# **Original Research Article**

DOI: http://dx.doi.org/10.18203/2349-2902.isj20182215

# A comparative study of conventional endoscopy and chromoendoscopy for detection of premalignant gastric lesions using methylene blue stain

Virendra S. Athavale, D. S. Nirhale, Tejas R. Sonawane\*, Shahaji G. Chavan, Mansi S. Dhande, Gaurav C. Kulkarni

Department of Surgery, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India

Received: 09 April 2018 Revised: 20 April 2018 Accepted: 28 April 2018

## \*Correspondence: Dr. Tejas R. Sonawane,

E-mail: tejas.sonawane4446@gmail.com

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

#### **ABSTRACT**

**Background:** Early diagnosis represents the most important measure to decrease gastric cancer mortality. Endoscopists should be trained to perform standardized extremely rigorous observation with a low threshold of suspicion for neoplasia. Objective of present study was to compare the efficacy of conventional endoscopy with chromoendoscopy for the detection of gastric premalignant lesions using methylene blue.

**Methods:** 100 cases where enrolled in present study with chronic abdominal pain more than 6 months. All patients underwent conventional endoscopy followed by chromoendoscopy. Biopsies from pylorus, body and fundus were sent for HPE. Comparative study was done between biopsies from conventional endoscopies and chromo endoscopies, Inference (sensitivity, specificity and accuracy) were drawn.

**Results:** Out of 100 patients, 4 of the patients were positive for pre-gastric malignancy. Total 4 biopsies were positive from pylorus of which 1 biopsy was positive by conventional endoscopy and 3 were positive from chromoendoscopy. In our study sensitivity of chromoendoscopy for detection of lesions in pylorus was 25%, specificity was 100% and accuracy was 97% P=0.04

**Conclusions:** Chromoendoscopy is superior to conventional endoscopy in detection of pre-gastric malignancy. Chromoendoscopy could be performed in the same setup of conventional endoscopy which was relatively cheaper than the other modalities and the results were equivocal with that of other commercial modalities.

Keywords: Conventional endoscopy, Chromoendoscopy, Methylene blue stain, Premalignant gastric lesions

#### INTRODUCTION

Early diagnosis represents the most important measure to decrease gastric cancer mortality. Endoscopists should be trained to perform standardized extremely rigorous observation with a low threshold of suspicion for neoplasia.

Together with recent interest in new imaging techniques such as magnification, chromoendoscopy should be

considered to represent a simple, safe and inexpensive technique that may be useful in identifying premalignant conditions and minute cancerous lesions, estimating their superficial extent and determining the histological type and submucosal invasion. It is well recognized that conventional endoscopy using white light does not detect dysplasia and the subtle lesions (i.e. flat adenomas) may be missed. Furthermore, the ability to detect dysplasia within fields of transformed mucosa, such as intestinal metaplasia in premalignant gastric lesion is decreased. It

is a major clinical challenge and remains a strong motivation to develop new endoscopy systems to complement white light endoscopy.<sup>2</sup>

Chromoendoscopy using methylene blue as a vital stain involves active mucosal absorption of the dye by small intestinal and colonic epithelium. The stain is not absorbed by non-absorptive mucosa such as squamous or gastric epithelium.<sup>3</sup>

The present study is done to compare the efficacy of conventional endoscopy and chromoendoscopy for detection of intestinal metaplasia as premalignant gastric lesion.

Aim of present study was to compare the efficacy of conventional endoscopy with chromoendoscopy for the detection of gastric premalignant lesions using methylene blue.

#### **METHODS**

The study was conducted at Dr. D. Y. Patil Medical College, Hospital and Research Centre, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune 18, for a period of 2 years (from MAY 2015 to September 2017) and is a Prospective and Comparative Study using 100 patients. The study was approved by the Institute Ethics Committee and informed and written consent was taken from patients.

#### Inclusion criteria

- Age: 18-70 years
- Patient with Chronic abdominal pain.
- Patient with old H/O Hematemesis.
- Patient with old H/O Malena.

#### Exclusion criteria

- Prediagnosed cases of gastric cancer.
- Patient with coagulopathy.
- Immuno compromised patient.
- Grossly visible mucosal lesion.
- Recent upper GI bleed.
- Active TB.
- Pregnancy

Patients were kept nil by mouth at least 6-8 hrs before the procedures. All the procedure of GI endoscopy was performed on FUJINON model no.EG250WR5.

Patient were sprayed orally with 10% lignocaine (LOX) spray and then made to lie in left lateral position. The upper GI scope was introduced orally and detailed examination of esophagus, stomach and duodenum was done. One Biopsy was taken each from pylorus, body and fundus and labeled as (P/B/F) respectively using conventional endoscopy method. The biopsy samples of

the patients after conventional endoscopy procedure were grouped as GROUP I.

The biopsy samples were labeled as

- GROUP I P
- GROUP I B
- GROUP I F

After the conventional endoscopy, a mucolytic solution (Mucomist) 20% was sprayed using spray catheter. 5ml each at pylorus,5ml over body (greater curvature) and 5ml over fundus for having mucolytic action and waited for 2-3 mins.

Using spray catheter, 5ml each of 0.5% methylene blue will be sprayed over pylorus, body, fundus and waited for the dye to act on gastric mucosa. A thorough wash was given using tap water to remove the excess stain. Biopsies were taken from stained areas (blue colour). The biopsies were taken from pylorus, body and fundus and were labelled as. (Pc/Bc/Fc).

# Chromoendoscopy

The biopsy samples of the patients after chromoendoscopy were labeled as GROUP II

The biopsy sample were labled as

- GROUP II Pc
- GROUP II Bc
- GROUP II Fc

After confirming the hemostasis upper GI scope was removed and patient was started with oral food after 1hr.

Specimens were sent for histopathological examination after labeling them properly. Examination was performed by same team of pathologist. Sensitivity and specificity of the procedure was determined. All the patients (100 cases) were subjected for both conventional endoscopy and chromoendoscopy.

Positive results indicate visualization of intestinal metaplastic cells in the biopsy specimen these patients was investigated further and treated accordingly.

## **RESULTS**

Table 1 showing age wise relation of cases in present study we concluded maximum number of cases were between 41-50 years number of cases were 31 followed by 51-60 years cases were 29 least number of cases were below 30 years of age i.e. 12.

Table 2 showing gender distribution in present study suggestive male predominance out off 100 patients 68 was male and 32 were female.

Table 1: Age wise distribution of cases in study group.

Age (Yrs)	No of cases	Percentage
≤30	12	12
31-40	15	15
41-50	31	31
51-60	29	29
61 and above	13	13
Total	100	100

Table 2: Sex wise distribution of cases in study group.

Sex	No of cases	Percentage
Male	68	68
Female	32	32
Total	100	100

Figure 1 showing chief complaints of patients in present study maximum cases were pain in abdomen, indigestion, nausea, vomiting and post prandial pain respectively.

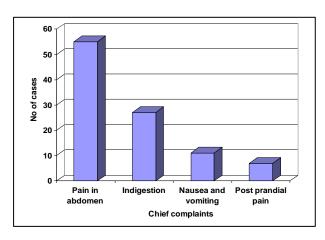


Figure 1: Chief complaints wise distribution of cases in study group.

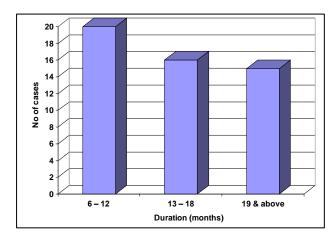


Figure 2: Duration wise distribution of cases in study group.

Figure 2 showing duration of pain in present study maximum cases had 6-12 months followed by 13-18 months.

Figure 3 showing HPE findings of cases in present study. Pre gastric malignancy was present in 4 of the cases.maximum biopsy was suggestive of chronic gastritis followed by gastritis.

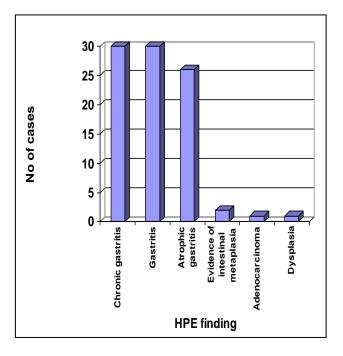


Figure 3: Histopathological finding wise distribution of cases in study group.

Table 3: Association of examination of pylorus between conventional endoscopy and chromo endoscopy in study group.

Pylorus by conventional	Pylorus by chromo endoscopy		_ Total
endoscopy	Present	Absent	
Present	1	0	1
Absent	3	96	99
Total	4	96	100

Table 3 showing comparison of biopsies from pylorus using conventional and chromoendoscopy. We found chomoendoscopy was accurate (97%) with 100% specificity. Total 3 biopsy were positive by chromoendoscopy and single by conventional endoscopy.

Table 4: Association of examination of body between conventional endoscopy and chomo endoscopy in study group.

Body by conventional		Body by chromo endoscopy	
endoscopy	Present	Absent	
Present	1	0	1
Absent	2	97	99
Total	3	97	100

Fisher exact test, P=0.04; Sensitivity = 33.33%; Specificity = 100%; PPV = 100%; NPV = 97.98%; Accuracy = 98%

Table 4 showing biopsies from Body of stomach chromoendoscopy was more accurate (98%) with specificity of 100%.

Total 3 biopsy were positive out of which 2 were positive by chromoendoscopy and single by conventional endoscopy. Table 5 showing positive biopsies from fundus only one biopsy was positive in chromoendoscopy and none in conventional endoscopy.

Table 5: Association of examination of fundus between conventional endoscopy and chromo endoscopy in study group.

Fundus by conventional	Fundus by chromo endoscopy		Total
endoscopy	Present	Absent	
Present	0	0	0
Absent	1	99	100
Total	1	99	100

Table 6: Association between conventional endoscopy and chromo endoscopy in study group.

Biopsy by conventional		Biopsy by chromo endoscopy	
endoscopy	Positive	Negative	
Positive	1	0	1
Negative	3	96	99
Total	4	96	100

Fisher exact test, P=0.04; Sensitivity = 25%; Specificity = 100%; PPV = 100%; NPV = 96.97%; Accuracy = 97%

Table 6 showing positive biopsy by chromoedoscopy was more than conventional endoscopy from body, pyloros, fundus. With specificity of 100% and accuracy of 97%.

#### **DISCUSSION**

This study was done in department of General Surgery, Dr DY Patil Medical College, Hospital and Research Centre from May 2015 to September 2017. A total of 100 patients of age more than 18 years with chronic abdominal pain, Hematemesis and Malena was included in this study.

Diagnosed patient of gastric malignancy, immunocompromised patients, active TB, upper GI bleeding, visible mucosal lesion, pregnancy and patients with coagulopathy were excluded from this study.

# Age

In present study, out of 100 patients maximum number of patients were between 41 to 50 years followed by 51 to 60 years with mean age of 46.95 (Table 1).

There was wide variation in mean ages in different parts of world. Our results were similar with the study done in 2015 in Pakistan by Daniyal M et al to provide awareness

about gastric cancer and epidemiology of gastric cancer in Pakistan which suggested mean age 48±4.47 years.<sup>4</sup>

#### Gender

Out of 100 patients, 68 (68%) were male patients and 32 (32%) were female patients with male: female ratio of 2.12: 1, so present study was a male predominant study. (Table 2). Similar findings of constant male: female ratio was noted in India by Kumar A et al. It was 2.7: 1 in India and 2.2: 1 in Saudi Arabia.<sup>5</sup>

#### Chief complaints

In present study, Out of 100 patients, maximum came with chief complaints of pain in abdomen in 55 patients, followed by indigestion in 27, nausea, vomiting in 11 and post prandial pain in 7 (Figure 1). A similar study was conducted by Saha et al in 2013 and found the commonest cause of pain as Abdominal pain in 66.2%, followed by weight loss in 43, 3%, indigestion in 45.9%, nausea and vomiting in 34.2%, postprandial pain in 29% and malena in 9.5%. Parallel results were drawn by Qurieshi et al that suggested pain in abdomen as the commonest cause in 51%, followed by indigestion in 28.9%, nausea and vomiting in 34% and post prandial pain in 7%, malena in 20.2%.

#### Duration of abdominal pain

In present study, out of 100 patients, 69 patients came with complaints of pain within 6-12 months after onset whereas 16 patients came after 13-18 months, and 15 patients after 19 months (Figure 2).

#### Histopathology report

It was observed that, out of 100 patients, 39 patients' histopathology report was suggestive of chronic gastritis, 31 patients with gastritis, 26 patients with atrophic gastritis, 2 with erosive intestinal metaplasia, 1 with adeno-carcinoma and 1 with dysplasia (Figure 3). Present findings were similar with study performed by Gomez JM et al found that chronic gastritis in 56.6%, gastritis in 23.9%, atrophic gastritis in 13.2%, gastric cancer in 6.3%.8

# Pre-malignant gastric lesion

In present study, out of 100 patients, 4 of the patients were positive for pre-gastric malignancy. Total 4 biopsies were positive from pylorus of which 1 biopsy was positive by conventional endoscopy and 3 were positive from chromoendoscopy. In present study sensitivity of chromoendoscopy for detection of lesions in pylorus was 25%, specificity was 100% and accuracy was 97% P=0.04 (Table 3).

In present study, out of 4 positive patients for pre-gastric malignancy, total of 3 biopsies were positive in body of

stomach, 2 were positive on chromoendoscopy and 1 was positive on conventional endoscopy. With a sensitivity of 33.33%, specificity of 100% and accuracy of 98% (Table 4).

In present study, out of 4 positive patients of pre-gastric malignancy only 1 biopsy was positive on chromoendoscopy and not a single biopsy on conventional endoscopy (Table 5). Present findings were consistent with the study by Taghavi et al which suggested the that out of total 33 patients, positive biopsies from the antrum, body and fundus were 18, 15 and 7, respectively, using chromoendoscopy, and 10, 4 and 2, respectively, from the same sites using conventional endoscopy. Pylorus being the main site of pre gastric malignancy followed by Body and Fundus. 9

In present study we concluded chromoendoscopy being more specific with sensitivity 25%, specificity 97% and accuracy 100% (Table 6). Similar findings were drawn by Astudillo CG et al suggesting sensitivity of 46%, specificity 91% using targeted biopsy vs. non targeted biopsy.<sup>10</sup>

#### **CONCLUSION**

We have concluded from present study that chromo endoscopy is superior to conventional endopscopy in detection of pre gastric malignancy. Chromoendoscopy enables targeted biopsies and thus improves the diagnostic yield of dysplastic alterations. It also improves further characterization, differentiation and diagnosis of endoscopically detected suspicious lesions.

Chromoendoscopy is considered a safe, relatively inexpensive procedure aside from the additional endoscopy time required. The chromoendoscopic staining methods are not technically demanding and easy to learn, but require experience in the interpretation of the observed staining pattern. The accessories needed to perform chromoendoscopy, the dye agents and spraying catheters, are readily available. However more expensive technique as NBI are available but are much more expensive. Chromoendoscopy is helpful in small setup were conventional endoscopy is available.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

#### REFERENCES

- 1. Dinis-Ribeiro M. Chromoendoscopy for early diagnosis of gastric cancer. Eur J Gastroenterol Hepatol. 2006 Aug;18(8):831-8.
- Saha AK, Maitra S, Hazra SC. Epidemiology of gastric cancer in the gangetic areas of West Bengal. ISRN Gastroenterol. 2013 Oct 23;2013.
- 3. Niveloni S, Fiorini A, Dezi R, Pedreira S, Smecuol E, Vazquez H et al. Usefulness of videoduodenoscopy and vital dye staining as indicators of mucosal atrophy of celiac disease: assessment of interobserver agreement. Gastrointest Endosc. 1998 Mar 31;47(3):223-9.
- 4. Daniyal M, Ahmad S, Ahmad M, Asif HM, Akram M, Ur Rehman S et al. Risk factors and epidemiology of gastric cancer in Pakistan. Asian Pac J Cancer Prev. 2015;16:4821-4.
- Satti MB, Al-Quorain AA, Al-Gindan YM, Al Hamdan AA, Al-Idrissi HY. Gastric malignancy: clinicopathologic spectrum and relationship to Helicobacter pylori infection. Saudi J Gastroenterol. 2005 Sep;11(3):149.
- Saha AK, Maitra S, Hazra SC. Epidemiology of gastric cancer in the gangetic areas of west bengal. ISRN Gastroenterol. 2013 Oct 23;2013.
- 7. Quriesh MA, Masoodi MA, Kadla A, Ahmad SZ, Gangadharan P. Gastric cancer in Kashmir. Asian Pacific J Cancer Prevent. 2011;12:303-7.
- 8. Gomez JM, Wang AY. Gastric intestinal metaplasia and early gastric cancer in the west: a changing paradigm. Gastroenterol Hepatol. 2014 Jun;10(6):369.
- 9. Taghavi SA, Membari ME, Eshraghian A, Dehghani SM, Hamidpour L, Khademalhoseini F. Comparison of chromoendoscopy and conventional endoscopy in the detection of premalignant gastric lesions. Canadian J Gastroenterol Hepatol. 2009;23(2):105-8
- Calle AG, Jerves T, Pesántez L, Calle P, Gutiérrez A, Calle G. Utility of routine gastric biopsies and staining with methylene blue in the diagnosis of intestinal metaplasia in patients over 40 years. Acta Gastroenterolog Latinoameric. 2013;43(3):189-97.

Cite this article as: Athavale VS, Nirhale DS, Sonawane TR, Chavan SG, Dhande MS, Kulkarni GC. A comparative study of conventional endoscopy and chromoendoscopy for detection of premalignant gastric lesions using methylene blue stain. Int Surg J 2018;5:2165-9.