

# Evaluating Indications and Diagnostic Yield of Colonoscopy in Sardjito General Hospital

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## ABSTRAK

*Latar belakang:* Kolonoskopi merupakan prosedur baku emas untuk diagnosis dan terapi gangguan mukosa kolon. Indikasi kolonoskopi yang tidak tepat dapat meningkatkan risiko komplikasi.

*Tujuan:* Tujuan penelitian ini adalah untuk mengevaluasi indikasi, penemuan dan diagnosis kolonoskopi.

*Metode:* Studi retrospektif terhadap semua hasil kolonoskopi dilakukan pada periode Januari 2012- Agustus 2013, di RS Sardjito, Yogyakarta, Indonesia, dan ada 688 laporan kolonoskopi yang dianalisis. Tercatat ada tujuh indikasi kolonoskopi, yaitu: hematochezia, diare kronis, nyeri perut, konstipasi, skrining dan surveilans neoplasia kolon, perubahan pola defekasi dan anemia. Hasil diagnostik endoskopi didefinisikan sebagai perbandingan antara penemuan pemeriksaan kolonoskopi dengan jumlah prosedur total kolonoskopi berdasarkan indikasi pemeriksaan. Pada studi ini hasil diagnosis ditegakkan berdasarkan penemuan kolonoskopi, tidak dikonfirmasi dengan biopsi.

*Hasil:* Hasil temuan diagnosis dari hematochezia yang merupakan indikasi utama pemeriksaan kolonoskopi adalah 72,53%. Indikasi utama kolonoskopi adalah hematochezia (36,19%), diikuti diare kronis (23,11%), nyeri perut (14,09%), konstipasi (13,37%), skrining dan surveilans (5,66%), perubahan pola defekasi (5,52 %) dan anemia (2,02%). Temuan diagnosis berdasarkan pemeriksaan kolonoskopi adalah normal (37,14%), kanker kolorektal (19,33%), proktitis (14,24%), inflammatory bowel disease (12,50%), polip (11,19%), hemoroid (10,03%), dan divertikel (3,78%). Kanker kolorektal ditemukan pada pasien dengan hematochezia (74 pasien / 29,71%), diare kronis (34 pasien / 21,38%), konstipasi (13 pasien / 14,13%). Dari 249 pasien yang mengeluh hematochezia ditemukan sebagai kanker kolorektal (74 pasien), hemoroid (50 pasien), proktitis (30 pasien), normal (30 pasien). Melalui penelitian ini dilaporkan bahwa hasil temuan diagnostik berdasarkan pemeriksaan kolonoskopi adalah jauh lebih rendah secara bermakna pada usia < 50 tahun (38,48%), dibandingkan pada usia > 50 tahun ( 61,52%), terutama pada kanker kolorektal ( $p < 0.001$ ), polip ( $p = 0.004$ ) dan divertikel ( $p < 0.001$ ).

*Kesimpulan:* Hematochezia merupakan indikasi utama pemeriksaan kolonoskopi dan hasil temuan diagnosis adalah 72,53%. Penemuan utama pada pemeriksaan kolonoskopi adalah normal, diikuti kanker kolorektal, proktitis, inflammatory bowel disease, polip dan divertikel. Indikasi kolonoskopi seharusnya didasarkan pada pedoman yang telah tersedia untuk meminimalisasi ketidaktepatan indikasi dan komplikasi tindakan.

*Kata kunci:* kolonoskopi, hasil penemuan diagnosis, indikasi kolonoskopi, ketepatan indikasi kolonoskopi

## ABSTRACT

**Background:** Colonoscopy is the gold standard procedure which is widely used in the diagnosis and treatment of colonic mucosal disorder. Inappropriate colonoscopy indications increase rate of complications.

**Aim:** The main aims of our study were to evaluate indications, findings and diagnostic yield at colonoscopy.

**Methods:** A retrospective study of all colonoscopy was conducted from January 2012 through August 2013, at Dr. Sardjito General Hospital, Yogyakarta and there were 688 colonoscopy reports. Seven colonoscopy indications were documented and presented: rectal bleeding or hematochezia, chronic diarrhea, abdominal

pain, constipation, screening and surveillance for colonic neoplasia, change in bowel habit and anemia. Diagnostic yield was defined as the ratio between significant findings detected on colonoscopy and the total number of procedures performed for the indication. In our study, diagnostic yield was established by colonoscopy, not confirmed by biopsy.

**Results:** Overall diagnostic yield was 72.53%. The leading indication for colonoscopies was rectal bleeding or hemochezia (36.19%), followed by chronic diarrhea (23.11%), abdominal pain (14.09%), constipation (13.37%), screening and surveillance (5.66%), change in bowel habit (5.52%) and anemia (2.02%). Diagnostic yields according colonoscopies examination were normal (37.14%), colorectal cancer (19.33%), proctitis (14.24%), inflammatory bowel disease (12.50%), polyps (11.19%), hemorrhoid (10.03%), and diverticel (3.78%). Colorectal cancers were found in patients with hemochezia (74 patients, 29.71%), chronic diarrhea (34 patients, 21.38%), constipation (13 patients, 14.13%). Of 249 patients presenting with hemochezia were found colorectal cancer (74 patients), hemorrhoid (50 patients), proctitis (30 patients), normal (30 patients). Our study showed that diagnostic yield was far lower in patients below 50 years (38.48%) compared > 50 years (61.52%), especially for colorectal cancer ( $p < 0.001$ ), polyps ( $p = 0.004$ ) and diverticular ( $p < 0.001$ ).

**Conclusions:** Hemochezia was the leading indication for colonoscopy and the diagnostic yield was 72.53%. The leading of colonoscopy findings were normal colonoscopies, followed by colorectal cancer, proctitis, inflammatory bowel disease, polyps and diverticel. Colonoscopy indications should be based on the available guidelines to minimize as much as possible the number inappropriate procedures and complications.

**Keywords:** Colonoscopy, diagnostic yield, colonic indications, appropriateness of colonoscopy

## INTRODUCTION

Colonoscopy is performed to visualize the colonic mucosa, and can be both a diagnostic and therapeutic procedure; it require the passages of a specialized endoscope – a colonoscope – via anus or a colostomy to the caecum and, in some cases, to the terminal ileum.<sup>1</sup> In general, colonoscopy is regarded as a safe procedure. Colonoscopy is relatively expensive and associated with a small but definite rate of complications. The most dreaded of these is colonic perforation.

An estimated 50% to 100% of patients with a colonic perforation after colonoscopy require a laparotomy for closure of the perforation.<sup>2</sup>

To maintain or enhance the quality of care, appropriate indication for colonoscopy is very crucial. Appropriate of colonoscopy procedure is defined by the fact that the health benefit exceeds the health risk by a sufficiently wide margin of security.<sup>3</sup> The American

Society for Gastrointestinal Endoscopy (ASGE) and the US Multi Society Task Force on Colon Cancer have published appropriate indications for colonoscopy. Study has shown that 21–39% colonoscopy procedures were classified as inappropriate.<sup>4</sup> The main aim of our study was to determine the indications, findings and diagnostic yield at colonoscopy.

## PATIENTS AND METHODS

A retrospective review of all colonoscopy performed at Sardjito General Hospital, Yogyakarta, Indonesia was conducted from January 2012 through August 2013. During 20 months period of retrospective study, there were 688 colonoscopy reports. All the patients were conducted colonoscopy without sedation. Colonoscopies were conducted by 2 gastroenterologists and 2 gastroenterology (GI) fellows. Standard adult colonoscope (Fujinon EC-250WL5) was used. In our study the quality of bowel preparation was

ranked into two categories: good and poor only. Products for colon cleansing can be classified into two groups: osmotic agents and stimulants. In this study we used sodium phosphate or magnesium sulphate salt (*garam Inggris*) for colon cleansing. In this study, diagnostic yield was defined as the ratio between significant findings detected on colonoscopy and the total number of procedures performed for the indication. Data were presented as frequencies and percentages. The Chi-square test was used to compare the proportion data and a p – value < 0.05 was considered significant.

## RESULTS

The mean age of subjects was 52.15 ± 15.13 years and ages ranged from 13 to 97 years, and men proportion was 51.5% vs. women 48.5%. The main colonoscopy indications were lower GI bleeding or hematochezia (36.19%), chronic diarrhea (23.11%), abdominal pain (14.09%), constipation (13.37%), screening and surveillance (5.66%), change in bowel habit (5.52%) and anemia (2.02%) (**Table 1**).

Diagnostic yield according colonoscopies findings were normal (37.14%), colorectal cancer (19.33%), proctitis (14.24%), inflammatory bowel disease (12.50%), polyps (11.19%), hemorrhoid (10.03%),

and diverticular (3.78%) (**Table 2**). **Table 3** showed that cases of colorectal cancers were detected in rectum (58.64%), sigmoid (19.54%), descending n colon (5.26%), transversum (5.26%), ascending colon (9.77 b%) and cecal (1.50%). Colorectal cancers were found in patients with hematochezia (74 patients, 29.71%), chronic diarrhea (34 patients, 21.38%), constipation (13 patients, 14.13 %) (**table 4**).

**Table 2. Colonoscopy findings of the main colonoscopy indications**

Colonoscopy findings	total	%
Normal	189	37.14
Colorectal cancer	133	19.33
Proctitis /procto-sigmoiditis	98	14.24
Inflammatory bowel disease	86	12.50
Polyps	77	11.19
Hemorrhoids	69	10.03
Diverticular	26	3.78
Others (stenosis/stricture/adhesion)	10	1.45
<b>Total</b>	<b>688</b>	<b>100</b>

**Table 3. Colorectal cancer location**

Regio of colorectal cancer	No. of patients	%
Rectum	78	58.64
Sigmoid	26	19.54
Colon descenden	7	5.26
Colon transversum	7	5.26
Colon ascenden	13	9.77
Cecum	2	1.50
<b>Total</b>	<b>133</b>	<b>100</b>

**Table 1. The main colonoscopy indications**

Colonoscopy Indication	Total	No. of normal colonoscopies (%)	No. of abnormal colonoscopies (%)
Hematochezia	249 (36.19 %)	30 (12.04)	219 (87.96)
Chronic diarrhea	159 (23.11 %)	40 (25.16)	119 (74.84)
Abdominal pain	97 (14.09 %)	47 (48.45)	50 (51.55)
Constipation	92 (13.37 %)	30 (32.61)	62 (67.39)
Screening and surveillance	39 (5.66 %)	23 (58.97)	16 (41.03)
Change in bowel habit	38 (5.52 %)	13 (34.21)	25 (65.79)
Anemia	14 (2.02 %)	6 (42.85)	8 (57.15)
<b>Total</b>	<b>688</b>	<b>189 (27.47)</b>	<b>499 (72.53)</b>

**Table 4** showed the main colonoscopy indications and colonoscopy findings distribution. In hematochezia patients the colonoscopic findings were colorectal cancer 74 (29.71%), haemorrhoids 50 (20.08%), proctitis 30 (12.04%), colitis 27 (10.84%), polyps 25 (10.04%), diverticulosis 11 (4.41%) and normal findings 30 (12.04%). The causes of chronic diarrhea were normal findings (25.15%), IBD (22.01%), colorectal cancers (21.38%), and proctitis (18.23%). Among patients with abdominal pain, colonoscopy findings were normal in 48.45%, followed by proctitis (16.49%), polyps (9.27%) and IBD (8.24%). The causes of constipation patients were normal findings (32.60%), polyps (23.91%), colorectal cancers (14.13%), and proctitis (13.04%). In patients with changed bowel habit, colonoscopy findings were normal in 34.21%, IBD 26.31% and proctitis

18.42%. In screening and surveillance purposes colonoscopy findings were normal in 58.97%, polyps 12.82% and colorectal cancers 7.69%.

**Table 5** showed colonoscopy abnormal findings and age distribution. The more increase of age the more frequent colonoscopy abnormal findings. Colorectal cancers, polyps and diverticular diseases were more frequent significantly in > 50 years of age compared < 50 years or age.

## DISCUSSION

The American Society for Gastrointestinal Endoscopy (ASGE) and the US Multi Society Task Force on Colon Cancer have published appropriate indications for colonoscopy.

**Table 4. The main colonoscopy indications and colonoscopy findings distribution**

Indications	Normal	Polyps	Malignancy	IBD	Proctitis	Diverticular	Hemorrhoid	Others	Total of patients
Hematochezia	30	25	74	27	30	11	50	2	249
Chronic diarrhea	40	10	34	35	29	5	5	1	159
Abdominal pain	47	9	5	8	16	5	4	3	97
Constipation	30	22	13	3	12	3	5	4	92
Screening and surveillance	23	5	3	3	2	1	2	0	39
Change in bowel habit	13	4	3	10	7	0	1	0	38
Anemia	6	2	1	0	2	1	2	0	14
<b>Total of patients</b>	189	77	133	86	98	26	69	10	688

**Table 5. Colonoscopy abnormal findings and age distribution**

Colonoscopy findings	Age distribution (years)					>50	Total	P
	<50							
	<20	20 - 29	30 - 39	40 - 49	Total			
Colorectal cancer	0	7	13	25	45	88	133	0.000
Proctitis /procto-sigmoiditis	1	8	13	28	50	48	98	0.840
Inflammatory bowel disease	2	4	9	21	36	50	86	0.131
Polyps	2	5	11	8	26	51	77	0.004
Hemorrhoids	2	1	7	17	27	42	69	0.090
Diverticular	0	0	1	3	4	22	26	0.000
Others (stenosis/stricture/adhesion)	1	1	0	2	4	6	10	0.527
<b>Total abnormal findings</b>	8	26	54	104	192	307	499	0.000
	( 1.60)	( 5.21)	( 10.82)	(20.84)	(38.48)	(61.52)	(100)	

According to the ASGE, colonoscopy indications are evaluation on abnormality of barium enema, lower GI bleeding (hematochezia, fecal occult bleeding test/FOBT), unexplained iron deficiency anemia, chronic diarrhea of unexplained origin, evaluation of IBD, screening and surveillance for colonic neoplasia and treatment bleeding or neoplasia.<sup>5</sup> Lower gastrointestinal (GI) bleeding or hematochezia is one of the reasons why colonoscopy should be conducted. Zia et al<sup>6</sup> found ulcerative colitis, colorectal cancer, and non-specific colitis as the commonest causes of lower GI bleeding amongst Pakistanis. Other studies showed that haemorrhoids, diverticulosis and polyps were the commonest causes.<sup>7</sup>

Our study showed, in hematochezia patients the colonoscopic findings were colorectal cancer 74 (29.71%), haemorrhoids 50 (20.08%), proctitis 30 (12.04%), colitis 27 (10.84%), polyps 25 (10.04%), diverticulosis 11 (4.41%) and normal findings 30 (12.04%). Diagnostic yield in hematochezia patients was 219 (87.96%) more lower than studied by Olokoba et al,<sup>8</sup> that was 94.9%. In our study, symptom and sign colorectal cancer were hematochezia 74 (55.63%), chronic diarrhea 34 (25.56%) and constipation 13 (9.77%) and most of the cases of colorectal cancers were detected in distal colon (83.44%) and right sided (11.27%). Nayyar et al<sup>9</sup> showed similar findings, colorectal cancers were detected in distal colon (80%) and in the ascending colon (20%).

The ASGE recommends to conduct colonoscopy in patients with clinically significant chronic diarrhea of unexplained origin.<sup>4</sup> Colonoscopy with biopsy has a very high yield in chronic diarrhea. Rafi Ud Din et al<sup>10</sup> reported their study, thirty two (64%) patients had abnormal findings visible on colonoscopy, and after confirmed with

histopathology, it was normal in 18 (36%). The causes of chronic diarrhea were ulcerative colitis (40%), irritable bowel syndrome/IBD (34%), colorectal cancers (10%) and Crohn's disease. They reported that diagnostic yield in chronic diarrhea was 64%. In our study showed that diagnostic yield was 74.84% and the causes of chronic diarrhea were normal findings (25.15%), IBD (22.01%), colorectal cancers (21.38%), and proctitis (18.23%).

In individuals < 50 years of age with uncomplicated lower abdominal pain and no risk factors for colorectal cancer (anemia, FOBT – positive stools), indication for colonoscopy is inappropriate.<sup>11</sup> In our study, among patients with abdominal pain, colonoscopy findings were normal in 48.45%, followed by proctitis (16.49%), polyps (9.27%) and IBD (8.24%). Diagnostic yield was 51.55%. In our study indication for colonoscopy in several patients with abdominal pain may be inappropriate.

In individuals < 50 years of age with change in bowel habits (predominantly constipation) with or without uncomplicated lower abdominal pain and no risk factors for colorectal cancer (anemia, FOBT – positive stools), indication for colonoscopy is inappropriate.<sup>11</sup> In our study among patients with constipation and change in bowel habit, colonoscopy findings were normal in 32.60% and 34.20%.

Diagnostic yield was defined as the percentage of relevant colonic pathologies of the total number of colonoscopies performed.<sup>3</sup> In our study, diagnostic yield was established by colonoscopy, and not confirmed by biopsy, this was the limitation of this study. Our study showed that diagnostic yield was 72.53%. Berkowitz et al<sup>12</sup> have shown an overall diagnostic yield was 79.6%, this figure was similar to the 79.0% diagnostic yield found

by Ismail and Misauno in Jos, Nigeria.<sup>13</sup> Age should be considered when colonoscopist want to conduct colonoscopy. Our study showed that diagnostic yield was far lower in patients below 50 years (38.48 %) compared > 50 years old ( 61.52 %), especially for colorectal cancer ( $p < 0.001$ ), polyp ( $p = 0.004$ ) and diverticular disease ( $p < 0.001$ ) (**Table 5**).

In summary, our study showed that diagnostic yield was similar with others study. Hematochezia was the leading indication for colonoscopy followed by chronic diarrhea, abdominal pain, constipation, colorectal screening and change in bowel habit. The leading of colonoscopy findings were normal colonoscopies, followed by colorectal cancer, proctitis, inflammatory bowel disease, polyps and diverticel. Although colonoscopy is generally safe, accurate and well tolerated by most patients, it is relatively expensive and associated with perforation complication. So it is wise that colonoscopy indications should be based on the available guidelines to minimize as much as possible the number inappropriate colonoscopy procedures. Internal audit should be done to verify whether colonoscopy procedure is appropriate or not.

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