

# DIAGNOSTIC AND THERAPEUTIC COLONOSCOPY IN CHILDREN: EXPERIENCE FROM A PEDIATRIC GASTROENTEROLOGY CENTRE IN INDIA

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## ABSTRACT

Eighty colonoscopies were performed in 72 children suffering from various colonic disorders. The indications for colonoscopic examination were bleeding per rectum (83.3%), prolonged colitis (14.0%) and colonic obstruction (2.7%). Total bowel wash with normal saline was very good for colonic preparation in majority of the cases. Pediatric colonoscope (PCF—Olympus) was used and the procedure performed under sedation with intravenous diazepam and pentazocine. Juvenile polyps were the commonest lesions (69.4%). Diagnosis of idiopathic ulcerative colitis, acute colitis, tuberculous colitis, amebic colitis and allergic colitis was made in 5.5, 4.2, 2.7, 1.3 and 1.3% cases, respectively. Tuberculous hypertrophic lesion and tuberculous stricture was seen in one case each. The commonest site of juvenile polyps was rectosigmoid region. Ninety per cent of them were single, 8% had polyps ranging from 2-4 in number and one (2%) child had juvenile polyposis coli. Successful colonoscopic removal of polyps with polypectomy snare was possible in 96% cases. No complications were observed. Colonoscopy is a safe and useful mode of investigation of colonic disorders in expert hands. It has a great therapeutic value in childhood.

**Keywords:** Colonoscopy, Polyps, Colitis, Tuberculosis colon, Polypectomy.

Colonoscopy is a well established diagnostic and therapeutic modality for various disorders of colon in adults. There are limited reports of colonoscopy in Pediatric patients and there are very few centres where it is performed in this age group(1-4). Literature from tropical countries is even scantier. This may be because of reluctance on part of the pediatricians and lack of availability of the diagnostic equipment and trained personnel(2). Colonoscopy is an excellent method for evaluation of appearance and integrity of the colonic mucosa, detection of lesions and treatment of some colonic lesions(1,2). Juvenile polyps remain the commonest cause of bleeding per-rectum and colonoscopic removal by snare and diathermy has revolutionised the approach(5-7). In this paper, our experience of colonoscopy in pediatric patients with respect to its diagnostic as well as therapeutic value is presented.

## Material and Methods

Eighty colonoscopies were performed in 72 children suffering from colonic disorders in the Pediatric Gastroenterology Section of the Postgraduate Institute of Medical Education and Research, Chandigarh from August, 1984 to August, 1988. It is the first Centre of Pediatric Gastroenterology in India to initiate colonoscopies in infants and children. The age ranged from 1½ to 14 years. Of the 72

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Received for publication October 30, 1989;

Accepted December 17, 1990

children, 25 (34.7%) were less than 5 years, 33 (45.9%) were between 5 and 10 years of age and 14 (19.4%) were between 10 and 14 years of age. Multiple procedures were performed on patients in whom earlier examination was inadequate or it was carried for removal of multiple polyps. Barium enema examination was done in 65 cases prior to colonoscopy. Thirty five out of them had barium enema done from outside and were referred to our centre for further management.

The indications for the examination were bleeding per rectum in 60 (83.3%), chronic colitis in 10 (14.0%) and colonic obstruction in 2 (2.7%) patients. Diagnostic as well as therapeutic evaluation was done depending upon the type of the lesion seen.

### *Preparation*

A light diet consisting of rice and soup was allowed a day earlier. Seventy six times total bowel wash (TBW) with isotonic saline was given at room temperature while 4 times isotonic saline enema was given before the procedure. All the patients for TBW received metoclopramide, 0.5 mg/kg injectable or oral. A plastic Ryle's tube containing mercury at its tip was placed ensuring that it was in the second part of duodenum by aspirating bile stained fluid. Isotonic saline was used in drip form through the Ryle's tube till the stool returns were clear. Amount of the saline thus used varied from 2.0 to 4.5 litres. The procedure took 2-4 hours for the clearance and was done under supervision. Temperature record, vital signs and liver size were monitored. No complications except hypothermia on two occasions were encountered. Four patients with active colitis were prepared with isotonic saline enema.

### *Sedation*

All the colonoscopic procedures were done under sedation with intravenous diazepam (0.5 mg/kg) and pentazocine (0.5 mg/kg). A resuscitation set with oxygen and suction were kept ready at hand. General anesthesia was not required in any case.

### *Instruments and Techniques*

Examination was carried with Pediatric Colonoscope (PCF-Olympus) having an outer diameter of 10 mm. A polypectomy snare (size: 5 cm) alongwith diathermy apparatus was used for polypectomy, polyps from pedicle were snared by cutting and coagulation and at the same time a current of 5 amp was passed for <30 sec in repeated bursts to complete the procedure of diathermy. Colonic mucosal biopsies were taken with the flexible biopsy forceps.

The examination was performed by keeping the child in left lateral position. After a digital examination the lubricated colonoscopic tip was passed in the rectum with the help of right index finger. Occasionally, in order to snare the polyp, supine position of patient was needed. Manual compression over the abdomen was required to avoid loop formation in sigmoid colon and transverse colon. Fluoroscopic help was not required during the procedure in any case. The procedure could be completed in 20-40 min. Colonoscopic finding were recorded and biopsy was taken whenever indicated. Polyps were collected after defecation. Colonoscopic biopsy material and retrieved polyps were subjected to histopathologic examination.

### *Results*

Endoscopist at the time of examination

recorded the results of total bowel wash preparation as being perfectly clean in 90%, acceptably clean in 7.6% with small amounts of residue and poor in 2.5% with solid residue compromising the procedure. In 2 (2.4%) patients, hypothermia was encountered. Out of the 4 patients with enema preparation it was so poor in 2 patients that the procedure was incomplete.

A combination of diazepam and pentazocine was adequate and in none anaesthesia was resorted to. PCF-Olympus colonoscope was satisfactory for the examination and no problems were encountered during the procedure.

Total colonoscopy was done in 70% of examinations. Limited colonoscopy was done for therapeutic polypectomy mostly. During diagnostic colonoscopy, complete examination was possible in 90% of cases. In 4 cases it was technically difficult due to obstruction at transverse colon in 2 patients and poor preparation in the remaining.

### Diagnostic Yield

Colonoscopic examination showed abnormality in 87.4% of patients. In 12.6% cases it was normal; possibly the polyps had been autoamputated. Barium enema examination was inconclusive in these cases. Histopathology examination of the biopsy material correlated very well. Table I shows that juvenile polyps were the commonest lesions in 69.4% of patients. Colitis was diagnosed as idiopathic ulcerative colitis in 5.5%, acute colitis in 4.2%, tuberculous colitis in 2.7%, amebic colitis and allergic colitis in 1.3% each. Diagnosis of tuberculosis was confirmed in 2 (2.7%) patients who presented as large bowel obstruction. One of them had

polypoidal hypertrophic lesions and the other had stricture.

### Therapeutic Colonoscopy

Fifty patients had polyps in the large bowel. The distribution of the polyps is shown in Table II. Rectum and sigmoid colon were the commonest area of involvement. Forty-five (90%) patients had a single polyp, 4 (8%) had multiple polyps ranging from 2 to 4 and one (2%) child had juvenile polyposis coli. Successful polypec-

TABLE I—*Diagnosis by Colonoscopy finding and Histopathology of the Material in 72 Patients*

Conditions	Number	Percentage
Polyps	50	69.4
Idiopathic ulcerative colitis	4	5.5
Tuberculosis of colon	4	5.5
Colitis	2	2.7
Obstruction	2	2.7
Acute colitis	3	4.2
Amebic colitis	1	1.3
Cow's milk allergy	1	1.3
Normal	9	12.6

TABLE II—*Distribution of Polyps in Large Bowel in 50\* Children*

Site	Number	Percentage
Rectum	30	60
Sigmoid colon	12	24
Descending colon	4	8
Splenic flexure	1	2
Transverse colon	1	2
Ascending colon	1	2

\*One out of 50 cases of polyps had juvenile polyposis coli.

tomy with snare was done in 96% of cases whereas in two patients it was not possible. One child had a large polyp 3 cm size and another had a sessile polyp. A total of 105 polyps were removed.

About 45 polyps were removed in one patient having juvenile polyposis coli in 6 different sittings. This patient had polyps in hundreds loading the whole of colon up to cecum. Polyps were of varying size; pedunculated and sessile and all were impossible to remove by snare. This child had growth retardation, severe anemia, hypoalbuminemia and clubbing. Total colectomy with ileo-rectal ileostomy was done. After this, the child showed a remarkable improvement.

### *Complications*

There were no complications encountered during and after the procedure. Two children while receiving total bowel wash during winter developed hypothermia which was corrected immediately by warming.

### *Discussion*

Flexible fiberoptic colonoscopy can be performed in any age with the advent of various diameter endoscopes(1). In younger age group, the procedure requires skill and expertise in the field of pediatric endoscopy(2,3). The procedure can be safely performed under sedation with intravenous diazepam and pentazocine. The child should be able to indicate pain or distress because of the air insufflation or maldirection of the colonoscope during the procedure. General anesthesia has been used by some but it can be associated with risks(2).

A pediatric colonoscope (PCF-

Olympus) with outer diameter of 10 mm is suitable for the children(2,5). Infants may require smaller diameter colonoscopes. In our experience, there were no problems with PCF-Olympus as noted by others(2,5). The use of flexible biopsy forceps and polypectomy snare becomes easy and safe.

It is very important to have a clean colon for a good view of the colonic mucosa. There are many ways of cleansing the colon for the procedure(1). Various types of enema have been used. These can cause mucosal hyperemia, petechiae, mucus depletion and inflammatory changes in the rectal mucosa on histology(8). Total bowel wash (TBW) with isotonic saline has been used in adults safely(9). We have used the same in children. The fluid requirement varied from 2 to 4.5 litres depending upon the age. The patients were ready for the procedure within 4 hours of the preparation, adjudged by clear returns.

Our results showed good preparation in 97% of patients, whereas in 3% of cases preparation was poor. There can be problems of fluid overload, hypernatremia and hypothermia. These complications can be avoided by monitoring the patients closely. Use of warm saline at body temperature is suggested in winter to avoid hypothermia. In the presence of active colitis, saline enema is enough to clean the colon.

Rectal bleeding (83.3%) was the commonest indication for colonoscopy in the present series. Other indications were colitis (14%) and colonic obstruction (2.7%). Colonoscopy was important to examine the state of colonic mucosa and characterization of the lesions.

Therapeutic polypectomy was done in 48 patients. Biopsy material and the polyps procured after polypectomy were subjected to histopathology. There was very good correlation between the colonoscopic ap-

pearance and histopathology diagnosis. The diagnosis could be made in 87.4% of patients. Double contrast barium enema can delineate the site, extent and type of lesions(2). However, a precise diagnosis can be made only by having direct examination of the lesion and further confirmation comes from the histopathology. Also, a therapeutic polypectomy can be performed if the lesion is a juvenile polyp. Barium enema guides the colonoscopist. It is an important prerequisite under some situations but not in all the cases(2). In the present series, 65 (91%) patients had barium enema before the procedure. In active or recent lower gastrointestinal bleeding, colonoscopy is more valuable(2,3).

Juvenile polyps in the pediatric group are the commonest lesions in colon(1-5). In our series, 69.4% patients had juvenile polyps. The commonest site is the rectum and the sigmoid colon(1). In present series, the site of polyp was rectum (60%), sigmoid colon (24%); descending colon (8%), splenic flexure (2%), transverse colon (2%), and ascending colon (2%) while the colon was studded with polyps in one case (juvenile polyposis coli). Ninety per cent of them had single polyps, 8% had 2-4 polyps and one child (2%) had juvenile polyposis coli. Polypectomy by diathermy coagulation snare is very important to avoid surgical intervention(10-12). In 96% of patients successful polypectomy could be performed. However, colonoscopic polypectomy has some limitations especially if the polyp is sessile, large sized or there are multiple polyps of variable size. In 4% of our patients polypectomy could not be performed because of sessile and large polyp. In the child with juvenile polyposis coli, 45 polyps could be removed and adenomatous polyp was identified; he required colectomy(13). Polypectomy can be associated

with complications like excessive rectal bleeding and perforations(14-15). These complications were not observed in our patients. Recurrence of polyps was not encountered on follow-up.

Colonoscopic polypectomy is a safe and effective therapeutic procedure in children. Histopathology of all the polyps showed hamartomatous polyps except one showing adenomatous polyps. All polyps removed should be subjected to histopathology to detect any adenomatous polyp that has malignant potential. Other causes of rectal bleeding such as colonic hemangiomas, vascular malformation, ectopic varices, lymphoid hyperplasia, Henoch-Schonlein disease, leiomyoma and carcinoma(2) were not encountered in our series.

The second commonest indication for colonoscopy was colitis. Direct visualisation and biopsy of the mucosa helped in differentiating 4 cases (5.5%) of idiopathic ulcerative colitis (IUC) from Crohn's disease and prolonged infective colitis. It is important to determine the extent of the disease and colonoscopic surveillance for dysplasia or carcinoma in pancolitis. Three patients had suggestion of acute infective colitis which resolved without any specific treatment.

Tuberculosis of the colon is an uncommon disease in children(16). The exact diagnosis is possible by direct colonoscopic examination and histopathology of the lesion. Four (5.5%) patients had tuberculosis of the colon. One of them had diffuse colitis, whereas one had segmental colitis with proctitis(13). One each had tuberculous polypoidal lesions and stricture responsible for obstruction of large bowel. Histopathology of biopsy of colon confirmed the diagnosis. All responded well to antitubercular therapy. However, two patients with obstruction required surgical correction.

Amebic colitis is an uncommon disease in children. One child in the present series had typical discrete ulcers with normal intervening mucosa in rectum, sigmoid and descending colon. Histopathology of biopsy from ulcers showed trophozoites of *E. histolytica*. The patient responded well to the metronidazole therapy.

Cow milk allergy can simulate IUC in childhood and infancy. One child had diffuse colitis and histopathology of the lesion showed infiltration of submucosa with eosinophils. Withdrawal of milk led to remission of the clinical picture(1).

The cecum was reached in 70% of all the colonoscopic procedures in our series. However, during the diagnostic procedures, total colonoscopy was possible in 90% of the patients which is quite comparable to that reported in the literature(5). The frequency of complete examination varies in adults from 60 to 95%(17,18). In our series, repeated polypectomy and technically difficult procedure due to poor preparation and obstruction were the reasons for limited colonoscopy. All efforts must be made to screen the whole of colon carefully so that no lesion is missed.

To conclude, colonoscopy is safe and effective in children. It has immense diagnostic and therapeutic implications in cases of lower gastrointestinal bleeding, colitis and colonic obstruction.

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