ORIGINAL ARTICLE

Role of Narrow band Imaging (NBI) in Detection of H. Pylori induced gastric intestinal metaplasia in Egyptian patients

Ahmed M. Massoud, Ahmed M. Ghazy, Ahmed E. A. Mohammed, Mohamed A. M. Alshahat *

Department of Hepatology, Gastroenterology and Infectious Diseases, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

Abstract

Background: ***Helicobacter pylori (H. pylori) colonizes the stomach mucosa of over 50% of the global population. Persistent infection progresses from gastritis to atrophy, intestinal metaplasia, dysplasia, and gastric adenocarcinoma. In Egypt, H. pylori-induced gastritis is prevalent. Narrow-band imaging (NBI) enhances early detection of premalignant lesions.***

Aim: ***To assess the validity and accuracy of narrow-band imaging in the identification of H. pylori-related gastric intestinal metaplasia.***

Patients and methods: ***This cross-sectional investigation was done on 250 symptomatic cases with positive Helicobacter pylori infection at the El-Sayed Galal Hospital endoscopy unit from December 2023 to July 2024. Based on endoscopic findings and histopathological results, 130 patients were diagnosed with non-atrophic gastritis (excluded from the investigation), while 120 cases were diagnosed with atrophic gastritis (involved in the investigation). The atrophic gastritis patients were further classified into two groups: Group 1, atrophic gastritis without intestinal metaplasia (95 patients), and Group 2, atrophic gastritis with intestinal metaplasia (25 patients).***

Results: ***NBI demonstrated a sensitivity of 88%, specificity of 89.5%, and overall diagnostic accuracy of 89.2% in detecting gastric intestinal metaplasia compared to histopathology. The light blue crest (LBC) was the most common NBI pattern found in IM cases, while all cases of white opaque substance (WOS) were related to an elevated risk of gastric cancer, depending on the OLGIM score.***

Conclusion: ***NBI accurately diagnoses intestinal metaplasia, with the light blue crest being the most common. High OLGIM stages are independent risk factors for gastric cancer.***

Keywords: NBI; H. pylori; Gastric Intestinal Metaplasia (GIM)

1. Introduction

A gram-negative microaerophilic bacterium, Helicobacter pylori, colonizes the stomach mucosa of over fifty percent of the worldwide population, with a significant degree of geographic variability.[1]

H. pylori was identified as a Class I carcinogen by the International Agency for Research on Cancer.[2]

In Egypt, the occurrence of H. pylori-induced gastritis has been detected in 81.7 percent of cases, of which 28.3 percent had atrophic gastritis and 15.1 percent intestinal metaplasia.[3]

The etiology of stomach cancer is still uncertain, but chronic atrophic gastritis (AG) and H. pylori infection are recognized as 2 major risk factors for gastric tumors. [4]

Stomach cancer is the 4th leading etiology of cancer death globally & the 5th most frequent malignant cancer, and early detection is the key strategy to improve patient survival.[5]

A persistent infection with Helicobacter pylori can cause a stepwise histological progression from chronic gastritis to atrophy, intestinal metaplasia (IM), dysplasia, and finally lead to intestinal-type gastric adenocarcinoma.[6]

The diagnosis of intestinal metaplasia is at present predicated on the histology of biopsy specimens, as IM typically manifests in flat mucosa and has minimal morphologic alterations. Conventional endoscopy has a high interobserver variability and a poor association with histological results.[7]

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* Corresponding author at: Hepatology, Gastroenterology and Infectious Diseases, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt.
E-mail address: malshahat13070@gmail.com (M. A. M. Alshahat).

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Current endoscopic cancer screening and surveillance strategies face numerous challenges, like interobserver variability in lesion identification, time-consuming biopsy protocols, and sampling errors, particularly with subtle and early premalignant lesions that may be easily missed by endoscopists.[8]

Narrow-band imaging (NBI) is a technological innovation that improves the visualization of vascular and mucosal patterns by employing two specific wavelengths (400–430 nm and 525–555 nm). This technique amplifies contrasts in the microvascular architecture and surface structure of the gastric mucosa. When combined with magnification, narrow-band imaging facilitates the detection of histological patterns, such as the light blue crest (LBC) and white opaque substance (WOS), which are strongly associated with IM. Studies suggest that NBI improves diagnostic accuracy for gastrointestinal lesions, making it an invaluable tool in targeted biopsies and endoscopic surveillance of premalignant conditions. Detailed observation of the morphological features of the epithelium that correspond to histology is facilitated by narrow-band imaging.[9]

The diagnostic accuracy of NBI for recognizing gastrointestinal lesions has been described by many investigations. These findings suggest that the diagnostic yield of endoscopy for the primary detection of pre-malignant gastric lesions may be enhanced through the implementation of this method for targeted biopsy sampling.[10]

Gastric mucosa showing at least one of either a marginal turbid band (MTB), light blue crest, or a white opaque substance; these lesions have been reported to be strongly correlated with intestinal metaplasia.[11]

The goal of this investigation was to assess the validity and accuracy of narrow-band imaging in the identification of H. pylori-related gastric intestinal metaplasia.

2. Patients and methods

This was a cross-sectional investigation performed on 250 symptomatic cases with positive H. pylori infection at El-Sayed Galal Hospital's endoscopic unit during the period from December 2023 to July 2024. According to the endoscopic findings and histopathology, there were 130 patients with nonatrophic gastritis (excluded) and 120 cases with atrophic gastritis (enrolled). Cases with atrophic gastritis have been classified into two groups: Control group (group 1): 85 cases with atrophic gastritis without gastric intestinal metaplasia. Cases group (group 2): 25 cases with atrophic gastritis with gastric intestinal metaplasia.

Inclusion criteria: symptomatic cases with positive H. pylori infection among their symptoms: epigastric pain (a burning or discomfort sensation in the upper abdomen), dyspepsia (chronic or recurrent upper abdominal discomfort, early satiety, bloating, or postprandial fullness), nausea and vomiting (persistent or intermittent episodes), and other symptoms such as heartburn, regurgitation, and unexplained weight loss in some cases, and infection and aged between 18 and 65

Exclusion criteria: Patients younger than eighteen years or older than sixty-five years were excluded, those with previous gastric surgery, or a history of gastric neoplasm, and those who declined to provide informed consent were also excluded.

Methods: All examined cases were subjected to informed written consent, full clinical assessment, and complete history taking, general abdominal examination, laboratory investigation, and endoscopy. Utilize high-definition white-light endoscopy to detect structural abnormalities in the esophagus, stomach, and duodenum, then switch to NBI mode for mucosal and vascular gastric mucosa abnormality characterization.

Image analysis: The gastric metaplasia diagnosis concluded from endoscopy was subjective. Consequently, to prevent the selective bias in the current investigation, objective and scientific diagnoses have been performed. 2 experienced endoscopists carried out the endoscopies independently and interpreted the endoscopic images to classify the gastric mucosa into metaplastic and non-metaplastic mucosa.

2 additional senior endoscopists reviewed the outcomes randomly. When a pattern determination was agreed upon by all endoscopists, that pattern was adopted.

Biopsy protocol: Due to the increased risk, the updated Sydney procedure has been suggested for the purpose of acquiring topographical biopsies in cases of those who had substantial gastric metaplasia that was limited to the antrum. With this protocol, the sensitivity of recognizing H. pylori colonization is very close to one hundred percent. A total of 5 Gastric biopsies are required, with 2 from the antrum, 2 from the gastric corpus, and 1 from the incisura angularis. Due to the fact that AG/IM usually includes the incisura angularis. (biopsies from the antrum and incisura in one jar and body in another jar). If needed, one or two target biopsies may be performed (separate jar).

Histopathology: specimens were collected in liquid formalin and sent for histopathological examination. According to H. pylori intensity, patients would be categorized into mild, moderate, and severe H. pylori intensity. Operative link for the gastritis assessment (OLGA/OLGIM) staging system. The operative link for gastritis assessment, which was previously dependent on the histopathology outcome of biopsy specimens, has

been proposed as an efficient technique to rank gastritis into stages with corresponding carcinoma possibilities. It was previously stated that a high-risk stage (defined as stage three or four of the OLGA/OLGIM classification) is significantly related to an elevated probability of developing cancer of the stomach. The sensitivity, specificity, and accuracy of NBI in the detection of gastric intestinal metaplasia in comparison to histopathological findings have been assessed using photographs, final endoscopic diagnosis by NBI, and histopathological findings following review.

Ethical consideration: The protocol for the research has been permitted by the ethical committee at Al-Azhar University, as well as the Committee of the Faculty of Medicine and the Committee of Hepato-Gastroenterology and Infectious Diseases Department at Al-Azhar University.

Statistical analysis

All data have been gathered, tabulated, and statistically analyzed utilizing SPSS version 28. The mean ± standard deviation (SD) has been utilized to express quantitative data for parametric data, while the median (range) was used for non-parametric data. Percentages and frequencies have been utilized to represent qualitative data. Utilizing the independent t-test for parametric data, the Mann-Whitney U test for non-parametric data, and Fisher's exact or chi-square test for categorical variables, comparisons among groups were determined. The diagnostic accuracy of narrow-band imaging has been evaluated utilizing a 2x2 contingency table to compute sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall accuracy. Interobserver agreement has been calculated using the kappa statistic. The diagnostic efficacy of NBI was assessed by constructing a receiver operating characteristic (ROC) curve, and the area under the curve (AUC) has been reported. Statistical significance has been defined as a p-value of less than 0.05.

3. Results

Table 1 illustrated a comparison among the examined groups according to baseline data; a statistically significant distinction has been observed regarding age, as the mean age of group II (48.5±9.6) was significantly greater in comparison with the mean age of group I (43.4±8.9) (p-value below 0.05). While a statistically insignificant distinction has been observed with regards to sex, residence, and BMI (p-value more than 0.05).

Table 1. Comparison of baseline data between examined groups

	GROUP I ATROPHIC GASTRITIS N=95	GROUP II INTESTINAL METAPLASIA N=25	P-VALUE
AGE			
MEAN ±SD	43.4±8.9	48.5±9.6	0.01*
RANGE	20-60	25-65	
SEX			
MALE	51 (53.6%)	13 (52%)	0.88
FEMALE	44 (46.4%)	12 (48%)	
RESIDENCE			
URBAN	60 (63.1%)	16 (64%)	0.83
RURAL	35 (36.9%)	9 (36%)	
BMI			
MEAN ±SD	26.4±5.5	27.3±6.1	0.47
RANGE	19.5- 35.6	18-37	

Table 2 showed a comparison among the examined groups with regards to the medical history; a statistically significant distinction has been observed regarding smoking, as the percentage of cases with intestinal metaplasia who were smokers was significantly higher (60%) than among cases with atrophic gastritis only (21%). (p-value < 0.05). While a statistically insignificant distinction has been observed with regards to comorbidities such as DM and hypertension, history of drug intake as PPI or NSAIDs, and family history of gastric cancer (p-value more than 0.05).

Table 2. comparison among examined groups regarding medical history

	GROUP I ATROPHIC GASTRITIS N=95	GROUP II INTESTINAL METAPLASIA N=25	P-VALUE
COMORBIDITIES			
DM	12 (12.6%)	5 (20%)	0.34
HTN	10 (10.5%)	3 (12%)	0.83
SMOKING	20 (21%)	15 (60%)	0.0002*
HISTORY OF DRUGS			
PPI	60 (63.15%)	12 (48%)	0.16
NSAIDS	70 (73.68%)	18 (72%)	0.86
FAMILY HISTORY OF GASTRIC CANCER	8 (8.4%)	4 (16%)	0.26

Table 3 showed Comparison among the examined groups with regards to the complaint and epigastric tenderness, a statistically insignificant distinction has been observed (p-value more than 0.05), as the percentage of cases who had epigastric pain, vomiting, and dyspepsia in group I was 68.4%, 55.7%, and 68.4%, respectively, compared to 64%, 68%, and 64% among cases in group II; also, the percentage of cases who had epigastric tenderness in group I was 45.2% compared to 56% among cases in group II.

Table 3. Comparison among examined groups regarding compliant and clinical examination:

		GROUP I ATROPHIC GASTRITIS N=95	GROUP II INTESTINAL METAPLASIA N=25	P-VALUE
COMPLAIN	Epigastric pain	65 (68.4%)	16 (64%)	0.67
	Nausea and vomiting	53 (55.7%)	17 (68%)	0.27
	Dyspepsia	65 (68.4%)	16 (64%)	0.67
CLINICAL EXAMINATION	Epigastric tenderness	43 (45.2%)	14 (56%)	0.33

Table 4 showed a comparison among the examined groups with regards to laboratory data; a statistically insignificant distinction has been observed (p-value more than 0.05); however, the mean hemoglobin level was slightly lower among cases with intestinal metaplasia, and the mean ESR was slightly higher among cases with intestinal metaplasia than among cases with atrophic gastritis only. Also, the mean TLC was slightly greater and the mean platelet count was slightly lower among cases with intestinal metaplasia than among cases with atrophic gastritis, and this difference was non-significant.

Table 4. comparison among examined groups as regards lab information

	GROUP I ATROPHIC GASTRITIS N=95	GROUP II INTESTINAL METAPLASIA N=25	P-VALUE
HB			
MEAN ±SD	11.5±0.6	11.3±0.8	0.17
RANGE	10.5-13	10-13	
TLC			
MEAN ±SD	7.13±3.7	7.8±2.2	0.39
RANGE	3.3-18	3.9-11	
PLATELET			
MEAN ±SD	239.3±33.3	227.9±29.9	0.10
RANGE	211-358	160-311	
ESR (FIRST H)			
MEAN ±SD	34.5±13.9	37.9±12.3	0.26
RANGE	15-60	20-70	

Table 5 showed a comparison between the examined groups with a statistically insignificant variance regarding H. pylori intensity (p-value > 0.05); however, the percentage of cases with mild infection was slightly lower among cases with intestinal metaplasia, and the percentage of cases with moderate infection was slightly higher than among cases with atrophic gastritis.

Table 5. comparison among examined groups as regards H. pylori intensity (histopathology)

H. PYLORI INTENSITY	GROUP I ATROPHIC GASTRITIS N=95	GROUP II INTESTINAL METAPLASIA N=25	P-VALUE
MILD	41 (43.1%)	8 (32%)	
MODERATE	24 (25.3%)	12 (48%)	0.08
SEVERE	30 (31.6%)	5 (20%)	

Table 6 showed that a statistically significant distinction has been observed among the examined groups with regards to findings suggestive of intestinal metaplasia by NBI. Out of 95 cases who were diagnosed with atrophic gastritis only by histopathology, findings suggestive of intestinal metaplasia are absent in 85 cases (89.5%) and present in 10 cases (10.5%). Also, out of 25 cases with intestinal metaplasia by histopathology, findings suggestive of intestinal metaplasia are present in 22 cases (88%) and absent in 3 cases (12%). (NBI imaging agreed with histopathology in 22 cases with a Kappa for measurement of agreement of 0.70 and a highly significant p-value less than 0.001).

Table 6. Comparison among examined groups with regard to finding suggestive of intestinal metaplasia by NBI:

		HISTOPATHOLOGY		TOTAL	CHI SQUARE	KAPPA	P-VALUE
		Atrophic gastritis	Intestinal metaplasia				
NBI	Negative	85 (89.5%)	3 (12%)	88 (71.7%)	60.7	0.70	<0.001*
	Positive	10 (10.5%)	22 (88%)	32 (28.3%)			
TOTAL		95 (100%)	25 (100%)	120 (100%)			

Table 7 showed that regarding the results of ROC curve analysis for NBI for diagnosis of intestinal metaplasia, it has been found that NBI had a sensitivity and specificity of 88 percent and 89.5 percent, correspondingly, with a total accuracy of 89.2% and a good area under the ROC curve of 0.88 and a highly significant p-value of <0.001.

Table 7.ROC curve analysis for NBI for diagnosis of intestinal metaplasia

AUC	0.88
95% CI	0.80-0.96
P-VALUE	<0.001*
SENSITIVITY	88%
SPECIFICITY	89.5%
PPV	68.8%
NPV	96.6%
TOTAL ACCURACY	89.2%

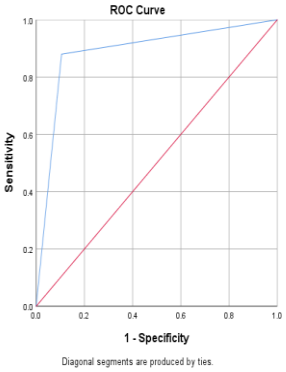

Figure 1. ROC curve analysis for NBI for diagnosis of intestinal metaplasia.

Table 8 Comparison between the examined groups regarding the possibility of gastric cancer by the OLGA/OLGIM staging system: A statistically insignificant distinction has been observed (p-value more than 0.05); however, the percentage of cases with high risk (stage III and IV) was higher among cases with intestinal metaplasia (32%) than among cases with atrophic gastritis only (16.8%).

Table 8. Comparison among examined groups with regards to the possibility of gastric cancer by the OLGA/OLGIM histological staging system:

STAGING SYSTEM	GROUP I ATROPHIC GASTRITIS N=95	GROUP II INTESTINAL METAPLASIA N=25	P-VALUE
LOW RISK STAGE I AND II	79 (83.15%)	17 (68%)	0.09
HIGH RISK STAGE III AND IV	16 (16.8%)	8 (32%)	

Table 9 showed a statistically highly significant distinction has been observed among different mucosal patterns of NBI and risk of gastric cancer by OLGIM (p-value <0.001), as all cases of marginal turbid band and 9 cases of light blue crest have been correlated with low risk of gastric cancer, while 2 cases of light blue crest and all cases of white opaque substance have been related to an elevated risk of gastric cancer.

Table 9. Comparison among different mucosal patterns of NBI according to OLGIM score:

OLGIM SCORE	MUCOSAL PATTERN OF NBI			TOTAL	FE	P-VALUE
	Marginal turbid band	Light blue crest	White opaque substance			
LOW RISK STAGE I AND II	8 (47%)	9 (53%)	0(0%)	17 (100%)	16	<0.001*
HIGH RISK STAGE III AND IV	0(0%)	2(40%)	3(60%)	5 (100%)		

Table 10 showed that out of 22 cases who were available for targeted biopsy by NBI in the metaplasia group, more than one half had targeted biopsy from the antrum (59%), followed by 22.7% from the corpus and 18.1% from the incisura.

Table 10. Distribution of site of targeted biopsy by NBI in the metaplasia group N=22

SITE OF TARGET BIOPSY	FREQUENCY	PERCENTAGE
ANTRUM	13	59%
INCISURA	4	18.1%
CORPUS	5	22.7%

Table 11 showed Comparison among the examined groups with regards to biopsy site according to the Sydney protocol, a statistically insignificant distinction has been observed (p-value more than 0.05). In group I, 58 patients (61%) had antral atrophic gastritis, 29 patients (30.5%) had corpus atrophic gastritis, and 8 patients (8.4%) had both antral and corpus atrophic gastritis. In group II, 17 patients (68%) had antral intestinal metaplasia, 5 patients (20%) had corpus intestinal metaplasia, and 3 patients (12%) had both antral and corpus intestinal metaplasia.

Table 11. Distribution of biopsy site (according to Sydney protocol) among the examined groups.

BIOPSY SITE	GROUP I ATROPHIC GASTRITIS N=95	GROUP II INTESTINAL METAPLASIA N=25	P-VALUE
ANTRUM	58 (61%)	17(68%)	
CORPUS	29 (30.5%)	5(20%)	0.54
ANTRUM AND CORPUS	8 (8.4%)	3 (12%)	

4. Discussion

Gastric cancer is the 3rd leading cause of tumor fatalities globally, with 1,033,701 new cases diagnosed worldwide.[12]

In our investigation, the mean age of group II (48.5±9.6 years) was significantly higher in comparison with the mean age of group I (43.4±8.9 years) (p < 0.05). While a statistically insignificant distinction has been observed with regard to sex, residence, and BMI (p-value more than 0.05). The percentage of cases with intestinal metaplasia who were smokers was significantly higher (60%) than among cases with atrophic gastritis only (21%) (p-value <0.05).

This was consistent with the objective of Chen et al.[13], who sought to compare the variance among H. pylori-infected cases with intestinal metaplasia and cases without intestinal metaplasia. The intestinal metaplasia group was older than the no intestinal metaplasia group (mean age, 63.5 ± 12.3 years versus 59.4 ± 13.4 years, P-value equals 0.004). No significant inter-group distinctions have been found in the symptom's distribution, BMI, gender, and personal history, all with p-values greater than 0.05.

In our study, a comparison between the examined groups regarding the complaint and epigastric tenderness showed a statistically insignificant distinction (p-value more than 0.05), as the percentage of cases that had epigastric pain, vomiting, and dyspepsia in group I was 68.4%, 55.7%, and 68.4%, respectively, compared to 64%, 68%, and 64% among cases in group II. Also, the percentage of cases that had epigastric tenderness in group I was 45.2% compared to 56% among cases in group II.

Ahmed et al.[14] enrolled 151 cases in their investigation. In 83 cases (fifty-five percent), H. pylori has been detected. Epigastric pain was the most prevalent symptom of infected cases, observed in sixty-five (78.3 percent), followed by nausea/vomiting in forty-three (51.8 percent), heartburn in thirty-seven (44.6 percent), dyspepsia in nineteen (22.9 percent), and hemorrhage in twenty-six (31.3 percent) cases. The least common presentations were reflux/regurgitation in six cases (7.2 percent), dysphagia in four (4.8 percent), and weight loss in three (3.6 percent). The cases with H. pylori infection had a low incidence of epigastric pain (78.3 percent versus 91.2 percent, p-value equals 0.031), reflux/regurgitation (7.2 percent versus 20.6 percent, p-value equals 0.016), and dysphagia (4.85 percent versus 14.7 percent, p-value equals 0.037).

Our investigation showed that the comparison between the examined groups shows a statistically insignificant distinction regarding H. Pylori intensity (p-value more than 0.05). Also, a

statistically significant distinction has been observed among the examined groups regarding findings suggestive of intestinal metaplasia. Among 95 cases, NBI had the ability to diagnose 85 cases (89.5%), and the remaining 10 cases were falsely positive for intestinal metaplasia (10.5%). Also, out of 25 cases with intestinal metaplasia by histopathology, NBI imaging agreed with histopathology for 22 cases (88%), and only 3 cases were falsely negative (12%), with a Kappa for measurement of agreement of 0.70 and a highly significant p-value <0.001.

Alaboudy et al.[15] observed that all cases with normal mucosal patterns on narrow band imaging were negative for HP infection. Conversely, all cases that exhibited abnormal mucosal patterns on narrow band imaging were H. pylori positive. Despite the fact that cases in types one and two exhibited a moderate density of infection with H. pylori, those in types three and four exhibited a marked and mild density of infection with H. pylori, respectively.

In our investigation, we showed that regarding the results of ROC curve analysis for narrow band imaging for diagnosis of intestinal metaplasia, it was found that NBI had a sensitivity and specificity of 88 percent and 89.5 percent, correspondingly, with a total accuracy of 89.2% and a good area under the ROC curve of 0.88 and a highly significant p-value <0.001.

In agreement with Rokkas et al.[16] who involved eleven eligible investigations in the meta-analysis, comprising 1672 cases. In the detection of GIM, narrowband imaging demonstrated a pooled sensitivity of eighty percent (ninety-five percent confidence interval [CI] 69-87), specificity of ninety-three percent (ninety-five percent CI 85-97), DOR of forty-eight (ninety-five percent CI 20-121), & AUC of 0.93 (ninety-five percent CI 0.91-0.95).

Our study revealed that by comparing among examined groups as regards the possibility of gastric cancer by the OLGA/OLGIM staging system, the result was non-significant (p-value more than 0.05); however, the percentage of cases with elevated risk (stage III and IV) was higher among cases with intestinal metaplasia (32%) than among cases with atrophic gastritis only (16.8%) with p-value approaching statistical significance (p-value = 0.09).

In the research by Yun et al.[17], 71 (18.3 percent) of the 387 cases of intestinal-type gastric cancer were classified as high-risk OLGA stages (three, four), whereas 113 (29.2 percent) were categorized as high-risk OLGIM stages (three, four). Of the 246 instances with diffuse-type gastric cancer, 36 (14.6 percent) were classified in high-risk OLGA stages, whereas 39 (15.9 percent) were categorized in high-risk OLGIM stages. Independent risk factors for cancer of the stomach have been revealed in a multivariable study, irrespective of histologic type, including family history of stomach cancer, Helicobacter pylori infection, high-risk OLGA stages, and high-risk OLGIM stages, with odds ratios (ORs) of 1.78, 1.94, 2.63, and 3.18, respectively. Within the high-risk OLGA/OLGIM phases, neither a family history of stomach cancer nor H. pylori infection demonstrated significant risk modification.

Our investigation showed that a statistically highly significant distinction has been observed among different mucosal NBI and the risk of stomach cancer by OLGIM (p-value <0.001), as all cases of marginal turbid band and 9 cases of light blue crest have been correlated with low risk of gastric cancer, while 2 cases of light blue crest and all cases of white opaque substance have been related to a high possibility of stomach cancer.

Conversely, Yao et al.[18] have demonstrated that LBCs are infrequently observed in cancers and are more commonly found in the noncancerous background mucosa.

In our study, out of 22 cases who were available for targeted biopsy by NBI in the metaplasia group, more than half had targeted biopsy from the antrum (59%), followed by 22.7% from the corpus and 18.1% from the incisura. The most common site of atrophic gastritis and intestinal metaplasia is the antrum (61% and 68%, respectively).

In an additional investigation carried out by Lazăr et al.[19] type one intestinal metaplasia was the most frequently observed type (11.4 percent for antral biopsies and 15.6 percent for gastric body biopsies). The distribution of the three groups of intestinal metaplasia at the antrum and gastric body levels didn't differ significantly (p-value = 0.560).

Limitation: The 1ry limitation of the present investigation was the absence of an evaluation of additional risk factors related to gastric intestinal metaplasia and the lack of variability among the patients included.

4. Conclusion

In summary, the outcomes of the current investigation indicate that NBI had a high sensitivity and specificity in the diagnosis of intestinal metaplasia. The light blue crest (LBC) was the most prevalent NBI pattern in cases who have gastric intestinal metaplasia, and all cases of white opaque substance (WOS) were related to an elevated probability of stomach cancer with regard to the OLGIM score. There are independent risk factors for stomach cancer that are associated with elevated OLGIM stages.

Disclosure

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There are no conflicts of interest.

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