

Paediatric Colonoscopy: Experience from Pediatric Gastroenterology and Nutrition Department, BSMMU

FAHMIDA BEGUM¹, KHAN LAMIA NAHID², FAHMIDA ISLAM³, WAHIDUZZAMAN MAJUMDER¹, MD. RUKUNUZZAMAN⁴, ASM BAZLUL KARIM⁴

Abstract:

Background: Colonoscopy of the lower gastrointestinal tract has both diagnostic and therapeutic value.

Objective: This cross-sectional study aimed to investigate the indications, findings and complications of children who underwent the colonoscopy.

Materials & Methods: We studied the children between 1 and 18 years of age who presented with various indications and underwent both diagnostic and therapeutic colonoscopy in the Department of PGN, BSMMU, Dhaka from January 2015 to February 2018.

Results: Among the total 332 patients reviewed, 61.7% (205) were male and 38.3% (127) with a male to female ratio of 1.61:1. The most common (69.8%) indication was lower gastrointestinal bleeding (LGIB) followed by diarrhea (15.9%) and altered bowel (14%) as well. No serious complications occurred during the procedures. A total of 211 patients (63.5%) received a diagnosis, including 137 (41.3%) patients with colorectal polyps, erythema 40 (12%) and diffuse nonspecific colitis 34 (10.2%). Ninety four percent polyps are located in recto-sigmoid region. Juvenile polyp was the most common pathological findings.

Conclusion: LGIB is the commonest indication for pediatric colonoscopy. Pediatric colonoscopy is effective diagnostic as well as therapeutic option for lower GI pathology.

Keywords: Colonoscopy, children, lower gastrointestinal bleeding (LGIB), polyp.

Introduction

Worldwide the number of colonoscopies have been increased in children, including infants and young children due to advances in anesthetic techniques and the evolution in the size and flexibility of endoscopes.¹ Due to poor compliance and cooperation in pediatric patients colonoscopy is technically more challenging than esophago-gastroduodenoscopy.² The safety and effectiveness of diagnostic or therapeutic colonoscopies in pediatric patients is only recently emerging. The most prevalent indications for pediatric colonoscopy include LGIB bleeding (31%), abdominal pain (31%), and diarrhea 24%).³ On the other hand in case of adults the major

role of colonoscopy is the screening and diagnosis of colon cancer.⁴ The diseases that are frequently diagnosed during childhood through colonoscopy include polyps/polyposis and inflammatory bowel diseases (IBD). However, there are few reports regarding the role of colonoscopy in infants and young children.^{5,6} There is a rise in the incidence of IBD in children including those younger than six years of age.⁷ Early detection of both polyps and IBD can significantly improve the patients' quality of life and overall health. Therefore, in pediatric patients, colonoscopy is the best tool both for early lesion detection and as an effective therapy to treat lesions.⁸ This study aimed to investigate the indications, complications, and findings of pediatric colonoscopy.

Materials & Methods

This cross-sectional study was conducted on 332 patients (205 male and 127 female with age ranging from 1 to 18 years) at the Department of PGN, BSMMU, Dhaka, Bangladesh from January 2015 to February 2018.

All patients who needed colonoscopy for different indications (LGIB, abdominal pain, altered bowel habit) within this period at the Department of PGN, BSMMU,

1. Associate Professor, Paediatric Gastroenterology & Nutrition, BSMMU, Dhaka
2. Assistant Professor, Paediatric Gastroenterology & Nutrition, BSMMU, Dhaka
3. Assistant Professor, Paediatrics, Shaheed Tajuddin Ahmed Medical College, Gazipur
4. Professor, Paediatric Gastroenterology & Nutrition, BSMMU, Dhaka

Correspondence: Dr. Fahmida Begum, Associate Professor, Department of Paediatric Gastroenterology and Nutrition, BSMMU, Dhaka. Email: fahmidalily@gmail.com Cell: +8801674790940

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Dhaka, Bangladesh were included in this study. The procedure was explained to parents and consents were taken. Patients who did not give consent for colonoscopy and who had low hemoglobin along with or without thrombocytopenia and coagulopathy were excluded from the study.

Colonoscopy was done with a Pentax EC 3490 LK 3.8 pediatric colonoscope. All patients were kept on clear liquids for approximately 12–24 hours prior to the colonoscopy. Children more than six years of age were put on polyethylene glycol (PEG) and phosphate enema while children younger than six years of age were only on laxatives. The patients were premedicated with sedatives (midazolam) and analgesics (pethidine) so that none of them needed general anesthesia during colonoscopy. Statistical analyses were performed using the SPSS software (version 16.0; SPSS, Inc., Chicago, IL). Categorical variables were analyzed with a chi-square test and statistical significance was determined by a p value less than 0.05.

Results

Of the total 332 patients reviewed, 205 (61.7%) were male and 127 (38.3%) were female, with a male to female ratio of 1.61:1 [Table I]. The highest incidence was between the ages of 5 and 10 years (36.7%) [Table I].

Table-I

Age & Gender distribution of the study patients (n=332)

Age group	Frequency(%)
<5 yrs	96 (28.9)
5-10 yrs	122 (36.7)
10-15 yrs	99 (29.8)
>15 yrs	15 (4.5)
Mean±SD	7.69±3.91(1.0 – 16) yrs
Gender	
Male	205 (61.7)
Female	127 (38.3)

The presenting symptoms were LGIB in 232 (69.8%), diarrhea (chronic diarrhea) in 53 (15.96%), and alteration of bowel habit 47 (14.1%) [Table II]. The most common accompanying symptom was abdominal pain in 87 (26.2%), fever in 49 (14.8%), and constipation in 14 (4.2%) patients [Table II].

Table-II

Clinical presentation of patients underwent colonoscopy (n=332)

Presenting complaints	Frequency (%)
LGIB	232 (69.8)
Diarrhoea	53 (15.96)
Alteration of bowel	47 (14.1)
Associated symptoms	
Abdominal pain	87 (26.2)
Fever	49 (14.8)
Constipation	14 (4.2)

Colon polyps were the most common colonoscopic finding among children 137(41.3%), followed by erythema, linear ulcerations and edema 40 (12%), diffuse nonspecific ulcer 34(10.24%), and normal cases 121(36.4%) (Fig-1). Polypectomy was done in all pedunculated cases (39%) and tissue were sent for histopathology. Sessile (2%) ones were removed by cauterization.

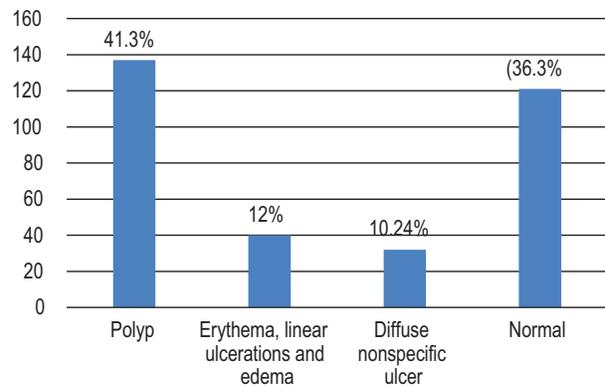


Fig-1: Frequency of colonoscopic findings

The most common histopathological finding was juvenile polyps 137(41%) followed by diffuse non-specific colitis 45 (13.55%), inflammatory bowel disease (IBD), 20 (6%), ileocecal TB 5 (1.5%), adenomatous polyp 4 (1.2%) and solitary rectal ulcer syndrome (SRUS) 4 (1.2%). (Table-III). In addition, the study showed that in the younger age (less than 5 years) polyps are common (46%) than other pathology (Table-IV)

Table-III

Frequency of pathologic finding after colonoscopy

Histopathologic findings	Frequency
Juvenile polyp	133(40%)
IBD	20(6%)
Adenomatous polyp	4(1.2%)
SRUS	4(1.2%)
TB	5(1.5%)
Non-specific colitis	45(13.55%)

Table-IV
Association of age with polyp and other than polyp[†]

Age group	Polyp (n=137)	IBD (n=20)	SRUS (n=05)	TB (n=04)	Non-specific colitis (n=45)	p- value
<5 yrs	63 (46%)	1(5%)	1(20%)	-	1(2.2%)	
5-10 yrs	58(42%)	6 (30%)	2(40%)	2(50%)	19 (42.2%)	<0.001*
10-15 yrs	16(11.6%)	11 (55%)	2(40%)	2(50%)	20 (44.4%)	
>15 yrs	-	2 (10%)	-	-	5 (11.1%)	

[†]Other than polyp – IBD, SRUS, TB, Non-specific colitis
Chi-square test, *significant

Discussion

There are difficulties in preparation and sedation for colonoscopy in children, because of this the procedure is performed less frequently in them.³

In this study male: female ratio was found 1.6:1.0, with the most common age group being 6-10 years (school-going age). This is close with the study by Sharma et al. where the male to female ratio was 1.62:1, and the most common age group was 6-10 years.⁹ Bhadauria et al. also found similar (2.1:1) male to female ratio, and the most common age group was 5-10 years in their studies.¹⁰ Mean age of the study children was 7.69 (standard deviation 3.8 years) which is similar to study done by We JH et al. who found the mean age was 6.4 years (standard deviation 4.4 years).¹¹ The most common indication for colonoscopy in our series was LGIB (69.8%). Nambu et al. found 70% case of LGIB in their colonoscopy series which is similar to our study.¹² Similar findings also observed by Deeb et al. who found 73.3% cases of LGIB in their colonoscopy series.¹³

In our study colorectal polyps constituted 41.3% of all colonoscopy cases. Colorectal polyp was found 26.4% in a study done in Korea which is albeit lower than our findings.¹¹ In the literature, there are great variations in the prevalence of colorectal polyps in pediatric patients who underwent colonoscopy. It is reported high in India (61.7%-67.7%) and also in Pakistan (75%) compared with western data (4%-17.5%).^{11,14-17}

Juvenile colorectal polyps were found in 75% of the cases, in a retrospective review of children under 15 years of age with chronic lower GI bleeding, of them 88% were solitary and in rectosigmoid region.¹⁴ In our series 94.3% of polyps are located in rectosigmoid region and of which 73.7% are solitary. Sharma et al.

also found juvenile rectosigmoid polyp was the most common cause of bleeding (61.40%).⁹ A significant number of our cases (26.3%) of polyps were multiple so full colonoscopy was done in most of the cases. Multiple polyps do occur in 20-35% of the pediatric population. Polyps in this series were removed successfully by colonoscopic polypectomy. Histologically juvenile (hammertomatous) polyp (96.5%) was the predominant finding which is similar to study done by Poddar et al where juvenile polyp was 93%.¹⁴ In another study of colorectal polyp in children, 97% of polyps were localized in the rectum or sigmoid colon and 96.2% were histologically juvenile polyps.¹⁵ Other than juvenile polyp we also found 3 (2.1%) cases of juvenile polyposis syndrome (JPS), 1 (0.72%) case of Peutz-jegher syndrome and 1(0.72%) case of familial adenomatous polyposis (FAP) syndrome. Poddar et al. found juvenile polyposis in 7% of the children in their study.¹⁴ In our FAP case polyps were present throughout the colon and also in upper GI tract. Colectomy was done by pediatric surgery. Follow-up colonoscopy was done in JPS and PJS. Apart from this, follow-up colonoscopy was done in one cases of juvenile polyp in this series who had recurrence of bleeding. The most common indication for colonoscopy in all these studies was LGIB and the commonest finding was juvenile polyp which was also the finding of our study. Like other previous reports we also found polyps more in boys (63%) than in girls (37%).^{11,14} We found 46% of polyps are less than 5 years of age and 88.3 % of polyps are within 0-10 of age. Next to juvenile polyp there are nonspecific colitis in 13.55 %, IBD 6 %, SRUS 1.2% and ileocecal tuberculosis (TB) in 1.5 % of cases. Wu et al. and Deeb et al. found 22.7% and 20% cases of nonspecific colitis in their series respectively.^{13,16} Histologically normal was found in about 36.55% of cases. This

similar result was shown by We JH et al. and Clarke et al. they reported 30% and 30.6% normal results in their studies respectively.^{11,17} IBD including ulcerative colitis (UC) and Crohn's disease (CD) are also common etiologies of lower GI bleeding in children. Previous studies have shown that approximately 20% of patients with IBD are diagnosed before the age of 20 years, among whom most are below 15 years of age.¹⁸ In our study, IBD (UC and CD) were the 3rd most common histological causes of colonoscopy and accounted for 6% of all patients. Sharma et al found IBD (8.77%) cases which is close to our study.⁹ In our study CD cases were 11 and 9 cases were UC. All the UC cases had pancolitis. CD cases had aphthous ulcer, linear ulcers and pseudopolyps. Non caseating granuloma was found only one third of cases, probably subcutaneous nature of granuloma could be the cause. All the cases responded to anti-inflammatory therapy. Sharma et al. found 3.5% cases of intestinal TB in their study.⁹ Among the ileocecal TB cases, all the cases had positive contact but 2 had patulous ileocecal valve, one had caseating granuloma. Transverse ulceration along with ileitis were present in all 5 TB cases. All the cases responded to anti-TB therapy. SRUS was found in 1.2% of cases. In a study from Iran regarding the etiology of lower GI bleed in children, juvenile polyp and solitary rectal ulcer accounted for most of the pathologies that caused rectal bleeding in children and adolescents, respectively.¹⁹ In all our cases of SURS, children had a history of associated constipation and straining during defecation along with mucorrhea. We managed these cases with high fiber diet and sucralfate enema.

Conclusion

To obtain a definite diagnosis and prompt treatment in children presenting with the symptoms or signs of lower gastrointestinal disorders should undergo colonoscopy. Paediatric colonoscopy was found helpful for diagnosis and most common pathology was juvenile polyp followed by IBD, SRUS and TB.

References

1. Croffie JM. Advances and new technologies in adult endoscopy: can they be adapted to pediatrics? *Curr Gastroenterol Rep.* 2007;9:208-13.
2. Park JH. Role of colonoscopy in the diagnosis and treatment of pediatric lower gastrointestinal disorders. *Korean J Pediatr.* 2010;53:824e9.
3. Gilger MA, Gold BD. Pediatric endoscopy: new information from the PEDSCORI project. *Curr Gastroenterol Rep.* 2005;7:234-9.
4. Levin B, Lieberman DA, McFarland B, Andrews KS, Brooks D, Bond J, et al. American Cancer Society colorectal Cancer advisory group; US multi-society task force; American College of Radiology Colon Cancer Committee. Screening

and surveillance for the early detection of colorectal cancer and adenomatous polyps, 2008: a joint guideline from the American Cancer Society, the US multi-society task force on colorectal Cancer, and the American College of radiology. *Gastroenterology.* 2008;134:1570-95.

5. Kawada PS, O'Loughlin EV, Stormon MO, Dutt S, Lee CH, Gaskin KJ. Are we overdoing pediatric lower gastrointestinal endoscopy? *J Pediatr Gastroenterol Nutr.* 2017;64(6):898-902.
6. Elitsur Y, Teitelbaum JE, Rewalt M, Nowicki M. Clinical and endoscopic data in juvenile polyposis syndrome in preadolescent children: a multicenter experience from the United States. *J Clin Gastroenterol.* 2009;43:734-6.
7. Uhlig HH, Schwerdt T, Koletzko S, Shah N, Kammermeier J, Elkadri A, et al. The diagnostic approach to monogenic very early onset inflammatory bowel disease. *Gastroenterology.* 2014;147:990-1007.
8. Lei P, Gu F, Hong L, Sun Y, Li M, et al. Pediatric Colonoscopy in South China: A 12-Year Experience in a Tertiary Center. *PLOS ONE.* 2014;9(4):e95933. doi:10.1371/journal.pone.0095933
9. Sharma B, Sharma R, Bodh V, Sharma S, Sood A, Sharma R, et al. Chronic lower gastrointestinal bleeding: Etiological profile and role of colonoscopy among children from sub-Himalayan ranges of North India. *J Dig Endosc.* 2018;9:109-13
10. Bhadauria N, Dubey SR, Mittal P, Arya AK, Singh RP. Clinico-etiological pattern of lower gastrointestinal bleeding in children (5-18 years age group) at a tertiary care center in central India. *Indian J Child Health* 2016;3:290-2.
11. We JH, Park HS, Park JH. The Role of Colonoscopy in Children with Hematochezia. *Korean J Pediatr Gastroenterol Nutr.* 2011; 14:155-60.
12. Nambu R, Hagiwara S, Kakuta F, Hara T, Shimizu H, Abukawa D, et al. Current role of colonoscopy in infants and young children: a multicenter study. *BMC Gastroenterology.* 2019;19:149.
13. Deeb MM, El-Zayat RS, Heba A. El-Khairb HA. Colonoscopic findings in children with lower gastrointestinal bleeding. *Menoufia Med J.* 2016; 29:247-51.
14. Poddar U, Thapa BR, Vaiphei K, Singh K. Colonic Polyps: Experience of 236 Indian Children. *Am J Gastroenterol.* 1998; 93:619-22.
15. Boukthir S, Mrad SM, Oubich F, Boussif A, Debbabi A, Barsaoui S. Colorectal polyps in children. A study of 34 patients. *Tunis Med.* 2006;84:496-9.
16. Wu CT, Chen CA, Yang YJ. Characteristics and Diagnostic Yield of Pediatric Colonoscopy in Taiwan. *Pediatr Neonatol.* 2015; 56, 334e338.
17. Clarke G, Robb A, Sugarman I, Macallion WA. Investigating painless rectal bleeding- is there scope for improvement? *J Pediatr Surg.* 2005;40:1920-2.
18. Yu Bai, Jun Peng, Jun Gao, Duo-Wu Zou, Zhao-Shen Li. Epidemiology of lower gastrointestinal bleeding in China: Single-center series and systematic analysis of Chi-nese literature with 53951 patients. *J Gastroenterol Hepatol.* 2011;26:678-82
19. Zahmatkeshan M, Fallahzadeh E, Najib K, Geramizadeh B, Haghghat M, Imanieh MH, et al. Etiology of lower gastrointestinal bleeding in children: A single center experience from southern Iran. *Middle East J Dig Dis.* 2012;4:216-23.