

UPPER GASTROINTESTINAL ENDOSCOPY IN CHILDREN

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ABSTRACT

The purpose of this paper is to study the use of upper gastrointestinal (GI) fiberoptic endoscopy in children. Two hundred consecutive patients referred to one of the authors were reviewed.

The indications for performing upper gastrointestinal endoscopy in these 200 patients were: (1) recurrent abdominal pain (46.5%), (2) persistent vomiting (14.5%), (3) haematemesis (14.5%), (4) acute abdominal pain (13%) and (5) other indications such as foreign body removal, failure to thrive and unexplained chest pain (11.5%). The endoscopy was performed with the Olympus P3 or Olympus XP-10 gastroscopes. The sedation used was a combination of intravenous pethidine (2mg/kg) and diazepam (0.5 mg/kg). Among the patients with recurrent abdominal pain, upper GI endoscopy showed duodenal ulcer in 7 patients (7.5%), duodenitis in 4 (4.3%), oesophagitis in 4 (4.3%) and gastric ulcer in 2 (2.2%). The rest of the patients were normal (81.7%). With regard to persistent vomiting, 37.9% of the patients showed gastroesophageal reflux and 6.9% had a hiatus hernia.

Of 29 patients examined endoscopically for upper GI bleeding, no focus of bleeding was identified in 27.6%. The remaining 72.4% were bleeding from acute gastric erosion (27.6%), oesophagitis (17.2%), oesophageal varices (13.8%), duodenal ulcer (10.3%) and Mallory-Weiss tear (3.5%).

The Majority of the patients with acute abdominal pain were normal endoscopically (61.5%). The two common abnormal findings were acute gastritis (27.0%) and acute duodenitis (11.5%).

No major complications were encountered during the procedure in these 200 patients. It was concluded that upper GI endoscopy is useful for defining upper GI mucosal pathology. The procedure can be performed safely in children under sedation.

Keywords: Upper gastrointestinal endoscopy, children

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INTRODUCTION

The use of fiberoptic technology in medical instruments has made gastrointestinal and other endoscopy a routine diagnostic and therapeutic tool. More recently, this has been increasingly applied to paediatric patients (1). Upper gastrointestinal (GI) fiberoptic endoscopy is now an accepted and well established modality in the work-up of paediatric patients presenting with a variety of upper

gastrointestinal complaints. These include acute and recurrent abdominal pain, upper GI bleeding, persistent vomiting, suspicion of portal hypertension, identification of mass lesions and gastric ulcers, retrosternal pain and following caustic ingestion. Therapeutically, upper GI endoscopy can be used for the removal of foreign body, securing hemostasis in upper GI bleeding, dilatation of oesophageal stricture and polypectomy (2).

We are not aware of any report on paediatric upper gastrointestinal endoscopy locally. The purpose of this paper is to review the indications and results of upper GI fiberoptic endoscopy in 200 consecutive paediatric patients referred to one of the authors (QSH) in Singapore.

MATERIALS AND METHODS

A retrospective study on 200 consecutive paediatric patients who underwent upper GI endoscopy was carried out. These patients were referred to one of the authors and the indications for performing the upper GI endoscopy are given in Table I. A total of 231 procedures were performed in these 200 patients. The age of these patients ranged from one month to 15 years (mean age 7.8 years).

Written consent was obtained and the patients were fasted for a minimum of 4 to 6 hours prior to the procedure. All the endoscopies were performed under intravenous sedation using a combination of pethidine (2mg/kg) and diazepam (0.5mg/kg) given into an

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indwelling intravenous needle. A heparinised saline flush was given immediately after intravenous diazepam to alleviate the discomfort caused by local irritation. The rapid effect of the intravenous medications allowed the endoscopy to be performed shortly after their administration.

Endoscopy was performed with the patient in the left lateral position using the Olympus P3 or Olympus XP-10 gastroscopes. These long forward-viewing instruments with 4-way tip manoeuvrability (panendoscopes) allow a good direct view of the entire upper gastrointestinal tract (oesophago-gastro-duodenoscopy). The gastroscope was passed through a mouth-guard and systematic examination of the whole length of the oesophagus, the entire stomach and the upper duodenum was carried out. Where relevant, mucosal biopsies or therapeutic procedures (eg. foreign body removal) were performed.

Following the procedure, the patients were observed in the ward. Drinks and soft diet were allowed when recovery from the sedation was complete.

Utilizing the above protocol, upper GI endoscopy was performed without any major complications among the 200 children, except for sore throat which occurred in 25% of the children and all the sore throat subsided within 48 hours after the endoscopy.

RESULTS

Table I shows the indications for the upper gastrointestinal endoscopy. Close to half of the patients (46.5%) underwent the procedure for recurrent abdominal pain. The majority of the remainder comprised 3 nearly equal groups with persistent vomiting, haematemesis and acute abdominal pain as the main presenting complaints. A

Table I
Indications for Upper Gastrointestinal Endoscopy

	No.	%
Recurrent abdominal pain	93	46.5
Persistent vomiting	29	14.5
Haematemesis	29	14.5
Acute abdominal pain	26	13.0
Others – Foreign body	6	3.0
– Failure to thrive	5	2.5
– Unexplained splenomegaly	4	2.0
– Chest pain	4	2.0
– Lymphangiectasia	3	1.5
– Dysphagia	1	0.5
Total	200	100.0

miscellaneous group had the endoscopy because of foreign body ingestion, failure to thrive, chest pain, unexplained splenomegaly, lymphangiectasia and dysphagia. These indications were quite similar to those reported by Ament and Christie (3).

The majority (81.7%) of the patients with recurrent abdominal pain had normal endoscopic findings (Table II). These were later found to have lactose intolerance, food protein allergy, irritable bowel, psychogenic causes

Table II
Endoscopic Findings for Recurrent Abdominal Pain

Endoscopic findings	No.	%
Duodenal ulcer	7	7.5
Duodenitis	4	4.3
Oesophagitis	4	4.3
Gastric ulcer	2	2.2
Normal findings	76	81.7
Total	93	100.0

mean age = 9.0 years (SD = 3.7 years)

male : female = 1:1.1

or no obvious cause for the pain. Duodenal ulcer was found in 7.5%, duodenitis and oesophagitis in 4.3% each and gastric ulcer in 2.2% of these patients. This group also comprised the oldest patients in the study population with a mean age of 9 years and there were about equal numbers of males and females (M:F 1:1.07).

Pathological findings were identified in 44.8% of the patients with persistent vomiting: 37.9% had

Table III
Endoscopic Findings for Persistent Vomiting

Endoscopic findings	No.	%
Gastroesophageal reflux	11	37.9
Hiatus hernia	2	6.9
Normal findings	16	55.2
Total	29	100.0

mean age = 4.7 years (SD = 3.6 years)

male : female = 16:13

Table IV
Endoscopic Findings for Upper Gastrointestinal Bleeding

Endoscopic findings	No.	%
Acute gastric erosion	8	27.6
Oesophagitis	5	17.2
Oesophageal varices	4	13.8
Duodenal ulcer	3	10.3
Mallory-Weiss Tear	1	3.5
Normal findings	8	27.6
Total	29	100.0

mean age = 6.6 years (SD = 4.5 years)

male : female = 21:8

gastroesophageal reflux and 6.9% had hiatus hernia (Table III). This group was younger than those with recurrent abdominal pain, with a mean age of 4.7 years.

Nearly three-quarters of patients presenting with upper gastrointestinal bleeding had abnormal endoscopy findings (Table IV). Acute gastric erosion was the commonest cause (27.6%) followed by oesophagitis (17.2%), oesophageal varices (13.8%) and duodenal ulcer (10.3%). Mallory-Weiss syndrome was an uncommon finding (3.5%). There was an unexplained male predominance in this particular group with nearly three times as many boys as girls.

Acute inflammatory lesions (gastritis and duodenitis) were detected in 38.5% of patients presenting with acute

is often believed to be psychogenic. Here, we have found a definite mucosal pathology in 18.3% taking the form of either duodenal or gastric ulcer, duodenitis or oesophagitis. The incidence of positive findings in this study is somewhat lower than that of Ament et al (3) who found a source for the abdominal pain in one-third of their patients. Although the majority (81.7%) were normal endoscopically, the diagnostic value of the procedure remains, allowing appropriate therapy to be carried out. Follow-up endoscopies also permit the progress or improvement of the lesions to be sequentially studied and recorded.

For acute abdominal pain, positive endoscopic findings of acute gastritis or duodenitis were more frequently encountered (38.5%). The usefulness of endoscopy in the diagnosis of these acute inflammatory lesions is obvious as radiologic procedures and other investigations are unlikely to reveal the cause. Although campylobacter had been implicated for the gastritis in other studies, we were not able to identify the organism histologically in our cases (5-8). Culture for campylobacter was not done in this study.

Endoscopy in patients with persistent vomiting was also more revealing with pathological findings in 44.8%. The commonest cause was gastroesophageal reflux (37.9%) while a hiatus hernia was seen in 6.9%.

Upper gastrointestinal bleeding proved to be another problem where the procedure was especially valuable. Negative findings were found in only 27.6%. The other 72.4% comprised acute gastric erosion, oesophagitis, oesophageal varices, duodenal ulcer and Mallory-Weiss tear. The definitive diagnosis obtained permitted appropriate therapy to be rapidly instituted. The therapeutic use of endoscopy was also demonstrated for bleeding esophageal varices where endoscopic sclerotherapy was found to be effective in the management of this disorder (8). Of the 4 patients with oesophageal varices, 2 had successful emergency sclerotherapy to stop the bleeding. However, all 4 patients needed repeated sclerotherapy before the varices were obliterated.

Endoscopic removal of foreign bodies was performed in 6 patients. Although the majority of ingested foreign bodies are passed spontaneously, serious complications including abrasion, retention, penetration, perforation, hemorrhage, abscess formation and migration can occur (9). The use of endoscopic removal in selected instances has obviated the need for open surgical removal, with its attendant hazards as well as those of general anaesthesia.

For intestinal lymphangiectasia, diagnosed in 3 of our patients, the major advantage of endoscopy is the ability to take biopsies selectively from abnormal looking areas as the pathology is often patchy in occurrence. Riemann and Schmidt (10) reported fairly characteristic whitish tips of the villi on endoscopic viewing. The chief limitation is the inability to obtain biopsy under direct vision beyond the fourth part of the duodenum. Failure of blind small bowel biopsy in the diagnosis of intestinal lymphangiectasia has been reported (12), and this underscores the importance of biopsy under direct vision.

In summary, upper gastrointestinal fiberoptic endoscopy has proved to be a useful means for the detection of upper GI mucosal pathologies in paediatric patients. Its relative safety has allowed it to be included in the diagnostic work-up of patients with selected upper

Table V
Endoscopic Findings for Acute Abdominal Pain

Endoscopic findings	No.	%
Acute gastritis	7	27.0
Acute duodenitis	3	11.5
Normal findings	16	61.5
Total	26	100.0

mean age = 7.8 years (SD = 3.2 years)

male : female = 1:1.2

abdominal pain, with 61.5% having normal findings (Table V). This group also was of a relatively older age (mean 7.8 years).

Table VI shows the miscellaneous group. While endoscopy was unrevealing in those patients with failure to thrive (from occult causes), unexplained splenomegaly and chest pain, it was nevertheless therapeutic for all 6 children with an ingested foreign body and provided definitive diagnostic confirmation for the 3 cases with intestinal lymphangiectasia.

Table VI
Endoscopic Findings for Other Indications

Indications	"Endoscopic Findings"
Foreign body (6)	Foreign body removed (6)
Failure to thrive (5)	Normal (5)
Unexplained splenomegaly (4)	Normal (4)
Chest pain (3)	Normal (3)
Lymphangiectasia (3)	Biopsies (3)
Dysphagia (1)	Achalasia (1)

DISCUSSION

The commonest indication for upper gastrointestinal endoscopy in this study was recurrent abdominal pain. This is a very common symptom in paediatric patients occurring in up to 10% of children. Apley (4) has termed this "recurrent abdominal pain of children" and the cause

gastrointestinal symptoms, being especially effective in the localization of the source of upper GI bleeding as shown in our series where a cause can be found in three quarters of patients presenting with upper GI bleeding. Its scope has been extended from diagnostic to therapeutic as well, in securing hemostasis in upper

GI hemorrhage and in the removal of foreign bodies.

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