Personal practice

Routine colonoscopy service

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SUMMARY We report our experience of 50 paediatric colonoscopies in a relatively unselected group of patients. Collaboration between an experienced colonoscopist and a paediatrician has provided a smooth, routine service and the examination has proved extremely useful for the diagnosis and management of children with colonic symptoms.

Colonoscopy is now a well established and widely used technique in adults^{1 2} but the few reports from the United Kingdom on its use in infants and children are from specialist referral centres.^{3 4} The examination is perhaps used more frequently outside the United Kingdom.^{5 6}

We report our experience of 50 paediatric colonoscopies and show the importance of collaboration between an experienced colonoscopist dealing with adults and a paediatric investigation unit. This cooperation has allowed the more ready use of an investigation which has become a smooth, routine procedure.

The differences between colonoscopy in adults and in children are discussed in the hope that this will help endoscopists called upon by their paediatrician colleagues to perform the occasional examination. The patients described are relatively unselected in that most were referred not to a regional paediatric gastroenterology service but to a general paediatrician with an interest in gastroenterology (JML). The gastroenterology problems are those arising in a busy teaching hospital providing general paediatric services for a population of 350 000. We have been impressed with the usefulness of this investigation in the diagnosis and management of children with colonic symptoms.

Preparation of children for colonoscopy

The patients are admitted to the paediatric ward in the evening two days before or early on the day before the colonoscopy. All are given a liquid (clear fluid) diet from the time of admission.

Young children. Children aged less than 5 years are

given liquid Sennokot (15 ml for infants, increasing to 60 ml for older children) 18 hours before the procedure. The evening before oral diazepam (5 or 10 mg) is given, followed approximately one hour later by a rectal washout with isotonic saline. At 6 am on the morning of the colonoscopy a second dose of diazepam (5 or 10 mg) is given followed at 7 am by a second rectal washout with normal saline.

Older children. Children aged 5 years and older are prepared using sodium picosulphate and magnesium citrate (Picolax). One sachet is given to older children weighing over 20 kg and half a sachet to those weighing less at 8 am on the day before the colonoscopy. The Picolax must be drunk quickly, soon after mixing, as recommended by the manufacturers; the dose is repeated at 4 pm. This preparation produces watery diarrhoea and no rectal washouts are required. No premedication is necessary in older patients unless they are unduly anxious, in which case oral diazepam (5 to 10 mg) is given the previous evening and one hour before the colonoscopy.

Colonoscopy procedure

The examination is performed in the investigation unit adjacent to the paediatric ward and begins at 8.15 am. The paediatric investigation nurse has been trained in the adult endoscopy unit. Radiological screening is not available and has not been necessary because of the presence of an experienced colonoscopist. Two types of colonoscope have been used, an Olympus adult colonoscope (either the LB3R or CF1TL) and the Olympus PCF paediatric colonoscope—the latter is now being used routinely.

The colonoscopy is carried out under intravenous sedation with pethidine and Diazemuls (a water soluble preparation of diazepam) and sedation is supervised by the paediatrician. A small intravenous cannula is inserted and remains in situ during the colonoscopy. Intravenous pethidine (2 mg/kg body weight, maximum 75 mg) is given, followed by a slow injection of Diazemuls (approximately 10 to 20 mg) until adequate sedation is achieved. Facilities for resuscitation must be available. The effect of the pethidine is reversed after the procedure with intravenous naloxone (0.4 mg), given before the cannula is removed.

The colonoscopy is carried out with the sedated child in the left lateral position. After digital rectal examination the well lubricated colonoscope can easily be passed into the rectum. The endoscope is advanced in the normal way, often with clockwise rotation and pulling back of the instrument in order to prevent the formation of loops and to keep the lumen in view. As in adults, suction is useful to concertina the bowel over the instrument.

There are a number of differences between examination of the adult and childhood colon. In the child it has proved easier to negotiate the sigmoid and transverse colons without the formation of redundant loops, particularly since the paediatric colonoscope became available. The position of the endoscope is much easier to locate than in adults since the light is often easily visible externally through the abdominal wall. Advancement of the instrument is often improved in adults by external pressure to the abdomen applied by the endoscopy assistant; this has proved even more beneficial in children (particularly pressure applied across the upper abdomen) in preventing the formation of a transverse loop. The internal landmarks, for example liver blueness, are similar in children and adults, as are the various appearances of the ileocaecal valve. It has proved easier to cannulate the valve to inspect the terminal ileum in children. Routine biopsies are taken from all areas of the colon.

Children who have been colonoscoped

Forty patients underwent 50 colonoscopies between March 1978 and October 1983. Only 10 of the examinations were performed before January 1982 and most (40) have been performed since the formation of the team of adult colonoscopist and paediatrician with a regular colonoscopy session.

The 40 patients were aged between 7 months and 16 years. Seven were aged less than 3 years, 10 were between 3 and 6 years, 5 were between 6 and 10 years, and 18 patients were over 10 years. The

children were attending the paediatric clinic of one of the authors (JML) or the adult gastroenterology clinic. The indications for colonoscopy in these children are shown in Table 1.

Comments on the technique of bowel preparation and colonoscopy. Preparation was judged to be inadequate in only six examinations (three in one patient with chronic constipation and cystic fibrosis). This prevented total colonoscopic examination to the caecum in five of the six examinations.

Preparation using Picolax (although said by the manufacturers to be 'not applicable to children') has been excellent. It is tolerated very well by children 5 years and over, avoids the distress of rectal wash-outs, and there has been no clinical evidence of dehydration. Plasma electrolyte concentrations, which were measured in the earlier patients, remained normal.

The whole colon was examined in 36 examinations and the terminal ileum entered on 14 occasions. On three occasions the examination was purely for the removal of sigmoid polyps and this was restricted to the left side of the colon.

Colonoscopic findings. The final diagnoses in these patients are shown in Table 2. Included in the 18 patients who underwent colonoscopy for inflammatory bowel disease was a 7 month old baby with eosinophilic colitis secondary to food allergy, similar to the patients described by Jenkins *et al.*⁷

Polyps were confirmed in all seven patients in whom they were suspected after a preceding examination—either barium enema or short colonoscopy. Six children had single sigmoid polyps, the seventh had an additional one in the distal transverse colon.

There were, therefore, positive findings leading to a definite diagnosis in 29 examinations. In the remaining 21 examinations negative findings were obtained; these were particularly important diagnos-

Table 1 Indications for colonoscopy

Inflammatory bowel disease	
Suspected	7
Known	11
Rectal bleeding	12
Polyps (suspected from barium enema or sigmoidoscopy)	7
Family history of polyposis	5
Others	
Intestinal lymphangiectasia	1
Cystic fibrosis (chronic constipation)	3
Diarrhoea (?) food allergy	2
Diarrhoea (?) cause	1
Recurrent abdominal pain	1
Total	50

Table 2 Final diagnoses

Inflammatory bowel disease	
Inflammatory bowel disease	15
Eosinophilic colitis	1
Normal	1
Granuloma on histology (?) Crohn's disease	1
Total colonoscoped for inflammatory bowel disease	18
Rectal bleeding	
Normal	10
Polyps	2
Total colonoscoped for rectal bleeding	12
Polyps	
Confirmed	7
Polypectomy	(4)
Autopolypectomy	(1)
Total colonoscoped for suspected polyps	7
Family history of polyposis	
Normal	3
Abnormal	2
Total	5
Others	
Intestinal lymphangiectasia	1 (normal)
Cystic fibrosis	1 (3 attempts, normal)
Diarrhoea (?) food allergy	2 (normal)
Diarrhoea (?) cause	1 (normal)
Recurrent abdominal pain	1 (normal)

tically in 10 children with rectal bleeding and three with a history of familial polyposis.

Comments on the use of polypectomy. Recurrent rectal bleeding in four patients necessitated the removal of the polyps at a further colonoscopy. In two children general anaesthesia was used for colonoscopy and polypectomy but in the other two polypectomy was performed while they were sedated with intravenous medication. General anaesthesia was used in the two younger patients to avoid any restlessness that might have made the procedure more difficult. The patients were prepared as outlined above. Polypectomy was performed using standard diathermy equipment and polypectomy snares, with CO₂ to inflate the colon.

No problems were encountered with polypectomy. All polyps had stalks and were easily removed using a standard technique. The histology in each case was typical of a juvenile polyp. In one patient only a 'stump' was present when colonoscopy for polypectomy was performed—between the first and second examinations (one week) auto-amputation had occurred.

Envoi

Collaboration between a gastroenterologist with experience of over 400 colonoscopies in adults and a busy paediatric gastroenterology investigation unit has led to the development of a smooth routine procedure for paediatric colonoscopy. As the procedure has become more routine there has been

increased use made of the facility. In addition, the availability of the paediatric colonoscope permits its frequent use by the paediatrician for short colonoscopy,⁸ a most valuable and technically a relatively easy procedure which has now replaced rigid sigmoidoscopy and proctoscopy. (The additional use of the paediatric colonoscope for short colonoscopy should be considered when the initial financial outlay is considered.)

The present series of patients was relatively unselected and we have been impressed by the varied pathology found in those with positive examinations and by the value of finding a normal colon and terminal ileum both at colonoscopy and on histological examination in the others. Our findings are similar to those reported by Williams *et al*³ in 1982.

Colonoscopies were carried out without routine radiological screening and the endoscopist did not find this to be a major disadvantage. The absence of screening facilities should not, therefore, prevent the introduction of a paediatric colonoscopy service.

We have found that the availability of a routine paediatric colonoscopy service has made a major contribution to our management of children with gastrointestinal problems, particularly rectal bleeding and suspected inflammatory bowel disease. This has also been the experience of others.³

Colonoscopic polypectomy in children represents a major advance.⁹ Although the risk of perforation is reported to be slightly higher than in adults,⁶ laparotomy is avoided in those children with severe and recurrent bleeding. Colonoscopic polypectomy in children is safe and efficient when carried out by skilled colonoscopists.⁹ Autoamputation, which has been suggested as the natural history of many juvenile polyps,⁶ was actually found in successive examinations in one of our patients. The presence of a colonic polyp which is no longer bleeding should not be regarded as an absolute indication for polypectomy; however, recurrent bleeding, particularly if severe and resulting in anaemia, is an indication for surgical removal of the polyp.

It is likely that colonoscopy will make further contributions to our understanding of a variety of gastrointestinal problems of childhood. The availability of biopsy material and the ability to visualise and biopsy the lower ileum may lead to better understanding of conditions such as 'non-specific abdominal pains', mesenteric adenitis and lymphoid hyperplasia, food intolerance, and inflammatory bowel disease.

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