgical treatment and/or chemoradiotherapy.

IMAGE1 S™ technology (KARL STORZ, Tuttlingen, Germany) is a new digital technique used to improve endoscopic visual–digital reprocessing, based on the spectral separation of the record within a high-definition camera system. IMAGE1 S™ enhances the appearance of the mucosal surface, and the epithelial vascular architecture is characterized by five defined spectral ranges (CLARA, CHROMA, CLARA + CHROMA, SPECTRA A and SPECTRA B). Although NBI endoscopy has been commonly used in the last decade and was widely recommended, the initial experience with IMAGE1 S™ is more limited, because very few articles have been published to compare both methods.

Reasons for the Comparison of the two Methods.
The reason why we wanted to compare both investigative methods was practical. We have a good six years of experience using NBI technology and flexible endoscopy for evaluation of laryngeal lesions in our outpatient department. Nevertheless this technology is not available in the operating theatres of our clinic, where operations are performed under general anesthesia. We can use the IMAGE1 S™ system only for evaluation of lesions during surgery. The question was whether or not both technologies are comparable and if it is possible to evaluate laryngeal lesions with the IMAGE1 S™ system and if we can rely on it.

Methods
Patients with different laryngeal lesions were investigated using a high-definition flexible endoscope with NBI 3.9 mm under local anesthesia in an outpatient department. After NBI endoscopy all patients underwent direct laryngoscopy, and the microvascular patterns were evaluated using the CLARA + CHROMA and SPECTRA B modalities of the IMAGE1 S™ enhancement system with a 4 mm 30° rigid endoscope under general anesthesia. Then a targeted biopsy from the lesion was taken. Evaluation for neoangiogenesis was performed under NBI as well as IMAGE1 S™ endoscopy, vascular patterns in the center and around the laryngeal lesions were analyzed and classified according to the descriptive guidelines of vascular changes by Arens et al. The NBI examination and IMAGE1 S™ endoscopy were performed by three experienced otolaryngologists and compared with 4 groups of histological results (I - benign lesions, II - recurrent respiratory papillomatosis, III - low grade dysplasia, IV - severe dysplasia + carcinoma in situ + invasive squamous cell carcinoma).

Results
73 patients were included in the study. The results confirmed strong agreement between histological assessment and NBI (81.43%) as well as IMAGE1 S™ (81.16%). The level of agreement between the endoscopic methods was 92.54% – the two endoscopic imaging methods did not differ significantly from each other. According to us the best impact for us had CLARA + CHROMA and SPECTRA B visualization technologies.
Conclusion
Both the NBI videendoscopy and IMAGE1 S™ endoscopy methods are comparable in detection and analysis of superficial neoangiogenesis that is typical for benign lesions and also for precancerous or cancerous changes.

Legends
Figure 1

Squamouscellular carcinoma of the left vocal cord, IMAGE1 S™ details and borders of tumor are more visible:
a = CLARA + CHROMA, b = SPECTRA B

Figure 2

Benign granuloma. IMAGE1 S™ details: a = CLARA + CHROMA, b = SPECTRA B

Figure 3

Leukoplakia of the left vocal cord, histologically mild dysplasia, IMAGE1 S™:
a = CLARA + CHROMA, b = SPECTRA B
References


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**Experts' Opinion:**

“Although differentiation with ECE between hyperplasia and low-grade dysplasia is still difficult, ECE offers an Se and Sp rate of 100% in the distinction between normal tissue, inflammation, and hyperplasia versus SCC, and appears as a useful method to better visualize and more precisely interpret the vascular changes in precancerous and cancerous lesions of the larynx and hypopharynx.”


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