

## STROBE Statement

Title and abstract	<p><b>Title:</b> Upper Gastrointestinal Bleeding in Bangladeshi Children: Analysis of 100 Cases</p> <p><b>Background:</b> Upper GI bleeding is defined as bleeding that occurs proximal to ligament of treitz, sometime which can lead to potentially serious and life-threatening clinical situation in children. Globally, the cause of Upper GI bleeding (UGIB) differs significantly depending on geographic variation, patient population and presence of co-morbid conditions. The objective of this study was to observe endoscopic findings of upper gastrointestinal bleeding in children, at a tertiary care centre of Bangladesh.</p> <p><b>Methods:</b> This retrospective study was carried out in the department of Paediatric Gastroenterology &amp; Nutrition of Bangabandhu Shiekh Mujib Medical University (BSMMU), a tertiary care hospital of Bangladesh. Between January 2017 and January 2019. Data collected from hospital records of 100 children who were 16 years of age or younger, came with hematemesis, malena or hematemesis and malena both. All patients underwent upper gastro intestinal endoscopy (Olympus CV 1000 upper GI video endoscope) after initial stabilization. Necessary investigations to diagnose portal hypertension, CLD with underlying cause for management purpose were also done..</p> <p><b>Results:</b> Total 100 patients were studied. UGIB was common in the age group 5-10 years (42%), followed by above 10 years (36.8%). Hematemesis was the most common presenting symptom (75%) followed by both hematemesis and melena (25%). UGI bleeding from ruptured esophageal varices was the most common causes (65%) on UGI endoscopy followed by gastric erosion (5%), prolapsed gastropathy (2%), and 23% children were normal at endoscopy.</p> <p><b>Conclusions:</b> Ruptured esophageal varices was the most common cause of upper GI bleeding in children in Bangladesh, followed by the other causes of upper GI bleeding like gastric erosions, prolapsed gastropathy syndrome at Upper GI endoscopy.</p>
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Introduction	<p>Gastrointestinal (GI) bleeding is not uncommon in children. When the source of bleeding is proximal to the ligament of Treitz, it is defined as Upper Gastrointestinal Bleeding (UGIB) and, when distal to the ligament of Treitz as Lower Gastrointestinal Bleeding (LGIB) [1]. Upper gastrointestinal bleeding (UGIB) varies greatly in presentation and may provoke anxiety in the child, care-givers, and health-care providers. UGIB may present commonly as haematemesis, melena, hematemesis &amp; melena. Haematemesis may be defined as vomiting of blood that may be bright red or coffee-ground colour, small or large volume and may be associated with clots. A fistful of clots is nearly equivalent to 500 ml of blood [2]. Melaena is black, tarry stool. To produce melaena, 60 ml of blood is the minimum quantity and blood should stay for at least 6 hours in the intestine [3] Upper GI bleeding is infrequent in children with an estimated incidence of 1-2/10,000 per year [4], where the majority are being self limiting [5]. Significant upper GI bleeding is infrequent and remains a big challenge to clinicians regarding management.</p> <p>Aetiology of upper GI bleeding in children is diverse and causes varies with age, geographical location and with associated co-morbidity [6,7]. In older children and adolescents significant cause of Upper GI bleeding include variceal bleeding and peptic ulcer disease &amp; rarely foreign body ingestion, in infants more common etiologies are Mallory-Weiss tear and reflux esophagitis, in the neonates common cause includes swallowed maternal blood and milk protein allergy [7].</p> <p>Management of patients with upper GI bleeding depends on underlying cause, severity of bleeding and hemodynamic status of patient. There is a paucity of data regarding the etiology, mode of presentation &amp; endoscopic findings of UGIB in children of Bangladesh. The purpose of the study was to observe endoscopic findings of 100 cases of UGIB,</p>
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	admitted in the department of Paediatric Gastroenterology & Nutrition of Bangabandhu Sheikh Mujib Medical University (BSMMU), a tertiary care hospital of Bangladesh.
Methods	<p>This retrospective observational study <b>was</b> carried out in the department of Paediatric Gastroenterology of BSMMU of Bangladesh. Data <b>were</b> collected from hospital records after approval from <b>the</b> departmental ethical committee. 100 children who were 16 years of age or younger, presented with haematemesis and/or melaena <b>and underwent</b> upper GI endoscopy after <b>stabilization</b> of vitals within 24-48 hours, with sedation by parenteral midazolam &amp; <b>pethidine</b> with preparations for resuscitation, were included in this series. Patients who were older than 16 years of age or presented with bright red per rectal bleeding were excluded. Upper GI endoscopy was done by <b>an</b> expert Paediatric Gastroenterologist of <b>the</b> same department with <b>an</b> Olympus CV 100 video endoscope model. All patients were treated according to <b>the</b> standard departmental protocol. Blood for grouping (ABO &amp; Rh), routine complete blood count (CBC), and in selected cases blood liver biochemistry (ALT, Serum albumin, PT) with <b>Wilson's</b> disease/Autoimmune hepatitis panel were done. Stool for occult blood, along with doppler-ultrasonography of abdomen for ascites, liver echo-texture, portal vein thrombosis/cavernous malformation, diameter/pressure and splenomegaly were done for all patients according to <b>the</b> departmental protocol.</p> <p>Statistical analysis- Descriptive analyses were performed using frequency, means, Standard deviations, proportions.</p>
Results	Result- Total 100 children undergone UGI endoscopic evaluation, during the study period, among them, 62 male (62%), 38 (38%) were female. 22 (22%) below five years, 42 (42%) within 5 to 10 years, 36 (36%) were above 10

years with mean age of  $9 \pm 4.25$  years (table 1). 15 (15%) patient was admitted with impending shock (hypotension, tachycardia, cold clammy skin) from haematemesis and/or melaena needed volume resuscitation. Among the studied patients 30 (30%) presented with isolated haematemesis, 2 (2%) presented with isolated melaena, and 68 (68%) presented with combined haematemesis and melaena (table-1).

Table-1 Demographic characters & presentation of studied children (n=100).

Variable	N (%)
Age	
<5 years	22(22%)
5-10 years	42(42%)
>10 years	36(36%)
Mean age $9 \pm 4.5$ year.	
Sex	
Male	62(62%)
Female	38(38%)
Presentation	
Hematemesis	30(30%)
Melena	2(2%)
Combined - hematemesis & melena	68(68%)

At endoscopy, 65 (65%) had esophageal varices, required endotherapy like variceal ligation/ sclerotherapy (figure-1), 12 (12%) had non-variceal bleeding & 23 (23%) had normal UGI endoscopic findings. Among the 12 children patients who had non-variceal bleeding, 5 had gastric erosion, 1 had features of gastro-esophageal reflux disease (GERD), 1 had non-conclusive findings but ultimately diagnosed as hemophilia, 1 had features of blue rubber bleb nevus syndrome (BRBNS) (figure-3,4), 1 had Mallory Weiss tear, 2 had prolapsed-gastropathy (figure-2), 1 with eroded posterior duodenal artery from duodenal ulcer (underwent emergency laparotomic ligation of eroded posterior duodenal artery).

Table-2 Upper GI Endoscopic findings of studied children (n=100).

	Variable	N (%)
	Normal	23 (23 %)
	Esophaeal varices	65 (65 %) Extrahepatic PHTN 47 (47%) CLD with PHTN 18 (18%)
	Non varicial causes	Gastric erosion 5(5%) GERD 1(1%) Hemophilia 1(1%) BRBNS 1(1%) MWT 1(1%) PGS 2(2%) Duodenal artery erosion 1(1%)
	<p>We didn't get any patient of upper GI bleeding from foreign body ingestion. 65 (65%) children with UGIB who had variceal bleeding from ruptured esophageal varices, 47(47%) was ultimately diagnosed as extra-hepatic portal hypertension (PHTN), 18 (18%) was due to chronic liver disease (CLD). Etiology of CLD includes Wilson's disease (12), post kasai biliary atresia (1), auto-immune hepatitis (1), congenital hepatic fibrosis (1), cryptogenic (3). In our series we don't got any identifiable cause in 23(23%) cases (Table-2).</p>	
Discussion	<p>In the current study, male female ratio was 1.6:1, which is nearly similar in another study of upper GI bleeding in children [6]. A recent study by Dubey SRK et al. showed UGI bleeding is more common in 5 to 10 year age group (71.4%) [8], we also found majority of children (42%) was in 5-</p>	

	<p>10 year group.</p> <p>Variceal bleeding from portal hypertension was the common cause (65%) of UGI bleeding in this study, which is also high (95%) reported from another study [9]. Variceal bleeding rate of our study is very high in comparison to 10.6% in Western hemisphere (South America &amp; North America) [5,10,11] may be explained by, referral biasness, [as the majority of non-variceal bleeding cases were managed in non-tertiary healthcare centres, variceal bleeding cases needed referral to tertiary care centre], also the underlying geographic variation of disease states resulting in UGI bleeding.</p> <p>Among the variceal-bleeding cases, extrahepatic portal hypertension (EHPVO) was the major cause (47%), whereas (18%) were from chronic liver disease (CLD) with portal hypertension. For unknown reason EHPVO was found to be the common cause (46%) of variceal bleeding in another study from neighbor country [9, 12] that may be also true for Bangladesh. In a study from India showed 16.1% cases of UGI bleeding from CLD with portal</p>
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	<p>hypertension, which is almost similar to our findings (18%) [8]. The study showed Wilson's disease was the most common cause (12%) of CLD with portal hypertension, may be related to burden of consanguineous marriage, referral biasness, [as the disease is not routinely diagnosed in non-tertiary hospitals of the country]. We found 3% cases of UGI bleeding due to cryptogenic CLD with portal hypertension, which may be explained by lack of modern laboratory facility to diagnose metabolic liver disease other than Wilson's disease that remains undiagnosed.</p> <p>During evaluation of the 100 children with UGI bleeding, at endoscopy we found 12% children had non-variceal bleeding, among them, gastric erosion was found in 5% cases which is nearly similar (9%) to another study from India [12]. This may be partially explained by the fact that, parents using self medication (NSAIDS/traditional medications), during minor trauma/ high fever <i>etc.</i> Other endoscopic diagnosis were BRBNS, MWT,</p>
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	<p>prolapse gastropathy syndrome, posterior duodenal artery erosion from duodenal ulcer. In our series, of 23% cases no source of bleeding was found endoscopically, which was similar to Mittal et al. findings (28%) [12]. Cleveland et al. also found Normal/doubtful source on endoscopy in 42% cases [6]. Normal upper GI endoscopy findings may suggest minor mucosal lesions or extra GI source i.e. swallowed blood.</p>
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