

## Research Article

### Upper Gastrointestinal Endoscopies in Children – Our Experience at Private Sector Hospital, Karachi, Pakistan

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#### Abstract

**Introduction:** Gastrointestinal endoscopies are standard care for the diagnostic and therapeutic procedures for pediatric gastrointestinal diseases in developed countries but in developing countries, Pediatric Gastroenterologists (GI) with endoscopy skills are scarce and very limited institutes performing Pediatric Gastrointestinal Endoscopies.

**Objective:** To determine the indications, endoscopic findings, therapeutics interventions, diagnostic yield and complications of Upper GI Endoscopies in children.

**Methodology:** This was Retrospective descriptive study; we included all infants, toddlers and adolescents who underwent upper GI endoscopy during the study period. Data was collected from Private sector Hospitals at Karachi from May 2001 to May 2021. Total 619 procedures were reviewed from records.

**Results:** In this study, mean age was recorded 7.9 years. Majority were >10years of age n=256 (41%). Male were predominant 346 (56%). Main indication was the malabsorption syndrome in 254 (41%) followed by upper GI bleeding in 113(18.5%). Endoscopic findings in decreasing frequencies were a decrease number of folds, scalloping/bald duodenal folds in 146 (23.5%), normal endoscopy in 141 (22.5%) and Gastritis in 120 (19.5%) were major findings. Positive findings were noted in 478 (77%) patients and 141 (23%) had normal endoscopy findings. Endoscopic Variceal Band Ligation was main therapeutic intervention 90 (14%) followed by foreign body removal in 23(3.5%). Complications of prolonged sedation in 3 patients and post-general anesthesia fever were documented in 4 patients.

**Conclusion:** Malabsorption syndrome was most common indication followed by Upper GI bleed, epigastric pain and vomiting. Decreased duodenal folds with scalloping and gastritis were most common findings found in this study. Banding for esophageal varices was main intervention and no significant complication was found. It was concluded that pediatric upper GI endoscopy is safe and effective and can be performed across wide age range. (is very important in diagnosis and has important role in therapeutic intervention of various gastrointestinal diseases thus highlighting the importance of early referral among general pediatrician) 1 pediatricians and general practitioners about the diagnostic and therapeutic role of this procedure.

**Key Words:** Upper GI endoscopy, Children, Malabsorption, Banding

#### Introduction

Gastrointestinal endoscopies are standard care for the diagnostic and therapeutic procedures for pediatric gastrointestinal diseases in developed countries. However, in developing countries, Pediatric Gastroenterologists (GI) with endoscopy skills are scarce, and very few institutes are performing Pediatric Gastrointestinal Endoscopies.(1) In 1805, modern gastroenterology pioneer Bozzini used the candle-powered "Lichtleiter" and Hirschowitz introduced a fiberscope in 1958.(2) Pediatric Fiberscope developed in 1969 after the Hopkins rod-lens system that allowed the miniaturization of scope and in 1983, Welch Allyn introduced video-endoscopes.(3)

Ashraf F et al from Karachi, Pakistan published an audit of upper GI, lower GI and ERCPs in children. They reported 1779 upper GI endoscopies were performed in children with high diagnostic yield and negligible complications.(4) International studies also reported the safety and usefulness of upper GI endoscopies in children.(5,6) This modality improves the pathological detection rates by getting mucosal biopsies.(7) The Upper GI endoscopies in children help in the diagnosis of gastrointestinal diseases and it also have therapeutic potential.(8) This modality is underutilized in developing countries due to cost, non-availability and accessibility and only a few studies are previously published about pediatric endoscopies from our country. Keeping all this in view, we aimed to study the cases who underwent upper GI endoscopy at our centers. The study aimed to determine the indications, endoscopic findings, therapeutics interventions, diagnostic yield and complications of Upper GI Endoscopies in children.

## Methodology

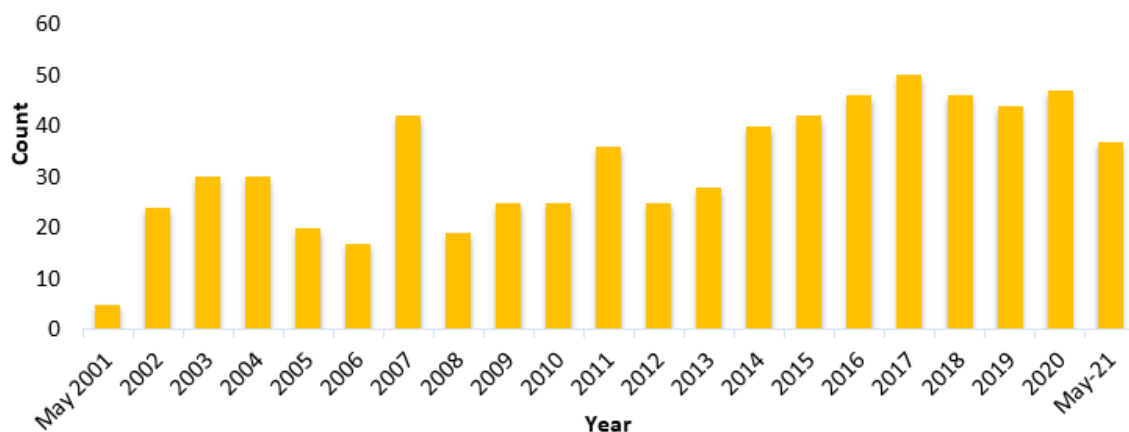
**Study Design:** This was a cross-sectional study and we included all infants, toddlers and adolescents who underwent upper GI endoscopy during the study period. Data was collected retrospectively from Private sector Hospitals at Karachi from May 2001 to May 2021.

**Data collection:** Data was collected from records of the patients. A total of 619 procedures of Upper Gastrointestinal endoscopies were performed during this period. Data including age, gender, type of anesthesia, indications, endoscopic findings, indications, therapeutic indications and complications were recorded.

**Statistical Analysis:** The collected data was analyzed with the Statistical Package for the Social Sciences (SPSS Version 20). Descriptive statistics were used. Numerical data was presented in mean and SD while categorical data was presented in frequencies and percentages.

**Ethical Considerations:** The permission and ethical approval for study were taken from the hospitals.

CHART 1



## Results

In this study, mean age was recorded 7.9 years, ranging from 2 months to 15 years. Majority were >10years of age n=256 (41%), 5-10years were n=181 (29%), 1-5years were n=171 (28%) and <1 year were n=11(2%). Male were predominant 346 (56%) and females were 273 (44%). Before 2013, intravenous sedation and analgesia was used in 326(53%) cases after that all cases were done in general anesthesia 293 (47%). Year wise number of procedures is shown in bar chart 1.

Indications for Upper GI endoscopy are given in table 1

Table 1: Indications for upper GI endoscopy		Frequency (%)
Malabsorption syndrome (pallor, recurrent diarrhoea, short stature & underweight)	194 (31.5%)- Anti- tissue transglutaminase – IgA level raised	Total 254(41%)
	60 (9.5%)- with normal anti- tissue transglutaminase –IgA level	
Upper GI bleeding		113 (18.5%)
Epigastric pain and Vomiting		94 (15%)
Recurrent Vomiting		56(9%)
Recurrent abdominal pain		40(6.5%)
Foreign body ingestion		23(3.5%)
Short Stature (Anti- tissue transglutaminase –IgA level raised)		19 (3%)
Caustic ingestion		9(1.5%)
Refractory iron deficiency anemia		6 (1%)
Recurrent Diarrhea, edema, ascites and hypoalbuminemia		5 (1%)

Endoscopic findings in decreasing frequencies were decreased number of folds, scalloping/bald duodenal folds in 146 (23.5%), normal endoscopy in 141 (22.5%), Gastritis in 120 (19.5%), Gastritis with Antral Nodularity 63 (10%), Esophageal Varices 90 (14%), Esophagitis 42 (6.7%), Duodenitis 32 (5%), Lax GE- Junction in 28 (4.5%), Foreign body impaction 23(3.5%): out of these the button battery ingestion were 12, pin ingestions were 5, piece of toy were 4 and magnet were 2 in number, Hiatus Hernia 16(2.5%), Esophageal stricture 15 (2.5%), Duodenal nodularity 14 (2.3%), Starry sky appearance of duodenal mucosa (white lacteals/spots) 5 (0.8%), Peptic Ulcer 4 (0.6%), Gastric Polyp with severe Gastritis in 1 (0.2%), Duodenal polyp in 1 (0.2%) and Gastric Outlet Obstruction in 1 (0.2%) was found. More than one finding was present in 75 (12%) of patients. Positive findings were noted in 478 (77%) patients and 141 (23%) had normal endoscopy findings. The therapeutic intervention was done in 128 (20%) patients including banding in 90 (14%), foreign body removal in 23(3.5%) and esophageal stricture dilatation in 15(2.5%). Complications of prolonged sedation in 3 patients and post-general anesthesia fever were documented in 4 patients. No other complication was found.

## Discussion

Our study focused on upper gastrointestinal (GI) endoscopies in children at a private sector hospital in Karachi, Pakistan, identifying malabsorption syndrome as the most common indication, followed by upper GI bleeding, and epigastric pain and vomiting. The findings were dominated by decreased duodenal folds with scalloping and gastritis. Our study concluded that pediatric upper GI endoscopy is both safe and effective, highlighting the need for increased awareness among pediatricians about its diagnostic and therapeutic roles.

Comparing our findings with other studies, several similarities and differences emerge. Jalpa Devi et al. reported that in a tertiary care hospital in Hyderabad/Jamshoro, upper GI bleeding was the most common indication for endoscopy (33.2%), followed by dysphagia (21.6%).(9) This differs from our findings where malabsorption syndrome was the most frequent indication. This study was done on adult population. Their study also found esophageal varices (32.2%) as the most common endoscopic finding, contrasting with our findings where decreased duodenal folds and gastritis were more prevalent (9).

Ashraf et al. conducted a comprehensive study over fifteen years in a tertiary care hospital in Karachi, involving 1,779 pediatric upper GI endoscopies.(4) They identified epigastric pain (29.7%) and hematemesis (15.7%) as the primary indications, which align closely with the indications in our study, albeit with a higher prevalence of epigastric pain in their cohort. Their endoscopic findings were dominated by gastritis/ulcers (21.4%) and celiac disease (11%),(4) which partially aligns with our finding of gastritis but not with the prominence of duodenal folds.

Kamran et al. in a rural Sindh population found that epigastric pain was the primary indication for upper GI endoscopy (62.6%), and one-third of the procedures did not report any pathological finding.(10) This is consistent with our finding of epigastric pain as a common indication but differs in the higher proportion of normal findings in their study. Esophageal varices and gastritis were significant findings in their study, similar to our results but with differing prevalence.(10)

Mazumder et al. at Bangabandhu Sheikh Mujib Medical University (BSMMU) reported a high frequency of upper GI endoscopy in older children (>10 years), consistent with our demographic findings.(2) They reported GI bleeding as the most common indication (41%) and esophageal varices as the most common endoscopic finding (49%).(2) This is somewhat aligned with our study where upper GI bleeding was a significant indication but differs in the endoscopic findings hierarchy.

Khan et al. from Aga Khan University Hospital observed failure to thrive with suspected celiac disease as the most common indication (31%) and found gastritis to be the most common abnormal endoscopic finding (14.5%).(11) Their study aligns with our findings in terms of the age group distribution and the significant role of gastritis but differs in the primary indication being celiac disease-related.(11)

Gadgade et al. in Karnataka, India, found hematemesis (25.3%) and foreign body removal (22.5%) as common indications, with foreign body removal being a significant therapeutic intervention.(12) Their study is consistent with ours in terms of therapeutic interventions but differs in the indication priorities.

Kumo et al. in Nigeria reported upper abdominal pain (47.7%) and dyspepsia (19.8%) as major indications, with gastritis being the most common finding (22.1%).(8) This aligns partially with our findings of gastritis being significant but differs in prevalence of upper abdominal pain as the indication. Lesi et al. conducted a study at the Lagos University Teaching Hospital in Nigeria, where recurrent abdominal

pain (52.1%) and upper GI bleeding (23.9%) were the leading indications for upper GI endoscopy.(13) Their study identified gastritis (26.8%) as the most common endoscopic finding, which aligns with our findings, although the prevalence of hiatus hernia (18.3%) and gastric erosions (16.9%) in their study differs from our findings.(13)

Kefa conducted a study at Kenyatta National Hospital and Gertrude's Children's Hospital in Nairobi, Kenya, documenting upper GI bleeding and dysphagia as main indications at Kenyatta, and abdominal pain and emesis at Gertrude's.(14) The study found gastritis and esophagitis as common gastroscopic findings, with therapeutic procedures including banding for esophageal varices and foreign body removal.(14) This aligns with our findings on the role of gastritis but highlights the regional variation in indications and therapeutic needs.

Arslan et al. analyzed the indications and findings of upper GI endoscopy over several years, noting epigastric pain and abdominal pain as the most common indications, with antral gastritis being the most frequently detected endoscopic finding.(15) This study underscores the significance of gastritis as a common finding, resonating with our results.(15)

Mahmud et al. reported recurrent abdominal pain (34.7%) and hematemesis ± melena (25.8%) as the most common indications for pediatric upper GI endoscopy in Bangladesh, with gastritis (26.9%) being the most common finding.(16) Their findings are consistent with our study, emphasizing recurrent abdominal pain and gastritis as significant clinical issues.(16)

These comparisons highlight both regional consistencies and variances in the indications and findings of pediatric upper GI endoscopy. Our study underscores the significance of malabsorption syndrome and highlights the need for tailored approaches in pediatric gastroenterology based on regional disease prevalence and presentation patterns.

## Conclusion

Malabsorption syndrome was most common indication followed by Upper GI bleed, epigastric pain and vomiting. Decreased duodenal folds with scalloping and gastritis were most common findings found in this study. Banding for esophageal varices was main intervention and no significant complication was found. It was concluded that pediatric upper GI endoscopy is safe and effective and can be performed across wide age range. Therapeutic procedures are also effective and safe. In developing countries, there is need of awareness amongst general pediatricians and general practitioners about diagnostic and therapeutic role of this procedure.

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