

Short communication

Paediatric gastrointestinal endoscopy: experience in a Sudanese university hospital

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التنظير الهضمي عند الأطفال: خبرة مستشفى جامعي في السودان

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الخلاصة: استقصى الباحثون دواعي ونتائج التنظير الهضمي لجميع الأطفال دون عمر 16 سنة، ممن حولوا إلى وحدة التنظير في مستشفى سوبا الجامعي في الخرطوم خلال الفترة بين كانون الثاني/يناير 2004 وكانون الثاني/يناير 2006. وقد شملت الدراسة 113 طفلاً، أُجري لـ 73٪ منهم تنظيراً هضمياً علوياً ولـ 27٪ تنظيراً هضمياً سفلياً (15٪ تنظير القولون و12٪ تنظير السيني بالمنظار المرئي). وكانت دواعي التنظير الهضمي العلوي إقياء الدم في 24٪ وارتفاع الضغط الباطني في 21٪ والألم البطني في 16٪ والإقياء في 15٪. وكان التشخيص يشمل دوالي المريء في 16٪ والتهاب المعدة في 7٪ والفتق الحجابي في 6٪. أما دواعي التنظير الهضمي السفلي فشملت النزف من المستقيم في 87٪ من الحالات والإسهالات في 19٪ منها وفقر الدم في 10٪.

ABSTRACT We investigated the indications for and findings of gastrointestinal (GI) endoscopy in all children \leq 16 years old referred for the procedure to the endoscopy unit at Soba University Hospital, Khartoum from January 2004 to January 2006. Thus 113 children were enrolled; 73% underwent upper GI endoscopy, 27% lower GI endoscopy (15% colonoscopy, 12% flexible sigmoidoscopy). Indications for upper GI endoscopy included haematemesis (24%), portal hypertension (21%), abdominal pain (16%) and vomiting (15%). Diagnoses included oesophageal varices (16%), gastritis (7%) and hiatus hernia (6%). Indications for lower GI endoscopy included rectal bleeding (87%), diarrhoea (19%) and anaemia (10%).

Endoscopie gastro-intestinale en pédiatrie : l'expérience d'un hôpital universitaire soudanais

RÉSUMÉ Nous avons étudié les indications et les résultats de l'endoscopie gastro-intestinale chez tous les enfants de 16 ans ou moins orientés pour cet examen vers le service d'endoscopie de l'hôpital universitaire Soba de Khartoum, entre janvier 2004 et janvier 2006. Au total, 113 enfants ont été recrutés ; 73 % ont subi une endoscopie digestive haute et 27 % une endoscopie digestive basse (15 % une coloscopie et 12 % une rectosigmoïdoscopie flexible). Les indications de l'endoscopie digestive haute étaient l'hématémèse (24 %), l'hypertension portale (21 %), les douleurs abdominales (16 %) et les vomissements (15 %). Parmi les diagnostics figuraient les varices œsophagiennes (16 %), la gastrite (7 %) et la hernie hiatale (6 %). Les indications de l'endoscopie digestive basse étaient les saignements rectaux (87 %), la diarrhée (19 %) et l'anémie (10 %).

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Introduction

Since the advent of flexible gastrointestinal (GI) endoscopy in the 1970s and the subsequent development of smaller instruments in the 1990s, diagnostic and therapeutic paediatric endoscopic procedures are now standard care [1].

Gastrointestinal endoscopy is now a recognized major diagnostic tool in children. Knowledge of the pattern of gastrointestinal disorders detected by endoscopy is lacking in Sudan. In addition, there are very few studies on paediatric GI endoscopy in African children. One study from Uganda on upper GI endoscopy in adolescents with an age range of 11–18 years (mean age 16 years) concluded that upper GI endoscopy was a useful diagnostic tool in children and that gastritis and duodenal ulcer must be included in the differential diagnosis of upper GI pathology in symptomatic children [2].

This study was conducted to determine the indications, diagnoses and safety of upper and lower GI endoscopy in Sudanese children.

Methods

We conducted a prospective, descriptive, hospital-based study in a single endoscopy centre at Soba University Hospital in Khartoum, Sudan from January 2004 to January 2006. Soba University Hospital is a tertiary referral hospital in Khartoum, and its endoscopy unit is one of only 2 units in the country providing both diagnostic and therapeutic upper and lower GI endoscopy and endoscopic retrograde cholangiopancreatography services to both adult and paediatric population from all over the country.

All children ≤ 16 years old referred for diagnostic or therapeutic upper or lower GI endoscopy were enrolled in the study after

a brief interview with both parents and the child to explain the procedure and complete a questionnaire with basic demographic data. Indications for the procedure and endoscopic findings were recorded.

Children having upper GI endoscopy were requested to fast overnight and the procedure was performed the following morning. Children having lower GI endoscopy were required to take clear fluids one day before the procedure and they were also required to take 2 sachets each containing 59 g polyethylene glycol, an iso-osmotic bowel cleansing agent. Each sachet was dissolved in 1 L of water before being drunk by the child over 24 hours.

There are no dedicated paediatric GI endoscopists in Sudan and the procedure was performed by fully trained adult GI endoscopists. Olympus GIF XQ 240 video gastroscope and Olympus Q 240 CL video colonoscope (Olympus Inc., Tokyo, Japan) were used to perform the procedures. All procedures were done on an outpatient basis except when general anaesthesia was required. At least 2 endoscopy nurses were present in the endoscopy room to assist with the procedure. This was usually performed after insertion of a reliable venous access, with monitoring of vital signs and oxygen saturation. Sedation was either in the form of local lignocaine spray 2%, or conscious sedation with intravenous diazepam in a dose of 0.3 mg/kg body weight. For children undergoing colonoscopy for removal of colonic polyps, the procedure was always performed under general anaesthesia after obtaining consent from the parents.

The study was approved by the ethical committee at Soba University Hospital and children were only enrolled in the study after obtaining the informed consent of the parents.

Results

A total of 113 children \leq 16 years presented for endoscopy over the study period and were included in the study. Of these 82 (73%) attended for upper GI endoscopy, which constituted 2.5% of all patients attending for diagnostic/therapeutic upper GI endoscopy during the study period. Mean age of the children was 10 (standard deviation 4.39) years, range 14 months to 16 years; 76% of the children were aged 6–16 years. A total of 54% were male. Conscious intravenous sedation was used in 99% of cases and local lignocaine spray in 1%.

The commonest indications for upper GI endoscopy were haematemesis, 24% of cases, portal hypertension, 21%, abdominal pain, 16% and vomiting, 15%, (Table 1).

Endoscopic diagnoses included normal endoscopy, 49% of cases, oesophageal varices, 16%, gastritis/gastric erosions, 7%, hiatus hernia, 6%, duodenal ulceration, 5% and other, 15% (Table 2).

A biopsy or a therapeutic procedure was performed in 39% of children undergoing upper GI endoscopy: small bowel biopsy in 21%, oesophageal dilatation in 8.5%, endoscopic variceal sclerotherapy in 8.5% and foreign body retrieval in 1%.

Table 1 Indications for children attending for upper gastrointestinal endoscopy (n = 82)

Indication ^a	No.	%
Haematemesis	20	24
Portal hypertension	17	21
Abdominal pain	13	16
Vomiting	12	15
Small bowel biopsy	7	9
Anaemia	5	6
Dysphagia	5	6
Foreign body	2	2
Other ^b	15	18

^aSome children had more than one indication.

^bOther indications included diarrhoea, heartburn, ascites and splenomegaly.

Table 2 Findings in the children undergoing upper gastrointestinal endoscopy (n = 82)

Finding ^a	No.	%
Normal	40	49
Oesophageal varices	13	16
Gastritis/gastric erosions	6	7
Hiatus hernia	5	6
Duodenal ulcer	4	5
Peptic oesophageal stricture	4	5
Corrosive oesophageal stricture	2	2
Other ^b	12	15

^aSome children had more than one finding.

^bOther findings included abnormal gastric mucosa, oesophagitis, achalasia, gastric varices.

A total of 31 (27%) children attended for lower GI endoscopy (15% underwent colonoscopy and 12% flexible sigmoidoscopy). This represented 3.6% of all patients attending for diagnostic/therapeutic lower GI endoscopy during the study period. Mean age was 8 (standard deviation 4.04; range 2–16) years; 68% were between the ages of 6 and 16 years and 48% were males.

The procedure was done under conscious intravenous sedation in 74% of cases and under general anaesthesia in 26%; these were usually children undergoing a colonoscopy for removal of colonic polyps. Caecal intubation was achieved in all children undergoing a colonoscopy.

Indications for lower GI endoscopy included rectal bleeding in 87% of cases, diarrhoea in 19%, anaemia in 10%, abdominal mass in 3% and other in 9% of cases (Table 3). Diagnoses included colonic polyps in 45% (half of them were multiple), inflammatory bowel disease in 19%, normal endoscopy in 16% (Table 4). A biopsy or a therapeutic procedure was performed in 81% of cases; 42% had a colonic biopsy and 39% had a polypectomy. No complications were reported in this study.

Discussion

The majority of children underwent upper GI endoscopy, the most frequent procedure performed in children, with a male:female ratio of 1.2:1. This differs from studies in Saudi Arabia [3] where the ratio was 0.7:1. The majority of procedures (99%) were done under conscious sedation unlike the experience in Brazil [4] where 80% were done under general anaesthesia or Jordan [5] where no sedation was used in those under 12 years of age. The greatest proportion of children undergoing upper GI endoscopy presented with haematemesis (24%), compared to only 6% in Jordan [5]. In addition 21% of the children had portal hypertension secondary to hepatosplenic schistosomiasis, which is endemic in central Sudan [6]. This is also reflected in the number of those found to have oesophageal varices (16%) and in the number of those needing endoscopic oesophageal sclerotherapy (8.5%). Only 9% of the children were referred for small bowel biopsy, a figure much lower than that in Jordan (46%) [5] and Saudi Arabia (29%) [3], reflecting perhaps that endoscopy is under-used in the diagnosis of malabsorption in Sudanese children.

In 49% of the children undergoing upper GI endoscopy the findings were normal, which is similar to studies in the United

Table 4 Findings in children undergoing lower gastrointestinal endoscopy (n = 31)

Finding ^a	No.	% of patients)
Polyps	14	45
Inflammatory bowel disease	6	19
Normal	5	16
Rectal ulcer	1	3
Tumour	1	3
Other ^b	4	14

^aSome children had more than one finding.

^bOther findings included telangiectasia and abnormal colonic mucosa.

States of America (USA) (44%) [7], Brazil (42%) [4] and Jordan (38%) [5]. Gastritis was found in 7% of cases, much lower than figures reported from Saudi Arabia [3] (32%), and duodenal ulceration was found in 5% of the study group, similar to reports from Brazil (4%) [4] and Jordan (5.5%) [5]. Unfortunately testing for *Helicobacter pylori* infection is not routinely performed in Sudan and thus we could not define its role in the children with gastritis or duodenal ulceration in our sample. Endoscopy was indicated following foreign body ingestion in 2% of the children, this is similar to studies from the USA [7]. No complications were reported in our study, unlike the experience in Jordan, where respiratory depression was reported in some children [5], explaining perhaps their policy of not using intravenous sedation in children under 12 years.

Lower GI endoscopy constituted 3.6% of all lower GI procedures performed in the unit during the period of the study, slightly more than reported from Kuwait (2.9%) [8]. Rectal bleeding was the commonest indication for lower GI endoscopy (87%), a figure higher than that reported from Kuwait (60%) [8] and the USA (31%) [7]. This may explain the high yield of lower GI endoscopy in this study (84%) compared

Table 3 Indications in children undergoing lower gastrointestinal endoscopy, (n = 31)

Indication ^a	No.	% of patients
Rectal bleeding	27	87
Diarrhoea	6	19
Anaemia	3	10
Abdominal mass	1	3
Other ^b	3	10

^aSome children had more than one indication.

^bOther indications included chronic constipation and abdominal pain.

to the USA (59%) [7] and Kuwait (58%) [8]. The commonest diagnosis was colonic polyps in 45% of cases, in agreement with the high number of those presenting with rectal bleeding. This is higher than reported from Kuwait [8] and the USA [7] (polyps found in 26% and 11% of cases respectively). Inflammatory bowel disease was diagnosed in 19% and rectal ulcer in 3% of the children in our study, which is similar to Kuwaiti children [8] with figures of 22% and 4.4% respectively. One 14-year-old girl had colorectal cancer; she had no associated colonic polyps or family history of colorectal cancer. No cases of colorectal cancer were reported from Kuwait [8] and the USA [7]. No complications were reported in our study, while complications such as bleeding

and perforation have been reported in other studies on children [9,10].

Conclusion

This is one of the few studies on paediatric GI endoscopy in our region. It provides useful data on the frequency of, indications for and findings from this procedure in a sample of Sudanese children.

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References

1. Haight M, Thomas DW. Pediatric gastrointestinal endoscopy. *Gastroenterologist*, 1995, 3(3):181–6.
2. Okello TR. Upper gastrointestinal endoscopic findings in adolescents at Lacor Hospital, Uganda. *African health sciences*, 2006, 6(1):39–42.
3. El-Mouzan MI et al. Indications and yield of upper gastrointestinal endoscopy in children. *Saudi medical journal*, 2004, 25(9):1223–5.
4. Ferreira CT et al. Endoscopia digestiva alta em pediatria: indicações e resultados [Upper gastrointestinal endoscopy in children: indications and results]. *Jornal de pediatria*, 1998, 74(1):39–44.
5. Rawashdeh MO, Abu-Farkash N, Al-Jaberi TM. Paediatric upper gastrointestinal endoscopy in developing countries. *Annals of tropical paediatrics*, 1996, 16(4):314–6.
6. Saad AM et al. Oesophageal varices in a region of the Sudan endemic for *Schistosoma mansoni*. *British journal of surgery*, 1991, 78(10):1252–3.
7. Gilger MA, Gold BD. Pediatric endoscopy: new information from the PEDS-CORI project. *Current gastroenterology reports*, 2005, 7(3):234–9.
8. Kalaoui M et al. Findings of colonoscopy in children: experience from Kuwait. *Journal of tropical pediatrics*, 1998, 44(6):371–5.
9. Williams CB et al. Total colonoscopy in children. *Archives of disease in childhood*, 1982, 57(1):49–53.
10. Kumar N et al. Colonoscopic polypectomy, north Indian experience. *Journal of the Association of Physicians of India*, 1990, 38(4):272–4.