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# A preliminary feasibility study: Narrow-band imaging targeted versus standard white light endoscopy non-targeted biopsies in a surveillance Barrett's population☆

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ABSTRACT

*Background:* Narrow band imaging (NBI) is used in the detection of intestinal metaplasia (IM) and dysplasia in patients with Barrett's oesophagus (BE).
*Aims:* The study compared the usefulness of NBI with white-light standard endoscopy (WLSE) for the detection of dysplasia and IM in BE and determined the prediction of the histological diagnosis according to the mucosal and vascular patterns obtained by NBI.
*Patients and methods:* A total of 84 patients were prospectively enrolled in the study. Every patient underwent a WLSE with random biopsies and after 4–6 weeks, a NBI examination was performed.
*Results:* NBI detected significant more IM positive biopsies than WLSE (74.5% vs. 35.9%; $p < 0.0001$) and significant more patients with low grade dysplasia (LGD) (7.1% vs. 0%; $p = 0.03$). Taking biopsy samples from the villous pattern determined the diagnosis of IM (80%) and biopsies from the area covered by the irregular pattern lead to the identification of LGD in 45.4% of the cases and indefinite dysplasia (ID) in 18.2% of the cases.
*Conclusion:* A thorough analysis of NBI patterns may lead to real-time IM diagnosis in the absence of the histological examination and may require targeted biopsies from the areas with an irregular pattern for diagnosing dysplasia.


## 1. Introduction

Barrett's oesophagus (BE) is the most important premalignant condition that is esophageal adenocarcinoma (EA) associated. The inclusion of BE patients within programmes of screening and endoscopic surveillance is recommended by the current guidelines for detecting neoplastic progression in early stages of disease. However, the surveillance programmes efficiency is contested, the studies [1] showing a modest impact over the life expectancy of these patients.

White light standard endoscopy (WLSE) identifies the columnar epithelium and visible macroscopic anomalies of mucosa, but it cannot distinguish intestinal metaplasia (IM) or dysplasia. Seattle protocol has several limitations: sampling errors, it is time consuming, expensive, and often there is a decreased compliance regarding biopsy protocols both by physicians and patients.

Narrow-band imaging (NBI), also called electronic chromoendoscopy, is a high resolution endoscopic technique allowing the visualization of mucosal and vascular architecture, without the necessity of applying any colour agents [2].

## 2. Aims

The first aim of the study was to evaluate the usefulness of the NBI endoscopic examination in detecting dysplasia and intestinal metaplasia in BE compared to WLSE, the most important end point of this study being the identification of dysplasia. The analysis regarding the prediction of the histological diagnosis according

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to the mucosal and vascular patterns obtained by NBI endoscopic examination was the second objective.

## 3. Patients and methods

*Patients*: We performed a prospective study within the period of January 2013–December 2014 in the Gastroenterology Clinic of Mureş clinical County Hospital, where patients undergoing an upper gastrointestinal standard endoscopy for the screening or surveillance of BE were invited to participate and were enrolled with the approval of the University Ethical Committee. In our study population, no patient has been previously diagnosed with dysplasia. Each patient signed an informed consent agreement. The inclusion criteria consisted of: age over 18, endoscopic aspect of the Barrett's oesophagus and the patient's agreement to take part in the study. The exclusion criteria were determined by the presence of some conditions contraindicating an esophageal biopsy (esophageal varices, coagulation disorders, anticoagulating treatment) and the endoscopic aspect of an esophageal tumour.

*Endoscopic examination*: The endoscopic examinations were performed by three examiners with a volume of 1000 upper gastrointestinal white light standard endoscopy per doctor annually, but with different levels of experience in the assessment of the NBI images: one of the examiners is an expert in the field of NBI with more than 500 upper gastrointestinal NBI procedures annually and the other two are non experts, with 100 upper gastrointestinal NBI procedures per year. Initially, each patient had a WLSE done with biopsies taken from the columnar mucosa. The procedure was followed after a period of between 4 and 6 weeks by a NBI endoscopic examination, but the endoscopists were not informed about previous histological results.

WLSE examinations were performed by three experienced endoscopists using Olympus EvisExera II CLE-165 endoscopic equipment. During the endoscopy, the columnar mucosa was inspected thoroughly for detecting any visible mucosa modifications.

The BE length was recorded according to the Prague classification, followed by 4-quadrant biopsies taken every 1–2 cm of the circumferential Barrett segment according to the Seattle protocol, or taking biopsies from the cranial extensions of columnar mucosa under the form of islands or tongue-like protrusion in case of non-circumferential BE. The number of biopsies was related to the affected mucosa. Each biopsy was placed in separate recipients, marking the place where it had been taken from.

The NBI examinations were performed using Olympus EvisExera III CV-190 endoscopic equipment and comprised the use of the NBI mode activated during the whole examination, with a thorough examination of esophageal mucosa for visualizing any eventual surface anomalies of mucosa or vascular abnormalities. The length of Barrett segment was recorded using the Prague classification.

The classification of mucosal and vascular morphologic patterns was made according to the classification used by Sharma et al. [3]. The mucosal morphology was divided into four distinct types: villous (Fig. 1), circular (Fig. 2), absent (Fig. 3), irregular (Fig. 4) and the vascular patterns were divided into regular or irregular.

The images of the obtained patterns were recorded and then targeted biopsies of each NBI different pattern were taken. In cases with more than one pattern type in the same patient, biopsies were also taken from these patterns. Each biopsy sample was introduced in a separate recipient, marking the correspondent pattern where the biopsy was taken from.

*Histology*: The biopsy samples taken both by standard endoscopy and by NBI were embedded in paraffin, coloured with

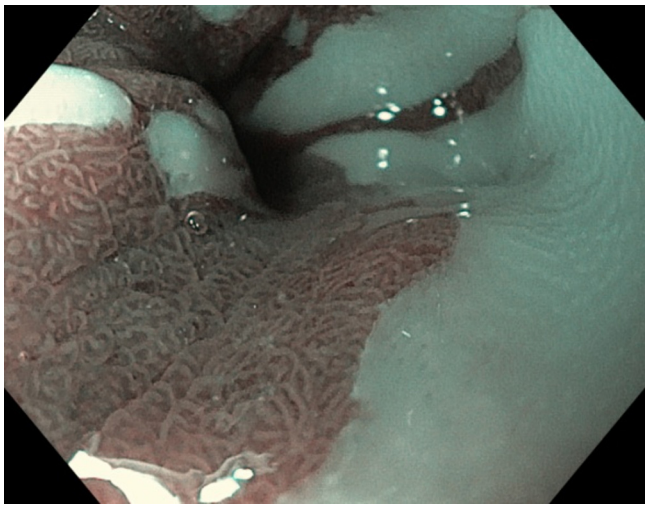

**Fig. 1.** Villous mucosal pattern.

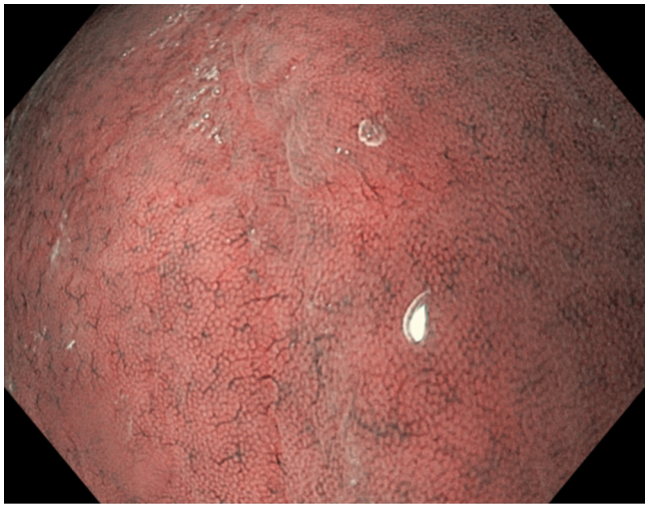

**Fig. 2.** Circular mucosal pattern.

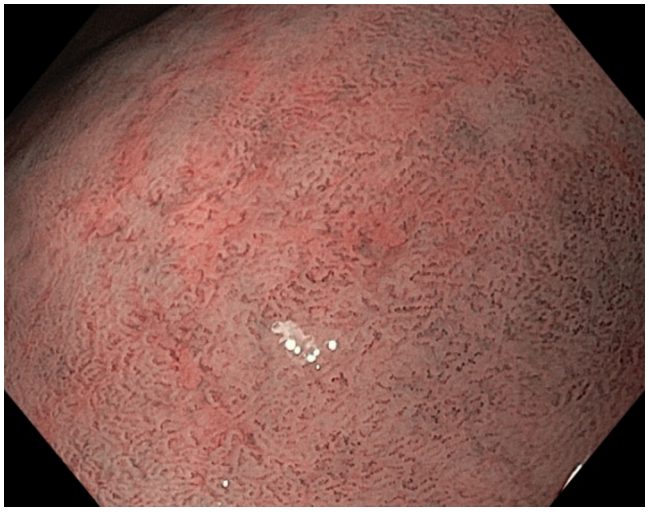

**Fig. 3.** Absent mucosal pattern.