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Role of Colonoscopy in Diagnosis of Lower Gastro-Intestinal Diseases

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Abstract

Background and Aims: The human gastro-intestinal tract is a complex system of serially connected organs. Symptoms of gut disorders are often vague such as pain in abdomen, diarrhoea, constipation and signs of abnormalities are few unless disease is advanced because the abdomen contains a large number of different structures within a relatively small cavity. Colonoscopy is useful for diagnostic as well as therapeutic purposes. This study, takes us into the colourful world of colonoscopy to understand various presentations and visual appearances of colonic diseases. **Methods and Methodology:** 75 patients (45 males, mean age 50 years) were evaluated in the present study after they satisfy the inclusion and exclusion criteria. Patients were posted for endoscopy and findings were tabulated. **Results:** Colonoscopy was performed on 45 males and 30 females. Most of the patients who underwent colonoscopy were above the age of 40 years. The youngest patient who underwent colonoscopy was 21 years and the oldest patient was 79 years. 31 patients underwent biopsies in our study. of these, 13 were adenocarcinoma, 4 were benign adenoma, 3 were non specific colitis, 2 were ulcerative colitis, and 1 was diverticulosis. 8 biopsies were normal. Of all the75 patients undergoing colonoscopy, none suffered from any complication. **Conclusion:** Colonoscopy has improved the management of lower gastro intestinal disorders by helping to diagnose the causative factors and thus, help in their management.

Keywords: Colonoscopy, Diagnosis, Lower gastro- intestinal diseases

1. Introduction

Humans have always worked towards knowing the details about different ways in which our bodies function. To achieve this end, many great minds have strived hard to discover things which have inspired various useful ideas for management of diseases. Numerous concepts and various inventions have come up which have explained to us as to how various physiological and pathological processes occur in the body.

Diseases of the rectum and anal canal have been described in ancient literature, probably due to the reason that the horse was a common means of transport[1]. Though, due to restriction of visualization of these areas, the diagnosis of lower gastro- intestinal lesions was limited.

Barium enema with its double contrast techniques which was prevalently used since the past 20-30 years was a huge step forward in the understanding of lower gastro-intestinal disorders; but it was the emergence of rigid sigmoidoscopy that opened up new roads to identifying accessible lower gastro-intestinal lesions. The real breakthrough came with the fibre-optic, flexible colonoscope which intensely improved the efficiency of diagnosis and management of colonic pathologies.

This study, takes us into the colorful world of colonoscopy to understand various presentations and visual appearances of a few of the many colonic diseases.

2. Material and Methods

We carried out an Observational study in Department Of Surgery of a Medical College and Tertiary Health Care Centre from August 2013 to December 2015 in which 75 patients were evaluated.

The inclusion criteria used were patients above 18 years of age of either sex having lower gastrointestinal disorder complaints, or patients showing lower gastrointestinal abnormalities on radiological investigations.

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We Excluded patients with acute abdominal conditions requiring immediate surgery, medically unstable patients, unwilling patients, patients with bleeding disorders and on anticoagulation therapy.

Written and Informed Consent was taken from all the participants for whom colonoscopy was to be performed in all study subjects as a primary diagnostic investigation and interpretation of the colonoscopy findings as observed by a single observer was noted.

3. Results and Observations

3.1 Age and Sex

This table shows the age and sex distribution of the patients registered in our endoscopy clinic and subjected to colonoscopy over the period of 2 years. The youngest patient was of 21 years who has pain in abdomen due to non specific colitis. The eldest was 79 years old who had moderately differentiated adenocarcinoma of ascending colon.

Table 1. Age and Sex Distribution

Age	Male	Female	%
21- 30	10	3	17.33
31- 40	6	2	10.67
41- 50	7	8	20
51- 60	8	9	22.67
61- 70	9	6	20
71- 80	5	2	9.33
Total	**45**	**30**	**100**

The maximum i.e., 22% examined, were of the 51-60 years age group. The male to female ratio was 3:2

3.2 Indications

The endoscopies were performed on an open access basis[2]. Similarly endoscopies were performed on patients referred from other surgical and medicine units. Indications were broadly divided into following.

Table 2. Indications

No.	Indications	Cases
1	Pain in abdomen	48
2	Diarrhoea	40
3	Per rectal bleed	14
4	Lump in abdomen	9
5	Mass per rectum/anal	7
6	Constipation	6

3.3 Endoscopic Findings

Table 3. Endoscopic Findings

No.	Finding	No. of cases	%
1	Normal	32	42.67
2	Colitis	18	24
3	Haemorrhoids	7	9.33
4	Caecal growth	3	4
5	Ascending colon growth	4	5.33
6	Sigmoid growth	3	4
7	Growth in rectum	3	4
8	Rectal polyp	2	2.67
9	Multiple polyps	2	2.67
10	Diverticuli	1	1.33
	Total	**75**	**100**

75 cases were examined and abnormalities were found in 43 patients.

In 32 cases, no abnormality was seen. Scope could not be negotiated beyond the growth in 1 case of carcinoma of sigmoid colon and 2 cases of carcinoma of ascending colon.

3.4 Carcinoma Locations

Table 4. Carcinoma Locations

Site	No. of cases
Caecum	3
Ascending colon	4
Sigmoid colon	3
Rectum	3
Total	13

3.5 Pain in Abdomen

It was the commonest complaint of our patients for endoscopy. 53 patients complained of pain in abdomen. To assess the role of an endoscopy in the diagnosis of so common a complaint, other modalities of investigations such as barium studies or computerized tomography scan were used.

Table 5. Pain in Abdomen

No.	Finding	No. of cases	% age
1	Normal	24	45.28
2	Colitis	16	30.19
3	Ascending colon growth	4	7.55
4	Caecal growth	3	5.66
5	Sigmoid growth	3	5.66
6	Multiple polyps	2	3.77
7	Diverticuli	1	1.89
	Total	**53**	**100**

Out of 53 cases of pain in abdomen, after endoscopy a diagnosis could be reached in 54.72 cases. Colitis was the most common cause of pain in abdomen found in 30.19%, followed by ascending colon growth in 7.55%. Caecal growth and sigmoid growth, were found in 5.66% each, and multiple polyps were seen in 2 cases (3.77%). Diverticuli were found in 1 case (1.89%).

24(45.28%) cases did not reveal any significant pathology.

3.6 Endoscopic Findings in Diarrhoea

40 cases of diarrhoea were registered in our endoscopy clinic. Their break up is as follows.

Table 6. Diarrhoea

No.	Finding	No. of cases	%
1	Normal	19	47.5
2	Colitis	11	27.5
3	Ascending colon growth	3	7.5
4	Rectal growth	2	5
5	Rectal polyp	2	5
6	Multiple polyps	2	5
7	Caecal growth	1	2.5
	Total	40	100

Most common cause of diarrhoea was colitis (27.5%) followed by ascending colon growth (7.5%). Rectal growth, rectal polyp, and multiple polyps were found in 2 cases (5%) each. Caecal growth was found in 1(2.5%) case.

No abnormality was found in 19 cases (47.5%).

3.7 Endoscopic Diagnosis of PR Bleed

Table 7. PR Bleed

No.	Finding	No. of cases
1	Haemorrhoids	7
2	Rectal growth	3
3	Colitis	3
4	Normal	1
	Total	**14**

3.8 Endoscopic Diagnosis of Lump in Abdomen

Table 8. Lump in Abdomen

No.	Finding	No. of cases
1	Growth in ascending colon	4
2	Growth in sigmoid colon	3
3	Growth in caecum	2
	Total	**9**

3.9 Biopsy

Biopsy was performed in 31 patients. 13 cases were diagnosed to be having adenocarcinoma of colon/rectum. 4 patients had benign adenoma. 3 patients had non specific colitis. 2 patients were diagnosed to be having ulcerative colitis, and 1 patient had diverticulosis.

In patients who had colitis, biopsies were only taken when ulcerations were seen along with inflammation in the colon on colonoscopy.

Table 9. Biopsy Results

Adenocarcinoma	**13**
Benign adenoma	4
Non specific colitis	3
Ulcerative colitis	2
Diverticulosis	1
Normal	8
Total	**31**

4. Discussion

We examined patients from 21 to 79 years with a mean of 50 years. Age is no bar for colonoscopy and is limited by the size of the scope only[3].

In our study, 45 males and 30 females underwent colonoscopy. With regards to carcinoma of the colon, there is an equal incidence of it in males as well as female[4]. In our study we detected 7 males and 6 females who suffered from carcinoma of the colon.

37.3% of patients with lower gastro-intestinal disorders presented with abdominal pain. 28% presented with diarrhoea whereas 9.3% of the patients with per rectal bleeding and constipation each. 6 patients (8%) presented with a lump in abdomen and and mass per rectum/anal each.

A bleeding colorectal neoplasm may be the cause of anaemia[5]. 21 Patients had anemia. 7 patients out of 13 of carcinoma had anemia. Both patients of familial adenomatous polyposis coli had anemia.

Occult blood testing is a good procedure for malignancy detection and but its specificity has still to be proved as there are a number of conditions that are benign but test positive for occult blood. The false negativity for this test is not known but the false positivity is 2%[6]. Compared to colonoscopy, faecal occult blood test detected only 66% of colorectal cancer. Sensitivity increases with serial examinations. It is even less sensitive for adenomas detecting only 20% of advanced adenomas. In our study, occult blood was positive in 7 patients. 6 patients of carcinoma out of 13 tested positive for occult blood. 1 patient of familial adenomatous polyposis coli tested

positive for occult blood. Rest of the stool examinations in our study was normal.

Serum Carcinoembryonic Antigen (CEA) is a glycoprotein found in the cell membranes of colorectal cancers. It is the tumor marker most often used for newly diagnozed and recurrent adenocarcinoma of the colon or rectum. CEA enters the circulation and can be detected by radioimmunoassay[7]. In our study, serum CEA was done only when carcinoma was suspected or diagnozed. It was raised in all 13 patients diagnozed with carcinoma. In a review of studies using CEA, Hundt et al., describe a sensitivity of 43% to 69% for detection of colorectal carcinoma using CEA. Sensitivity however was higher in patients with higher stage cancer[8]. In our study, serum CEA was done only when carcinoma was suspected or diagnozed. It was raised in all 13 patients diagnozed with carcinoma.

When analysed on a per-patient basis, for lesions 10 mm or larger in size, the sensitivity of barium enema is 48%, and colonoscopy is 98%. The specificity of barium enema was 0.90, and of colonoscopy is 0.996. For lesions 6-9 mm in size, sensitivity of barium enema is 35%, and 99% for colonoscopy. The specificity for colonoscopy to detect lesions of this size is the same, but specificity declines for barium enema[9]. In our study, a total of 11 patients underwent barium enema. 3 studies showed a filling defect in the colonic segment which was seen as a mass on colonoscopy, biopsy of which showed adenocarcinoma colon. 1 patient's barium enema showed loss of haustration with a narrow contracted descending colon. Colonoscopic biopsy diagnozed this patient to be having ulcerative colitis. Rest 7 barium enemas were normal out of which 5 patients' were diagnozed to be having non- specific colitis, 1 patient has a rectal polyp, and 1 patient had multiple diverticuli.

Conventional scan is less sensitive for the diagnosis of intraluminal colorectal carcinoma, but it is useful in demonstrating extracolonic spread to adjacent and remote organs[10]. A total of 15 patients underwent computerized tomography scan of the abdomen in our study. In 13 patients, a growth was seen in a colonic segment or rectum which was confirmed at colonoscopy, where a biopsy was taken, and an adenocarcinoma colon/rectum was seen on histopathology. The CT scan also showed presence or absence of any lymph node or liver metastases, and helped in assessment of the advancement of the tumor locally. As a result, the stage of the disease could be assessed and appropriate treatment was given. Multiple polyps were seen in 2 patients on CT scan which were confirmed on colonoscopy and biopsy reveled them to be benign adenoma.

Malignancies of the right side of the colon are visualized as polypoid, fungating masses with mucosal ulcerations. During initial stages, they appear sessile but as time passes, the growths become bulky, cauliflower like, irregular and protrude into the lumen. Occasionally, an infiltrative variety of neoplasm may be seen as mucosal flattening with ulceration without luminal projections[11].

Early left sided malignant lesions appear as a small, elevated button or polypoid masses. As the tumor grows, it encircles the wall and appears as a stricture. Eventually, the centre ulcerates and appears as an annular constriction with central ulceration and heaped up margins[12].

Polyps are visualized as circumscribed lesions with or without stalks protruding above the colonic mucosa. Tubular adenomas possess raspberry like heads and have slender stalks. Villous adenomas are broad, sessile, lobular, velvety and grey tar lesions. The surface shows hemorrhages or ulcerations. Tubulo-villous adenomas are intermediate between the two. Polyps having a size of more than 2 cm and a villous pattern have a high tendency to malignant conversion.

In acute ulcerative colitis, the mucosa appears hyperemic and edematous showing the presence of small ulcerations and crypt abscesses. Swollen, inflammatory tags of mucosa bulge up and are seen as pseudopolyps. In chronic ulcerative colitis, fibrosis and thickening occurs. This is seen as a small calibred colon with pseudopolyps and inflamed mucosa.

Diverticuli are seen as small openings in the mucosa with well defined edges and a dark lumen.

Non specific colitis is an exclusion diagnosis where the mucosa appears reddened and edematous but with no specific lesions.

The major finding in our study was colitis i.e., inflammatory conditions of the colon, which was detected in 24% of the patients. 13 cases of malignancy were detected and confirmed. The higher incidence of colitis in our study as compared to others may be because of rampant bowel infestations in our country. The lower incidence of diverticulosis in our study may be because of the high roughage diet consumed by Indians.

Table 10. Comparison for Diagnosis

Diagnosis	Wolff et al.,[12]	Sivak et al.,[13]	Our Study
Carcinoma	24	36	13
Colitis	13	37	18
Polyps	43	264	2
Polyposis Coli	--	131	2
Diverticulosis	11	108	1
Normal	15	171	32

The frequency of carcinoma in different segments of the large bowel varies with individual statistic tables. In

our study, the ascending colon accounted for 30.8% of neoplastic lesions, and the rectum, sigmoid, and caecum for 23.1% each.

Table 11. Comparison for Locations

Site	Wolff et al.,[12]	Coller et al.,[14]	Our study
Rectum	4	2	3
Sigmoid colon	13	9	3
Descending colon	5	5	--
Transverse colon	--	3	--
Hepatic flexure	--	--	--
Ascending colon	2	3	4
Caecum	--	--	3
Total	**24**	**22**	**13**

Though there is individual variation as regards to the segment involved, it is evident that left sided colonic malignancy accounts for a majority of the cases of colonic cancer. However, the incidence of right sided or proximal colon cancer has been increasing.

The likely factors for this anatomic shift are[15]:

- Increased longevity.
- Response to luminal procarcinogens and carcinogens may vary between different sites of the colon and rectum
- Genetic factors may preferentially involve defects in mismatch repair genes with resulting microsatellite instability in proximal colon cancers, and the chromosomal instability pathway may be predominant in left-sided colon and rectal cancers.

A total of 31 biopsies were done in our study using the standard, fenestrated biopsy forceps. Of all these, 23 biopsies i.e., 74.2% proved to be positive for the lesion diagnosed on colonoscopy. This is in contrast to 91.7% of positive biopsies in the Wolff et al series[R]. This may be due to a lot of technical errors which alter the success rate. 13 biopsies (41.9%) were reported as malignant.

Table 12. Comparison for Biopsy

Diagnosis	Wolff et al.,[12]	Our study
Positive biopsy	44	23
Negative biopsy	4	8
Total	**48**	**31**

5. Treatment

5.1 Non-Specific Colitis

Patients were administered oral antibiotics (fluoroquinolones and metronidazole) and were treated for the symptoms with mebeverine. Patients were adviced to keep adequate oral hydration with ORS powder. Lactobacillus powder was given to patients with diarrhoea.

5.2 lcerative Colitis

Patients were treated with a course of oral mesalamine upto 2.4 grams per day. They were very well controlled with medical therapy.

5.3 Carcinoma Colon

For 3 patients diagnosed with carcinoma caecum and 4 patients with carcinoma of ascending colon, a right hemicolectomy with ileo-transverse anastomoses was done.

2 patients of carcinoma of sigmoid colon underwent left hemicolectomy with anastomoses. A divergent loop colostomy was done for 1 patient who was closed after 2 months.

1 patient of carcinoma of sigmoid colon had liver and lung metastases.

Adjuvant 5-fluorouracil based chemotherapy was given postoperatively.

For non- operable tumors, 5-fluorouracil-leucovarin-oxaliplatin chemotherapy regimen was given.

5.4 Carcinoma Rectum

1 patient underwent abdomino-perineal resection.

1 patient underwent low anterior resection.

Both patients received adjuvant 5-fluorouracil based chemotherapy post- operatively.

1 patient had lymphatic metastases and hence he were referred for chemo- radiation.

Familial adenomatous polyposis coli:

Total proctocolectomy with ileal pouch anal anstomoses was done.

5.5 Rectal Polyp

Colonoscopic snare polypectomy was done.

5.6 Diverticulosis

Patient was adviced high-fibre diet, and bulk forming agent.

In our study, complications were nil. Colonoscopy is a relatively safe procedure. The following is a comparison study of rare complications during colonoscopy.

Table 13. Comparison for Complications

No.	Author	Haemorrhages	Perforations	Mortality
1	Rogers et al(1975)	0.05%	0.22%	0.008%
2	Smith(1976)	0.07%	0.26%	0.03%
3	Frumorgen and Demling(1979)	0.008%	0.14%	0.02%
4	Our study(2015)	0.00%	0.00%	0.00%

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