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Evaluation and Screening Using Routine Chromoendoscopy By Indigo Carmine dye For Early Detection of Rectosigmoid Lesions in Sohag University hospital, Egypt.

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Abstract

Background and study aim: Chromoendoscopy using indigo carmine staining significantly increased the detection rate for adenomas, flat lesions, and serrated lesions, this study aimto evaluate the role of routine chromoendoscopy using indigocarmine dye in early detection of rectosigmoid lesions.
Methods: Eighty five patients were presenting to Endoscopy Unit, Internal Medicine Department; Sohag University forcolonoscopic examination, aged ≥40 years, all the patients were subjected to screening about rectosigmoid lesions by conventional endoscopy thenchromoendoscopy using indigocarminedye .
Results: A total number of 85 patients were included, 52 males (61.2%), 33 females (38.8%) and their ages ranged from 40 to 74 years with a mean of 56.54 years ± 9.21. The diagnosis after conventional colonoscopy was normal in 43 patients (50.6%) , 17 patients (20%) had hyperplastic polyps, 7 patients (8.2%) had carcinomas, 7 patients (8.2%) had non- specific colitis,4 patients (4.7%) had angiodysplasia ,4 patients (4.7%) had diverticulae ,2 patients (2.4%) had adenomatous polyps and 1 patient (1.2) had a benign rectal ulcer. Flat elevated lesions were 72 lesions (55%), flat lesions were 57 lesions (43.5%) and lastly depressed lesions were only 2 lesions (1.5%). Histopathological examination after chromoendoscopy were 52 lesions revealed inflammatory conditions (39.7%), 32 lesions were hyperplastic in nature (24.4%), 4 lesions were indefinite for hyperplasia (3.1%), 23 lesions show dysplastic features (17.5%) and 20 lesions (15.3%) show normal histopathological examination. Total conventional colonoscopy time was 31.13±9.4,the added time by chromoendoscopy technique was 14.21±3.7 minutes and time of application of the dye was 176.82±51.4 seconds. The chromoendoscopy is more sensitive than the conventional endoscopy because number of false negative cases much less in the new method about 50% less than conventional method, screening test of chromoendoscopy is about excellent sensitivity 100% and excellent specificity 100% but less sensitivity in conventional 65%only.
Conclusion: Routine chromoendoscopy using indigocarmine is more sensitive than conventional as screening test. It is a valuable technique in demonstrating dysplastic and inflammatory rectosigmoid lesions.

Keywords: chromoendoscopy, evaluation, screening tests, histopathological, validity.

1. Introduction

Colorectal cancer (CRC) is the third most common cancer worldwide after lung and breast cancers with two-thirds of all colorectal cancers occurring in the more developed regions of the world. (**Dragovich and Tsikitis,2012).** Chromoendoscopy is an endoscopic technique that uses stains during endoscopy to highlight differences in mucosa, as well as dysplastic and malignant changes that are not apparent in white light. Chromoendoscopy is used to increase the detection rates for various pathologic processes during endoscopy **(Sakamoto et al., 2014).** The agents used in chromoendoscopy are commercially available and inexpensive. (**Wong et al., 2007).**

1.1 Study questions

- Is there role of screening using routine chromoendoscopy by indigocarmine dye for early detection of rectosigmoid lesions?
- What is evaluation of this procedures?

1.2 Study objectives

- Evaluate and screening used in this maneuver.
- Determinesociodemographic, family and disease related factors affecting technique in our study
- Discuss complete history taking, lab. And radiological examination.

1.3 Aim of the work:

The aim of this study is to do screening and evaluate the role of routine Chromoendoscopy using indigocarmine dye in early detection of rectosigmoid lesions in patients performing colonoscopic examination

2. Patients and Methods

2.1 Study design, setting and populations.

The study is case series includes 85 patients were presenting to Endoscopy Unit, Internal medicine department, Sohag University for screening about rectosigmoid lesions using the new technique of chromoendoscopy versus the conventional endoscopy.

2.2 Inclusion criteria :

Indication for colonoscopy and age ≥ 40 years.

2.3 Exclusion criteria :

Critically ill patients, pregnancy,significant coagulationdisorders, insufficient bowel preparation, known hypersensitivity to indigocarmine, moderate/severe mucosal inflammation, failure of obtaining informed consent. Eligible subjects, after an informed consent .

2.4 Data collection tools :

History taking, complete physical examination, lab.and radiological examination then colonoscopy was done. Conventional colonoscopy after good preparation was performed.Immediately before ending the conventional colonoscopic examination, re-introduction of the endoscope up to 30 cm from the anal verge was done, staining was applied to normally appearing mucosa of the sigmoid colon and rectum with Indigocarmine 0.4% solution.Newly detectable suspicious areas after staining were assessed and biopsied.

2.5 Ethical considerations

- The study protocol was approved by the ethical committee of faculty of medicine, Sohag University.
- The researchers assured voluntary participation and confidentiality of each patient who agrees to participate in this study.
- Written, informed consent was obtained from patients

2.6 Data management and statistical analysis

- Data were entered, cleaned and recoded (if needed) using the Statistical Package for Social Science (SPSS Inc., Chicago, IL, USA) version 20 descriptive statistics (frequency & percent for qualitative data, mean ± SD for quantitative data)
- Data analysis and comparative study between the conventional endoscopy and chromoendoscopy was done to evaluate the new screening method.

3. Results

A total number of 85 patients were included, 52 males (61.2%), 33 females (38.8%) and their ages ranged from 40 to 74 years with a mean of 56.54 years ± 9.21and age ≥ 40 years(figure 1). Indications for colonoscopy in the studied group were chronic diarrhea, chronic abdominal pain, bleeding per rectum, anemia for investigations and constipation. The diagnosis after conventional colonoscopy was normal in 43 patients (50.6%) , 17 patients (20%) had hyperplastic polyps, 7 patients (8.2%) had carcinomas, 7 patients (8.2%) had non- specific colitis,4 patients (4.7%) had angiodysplasia, 4 patients (4.7%) had diverticulae, 2 patients (2.4%) had adenomatous polyps and 1 patient (1.2) had a benign rectal ulcer,(figure2). Diagnosis after chromoendoscopy with dye yield results in (figure 3)

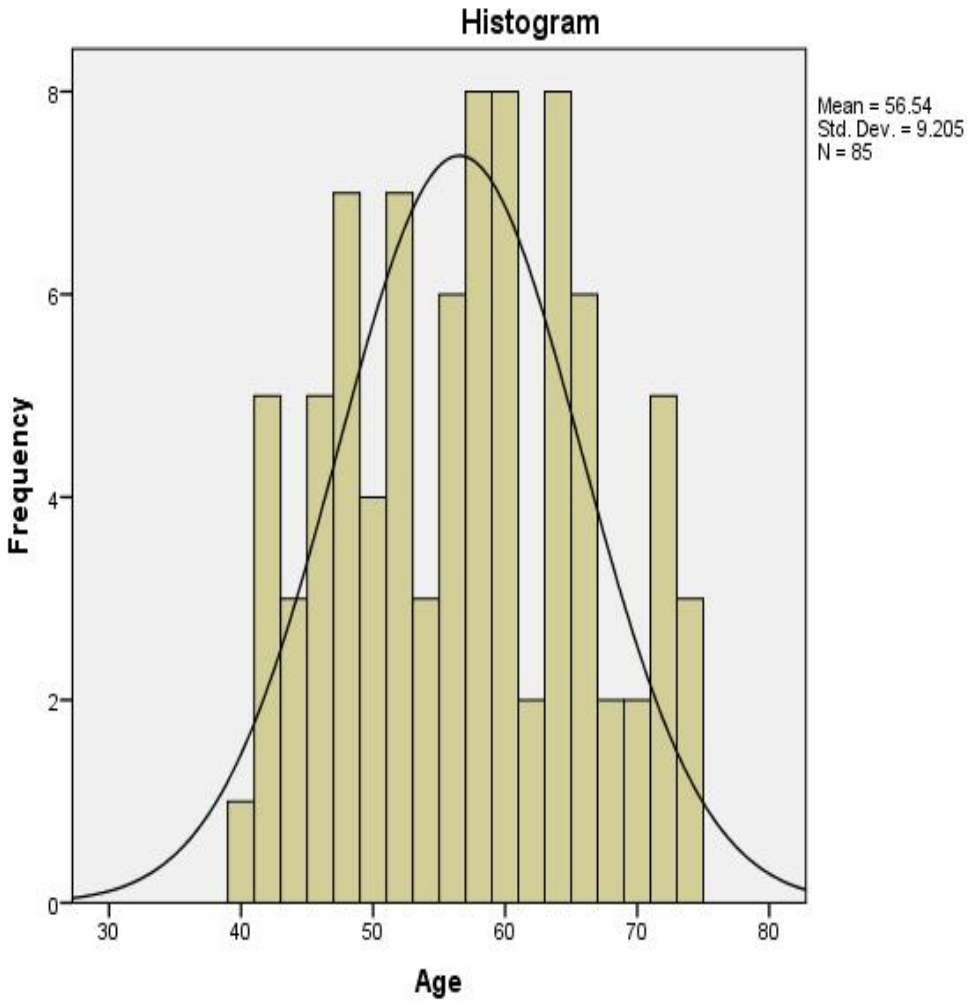

Figure (1) age in the procedure

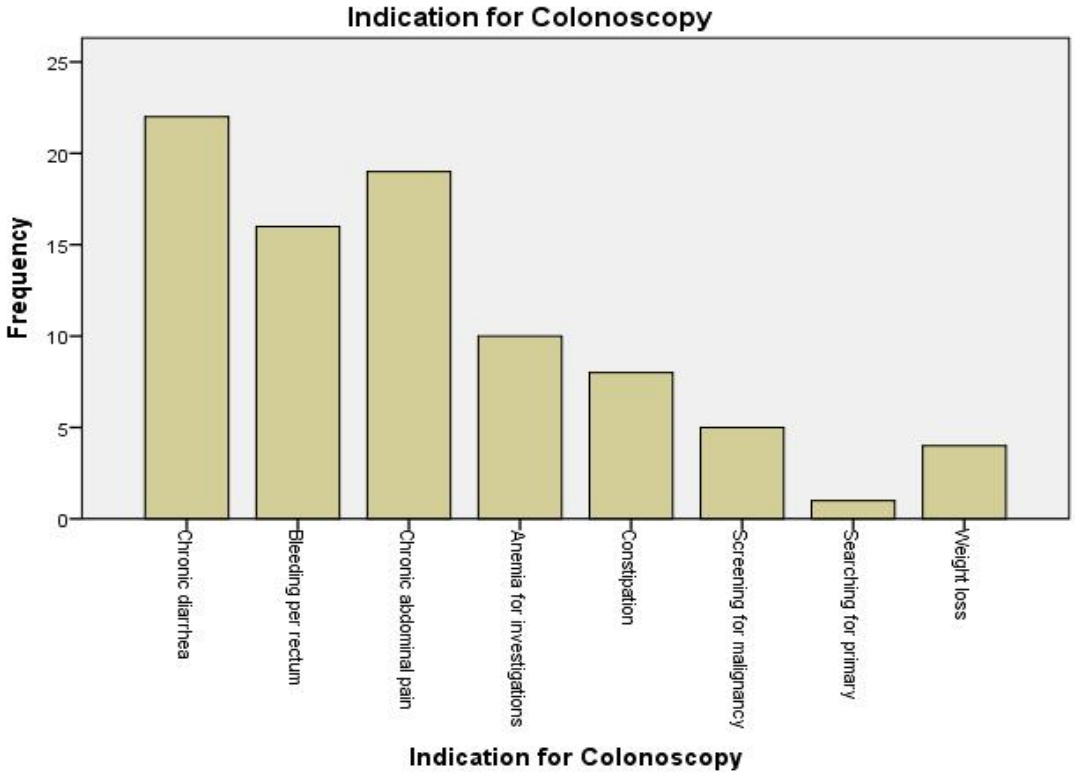

Figure (2) Indication in the procedure

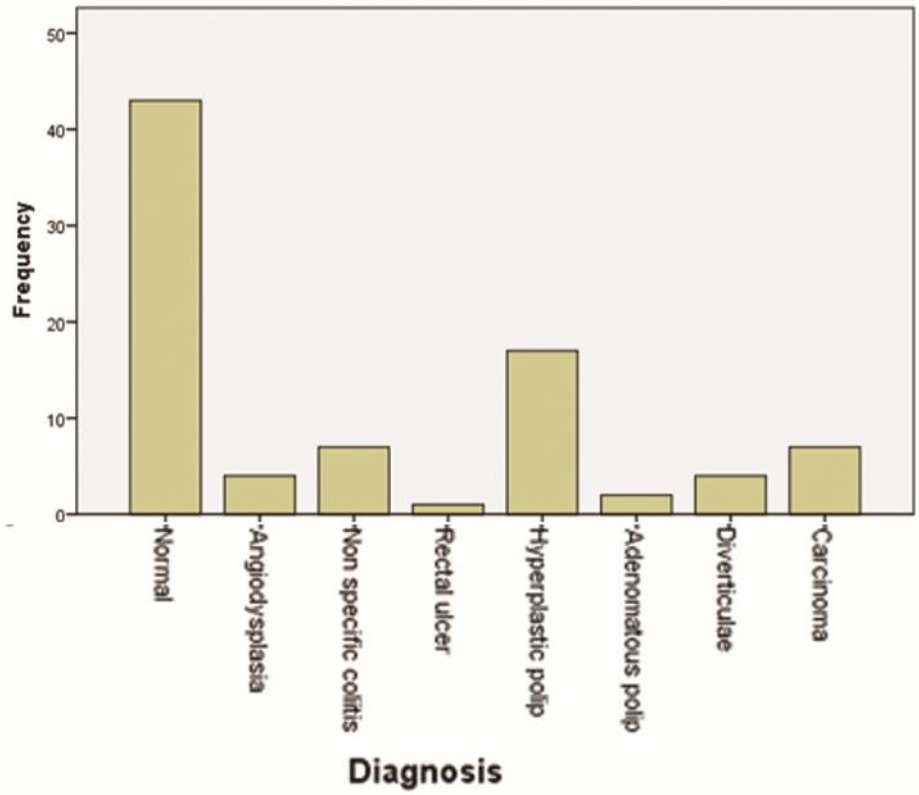

Figure 3 : Diagnosis after conventional colonoscopy

Histopathological examination after chromoendoscopy were 52 lesions revealed inflammatory conditions (39.7%), 32 lesions were hyperplastic in nature (24.4%), 4 lesions were indefinite for hyperplasia (3.1%), 23 lesions show dysplastic features (17.5%) and 20 lesions (15.3%) show normal histopathological examination (table 1), Dysplasia lesions subtype (figure 4), inflammatory lesion subtype(figure 5).

Table(1) Histopathology finding after screening by chromoendoscopy with dye

Variable		No/mean
Morphological picture of the lesion	Flat	57(43.5%)
	Flat elevated	72(55%)
	Depressed	2(1.5%)
Size in cm	Mean±SD	0.78±0.54
	0.25	21(16%)
	0.5	63(48.1%)
	1	21(16%)
	1.5	18(13.7%)
	2	5(3.8%)
	2.5	3(2.3%)
Distance from anal verge in cm	Mean±SD	17.64±7.32
Pit pattern	I	0
	II	72(55%)
	IIIL	20(15.3%)
	IIIS	28(21.4%)
	IV	11(8.4%)
	V	0
Histopathologic examination after colonoscopy	Normal	20(15.3%)
	Inflammatory	52(39.7%)
	Dysplasia	23(17.6%)
	Hyperplasis	32(24.4%)
	Indefinite for dysplasia	4(3.1%)
Inflammatory lesion subtype	Non specific	27(51.9%)
	CCC	20(38.5%)
	CLC	2(3.8%)
	Bilharzial	3(5.8%)
Dysplasia subtype	LGD	8(34.8%)
	LGD/A	10(43.5%)
	HGD	0
	HGD/A	5(21.7%)
TC	Mean±SD	31.13±9.42
TCH	Mean±SD	14.21±3.75
Dye	Mean±SD	176.82±51.39

CCC: chronic collagenous colitis, CLC: chronic lymphocytic colitis, TC: time for conventional, TCH: time for chromoendoscopy, LGD: low grade hyperplasia, HGD: high grade hyperplasia

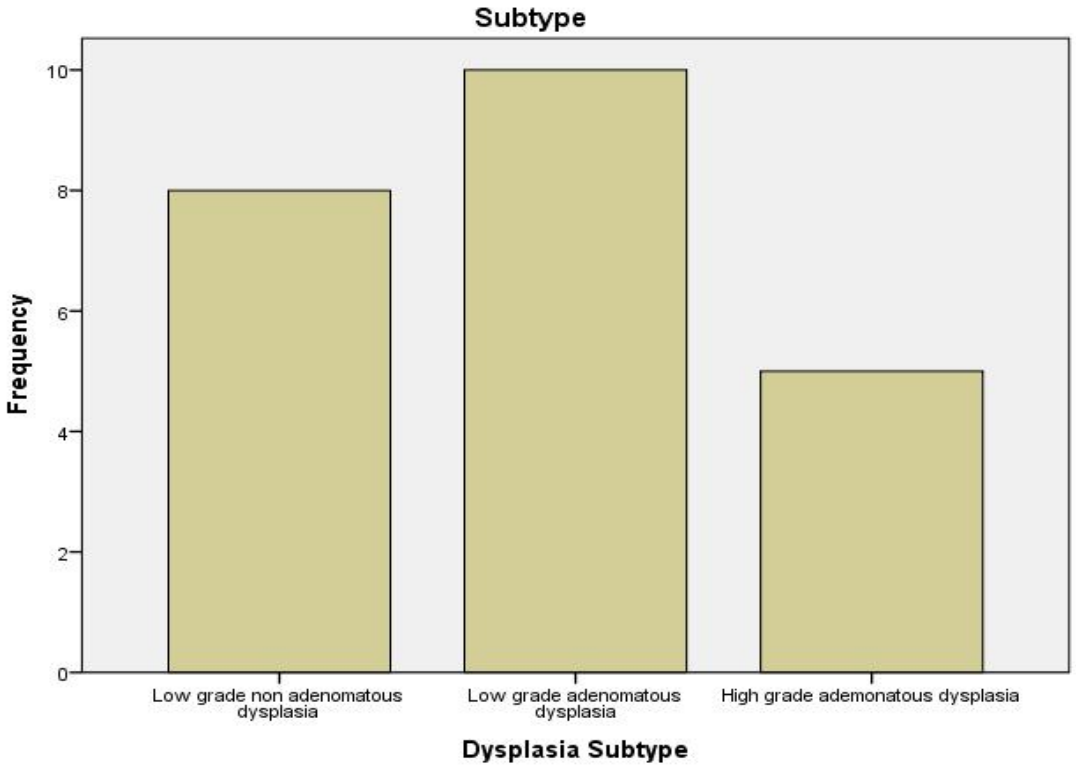

Figure 3: dysplasia lesions subtype

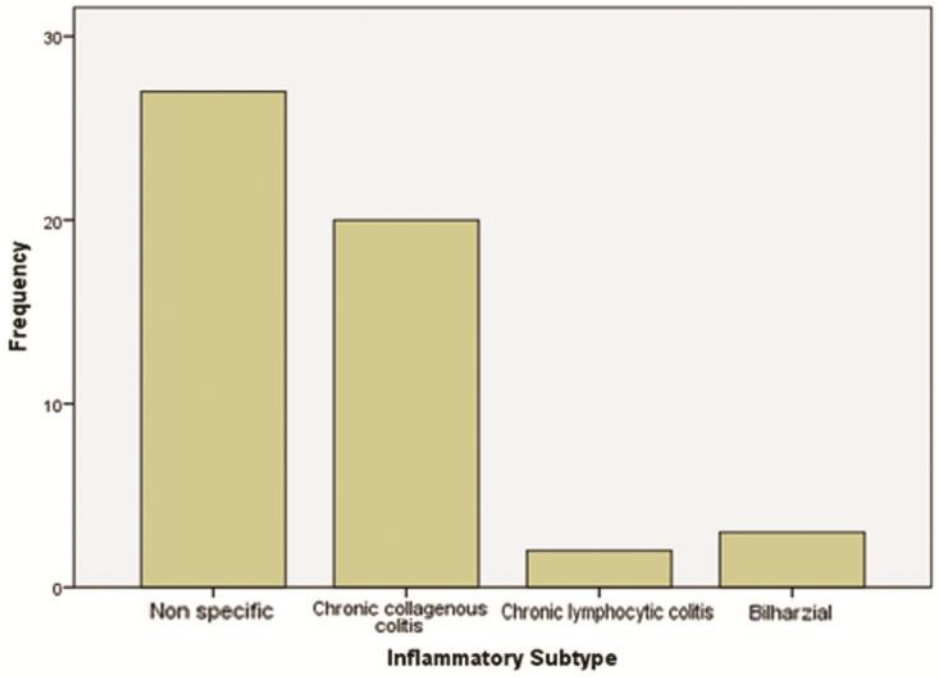

Figure 4: inflammatory lesions subtype

Table (2):- Screening test of patients with routine conventional endoscopy .

Validating test Screening test	Disease status		Total
	Positive	Negative	
Positive	(TP) 42	(FP) 0	42
Negative	(FN) 23	(TN) 20	43
Total	65	20	(N) 85

Conventional endoscopy method has fair sensitivity 65% and excellent specificity 100%,as shown in (table 2)

Table (3):- Screening test of patients with routine chromoendscopy with dye

Validating test Screening test	Disease status		Total
	Positive	Negative	
Positive	(TP) 65	(FP) 0	65
Negative	(FN) 0	(TN) 20	20
Total	65	20	(N) 85

The chromoendoscopy is more sensitive than the conventional endoscopy because number of false negative cases much less in the new method about 50% less than conventional method, about excellent sensitivity 100% and excellent specificity 100%,as shown in (table 3).

Table (4):- Durations of different steps of the procedure.

Procedure	**Mean ± SD**
Conventional Colonoscopy time (min.)	31.13±9.4
Chromo endoscopy time (min.)	14.21±3.7
Time of dye application (seconds).	176.82±51.4

Total conventional colonoscopy time was 31.13±9.4, the added time by chromoendoscopy technique was 14.21±3.7 minutes and time of application of the dye was 176.82±51.4 seconds (table 4).

Discussion

Colonoscopy is considered among the most appealing approaches for early detection and prevention of colorectal cancer CRC (**Winawer et al., 2003; Levin et al., 2008)**.Detection of early colonic lesions is important and resembles a clinical challenge, with difficulty in identification of these lesions. A percentage of about 45% of cancer colon occur at the rectosigmoid colon which is the most accessible part of the colon by colonoscopy. **(Atkin et al., 2010).**Inthis study a no. of 131 lesions were found after chromoendoscopy which is larger than those found by **Zakaria et al.,(2006)**,that found only 52 lesions in 35 patients, this difference may be due to large number of patients in this study.

Adenomatous lesions found in 8 patients in this study (9.4%) with low grade dysplasia (5.9%) and high grade dysplasia (3.5%),**Lee et al.,(2003)**found flat adenoma in10.2%.**Kiesslich et al.,(2001)** found 7.7% of biopsied lesions were adenomatous.In this study we found a 52 inflammatory lesions ,(38.5%) of them revealed chronic collagenous colitis,3.8 % revealed chronic lymphocytic colitis and 5.8% revealed bilharzial colitis(figure 3), this results support the study of **Suzuki et al.,(2011)** that examined 13 patients with microscopic colitis with indigocarmine and reported the clear mucosal changes shown by chromoendoscopy.

Total conventional colonoscopy time was 31.13±9.4 ,the added time by chromoendoscopy technique was 14.21±3.7 min. time of application of the dye was 176.82±51.4 seconds (table 4) ,this is relatively longer in durations when compared with a similar study done by **Zakaria et al., (2006)**, reported that mean duration of conventional colonoscopy was 24.7±13.1 minutes, while chromoendoscopy added a mean of 8.6±2 minutes ;this may be explained by larger number of detected lesions in our study (131) comparing with previous one (52).

Endoscopy is the gold standard diagnostic tool, chromoendoscopy less invasive and more cost-effective than other alternatives. Technologies have been studied, some of which are promising such as chromoendoscopy ; however, most studies were carried out in high-prevalence populations, mostly in secondary care. As discussed, it is not appropriate to extrapolate the sensitivity and specificity of these new diagnostic tests developed and validated in high-prevalence secondary care populations to a screening scenario in a population with low prevalence because this could result in a decrease in sensitivity and increase in specificity**(Usher-Smith J.A., et al.,2016).**

In our study selected age groups were included;≥ 40 years needed, suitable for screening, sensitivity and specificity of these new diagnostic test which use chromoendoscopy with dye are nearly 100% because chromoendoscopy is guided by biopsy, histopathological examination which is considered the most accurate, valid and specific test .

Limitations:

This study included only 85 patients a larger number of patients could yield more significant results.

Conclusion

Routine chromoendoscopy using indigocarmine is a valid and good screening technique in demonstrating dysplastic and inflammatory rectosigmoid lesions.

Chromoendoscopic surveillance recommendations:

Extending surveillance beyond the age of 75 years should be considered because of the potential for rapid neoplastic transformation and the occurrence in older patients of cancers from these precursor lesions, but this strategy should be weighed carefully against the risk of further chromoendoscopy.

Surveillance intervals may require modification in the presence of other risk factors such as age, family or personal history of colorectal cancer, comorbidity, and the accuracy and completeness of the chromoendoscopic examination. It is subject to modification by new data.

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