

ORIGINAL ARTICLE

Spectrum of Upper GI Endoscopy in Children: A Tertiary Centre Experience from Bangladesh

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Abstract

Background: Upper gastrointestinal endoscopy is an essential, safe and sensitive investigation for diagnosing pediatric gastrointestinal diseases. In resource-limited countries like Bangladesh, the practice of pediatric endoscopy remains rudimentary, lacking in trained pediatric endoscopists and appropriate-sized endoscopes. There is limited study on paediatric upper GI endoscopy in our country.

Objectives: The aim of the study was to find out the indications, common endoscopic findings and immediate post procedure complication of UGI endoscopy in children.

Methods: This is a retrospective study; the records of all the patients whose age is less than 18 years and who underwent endoscopy in the last 6 years were studied.

Results: Among the total of 384 children (age <18 years), the most common indications were recurrent abdominal pain in 133 (34.7%) patients followed by hematemesis+melenas in 99 (25.8%), esophageal varices (follow up with eradication) in 67 (17.5%), recurrent vomiting in 31 (8.1%), foreign body, CLD screening, suspected celiac disease, isolated splenomegaly, corrosive injury, and weight loss. The most common abnormal findings were gastritis in 103 (26.9%) children followed by esophageal varices in 73 (19.2%), duodenitis in 26 (6.8%), foreign body, esophagitis, hiatus hernia, esophageal stricture, esophageal ulcer, gastric ulcer, duodenal ulcer etc. Minor adverse events occurred in 7.0% of children.

Conclusion: The commonest indication for Pediatric UGI endoscopy was recurrent abdominal pain and the commonest endoscopic feature was gastritis. No significant post procedure complication was noted in the study.

Keywords: Bangladesh, Child, Upper GI endoscopy, Indication, Complications

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Introduction

Gastrointestinal diseases like esophageal varices, peptic ulcer disease, inflammatory bowel disease etc. are important health related problems worldwide especially in pediatric age group.¹ Upper gastrointestinal (UGI) endoscopy is the most sensitive investigation for diagnosing upper GI diseases.² After the introduction of flexible endoscopy by Hirschowitz in 1950's, use of upper GI endoscopy has become a routine GI procedure.³ Later on, fiberoptic endoscopy for children developed in 1970's and upper GI endoscopy has now become a standard diagnostic procedure for many gastrointestinal problems in children.⁴⁻⁶

Initially, pediatric endoscopy was mainly used for the identification of superficial lesions, which were not seen on radiographic contrast studies, and for diagnosing specific causes of UGI bleeding. Esophagogas-troduodenoscopy (EGD) can now be done at any age because of the development of flexible endoscopes with a small caliber and proper training of operators especially in developed countries.⁷ According to international guidelines, diagnostic pediatric EGD is usually safe and complications are rarely encountered.⁸⁻¹⁰ Complications mostly occur due to sedation and anesthesia administered during the procedure.¹¹ However, therapeutic endoscopy in children can have multiple complications depending upon the nature of intervention and expertise of the endoscopist, with the reported complication rate of less than 1% when EGD is done by expert pediatric endoscopists.^{7,10}

In contrary, the picture of developing countries are not same. Upper GI endoscopy is still an under-utilized tool and information regarding its efficacy is scanty in most of the developing countries. This is mainly due to lack of awareness about the role of this important diagnostic modality in children which prevents referrals of these children to a center where this facility is available.¹ In resource-limited countries like Bangladesh, the field of pediatric endoscopy remains rudimentary and only limited to a few centers due to lack of trained pediatric endoscopists and appropriate-sized endoscopes. Furthermore, there are only very few studies and lack of data regarding the appropriate indications and complications of endoscopy in children. Therefore, we carried out this hospital-based retrospective study to find out the common indications, endoscopic findings and complications

of Pediatric upper GI endoscopy in our setup, to raise awareness regarding use of upper GI endoscopy amongst pediatricians in diagnosing upper GI problems in our country.

Materials and Methods

The study was carried out in the department of Pediatric Gastroenterology, Hepatology & Nutrition, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh. The medical records of all patients under the age of 18 years who underwent upper GI endoscopy (both inpatient & outpatient department) from January 2016 to December 2021 were reviewed retrospectively. All of the pediatric patients (total 384) on whom upper GI endoscopy was performed during the study period were included in the study. The need for endoscopy was decided by the paediatric gastroenterologist as well as by the general paediatricians. Informed consent was taken from parents/patients before the procedure after careful explanation of procedure details and potential complications. Prior to the procedure, the children remain fasted for at least 6 hours. All pediatric upper GI endoscopies were performed by the faculty members.

The majority of the endoscopic procedures were done with video endoscopes (OLYMPUS GIF-Q190; Olympus, To-kyo, Japan) for ≥ 2 years of age. In children less than 2 years or weighing less than 10 kg, endoscopy was performed with a pediatric video endo-scope (OLYMPUS GIF-XP190; Olympus) with a diameter of 5.8 mm.

Mode of anesthesia was decided by performing faculty member depending upon patient's age, level of cooperation and physicians comfort level. Parenteral Midazolam (0.05-0.1 mg/kg IV, maximum single dose of 4 mg) with or without Ketamine (1 mg/kg I/V) was used as sedatives. In some adolescents, endoscopy was done without sedation/an-esthesia but under local xylocaine spray or jelly.

Endoscopic findings were documented for each patient and biopsy materials for histopathology were taken. Patients were kept in observation room to see the immediate post procedure complications. Patient's demographic data including age, sex and length of hospital stay were recorded. For descriptive purpose patients were divided into three age groups. Indications for upper GI endoscopy, findings and post endoscopic complications were recorded for each patient.

All data on categorical variables were presented as frequencies and percentages. Data of various indications, endoscopic findings and complications were entered into the SPSS (statistical package for social science) Version 24.0 statistical program and statistical analyses were carried out at 5% level of significance and $P < 0.05$ was considered statistically significant.

Results

Over a period of 6 years (2016-2021), a total of 384 children underwent upper GI endoscopy. Mean age of patients was 9.6 years with a minimum age of 2 months and a maximum of 18 years. Older children aged >10 years had highest frequency of upper GI endoscopy, *i.e.* 50.2% (n=193), followed by younger children (5-10 years of age), in which frequency of endoscopy was 32.3% (n=124). The frequency of endoscopy in youngest children between 0-5 years of age was 17.5% (n=67). Male were 207 (53.9%) and female were 177 (46.1%). The Male female ratio was 1.1:1. Out of 384 children, 171 (44.6%) were from outpatient department and 213 (55.4%) from admitted patient. No sedation were required in 75 (19.6%) children especially from >10 year age group. Only parenteral midazolam was given in 257 (66.9%) children whereas parenteral midazolam plus ketamine were required in only 52 (13.5%) sensitive children (Table I).

Variable	No.	Percentage (%)
Age		
<5 years	67	17.5
5-10 years	124	32.3
>10 years	193	50.2
Sex		
Male	207	53.9
Female	177	46.1
Patient status		
Outpatient	171	44.6
Inpatient	213	55.4
Sedation		
No Sedation	75	19.6
Midazolam	257	66.9
Midazolam+Ketamine	52	13.5
Biopsy obtained		
Yes	147	38.2
No	237	62.8

The most common indications were recurrent abdominal pain in 133 (34.7%) patients. Hematemesis±melena was the next cause (25.8%) of the procedure. In 17.5% patients upper GI endoscopy was done due to esophageal varices kept in follow up for surveillance. Other less common indications were recurrent vomiting (8.1%), foreign body ingestion (5.4%), suspected celiac disease (1.9%), isolated splenomegaly, corrosive injury and explained weight loss (Fig.-1).

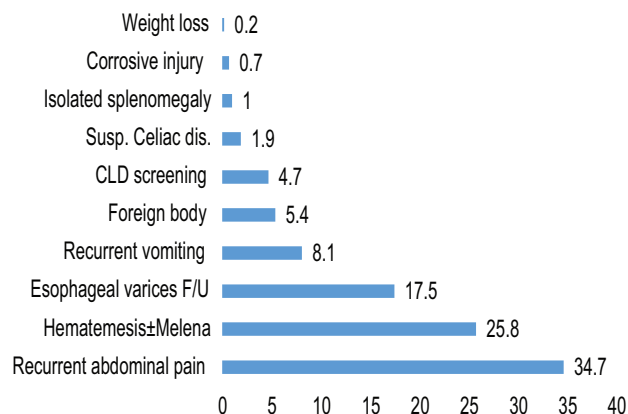


Fig.-1: Indications of Upper GI Endoscopy (N=384)

The abnormal endoscopic findings were found in 66% patients. Among them, gastritis was the most common histopathological finding on biopsy, seen 26.9% (n=103) cases. Esophageal varices was found in 19.2%, duodenitis in 6.8%, foreign body in 5.4%, esophagitis in 3.4% and endoscopic findings were normal in 34% cases (Table II & Fig. 2).

Findings	No.	Percentage (%)
Normal	131	34.1
Gastritis	103	26.9
Esophageal varices	73	19.2
Duodenitis	26	6.8
Foreign body	21	5.4
Esophagitis	13	3.4
Hiatus hernia	07	1.8
Esophageal stricture	03	0.8
Esophageal ulcer	02	0.5
Gastric ulcer	02	0.5
Duodenal ulcer	01	0.2
Duodenal growth	01	0.2
Duodenal polyp	01	0.2
Total	384	100

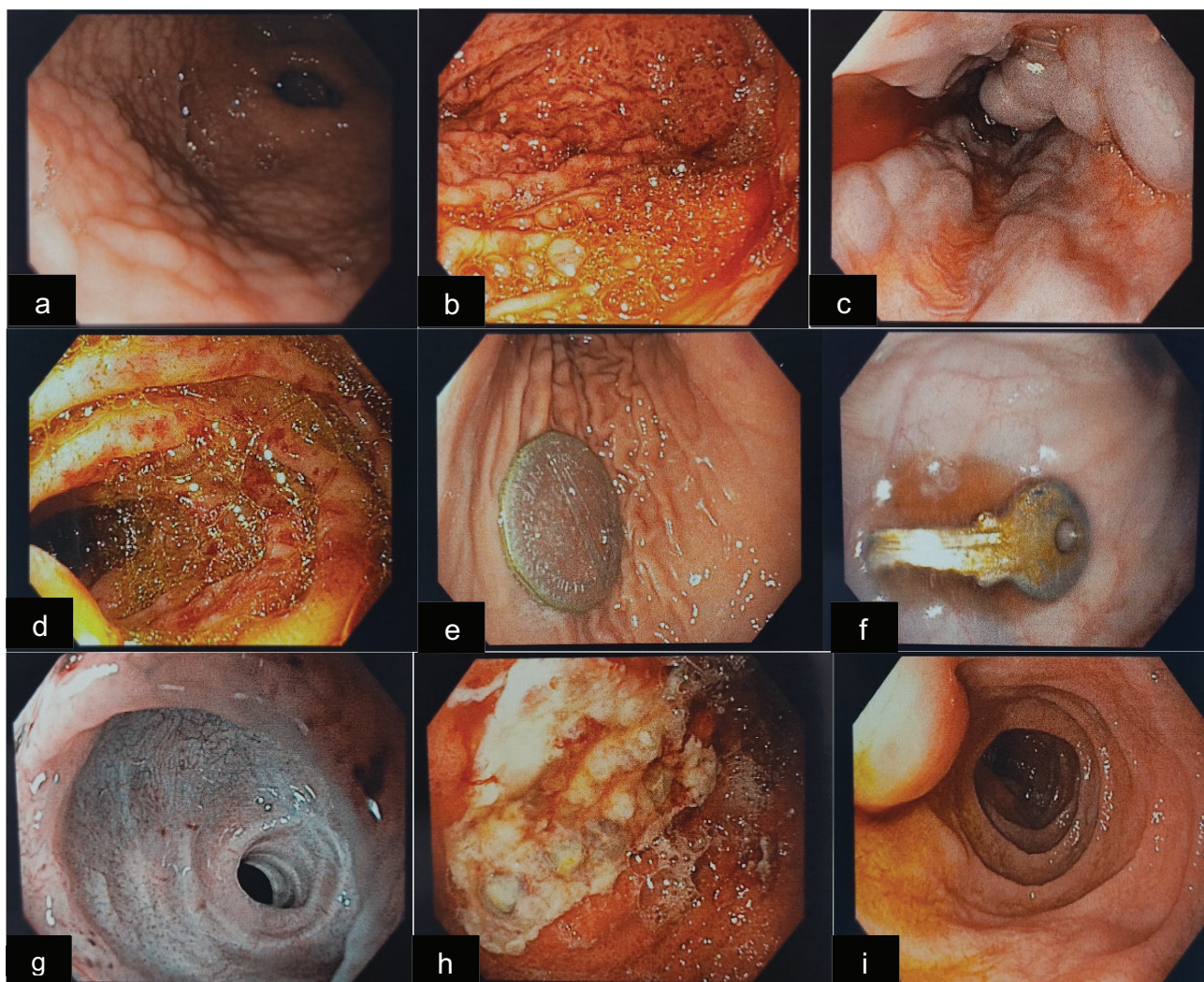


Fig.-2: Various endoscopic views: (a) Gastritis without bleeding, (b) Gastritis with bleeding, (c) Esophageal varices, (d) Duodenitis, (e) Foreign body, coin, (f) Foreign body, key, (g) Corrosive injury, (h) Gastric ulcer, (i) Duodenal growth

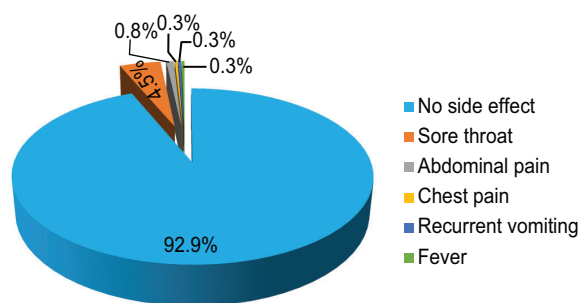


Fig.-3: Complications of Upper GI Endoscopy (n=384)

No side effects were observed in near 93% of children following endoscopy procedure. A total of 23 (7.0%) adverse events were recorded. Seventeen (4.5%) patients complained of sore throat, 3(0.8%) patients

had abdominal pain and 1(0.3%) patient each had complained of chest pain, recurrent vomiting and fever. All of them were minor and did not affect the overall survival and hospital stay (Fig-3).

Discussion

Upper GI endoscopy is one of the most specific, prompt, convenient and cost effective diagnostic tool for a wide variety of gastrointestinal disorders in children, especially under the circumstances when other investigations are often remain inconclusive. In addition to its diagnostic use, upper GI endoscopy also has an established therapeutic role and various disorders like upper GI bleeding, Mallory Weiss tear; gastric erosions can be effectively treated by

endoscopy.¹²⁻¹³ Therefore, despite changing indications over a period of time, the disorders requiring upper GI endoscopy for diagnostic or therapeutic purposes in children have shown a rising trend.¹⁴

In the present study, older children aged >10 years had highest frequency of upper GI endoscopy with 50.2%. Same phenomena were observed in Mazumder et al² (40%) from Bangladesh, Khan et al¹ (40%) from Pakistan, Wani et al⁷ (66.2%) from India, Kumo et al¹⁵ (80.2%) from Nigeria, Isa et al¹⁶ (35.8%) from Bahrain and Altamimi et al¹⁷ (35.8%) from Jordan. Less fear and much more gastrointestinal diseases in older children probably the possible causes. The Male female ratio was 1.1:1. Other studies gender ratio were same from different countries.^{2,7,15-17} No gender differences regarding incidence of pediatric gastrointestinal diseases may be the possible cause. No sedation were required in 75 (19.6%) children especially from >10 year age group. Another study from Bangladesh, Mazumder et al² (66%) and Wani et al⁷ (30.4%) from India did upper GI endoscopy without sedation in the older children. Appropriate counseling and good co-operation of older children probably the possible etiology. Mild sedation with intravenous midazolam was given in 66.9% children whereas midazolam plus ketamine were required in only 13.5% sensitive children. In different studies from Bangladesh², India⁷, Nigeria¹⁵, Bahrain¹⁶ and Jordan¹⁷, midazolam was commonly used as a sedative agent during endoscopy as it is safe, short acting, rapid onset with minimal side effects. In 14.8% patients, Wani et al⁷ using general anesthesia like developed countries. Due to unavailability of anesthetic support and inadequate number of experienced pediatric anesthesiologist, conscious sedation is the key for developing countries.

In the present study, the most common indications were recurrent abdominal pain in 34.7% patients followed by Hematemesis±melena (25.8%) and esophageal varices with follow up for surveillance (17.5%). Recent studies from Nigeria¹⁵ (47.7%), Bahrain¹⁶ (40.9%) and Jordan¹⁷ (45.1%) also observed the commonest indication was pain abdomen. From previous study of Bangladesh² (41%) and India⁷ (19%) esophageal varices with follow up for surveillance was the commonest cause. Recent trend of spicy diet, frequent use of nonsteroidal anti-inflammatory drugs

as a pain reliever and smoking habits among adolescents may be the possible etiology of pain abdomen nowadays. In the literature from most of the developing countries, recurrent abdominal pain has been reported to be the commonest indication of upper GI endoscopy ranging from 8% to 43%.¹⁸⁻²⁰

About one third of the children (34%) who underwent upper GI endoscopy in our study had normal endoscopic findings. Another study from Bangladesh² (36%), India (26.7%)²¹ and Pakistan¹ (46%) stated the similar results. The abnormal endoscopic findings were found in 66% patients. Among them, gastritis was the most common (26.9%) histopathological finding on biopsy followed by esophageal varices was found in 19.2%, deodenitis in 6.8%, foreign body in 5.4% and esophagitis in 3.4% cases. In the recent study, Isa et al.¹⁶ (29.3%) from Bahrain and Altamimi et al¹⁷ (22.1%) from Jordan also stated that gastritis were the commonest findings on pediatric endoscopy. On the other side, esophageal varices was the commonest one in Mazumder et al² (40%) from Bangladesh and Wani et al⁷ (23%) from India. Non-specific findings (30.5%) in Khan et al¹, Pakistan and foreign body in Gadgade et al²¹ (25.3%) from Karnataka, India were the superior one. Different studies from different geographic areas have shown different indications & findings but the overall pattern is almost similar.⁷

Adverse events were observed in 7% cases, which was similar to Wani et al⁷ (7.3%) from India. In the present study, Seventeen (4.5%) patients complained of sore throat which was similar to Indian⁷ (3.64%) and Nigerian¹⁵ (1.2%) study. All the adverse events were minor and did not increase morbidity or mortality.

Limitations of the study

This study's primary limitation is that it was a single-center study. Furthermore, its retrospective nature may have resulted in inaccurate findings regarding underreporting of adverse events in OPD patients.

Conclusions

Abdominal pain followed by upper GI bleeding was the most typical indication, and gastritis followed by esophageal varices were the most common abnormal findings of pediatric upper GI endoscopy. No significant premedication or procedure-related complications were found. We observed that upper GI endoscopy is beneficial and can be safely used in

children of all ages, which helps in early diagnoses and managing various GI conditions.

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