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Colonoscopic Findings In Children With Lower Gastrointestinal Bleeding

***Leith A. Hussein Abdullah**
****Jasim Muhsin Ghadhban**
*****Qasim Lefta Abbas**

ABSTRACT

Background and study aims: Lower gastrointestinal bleeding {LGIB} in children has many different causes and is a serious problem that warrants careful diagnostic work-up.The aim of this study is to verify the colonoscopic findings in children with lower gasterointestinal bleeding in Iraqi children. **Patients and methods:**One hundred colonoscopies were done during one year for determining the causes of LGIB in children who were referred to Gastro enter logy and Hepatology Teaching Hospital in Medical City in Iraq. Analyses of results was based on age, sex, etiology and clinical presentations. **Results:**One hundred patients in the pediatric age group were submitted to colonoscopies, 42% of LGBI were due to polyp which was the most common etiology.and in{27% }of patients, colonoscopic findings were normal then colitis{14%},Solitary rectal ulcer had a prevalence of {10%}.

Lymphoid nodular hyperplasia{4%},Hemorroids{1%},anal fissure{1%}and Intussusception{1%}. The peak age group of patients with polyps was 46 y.solitary rectal ulcer the peak age is also 4-6 y. **Conclusions:**Polyp is more common than other etiologies in the patients with lower gastrointestinal bleeding{(LGIB}and LGIB has many different etiologies and is a serious problem that warrants careful diagnostic work-up.

Keywords: Colonoscopy . Lower & GIT bleeding

Introduction:

Lower gastrointestinal bleeding {LGIB} is a bleeding with an origin after the ligament of Treitz. Its incidence in western report is about 20 in 100000 per year.[1] LGIB can be presented in four forms: 1}hematochezia which is passage of bright red blood from rectum. It can be isolated or mixed with stools. Its origin usually is from the large intestine but massive bleeding from upper GIT is also presented as LGIB; 2}melena which ispassage of tarry, foul smelling stool which suggests bleeding above the ileocecal valve and canalso occur in large intestine when the transienttime is high; 3} occult bleeding with symptoms offatigue and pallor. It is usually detected by laboratory tests revealing iron deficiency anemia or positivefecal blood test; and 4}symptom of severe bloodloss such as malaise, tachycardia, or even shock.

The mortality rate for LGIB is reported to be 3.6% and, similar to UGIB , mortality is markedly higher in patients who begin bleeding after hospitalization.[3]The diagnostic yield of colonoscopy is very high especially in children presenting with bloody diarrhea.[4,5] Minor or chronic gastrointestinal bleeding, defined as hemorrhages that does not affect hemodynamic status, is less than 20% of total blood volume and often results in chronic anemia[6]

**MBCHB FIBMS,FICMS(G&H),*The gastroenterology & hepatology teaching hospital

***C.A.B.M,FICMS,FICMS(G&H),*The gastroenterology & hepatology teaching hospital

***CABM (Internal Medicine); FIBMS (GE& H),The gastroenterology & hepatology teaching hospital

Table{{1}Causes of lower gastrointestinal bleeding based on age

Birth to 1 month	2 to 23 months	2 to 5 years	6 to 12 years	13 to 18 years
Milk allergy	Anal fissure	Polyps	Anal fissure	Anal fissure
Necrotizing enterocolitis	Milk allergy	Anal fissure	Polyps	Polyps
Duplication of bowel	Polyps	Infectious enterocolitis	Infectious enterocolitis	Infectious enterocolitis
Volvulus	Infectious enterocolitis	Intussusception	Henoch-Schönlein purpura	Inflammatory bowel disease
Anal fissure	Intussusception	Meckel diverticulum	Hemolytic-uremic syndrome	Hemorrhoids
Hirschsprung disease	Meckel diverticulum	Henoch-Schönlein purpura	Bleeding diathesis	Bleeding diathesis
Bleeding diathesis	Hirschsprung disease	Hemolytic-uremic syndrome	Angiodysplasia	Angiodysplasia
	Bleeding diathesis	Bleeding diathesis	Lymphnodular hyperplasia	
		Angiodysplasia		
		Lymphonodular hyperplasia		

reference: alexander k.c. leung, andrew l. wong. lower gastrointestinal bleeding in children.pediatric emergency care: 2002; vol. 18, no. 4p:320-323.We can summarize the causes of LGIB bleeding in pediatrics:

Polyps: Beyondinfancy,intestinal polyps are the most common source of lower gastrointestinal bleeding.Bleeding is typically bright red, small in amount, and painless[7,8].Polyps may be broadly divided into two groups:hamartomatous and adenomatous. Although adenomatous varieties have a premalignant potential, hamartomatous polyps are generally benign[9].Juvenile polyps are usually hamartomatous and account for 90% of all polyps found in children. The vast majority of these polyps are solitary and occur in the left side of the colon, with a predominance in the recto sigmoid region. Other hamartomatouspolyps are juvenile polyposis, Peutz-Jeghers syndrome, Cronkhite-Canada syndrome, and Cowden's syndrome[10]. Adenomatous polyps are found in familial polyposis coli, Gardner syndrome, and Turcot's syndrome [10].Rectal bleeding is often caused by gastrointestinal benign lesions in children, of which 80% are juvenile polyps[11]. The age at which polyps were mostly seen has been reported to be from 3 to 7 years[12]. Juvenile polyps account for more than 95% of allpolyps found in children.LGIB is rarely seen as a complication of colonoscopy following polypectomy[13,14,1516]

Anal Fissure: Anal fissure is the most common cause of rectal bleeding in the first two years of life .Anal fissure results from a superficial tear of the squamous epithelium lining of the anal canal, which is usually caused by the passage of hard, large stools[17,18,19,20].

Angiodysplasia: (or vascular ectasia) has been described as flat or slightly raised lesions that range from 2 to 10 mm in diameter and are red in color[21,22,23,24].

InflammatoryBowel Disease: Approximately 25% of all patients with inflammatory bowel disease present before the age of 20y, with the majority diagnosed between the ages of 10y and 16y [25,26,27,28,29].

Meckel'sDiverticulum:It is the most common congenital abnormality of the gastrointestinal tract, with an incidence ranging from 1 to 4% and a male-to female ratio of 2:1[30,31]. Most cases of Meckel 's diverticulum are fully asymptomatic and are found incidentally at the time of surgery or autopsy[32,33].It ischaracterized by the painless passage of a large amount of blood in an otherwise healthy child[34,35,36].

Henoch-ScholeinPurpura: Henoch-Scholeinpurpura is an immunologically mediated systemic vasculitis of small blood vessels that primarily involves the skin, gastrointestinal tract, joints, and kidneys [37,38,39,40].

Infectious Enterocolitis:can present with bloody stools. Important bacterial pathogens include *Salmonella,Shigella, Campylobacter jejuni, Yersinia enterocolitica, Escherichiacoli* (0157:H7), and *Clostridium difficile*[41,42]. *Entamoebahistolytica*is the most important parasitic pathogen [43] . Cytomegalovirus is a possible cause of significant LGI hemorrhage in immunocompromised patients [44,45,46]

Hemolytic-uremic Syndrome:is characterized by a triad of microangiopathic hemolytic anemia, thrombocytopenia, and acute renal failure. Infection with *E. coli* O157:H7 is considered the most important causative event in both sporadic and epidemiccases of hemolytic uremic syndrome [47,48,49,50].

Lymphonodular Hyperplasia:is characterized by multiple, yellowish nodules that are enlarged lymphoid follicles, which may be triggered by protein allergy or unidentified infection and associated with abdominal pain and hematochezia[51,52,53,54].

Solitary Rectal Ulcer Syndrome:is a benign chronic ulcerative disease that is very unusual in childhood. Symptoms include dyschezia, tenesmus, mucous discharge, pain located in the perineal area, rectal prolapse, and rectal bleeding[55,56,57,58]

.Other rare causes of lower GI bleeding include:Bleeding diathesis, Hemorrhoids, Intussusception,Food allergy, Duplication of the bowel,Traumatic rectal lesions, Neoplasia, Dieulafoy's lesion [59,60,61].

Clinical evaluation: History and Physical Examination are important in the assessment of LGIB which include the age of onset,character of bleeding,family and drug history.diagnostic investigation include laboratory tests and colonoscopy which is most helpful in the diagnosis of inflammatory bowel disease, pseudo membranous colitis, Angiodysplasia, lymph nodular hyperplasia, and polyps[62,63,64].

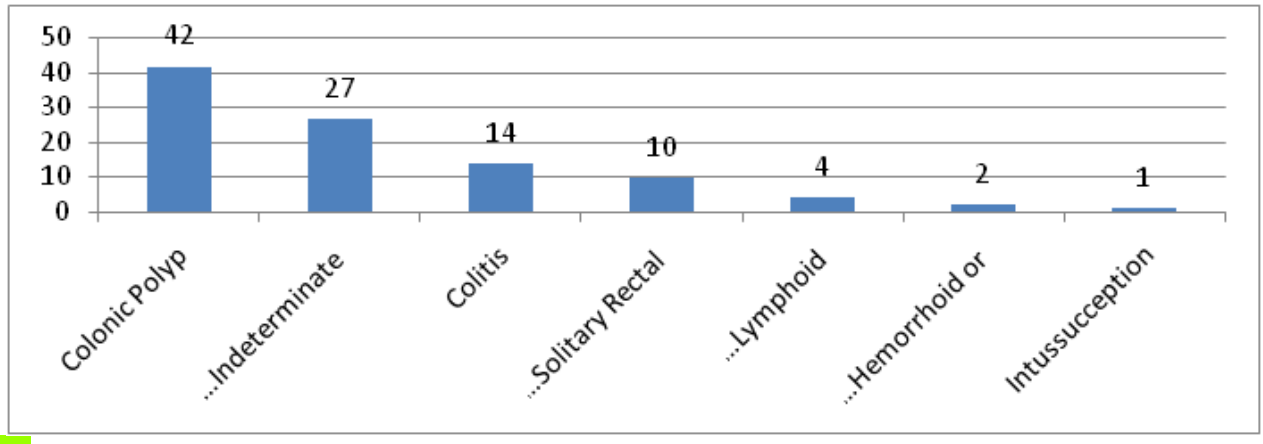
Patients and methods:

In this study we tried to determine colonoscopicfindings in children who presented with rectal bleeding who came to Gastroenterology and Hepatology Teaching Hospital in The Medical City. The group consisted of 100 children with age from 1y up to 16y of them 74 male and 26 female .Need for colonoscopy was approved for these children by a pediatric gastroenterologist. The procedure was explained for parents and consents were taken. Total colonoscopy was done with Olympus pcf.Q260AI size 11mm colonoscopy. All patients were prepared with colo-clean (polyethylene glycol) and rectal enema. The procedure was done under G.A.

Results:

:In this study conducted from November 2010 to November 2011, there were (100) children with LGIB who underwent colonoscopy. The age distribution ranged between (1)y and (16)y . There were 74 male and 28 female {male: female ratio of 2.6}. The main symptom was rectal bleeding. In few patients LGIB was associated with other complaints including: nine patientssuffered from abdominal pain; one had abdominal mass, four had bloody diarrhea. Weight loss and history of intussusceptions were present in one child and two patients had family history of polyp.In 42 (42%) patients, there was Polyp in colon with various size;all were polypectomised.Histopathological diagnosis of polyp was juvenile in 40 (95.2%), hyper plastic in two (4.8%).The causes of LGIB in children in our study in order of frequency are: 1) colonic polyps, 2) No definite endoscopic finding, 3) colitis, 4) Solitary Rectal ulcer, 5) Lymphoid nodular hyperplasia, 6) Hemmorroids,anal fissures and Intussusceptions.

Figure{1}shows: The distribution of different causes of LGIT bleeding in children.

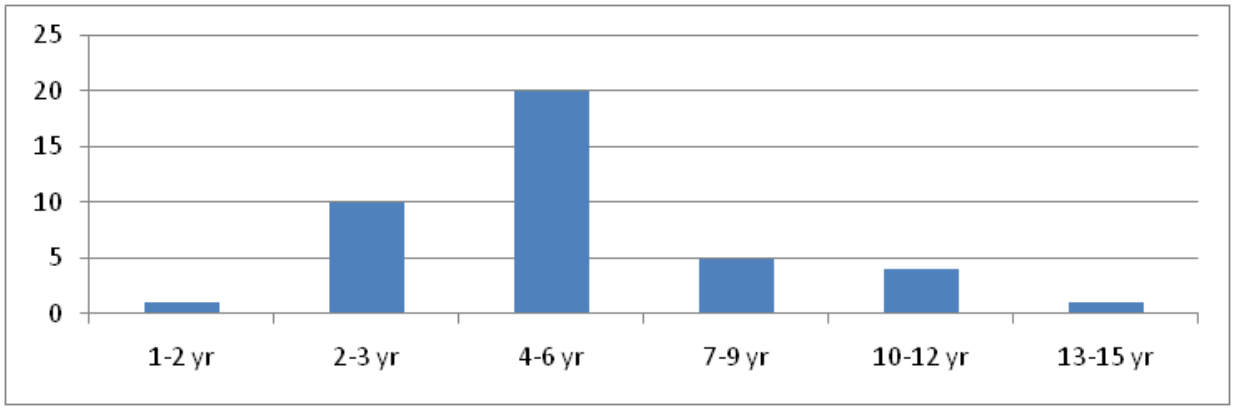


Gross appearance of colon was Normal in 27 {27%} patients; in these patients biopsy was taken and sent for histopathological study .Colitis had a frequency of 14% of them 8% had non specific colitis ,4% had Ulcerative colitis and 2% had Crohn's disease.
Ten patients{10%}had Solitary rectal ulcer, four(4%) had Lymphoid nodular hyperplasia, one{1%}had Anal fissure{posterior in position}one{1%}had External Hemorrhoid and one{1%} had Intussusceptions which was primary type reported at age of 18 months.
Regarding the major cause of LGIB in pediatric; colonic polyp found to be the main cause of this bleeding. The mean age of all patients was six and half{6.5}.
Mean age of children with polyps =5.8
; Median age of children with polyps =5

Table (2)shows: colonoscopic findings according to the age

Age	Polyp	Normal	S.R.U.
>3y	10	4	2
4-6 y	22	7	4
7-9 y	4	7	3
10-12 y	4	6	0
13-15 y	2	3	1

Figure{2}:Shows the distribution of polyps according to the age



The highest prevalence of polyp was observed in those aged 4-6y; 22 {52%}of 42 patients aged between four and six years had polyp. The prevalence of polyp was equal in the age groups of 7-9y{9.5%},1012y{9.5%} and less prevalence was in the age group13-15y{4.8%},there is no significant relationship between polyps and age {P value is 0.07 }which is not significant. Forty{40}patients had single polyp[95.24 %}and two{2}patients [4.76%}had two polyps.

Figure{3}shows: distribution of colonic polyp according to the gender

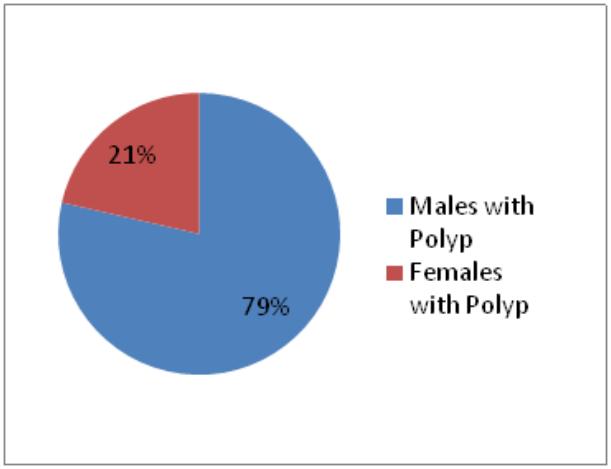
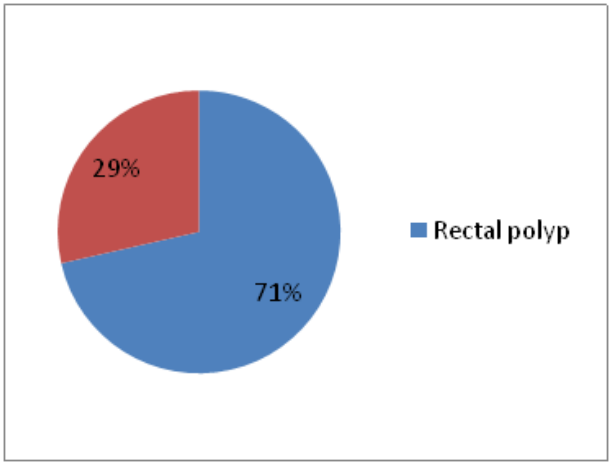


Figure {4} shows the distribution of polyp according to the site in the colon



Regarding the relation of polyp with gender, polyp is more common in males than females {33,9} patients{79%,21%}respectively.

Regarding the relation of polyp with the site in the colon we found that {30}patients of {42}were rectal and {12}patients were in another sites {71%, 29%} respectively.

Regarding patients with normal colonoscopy, the number of patients was {27} patients {27%}of them: 17{63%}were males and 10{37%}were females.

Solitary rectal ulcer was the forth most common cause of LGIB in children; there were ten patients {10%}from total number of patients: 70% were males and 30% were females.

Discussion:

Rectal bleeding is an alarming symptom and requires additional investigations[65]. Lower GI bleeding encompasses a wide clinical spectrum ranging from trivial bleeding to massive hemorrhage. It is a common reason for referral to pediatric gastroenterologists and surgeons[66]. The causes of LGIB are different in the children from that in adults[67] Although causes of LGIB are usually simple and require little or no treatment (e.g., anal fissure or juvenile polyp), sometimes, these symptoms are clues to more serious and life-threatening condition (67).Our study showed that LGIB is more common in male children than in females which is consistent with study done in Iran by Pediatric Unit of Digestive Disease research Center, Children's Hospital Medical Center, Gharib Ave. Tehran, Iran [68].In 85% of our patients, rectal bleeding was the only symptom which is also consistent with a Persian study was done by Farzaneh[68].They found that rectal bleeding is the only symptom in 87%. While in Finland. ;there is a study done by ampere University hospital by Areola, et al, [65]shows 80% of children presented with only rectal bleeding.The frequency of the source of colonic bleeding reported varies from one publication to the next. We have found that the most common cause of lower GI bleeding in our patients was polyps which is responsible for 42% of all of etiologies which is nearly similar to the Persian study which reports a 34.7% which was done by Farzaneh in Tehran University of Medical Sciences[68]. while in Turkish study done by EBalkan he found polyp in 32% of total patients[69].but our study was inconsistent to the rate of 10% reported by Clarke et al,Belfast,NorthernIreland,U.K.[66]; our rate was however very less than the relative frequency of 75% reported by Mandhan{Indian study}[67].The peak age in patients with polyps in our study was four and six years; in Mandhan's study [67], it was six years. In another study conducted by the Farzaneh[68] ,the mean age of 5.8 years was reported and the mean age of patients was 6{range 2 to 1l}years in Turkish study conducted by FE Balkan[69]. All these estimations of the prevalence of polyp might be an underestimation of the real value since even in expert hands, 10% or so of polyps can be missed at colonoscopy[68].In our study about 27% of colonoscopies were normal which is consistent with the range reported in other studies; the study done by Clarke, et al [66] reported 30% normal colonoscopy; another study conducted by the authors in

Shiraz(Iran) in hospital of Shiraz revealed a rate of 23% of normal colonoscopy[70] and Mandhans[67] reported a frequency of 10.6% while in another Persian study conducted by Farzaneh, the rate of normal is 15.8%. Colonoscopy, even in the best centers of the world cannot find any abnormality in 10%30% of patients with LGIB.That might be attributed to several causes such as hidden positions of lesions between intestinal folds, incomplete colonoscopy because of poor bowel preparation and presence of lesions in not examined segments, auto-amputation of polyps and healed ulcers before performing the procedure. Solitary Rectal ulcer was found in ten patients {10%}.The diagnosis depends on endoscopic appearance and histopathological confirmation,in 8 cases colonoscopy showed ulcers on the anterior rectal wall and in two showed polypoid lesion . Other less frequent causes of lower GI bleeding were reported with lower frequencies in our study for example non specific infections account for 8% of cases, inflammatory bowel disease 6%....which is consistent with Persian study conducted by Farzaneh[68]. LNH(4%) is greatly different from Persian study conducted by Farzaneh{22.5%}[68] and that reported by Mandhan's[67] {3%}and Clarke, et al{U.K}. [66]. The high frequency of LNH observed in other studies can be due to the higher prevalence of parasitic infestation, presence of more allergic diet in this region and a higher clinical suspicion for this diagnosis before colonoscopy[68]

. Vascular malformation such as angiodysplasia in children is a rare cause of LGIB. In a research by DeLa Torre, et al [71] during 23 years of follow-up, only six had vascular malformation; the mean age at clinical presentation was 2.3 years. In our study there was no case detected. In study of Motamed{hospital of Shiraz}[70]the prevalence of rectal Varices was 1% . A complication rate of the colonoscopic procedure like gut perforation and bleeding was reported to be 1.9% by Mandhan, et al.Other studies {MestreJM,Holgerson L} reported a complication rates of 5% and 14% respectively [72,73] , In our study, there was no complication during one year which may be attributable to a small number of patients in our study.Prognosis in lower GI bleeding varies; however, since most acute lower GI bleeding is self-limited, outcomes are typically favorable. Spontaneous cessation of acute lower gastrointestinal bleeding is seen in about 80% of patients which is consistent with that written in books[74].Indeed, the mortality rate associated with lower GI bleeding is generally considered to be less than 5% and when it occurs, is often a result of co morbid conditions and the need for emergency surgery, fortunately we reported no mortality in our study group.

References:

1. Grance HE. Gastrointestinal bleeding. In:Yammada T, AlpersD, Laine L, editors. Textbook of gastroenterology. 3rd ed. London:WilliamsandWilkins;1999.P.714-42.
2. TurckD, MichaudL.LowerGastrointestinal Bleeding. In:WalkerWA, Goulet O, Kleinman RE, editors. Pediatric Gastrointestinal Disease.4thed.Hamilton:BCDeckers;2004.P.266-80.
3. HaLongstreth GF. Epidemiology and outcome of patients hospitalizedwith acute lower gastrointestinal hemorrhage: a population-based study. Am J Gastroenterol 1997;92:419-24.milton: BC Deckers; 2004. P. 266-80. 6. Vinton NE.
4. Ulshen M. Clinical manifestation of gastrointestinal disease. In: Behrman RE, Kliegman RM, Arvin AM, editors. Nelson Textbook of Pediatrics. Philadelphia (PA): WB Saunders; 1996. p. 1031-1037.
5. *Mohammad I, El-Mouzan*Yield of colonoscopy in children with Rectal bleeding. Saudi Med J 2004; Vol. 25 (8): 998-1001.
6. Raffensperger JG, Luck SR. Gastrointestinal bleeding in children. SurgClin North Am 1976; 56:41324.
7. Latt TT, Nicholl R, Domizio P, Walker-Smith JA, Williams CB. Rectal bleeding and polyps.Arch Dis Child 1993; 69: 144-147.
8. Crankson SJ, Al-Zaben A. Juvenile colorectal polyps in childhood. Saudi Med J 2003; 24: S42.
9. Vinton NE. Gastrointestinal bleeding in infancy and childhood.GastroenterolClin North Am 1994;23:93122.
10. O'Hara SM. Acute gastrointestinal bleeding. RadiolClin North Am 1997;35:879895.
11. Soper RT. Gastrointestinal neoplasms. In: Ashcraft KW, Holder TM eds. Pediatric surgery. Philadelphia: WB Saunders, 1993: 45366.
12. Perisic VN. Colorectal polyps:an important cause of rectal bleeding. Arch Dis Child 1987;62:188203.
13. Perisic VN. Colorectal polyps: An important cause of rectal bleeding. Arch Dis Child 1987;62:1889.
14. Latt TT, Nicholl R, Domizio P, et al. Rectal bleeding and polyps.ArchDisChild1993;69:1447.

15. Hoffenberg EJ, Sauaia A, Maltzman T, et al. Symptomatic colonic polyps in childhood: not so benign. J PediatrGastroenterolNutr 1999;28:17581.
16. Rosen L, Bub DS, Reed JF. Hemorrhage following colonoscopicpolypectomy. Dis Colon Rectum 1993;36:112631.
17. Leung AKC, Wong AL. Lower gastrointestinal bleeding in children.PediatrEmerg Care 2002;18:31923.
18. Loening-Baucke V. Constipation in children. NEJ Med 1998;339:11556.
19. Ameh EA. Anal injury and fissure-in-ano from sexual abuse inchildren. Ann Trop Paediatr 2001;21:2735.
20. Silber G. Lower gastrointestinal bleeding. Pediatr Rev 1990;12:8593.
21. De la Torre Mondragon L, Vargas Gomez MA, Mora TiscarrenoMA, Ramirez Mayans J. Angiodysplasia of the colon in children.J PediatrSurg 1995;30:725.
22. De la Torre L, Carrasco D, Mora MA, et al. Vascular malformationsof the colon in children. J PediatrSurg 2002;37:17547.
23. Vinton NE. Gastrointestinal bleeding in infancy and childhood. GastroenterolClin North Am 1994;23:93122.
24. Farmer RG. Lower gastrointestinal bleeding in inflammatory bowel disease. GastroenterolJpn 1991;26:93100
25. Leichtner AM, Jackson WD, Grand RJ. Crohn's disease. In:Walker WA, Durie PR, Hamilton JR, et al, editors. pediatric gastrointestinal disease. Pathophysiology, diagnosis, management.Vol 1, 2nd ed. St. Louis: Mosby; 1996. p. 692711.
26. Langholz E, Munkholm P, Krasinilkoff PA, Binder V. Inflammatorybowel diseases with onset in childhood. Clinical features,morbidity, and mortality in a regional cohort. Scand J Gastroenterol 1997;32:13947.
27. Pardi DS, Loftus EV Jr, Tremaine WJ, et al. Acute major gastrointestinal hemorrrhage in inflammatory bowel disease. GastrointestEndosc 1999;49:1537.
28. Turgeon DK, Barnett JL. Meckel's diverticulum. Am J Gastroenterol1990;85:77781.28
29. Matsagas MI, Gatouras M, Koulouras B, Giannoukas AD. Incidence,complications, and management of Meckel's diverticulum. Arch Surg 1995;130:1436.
30. Mackey WC, Dineen P. A fifty-year experience with Meckel'sdiverticulum.SurgGynecolObstet 1983;156:5664
31. Meckel's diverticulum and intestinal duplication. SeminPediatrSurg 1999;8:202209.
32. Robson WL, Leung AK. Henoch-Schönleinpurpura.AdvPediatr 1994;41:163194.
33. Oguzkurt P, Senocak ME, Ciftci AO, et al. Mesenteric vascularocclusion resulting in intestinal necrosis in children. J PediatrSurg 2000;35:11614.
34. Lin TL, Wang CR, Liu MF. Multiple colonic ulcers caused byChurg-Strauss syndrome in a 15-year-old girl. Clin Rheumatol2001;20:3624.
35. Nadorra RL, Nakazato Y, Landing BH. Pathologic features of gastrointestinal tract lesions in childhood-onset systemic lupus erythematosus: study of 26 patients, with review of the literature. PediatrPathol 1987;7:24559.
36. Philpott DJ, Ismaili A, Sherman PM. Enterohemorrhagic Escherichiacoli 0157:H7 infection and colitis in children. J PediatrGastroenterolNutr 1997;24:623625.
37. Jammal MA, Cox K, Ruebner B. Amebiasis presenting as rectalbleeding without diarrhea in childhood. J PediatrGastroenterolNutr 1985;4:2946.
38. Choulot JJ, Pariente EA, Beze-Beyrie EA, et al. Acute hemorrhagiccolitis after intake of amoxicillin [in French]. Arch Pédiatr 1996;3:5089.
39. Ukarapol N, Chartapisak W, Lertprasertsuk N, et al.b Cytomegalovirus- associated manifestations involving the digestive tract in children with human immunodeficiency virus infection. J PediatrGastroenterolNutr 2002;35:66973.
40. Robson WL, Leung AK, Kaplan BS. Hemolytic-uremic syndrome.CurrProblPediatr 1993;23:1633.
41. Grabowski EF. The hemolytic-uremic syndrometoxin, thrombinand thrombosis. N Engl J Med 2002;346:5861.
42. Grodinsky S, Telmesani A, Robson WLM, et al. Gastrointestinalmanifestations of hemolytic uremic syndrome: recognitionof pancreatitis. J PediatrGastroenterolNutr 1990;11: 51824.
43. Lopez EL, Devoto S, Fayad A, et al. Association between severityof gastrointestinal prodrome and long-term prognosis in classic hemolytic-uremic syndrome. J Pediatr 1992;120: 2105.
44. Gottrand F, Erkan T, Turck D, et al. Food-induced bleeding fromlymphonodular hyperplasia of the colon. Am J Dis Child 1993;147:8213.
45. Kokkonen J, Karttunen T. Lymphonodular hyperplasia on themucosa of the lower gastrointestinal tract in children: an indication of enhanced immune response. J Pediatr GastroenterolNutr 2002;34:4 26.
46. Franken EA. Lymphoid hyperplasia of the colon. Radiology1970;94:32934.

47. Riddlesberger MM, Lebenthal E. Nodular colonic mucosa ofchildhood: normal or pathologic? Gastroenterology 1980;79: 26570.
48. Heaton ND, Davenport M, Howard ER. Symptomatic hemorrhoidsand anorectalvarices in children with portal hypertension. J PediatrSurg 1992;27:8335.
49. Heaton ND, Davenport M, Howard ER. Incidence of haemorrhoidsand anorectalvarices in children with portal hypertension. Br J Surg 1993;80:6168.
50. Yamamoto LG, Morita SY, Boychuk RB, et al. Stool appearancein intussusception: assessing the value of the term "currant jelly." Am J Emerg Med 1997;15:2938.
51. Leung AK. Food allergy: a clinical approach. AdvPediatr 1998;45: 145177.
52. Fox VL. Gastrointestinal bleeding in infancy and childhood.GastroenterolClin North Am 2000; 29:3766.
53. Kumar R, Shun A, Arbuckle S, Gaskin K. Diverticular rectal duplication with heterotopic gastric mucosa in a child: a rare causeof rectal bleeding. J Paediatr Child Health 2000;36:1912.
54. Rao KL, Sunil I, Pimpalwar A, et al. Intrapancreatic gastric duplication cyst presenting as lower gastrointestinal bleeding .JPediatrSurg 2003;38:2434.
55. Eigenmann PA, Le Coultre C, Cox J, et al. Solitary rectal ulcer:an unusual cause of rectal bleeding in children. Eur J Pediatr 1992; 151:65860.
56. Ertem D, Acar Y, Karaa EK, Pehlivanoglu E. A rare and oftenunrecognized cause of hematochezia and tenesmusinchildhood: solitaryrectalulcer syndrome. Pediatrics 2002; 110:e79.
57. Cummings SP, Lally KP, Pineiro-Carrero V, Beck DE. Colonicleiomyomaan unusual cause of gastrointestinal hemorrhage in childhood.Report of a case. Dis Colon Rectum 1990;33:5114.
58. Karnak I, Kale G, Tanyel FC, Buyukpamukcu N. Malignantstromal tumor of the colon in an infant: diagnostic difficultiesand differential diagnosis. J PediatrSurg 2003;38:2457.
59. Hyams JS, Haswell JE, Gerber MA, Berman MM. Colonic ulcerationin histiocytosis X. J Pediatr GastroenterolNutr 1985;4:28690.
60. Tooson JD, Marsano LS, Gates LK Jr. Pediatric rectal Dieulafoy'slesion. Am J Gastroenterol 1995;90:22323.
61. Chaer RA, Helton WS. Dieulafoy's disease. J Am CollSurg2003;196:2906.. Chaer RA, Helton WS.Dieulafoy's disease. J Am CollSurg 2003;196:2906.
62. Hill SM, Milia PJ. Colitis caused by food allergy in infants. Arch DisChild1990;65:132133. 63.Treem WR. Gastrointestinal bleeding in children.GastrointestEndoscClin North Am 1994;4:7597.
64. Kester RR, Welch JP, Sziklas JP. The 99mTc-labelled RBC scan. A diagnostic method for lower gastrointestinal bleeding. Dis Colon Rectum1984;27:4752.
65. Arvola T, Ruuska T, Keranen J, Hyoty H, Salminen S, Isolauri E.Rectal bleeding in infancy: clinical, allergological, and microbiologicalexamination. Pediatrics 2006; 117: 760-8.
66. Clarke G, Robb A, Sugarman I, macallionWA.Investigatingpainless rectal bleeding- is there scope for improvement. J pediatrsurg 2005; 40: 1920-2.
67. Mandhan P. Sigmoidoscopy in children with chronic lower gastrointestinal bleeding. J paediatr. Child health.2004; 40:365-68.
68. FarzanehMotamed MD. colonoscopicfindings in children with lower gastrointestinal bleeding. *Govaresh*. Vol. 13, No.1, Spring 2008; 54-57.
69. E Balkan, I~ Kýrýsqtýogçlu, A Gürpýnar, I~ zel, K Sýnmaz, H Dogç ruyol: Sigmoidoscopy in minor lower gastrointestin.Bleeding.*Arch Dis Child* 1998;78:267268.
70. Motamed F: Review for etiologies of lower gastrointestinalbleeding in children above 1 month old referred to Namazi.Hospital of Shiraz from Mehr 80 to Mehr 81 [dissertation].Shiraz: Shiraz University of Medical School; 2003.
71. Torre ML, Gomez V, Tiscarreno MM, MayansJR:Angiodysplasiaof the colon in children. J pediatrsurg 1995; 30:72-5.
72. Mestre JM. The changing pattern of juvenile polyps. AM JGastroenterol 1986; 81: 312-4.
73. Holgerson L, miller R, ZintelH.Juvenile polyps of the colon.Surgery 1971; 69: 288-93.
74. Leung AKC, Wong AL. Lower gastrointestinal bleeding in children.PediatrEmerg Care 2002;18:31923