

Original Research Article

Study endoscopic and colonoscopy findings in children under 16 years of age with gastrointestinal bleeding from 2018 to 2021

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ABSTRACT

Background: One of the most common reasons for Children to visit clinics is gastrointestinal issues in which endoscopic studies are used occasionally to investigate its etiology more accurately. GI bleeding eventhough uncommon in children, can be life threatening. The aim of this study was to study endoscopic and colonoscopic findings in children with GI bleeding.

Methods: This descriptive analytical study was done on 73 children under 16 years in Ardabil with the diagnosis of gastrointestinal bleeding. A checklist including demographic and treatment information of patients like severity of bleeding, bleeding type (melena, hematochezia, occult blood), laboratory results (hemoglobin, hematocrit) and clinical findings (abdominal pain, nausea and vomiting, ETC), endoscopic and colonoscopic results were collected and then analyzed by statistical methods in SPSS version 21.

Results: Total 38 cases (52.1%) were gone under upper endoscopy and 35 cases (47.9%) were gone under colonoscopy. The most common indications for upper endoscopy was GI bleeding (76.3%) and the most common involved anatomical part was lower portion of esophagus (44.7%). The most common indication for colonoscopy was recurrent abdominal pain (62.9%). Pathologic cases were often seen in sigmoid, rectum and anus (52/8%). The most common colonoscopic findings were nodular hyperplasia (25/7%) and solitary nodule (20%).

Conclusions: Results of study showed that, the frequency of endoscopic evaluation has been significantly lower in female children. According to the most common indications for upper and lower endoscopy, it is important to consider the frequency pattern of indications for endoscopic study.

Keywords: Colonoscopy, Endoscopy, Gastrointestinal system, Pediatrics

INTRODUCTION

Gastrointestinal (GI) bleeding in children, although uncommon, but can be life-threatening.¹ Manifestations of gastrointestinal bleeding in children can vary from subtle findings of anemia, pallor, and iron deficiency to clear episodes of bloody vomiting.² Bleeding from the gastrointestinal tract can be seen in several ways: hematemesis, melena, and hematochezia.³ Bleeding from the gastrointestinal tract (GI) is one of the most common cases for emergency endoscopy in pediatrics. Common

signs and symptoms included bleeding (73%), melena (21%) and coffee-ground emesis (6%). However, patients may also experience epigastric pain, abdominal tenderness, or dizziness. The worldwide mortality rate for UGIB in children can range from 5% to 21%. Mortality in the United States is at the lower end of the spectrum as a result of intensive improvements in pediatric care, advances in diagnosis and treatment, as well as in the stabilization and management of critically ill patients. The causes of UGIB in newborns are coagulation disorders such as vitamin K deficiency, cow's milk

intolerance, stress-induced gastritis, sepsis, and trauma from the placement of nasogastric tubes. From 1 month to 1 year, the most common causes are caustic ingestion, cyst proliferation, foreign substance ingestion, stress esophagitis, drug-induced bleeding (e.g., no steroidal anti-inflammatory drugs, NSAID use), and peptic ulcer bleeding. From 1 to 5 years of age, its causes included erosive esophagitis, gastritis, ingestion of caustic substances, bleeding from peptic ulcers, varices, and bleeding from vomiting, for example, from a Mallory-Weiss tear. During ages 5 to 18 years, bleeding can include coagulation disorders, gastritis, diolafoi lesions (an abnormal artery located in the digestive tract), erosive esophagitis, gastric ulcer, ingestion of caustic substances, and bleeding due to vomiting.⁴ A complete and accurate history about the progress, duration, frequency and severity of symptoms is necessary to evaluate the bleeding. Accompanying symptoms including nausea, diarrhea, constipation, abdominal pain, anorexia, rashes, swelling or joint pain, weight loss, fever, history of bleeding or immunological disorders can help in the diagnosis. There are no randomized controlled trials and no Cochrane review or systematic review to diagnose bleeding in children with upper gastrointestinal bleeding.⁵ The diagnostic approach is mostly evaluated based on adult studies. The key points are a history and extensive review of laboratory evaluation and diagnostic methods.⁴ During a retrospective study, Joshi et al, performed endoscopy for one year in children with upper gastrointestinal bleeding and concluded that endoscopy is a diagnostic tool. It is useful in children.⁶ The purpose of this study was to investigate the colonoscopic and endoscopic clinical table of the causes of gastrointestinal bleeding (lower and upper) in children, so that it can be used to quickly treat children with gastrointestinal bleeding and use the correct diagnostic and therapeutic methods.

METHODS

The descriptive-analytical study was conducted on 73 children under 16 years of age who referred to the Children's treatment center of Bu-Ali hospital in Ardabil city between 2017 and 2018. Children without GI bleeding and up 16 years old were excluded from the study. A checklist including demographic information (including age, sex) and treatment information of patients such as the reason for referral, hemodynamic status, severity of bleeding, its type (melena, hematochezia and occult blood), laboratory results (Hct/Hb/..) and findings clinical symptoms (abdominal pain, nausea, vomiting, etc.) and endoscopy and colonoscopy results were collected. After coding, the data were entered into the SPSS version 21 and quantitative variables were displayed as mean ± standard deviation. To check the relationship between the findings endoscopic and colonoscopy with children's age and bleeding duration, we used one-way analysis of variance and also we used chi-square test and Fisher test to compare qualitative variables. The level of significance in all tests was

considered as $p < 0.05$. The study was conducted after approval by the Ethics Committee.

RESULTS

The frequency of male gender with 63% was significantly higher than the female. The average age of the infants was 7.1 ± 3.6 years. Most of the examined infants were hospitalized in the general department (71.2%) and their hospitalization lasted an average of 3.1 ± 2.4 days (Table 1).

Table 1: Demographic and therapeutic characteristics of the examined children.

Qualitative variables	n	Percentage	
Gender	Girl	27	37
	Boy	46	63
Type of endoscopic examination	Upper	38	52.1
	Lower	35	47.9
Inpatient status	Special	7	9.6
	Normal	52	71.2
	Ambulatory	14	19.2
Quantitative variables	Average	SD	
Age	7.1	3.6	
Length of hospitalization	3.1	2.4	

The most common reason for performing upper and lower endoscopy is recurrent abdominal pain, and recurrent nausea in upper endoscopy and hematochezia in lower endoscopy have the least frequency in the indications for performing endoscopic studies (Table 2).

Table 2: Indications for endoscopic examination in the examined infants.

Variable	n	Percentage	
Upper Endoscopy	Recurrent abdominal pain	23	60.5
	Recurrent nausea	8	21.1
	digestive bleeding	29	76.3
Colono-scopy	stomach ache	22	62.9
	Chronic diarrhea	13	37.1
	Hematochezia	5	14.3

The common anatomical involved region was the lower part of the esophagus (44.7%) (Table 3).

In patients with gastrointestinal bleeding who used NSAIDs, the most common place of involvement with 42.8% was the stomach (Table 4).

The most common sites of involvement were sigmoid, rectum and anus (52.8%) (Table 5).

The most common abnormal findings were diffuse erythema (47.4%), erosion (34.2%) and positive RUT (34.2%) respectively (Table 6).

Table 3: Areas of involvement in the upper gastrointestinal tract.

Variable	Number	Percent to all patients undergoing upper endoscopy
Lower esophagus	17	44.7
Cardia/fundus of the stomach	3	7.9
Stomach trunk/antrum	14	36.8
Pyloric region/first part of duodenum	9	23.7
The second part of the duodenum	1	2.6
Normal	11	28.9

Table 4: Areas of involvement in the upper gastrointestinal tract by using NSAID.

Variable	With NSAID use		No NSAIDs		P value
	n	%	n	%	
Esophagus	1	10	9	90	0.03
Stomach	6	42.8	8	57.2	
Duodenum	1	14.3	6	85.7	
Normal	0	0	11	100	

Table 5: Areas of involvement in the lower digestive tract.

Variable	n	Percent to all patients undergoing upper endoscopy
Cecum and ascending colon	6	16.7
Hepatic flexure	2	5.6
Transverse colon	1	2.8
Splenic flexure	2	5.6
Descending colon	5	13.9
Sigmoid, rectum and anus	19	52.8
Normal	8	22.2

Table 6: The type of lesion observed in the upper endoscopic examination.

Variable	n	Percent to all patients undergoing endoscopy
Fragile mucus	8	21.1
Diffuse erythema	18	47.4
Positive RUT	13	34.2
Nodular hyperplasia	9	23.7
Ulcer	9	23.7
Erosion	13	34.2
Z line displacement	4	10.5
Normal	3	7.3

The most common abnormal findings in colonoscopy were nodular hyperplasia (25.7%) and single ulcer (20%) (Table 7). There was no significant difference between the indications of upper endoscopy and the

hospitalization status of the patients. The average age of children who simultaneously had both indications of recurrent vomiting and recurrent abdominal pain was higher than the others, and the lowest average age was related to patients with upper gastrointestinal bleeding (4.5±3.8 years).

Table 7: Type of lesion observed in colonoscopic examination.

Variable	n	Percent to all patients undergoing colonoscopy
Nodular hyperplasia	13	37.1
Polyp	5	14.3
Single ulcer	7	20
Diffuse ulcer	3	8.6
Fragile mucus	1	2.9
Loss of vascular pattern	6	17.1
Erythema appearance	4	11.4
Hemorrhoid and skin tag	1	2.9
Normal	10	25.6

The longest average duration of hospitalization was found in children who had recurrent vomiting and gastrointestinal bleeding at the same time (3.5±2.6). Hemoglobin level in patients who underwent endoscopy with complaints of recurrent abdominal pain was lower than other patients (10.9±3.2). Serum creatinine level in patients with recurrent abdominal pain had the highest mean (0.833±0.16) and patients who had recurrent vomiting and upper gastrointestinal bleeding at the same time had the lowest mean compared to others (0.55±0.12). There was no significant difference between indications for upper endoscopy and age variables and

laboratory findings. There was no significant relationship between the frequency of indications for upper endoscopy and gender. No significant relationship was observed between indications for lower endoscopy and hospitalization status. Hemoglobin level in patients who underwent endoscopy with complaints of hematochezia was lower than other patients (9.8 ± 3.6). Also, patients with hematochezia had a higher serum creatinine level than other patients (0.72 ± 0.14 vs. 65 ± 0.10 and 0.66 ± 0.18). There was a significant relationship between the duration of hospitalization and indications for lower endoscopy. There was no significant relationship between the frequency of indications for lower endoscopy and gender. There was no significant difference in the frequency of endoscopic findings between male and female gender.

DISCUSSION

In this study, it was found that there was no significant difference between upper and lower endoscopy indications and the hospitalization status of the patients. Although there was no significant difference between the indications for upper endoscopy and quantitative variables including age and laboratory findings, there was a significant relationship between the duration of hospitalization and the indications for lower endoscopy. In the study of Nakhai et al, which examined the endoscopic examination of children referred to Ali Asghar (AS) Children's Hospital affiliated to Iran University of Medical Sciences, based on the results of the said study, it was shown that the most common reason for patients to refer chronic abdominal pain (78%), similar to this study, in our research, the most common reason for performing lower endoscopy was recurrent abdominal pain, but in upper endoscopy, gastrointestinal bleeding was the most common reason for referral. The most common anatomic region of involvement in endoscopic examination during spinal cord study was related to the antrum region, while in our study, the most common region of involvement was related to the lower esophageal regions, followed by the stomach trunk and antrum.⁷ In the study by Zamani et al, who examined endoscopic findings in children with positive *Helicobacter pylori* serology, male and female children were examined in equal proportion. During the said study, the most common findings were related to nodular gastritis, followed by antral erythema and erogenous antrum of the stomach, while in our study, the gender ratio in the examined children was not similar to the aforementioned study. Also, the most common site of involvement in our study was related to the lower esophagus.⁸

In the study of Shuang et al, which investigated the clinical manifestations and final results of endoscopic examination in 164 children, it was found that nearly 65% of the children examined had no abnormal macroscopic and microscopic findings, which is significantly higher than the frequency of children with

endoscopy. The upper part was normal in our study, and this difference can be related to the differences caused by the cultural characteristics in the two studied populations. Further, during the aforementioned study, the common indications for colonoscopy were mentioned, which included abdominal pain, chronic diarrhea, and gastrointestinal bleeding, respectively, which were completely similar to the findings of our study.⁹ In Julián-Gómez et al.'s study, which was conducted in Spain, the indications and findings of endoscopy were reported together, which included foreign body, hiatal hernia, and esophagitis of the lower half of the esophagus, respectively, while in our study, hernia Hiatus and foreign body are not common indications or findings of upper endoscopy.¹⁰ In the study of Wani et al, which was conducted in India, among the 822 children examined, the most common reason for endoscopy was varicose veins (19.1%), dyspepsia (17.4%), upper gastrointestinal bleeding (16.5%) and Abdominal pain was recurrent (11.4%), which is somewhat consistent with our study. In our study, esophageal varices were not among the common symptoms, and according to the presented guidelines, esophageal varices in children are not among the common findings in the endoscopic examination of the upper digestive tract. It is possible that this unusual finding reported in the study of Wani et al was caused by a racial factor that increased the incidence of esophageal varices in the studied area.¹¹

In the study conducted by Deeb et al, in Egypt, 75 children with complaints of gastrointestinal bleeding were investigated. According to the results of this study, the most common findings from colonoscopy include colon polyps, linear ulcers, edema, and non-specific diffuse inflammation. In our study, the most common abnormal findings of colonoscopy included nodular hyperplasia, solitary ulcer and polyp.¹²

This study has some limitations. Due to the design of the current study, which was a cross-sectional study, follow-up of the treatment process was not done in the patients. Due to extracting the information needed for the study from the medical files in the archive, some information was not fully available.

CONCLUSION

The results of the present study showed that, the frequency of endoscopic examinations in female children was significantly lower. Most of the patients did not need to be hospitalized in the special ward. Also, considering the most common indications reported for upper endoscopy (upper gastrointestinal bleeding) and lower endoscopy (recurrent abdominal pain), it is important to consider the pattern of frequency of indications for endoscopic examination and it can be used for more accurate management of future patients. be helpful Also, according to the information related to the most common anatomical locations of lesions in the upper and lower endoscopic study, a more accurate prediction can be

made for the results of the upcoming endoscopic examinations in the relevant center by respected experts. Help to carry out experimental treatments needed before accurate diagnosis. It is suggested to design studies to check the prognosis of each of the pathological findings in order to better identify the different aspects of gastrointestinal complications in children in the region. Also, during the management of young patients referred to the relevant center, more accurate differential diagnoses can be proposed for the patients, taking into account the results of this study.

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REFERENCES

1. Moore LE. The advantages and disadvantages of endoscopy. Clin Techn Small Ani Pract. 2003;18(4):250-3.
2. Barth BA, Banerjee S, Bhat YM, Desilets DJ, Gottlieb KT, Maple JT, et al. Equipment for pediatric endoscopy. Gastrointes Endosco. 2012;76(1):8-17.
3. Valdastrì P, Simi M, Webster III RJ. Advanced technologies for gastrointestinal endoscopy. Ann rev Biomed Engineer. 2012;14:397-429.
4. Attard TM, Grima AM, Thomson M. Pediatric endoscopic procedure complications. Curr Gastroenterol Repor. 2018;20:1-11.
5. Schreiber-Dietrich D, Hocke M, Braden B, Carrara S, Gottschalk U, Dietrich CF. Pediatric endoscopy, update 2020. Appl Sci. 2019;9(23):5036.
6. Hazewinkel Y, Dekker E. Colonoscopy: basic principles and novel techniques. Nat Revi Gastroenterol Hepatol. 2011;8(10):554-64.
7. Nakhaei S. Upper gastrointestinal endoscopy in children: six months experience in Hazrate Ali Asghar children's hospital. RJMS 2000;6(4):315-8.
8. Zamani A, Bahremand SH, Ojaghi Haghghi SM, Daneshjou K, Targari F, Ghasemi M. Endoscopic findings in children with Helicobacter pylori infection and abdominal tenderness. Tehran Univ Med J. 2008;65 (11):60-5.
9. Wang S, Younus O, Rawat D, Naik S, Giles E, Meadows N, et al. Clinical presentation and outcomes of diagnostic endoscopy in newly presenting children with gastrointestinal symptoms. J Pediat Gastroenterol Nutrit. 2018;66(6):876-81.
10. Julián-Gómez L, Barrio J, Izquierdo R, Gil-Simón P, Gómez de la Cuesta S, Atienza R, et al. A retrospective study of pediatric endoscopy as performed in an adult endoscopy unit. Revis Espanola Enfermed Digestivas. 2010;102(2):100.
11. Wani MA, Zargar SA, Yattoo GN, Haq I, Shah A, Sodhi JS, et al. Endoscopic yield, appropriateness, and complications of pediatric upper gastrointestinal endoscopy in an adult suite: a retrospective study of 822 children. Clin Endosco. 2020;53(4):436-42.
12. Deeb MM, El-Zayat RS, El HAAEA. Colonoscopic findings in children with lower gastrointestinal bleeding. Menouf Medi J. 2016;29(2):247.

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