

## Original Article

# Paediatric Patients with Gastrointestinal Bleeding: 4-year Experience of a Single Centre

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### Abstract

**Objective:** Gastrointestinal bleeding can be seen in children of all ages, and it is one of the most frequent reasons for referral to a paediatric gastroenterologist. The aim of this study was to determine the demographic and aetiological factors of the paediatric patients admitted to our clinic with upper or lower gastrointestinal bleeding. **Methods:** This study included 150 patients who were admitted with upper and/or lower gastrointestinal bleeding between January 2010 and April 2014. **Results:** This research included 63 (42%) girls and 87 (58%) boys. The mean age of the patients was  $11.0 \pm 4.6$  years old. With regard to the aetiology of these upper gastrointestinal bleeding cases, *Helicobacter pylori* was detected in 25.3%, and 80% of the *H. pylori* positive patients were older than 10 years old. Fourteen (70%) of the 20 patients with peptic ulcer disease were older than 10 years old. Oesophageal varices were detected in 8 (5.3%) of these gastrointestinal bleeding patients, while 23 (15.3%) patients had drug use histories prior to bleeding. Twenty (25%) of the patients were diagnosed with ulcerative colitis, 4 (5%) were diagnosed with Crohn's disease, and 10 (12.5%) had colon polyps. Ninety percent of the polyps were localised in the rectosigmoid colon. **Conclusion:** Peptic ulcer disease was the most common aetiology of the paediatric patients with upper gastrointestinal bleeding. The majority of the cases with lower gastrointestinal bleeding were diagnosed with inflammatory bowel disease; therefore, ulcerative colitis plays an important role in paediatric lower gastrointestinal bleeding cases.

### Key words

Gastrointestinal bleeding; Paediatrics

### Introduction

Gastrointestinal (GI) haemorrhages are divided into two groups: upper and lower. Bleeding emerging

somewhere between the upper part of the oesophagus and the ligament of Treitz (suspensory ligament of the duodenum) and then flowing into the lumen is called upper GI bleeding (UGIB), while bleeding from the distal part of the ligament of Treitz is called lower GI bleeding (LGIB). The GI tract has a large surface area with a large amount of vascularity; therefore, when any type of GI bleeding occurs, a significant amount of blood may be lost in a short period of time. GI bleeding in any age group must be assessed as an alarming finding, and it should be addressed cautiously.<sup>1</sup> Endoscopy is a very useful intervention for the diagnosis and treatment of GI bleeding.

The aim of this study was to retrospectively determine the epidemiological and demographic characteristics of the children admitted to our clinic with UGIB and/or LGIB complaints living in the South Marmara Region of Turkey.

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## Methods

We retrospectively evaluated 150 children treated either as inpatients or outpatients in the Department of Paediatric Gastroenterology, Hepatology and Nutrition at the Uludag University Faculty of Medicine due to any UGIB and/or LGIB diagnosis between January 2010 and April 2014. The following data was obtained from each patient's file: age, gender, complaints upon admission, family history, medication history, presence of additional diseases, endoscopy and pathology findings, hospitalisation period and any transfusion requirements. Newborn patients and patients with haemorrhagic diathesis and sepsis were excluded from the study. The endoscopy procedures were performed with an Olympus Exera II CV180 paediatric video endoscope and colonoscope. The cases were divided into two groups: under 10 years old (including 10 years old) or over 10 years old. Those cases presenting with complaints of haematemesis or melena were defined as having UGIB, while those cases with complaints of haematochezia were defined as having LGIB. Diagnosis of *Helicobacter pylori* (*H. pylori*) infection was based on either a positive histopathology or a positive culture.

This study was approved by the Ethics Committee of the Uludag University Faculty of Medicine (2014-11/12).

### Statistical Analysis

The relationships between the variables were examined using the Statistical Package for the Social Sciences version 16 (SPSS Inc., Chicago, IL, USA). The differences in the frequencies of the categorical variables were investigated using the chi-squared test. The Shapiro-Wilk's test was used to examine whether the data showed a normal distribution. The differences between two groups for the continuous variables were compared with the Student's t test. The significance level was set at  $\alpha = 0.05$  ( $p < 0.05$ ).

## Results

One hundred and fifty patients with diagnoses of UGIB and/or LGIB who were treated as either outpatients or inpatients at the Department of Paediatric Gastroenterology were retrospectively evaluated. At the time of admission, the mean age of the patients was  $11.0 \pm 4.6$  years (minimum 8 months, maximum 18 years). Sixty-three (42%) of the cases were females and 87 (58%) were males. The mean admission age for the females was  $11.5 \pm 4.8$  years, and it was  $10.6 \pm 4.5$  years old for the males

( $p > 0.05$ ). The cases were divided into two groups: those younger than 10 years old (including 10 years old) and those older than 10 years old. Sixty patients (40%) were younger than 10 years old, and 90 patients (60%) were older than 10 years old. Ratio of haematemesis, haematochezia and melena in children younger than 10 years old were 46.7%, 50%, and 3.3%, respectively, and in patients older than 10 years old were 36.7%, 55.6%, and 7.8%, respectively.

When the cases were evaluated in terms of comorbid diseases, 6 patients presented with congenital hepatic fibrosis, 1 patient with cryptogenic cirrhosis, 5 patients with epilepsy, 2 patients with hypoxic ischemic encephalopathy, 3 patients with recurrent urinary tract infections, and 2 patients with mitral valve prolapse. The additional histories included fundoplication surgery, Peutz-Jeghers syndrome, psoriasis, tracheoesophageal fistula surgery, immunothrombocytopenic purpura, familial Mediterranean fever, autoimmune hepatitis, osteogenesis imperfecta, Joubert syndrome, anal atresia surgery, optic neuritis and autism, which were each present in at least one patient. The remaining 120 patients (80%) had no comorbid diseases.

Twenty-three (15.3%) of the patients with GI bleeding complaints had histories of medication use before the bleeding began. Three of them were taking valproic acid, two were taking phenobarbital, and the others were taking alendronate, methylphenidate, lamivudine, corticosteroids, topiramate and risperidone. The remaining 12 patients were using nonsteroidal anti-inflammatory drugs. According to the age groups, 12 of the children that were younger than 10 years old and 11 of those older than 10 years old had medication use histories ( $p > 0.05$ ).

When the cases were examined in terms of the family history, 14 (9.3%) of the patients' family histories were positive with regard to GI diseases. The family histories of 6 patients younger than 10 years old and 8 patients older than 10 years old were positive ( $p > 0.05$ ).

Oesophagogastroduodenoscopies (OGD) were performed in 64 of the cases (42.6%), colonoscopies in 71 (47.3%) and combined procedures OGD and colonoscopy in 15 (10%). The endoscopic findings were classified as oesophageal varices, oesophagitis, cardiac laxity, pangastritis, antral gastritis, duodenitis, gastric ulcers, duodenal ulcers, polyps, colon ulceration, colitis, haemorrhoids and anal fissures. Oesophagitis was seen in 24 (16%) patients, oesophageal varicose veins in 8 (5.3%), pangastritis in 50 (33.3%), isolated antral gastritis in 21 (14%), cardiac laxity in 14 (9.3%), duodenitis in 8 (5.3%),

gastric ulcers in 14 (9.3%) and duodenal ulcers in 6 (4%). The colonoscopic evaluations showed that 9 (6%) patients exhibited sigmoid colon or rectal polyps, 1 (0.6%) had transverse colon polyps, 20 (13.3%) had an appearance compatible with ulcerative colitis, 4 (2.6%) had an appearance compatible with Crohn's disease, 11 (7.3%) had mild vascular changes in the colon, 4 (2.6%) had external haemorrhoids, and 2 (1.3%) had anal fissures. The colonoscopies were normal in 23 (15.3%) of the patients with complaints of GI bleeding.

Gastric ulcers were detected in 6 patients under 10 years old (10%) and in 8 patients over 10 years old (8.9%); however, all the patients with duodenal ulcers were over 10 years old. Oesophageal varices were detected in 4 patients in both groups. Six of the cases with colonoscopic evaluations revealing polyps were younger than 10 years old, and 4 of them were older than 10 years old. While 5 of the ulcerative colitis cases were younger than 10 years old, 15 were older than 10 years old. One of the patients with Crohn's disease was only 28 months old, while the other 3 patients were over 10 years old. External haemorrhoids were detected in 1 of the patients that was younger 10 years old, but they were detected in 3 of those older than 10 years old. There was one anal fissure case in each group (older and younger than 10 years) (Figure 1).

In terms of pathological evaluation of the patients, Barrett's oesophagus was detected in one patient from both groups; chronic gastritis was present in 26 patients (43.3%) younger than 10 years old, and in 39 patients (43.3%) over 10 years old; ulcerative colitis was present in 4 patients (6.6%) younger than 10 years old, and in 18 patients (30%)

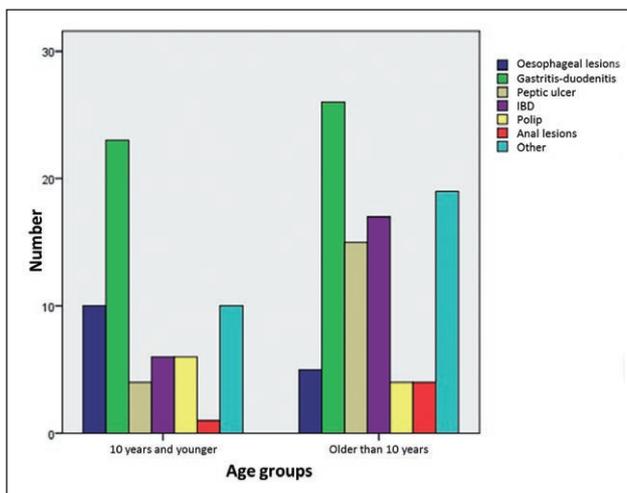
over 10 years old, two patients younger than 10 years old were reported as chronic inflammatory infiltration; Crohn disease was present in one patient younger than 10 years old, and in 3 patients over 10 years old; only one of the cases with polyps was reported as juvenile polyp and other 5 patients were reported as nonspecific infiltration (Figure 2).

*H. pylori* infections were found in 4 (11.8%) of 34 cases that were younger than 10 years old and in 16 (34%) of 47 cases that were older than 10 years old. The *H. pylori* infection rate was significantly higher in the group that was over 10 years old (p=0.02). It was determined that 65 (43.3%) of all the cases were treated as inpatients, and there was no significant difference between the groups in terms of the hospitalisation period, which was 4.2±6.2 days in the younger children and 4.7±10.6 days in the older children (p>0.05).

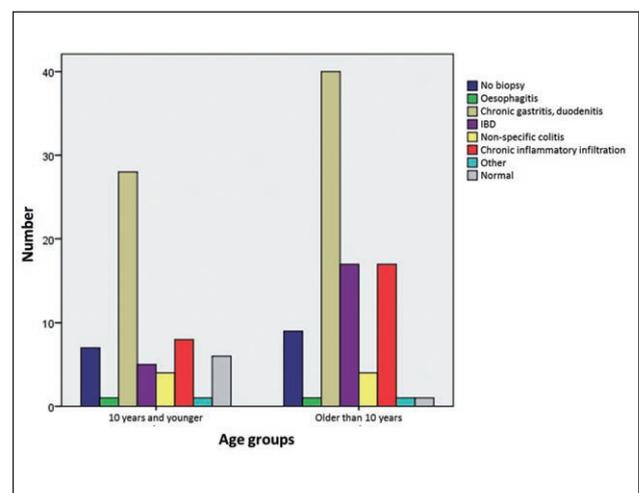
When the haemoglobin levels at the time of admission were examined, they were 10.9±2.2 g/dl in the younger patients and 11.4±2.5 g/dl in the older patients (p>0.05). Twenty-two (33.8%) of the patients required erythrocyte transfusions during hospitalisation. None of the patients died due to GI bleeding. Comparison of severity of the GI bleeding between the groups was showed in Table 1.

**Discussion**

GI bleeding in childhood is a major problem. Identifying the cause of the bleeding, which is an alarming gastroenterological emergency, requires



**Figure 1** Comparison of the endoscopic findings of the patients in two age groups.



**Figure 2** Comparison of the histopathologic findings of the patients in two age groups.

specific diagnostic methods as well as clinical skills so that the localisation and severity of the bleeding can be determined.

Studies of adults have indicated that the annual hospital admissions for GI bleeding accounted for 50-150/100000.<sup>2</sup> Although there is not enough data on the frequency of this condition in children, the studies that have been done were conducted mostly in intensive care unit patients. According to Chaibou et al<sup>3</sup> 103 of 1006 hospitalised children (10.2%) were diagnosed with UGIB, while 16 of them (1.6%) had clinically severe GI bleeding and were in a paediatric intensive care unit. In a study by Lacroix et al<sup>4</sup> 63 (6.4%) of 984 children admitted to the paediatric intensive care unit had UGIB. In another study by Pant et al<sup>5</sup> the epidemiology of GI bleeding was investigated in children who were treated in hospitals in the United States. The results showed that 23383 children were discharged with GI bleeding diagnoses, which was 0.5% of all the discharged cases. In our study, a total of 1164 patients with GI complaints underwent endoscopies between January 2010 and April 2014, and 150 of them (12.8%) were investigated for GI bleeding.

Previous studies of GI bleeding patients have indicated that the number of males with this complaint is somewhat greater in the study populations.<sup>5-7</sup> In our study, the number of males (58%) was slightly higher than that of the females. However, there was no information in the literature discussing why GI bleeding is more common in males.

In a study by Rafeey et al<sup>8</sup> 447 paediatric patients with UGIB were evaluated with EGDs within the course of 10 years, and the most common endoscopic findings were oesophagitis and erosive oesophagitis. In their study, Mrad et al<sup>9</sup> found peptic oesophagitis in infants and children at rates of 27.8% and 10%, respectively. In our study, oesophagitis was found in 24 patients (30.3%), and

pangastritis was found in 50 (63.2%) patients. Barrett's oesophagus was reported in two patients (10 and 13 years old) who had oesophagitis in their pathological evaluations. The Barrett's oesophagus disappeared in the control endoscopies of these patients.

UGIB can develop as a result of *H. pylori*-related ulceration. In Turkey in a study by Ecevit et al<sup>10</sup> *H. pylori* positivity was reported in 61% of the patients with peptic ulcers. In another study it was found that 1/5 of healthy Turkish children were infected with *H. pylori* before four years of age, and that every one child out of two under 11 years of age was infected with *H. pylori*.<sup>11</sup> Huang et al<sup>12</sup> reported that out of 1,234 endoscopic evaluations of paediatric patients, 67 patients had gastric or duodenal ulcers, and 47.7% of them had *H. pylori* infections. Houben et al<sup>13</sup> evaluated 76 children with UGIB and reported that acute bleeding was 2.6 times more common in the males. They also reported that 55% of the patients had *H. pylori* infections, while 75% of the UGIB patients had duodenal ulcers. In our study, *H. pylori* infections were found in 25.3% of the 79 patients who were admitted with UGIB complaints. Ratio of *H. pylori* positivity was higher in older age group as expected.

Rafeey et al<sup>8</sup> detected variceal lesions in 7.1% of 447 paediatric patients who underwent OGDs. Saliakellis et al<sup>14</sup> reported that variceal bleeding in developing countries occurs more often secondary to an extrahepatic portal venous obstruction. In our study, oesophageal variceal lesions were detected in 8 (5.3%) of the patients with GI bleeding. Congenital hepatic fibrosis was found in 6 patients, while oesophageal variceal bleeding, autoimmune hepatitis and cryptogenic cirrhosis were found in the others. In the patient with congenital hepatic fibrosis, the intestinal portal hypertensive vasculopathy caused long-lasting melena complaints. One month after the placement

**Table 1** Comparison of severity of the GI bleeding between the groups

	< 10 years old group	> 10 years old group	p
Localisation of GI bleeding (%)	Upper (50%) Lower (50%)	Upper (44.4%) Lower (55.6%)	>0.05
Weight z score	-0.09±1.45	-0.43±1.48	>0.05
Height z score	-0.20±1.28	-0.45±1.15	>0.05
Positivity of <i>H. pylori</i> (N, %)	4 (4.9%)	16 (19.8%)	<b>0.02</b>
Hospitalisation time (days)	4.2±6.2	4.7±10.6	>0.05
Drop in haemoglobin greater than 3 g/dl (N, %)	14 (9.3%)	22 (14.7%)	>0.05
Requirement of erythrocyte suspension transfusion (N, %)	5 (3.3%)	12 (8%)	>0.05

of a transjugular intrahepatic portosystemic shunt, the GI bleeding stopped, the patient's malnutrition improved, and weight gain began.

Grimaldi-Bensouda et al<sup>15</sup> detected at least one nonsteroidal anti-inflammatory drug (NSAID) use history in 83 out of a total of 177 paediatric patients who were admitted with UGIB. It has been previously reported that phenytoin does not increase the UGIB incidence, but it has also been stated that the chronic use of anticonvulsants may increase the risk of mucosal damage by other drugs.<sup>16</sup> In our study, 15.3% of the patients had previous medication use histories and 12 patients were using NSAIDs. In addition, 3 patients were taking valproic acid, and 2 patients were taking phenobarbital. Although valproic acid is known to cause thrombocytopenia and prolong the bleeding time, no thrombocytopenia was observed in any of our patients taking valproic acid (the bleeding times were not controlled in our cases).<sup>17</sup> Previous studies have reported that using alendronate in metabolic bone disease cases is associated with severe esophagitis, and that it might cause GI bleeding with gastric or duodenal ulcers.<sup>18</sup> One of our patients was taking alendronate to treat osteogenesis imperfecta, and it is believed that the cause of bleeding may have been associated with this medication. The other drugs used by our patients included methylphenidate, risperidone, topiramate and lamivudine, but no information directly indicating bleeding as a result of these drugs was found in the literature.

Although palpable purpura, which is a characteristic rash of Henoch-Schönlein purpura (HSP), was seen in every patient, it may not always be the first finding. GI bleeding and other GI findings are seen 7-10 days before the skin lesions in 15% of the cases.<sup>19</sup> In our study, a 5 years and 8 months old male patient was admitted to our hospital with hematochezia. Following the endoscopic detection of haemorrhagic gastritis and colonic ulcerations, he was examined for inflammatory bowel disease (IBD). On the 10th day of admission, when palpable purpura appeared in the gluteal region and legs confirming the HSP diagnosis, a steroid treatment was initiated with the onset of arthritis. The renal and scrotal involvement and all of the findings regressed within the course of this treatment.

IBD in school age children is an important cause of LGIB. IBD was detected in 24 (30%) of the 80 patients admitted with LGIB complaints in our study. Twenty of these patients had ulcerative colitis, and 4 had Crohn's disease. A 28-month-old female patient with Crohn's disease was admitted with seizures during the second year of treatment. She was diagnosed as embryonal

rhabdomyosarcoma with pulmonary and central nervous system metastases. This patient died due to the rapid progression of the malignancy. Immunologic tests (immunoglobulins and subgroups of lymphocytes) were within normal limits, but genetic test was not performed for this patient. In Crohn's disease, there is a risk of developing colorectal cancer that is 4-20 folds higher than in the normal population.<sup>20</sup> No information was found in the literature regarding the relationship between Crohn's disease and embryonal rhabdomyosarcoma.

Colorectal polyps are the most common cause of LGIB in children with painless bleeding symptoms. For example, Zahmatkeshan et al<sup>21</sup> found that 25.3% of 363 paediatric patients had polyps in their sigmoid colons, and that the most common pathological diagnosis was juvenile polyps. In our study, 10 (6.6%) of the patients with GI bleeding complaints had polyps. The pathological diagnosis was juvenile polyps in only one patient. Nonspecific inflammation was detected in 5 patients, and one patient had Peutz-Jeghers syndrome. The pathology reports of 3 patients were not found in the records. Moreover, our patients with polyps had no family histories.

In conclusion it was found that *H. pylori* infection was significantly more common in older age group when compared with smaller age group, but there was no difference in severity of GI bleeding between the age groups in our study. Our results showed that peptic ulcer disease was the most commonly detected aetiology in the paediatric patients with UGIB, while the majority of the cases with LGIB were diagnosed with ulcerative colitis.

## Declaration of Interest

The authors declare that they have no conflict of interests.

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