

Clinical Audit on Management of Hematemesis in Children Admitted to Pediatric Gastroenterology and Hepatology Unit of Assiut University Children Hospital

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Abstract

Background: Hematemesis is an uncommon but potentially serious and life-threatening clinical condition in children. It indicates that the bleeding origin is above the Treitz angle, i.e., that it constitutes an Upper Gastrointestinal Bleeding (UGIB).

Aim of Study: To assess for how much the adopted protocols of management of children with upper gastrointestinal bleeding were applied at Gastroenterology & Hepatology Unit of Assiut University Children Hospital.

Patients and Methods: This study is an audit on management of children with upper gastrointestinal bleeding admitted to pediatric Gastroenterology and Hepatology Unit, Assiut University Children Hospital during the period from the 1st of March 2016 to the 28th of February 2017 and it included 80 children with hematemesis.

Results: Detailed history intake was recorded in most cases except history of drug intake which was not recorded in 30% of cases, history of epigastric pain and food pain relationship were not recorded in 38.7% of cases. Data of examination were recorded in 100% of cases. Basic and mandatory investigations in diagnosis of hematemesis were done in 100% of cases except coagulation profile and liver function tests and upper endoscopy. The standard treatment of hematemesis has been applied in most treatment lines except admission to the Intensive Care Unit. Also intravenous vitamin K was not given to all patients.

Conclusion: The international guidelines for the management of hematemesis have been followed by the Gastroenterology and Hepatology Unit of Assiut University Children Hospital in most treatment lines with some defaults due to poor resources and lack of medication.

Key Words: Hematemesis – Pediatrics.

Introduction

UPPER Gastrointestinal Bleeding (UGIB) is an uncommon but potentially serious and life-threatening clinical condition in children [1,2].

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Hematemesis: Indicates that the bleeding origin is above the Treitz angle, i.e., that it constitutes an Upper Gastrointestinal Bleeding (UGIB) [3].

The etiology of upper GI bleeding varies by age. The pathophysiology of upper GI bleeding is related to the source of the bleeding. Most clinically significant causes of upper GI bleeds are associated with ulcers, erosive esophagitis, gastritis, varices, and/or Mallory-Weiss tears. While Physiologic stress, NSAIDs such as aspirin and ibuprofen, and infection with *Helicobacter pylori* are few of the factors contributing to the imbalance leading to ulcers and erosions in the GI tract [4].

A focused history and physical examination and vital signs targeted at elucidating potential causes of bleeding should be rapidly obtained. Children with a history of concurrent major illness that require PICU care, such as sepsis and respiratory failure, may present with stress gastritis or stress ulcers [5].

Blood should be obtained to measure hemoglobin, hematocrit, blood urea nitrogen, creatinine, platelet count, prothrombin and partial thromboplastin times, international normalized ratio, liver enzymes, crossmatch, electrolytes and hepatitis markers. Abdominal US and Upper Endoscopy are important for investigation [6].

Management of a child with hematemesis includes: Resuscitation and stabilization, correction of coagulopathies, pharmacotherapy and urgent endoscopy [1].

Patients and Methods

The present study was conducted in Assiut University Children Hospital on all children with hematemesis admitted to Gastroenterology & Hepa-

tology Unit during the period from the 1st of March 2016 to the 28th of February 2017 and it included 80 children.

The following items were taken:

A- History:

- History of recent or recurrent epistaxis.
- History of recent onset of jaundice.
- History of change in stool color.
- History of easy bruising or bleeding from other orifices.
- History of liver disease.
- History of epigastric pain, food pain relationship.
- History of recent medications ingested (such as NSAIDs and corticosteroids).
- History of previous attack of hematemesis.

B- Examination:

• *General examination:*

- Conscious level.
- Jaundice, pallor, cyanosis.
- Feter hepaticus.

• *Vital signs:*

- Pulse.
- Blood pressure.
- Temperature.
- Respiratory rate.

• *Skin-petechiae for liver cell failure disease like Palmar erythema, spider nevi.*

• *Chest examination.*

• *Cardiac examination.*

• *Abdominal examination:*

- Hepatomegaly.
- Splenomegaly.
- Ascites.

C- Investigations:

- Complete blood count.
- Prothrombin time, prothrombin concentration.
- Liver function tests.
- Kidney function tests and electrolytes.
- Hepatitis markers.
- Abdominal ultrasound.
- Upper endoscopy.

D- Treatment:

- Admission at Intensive Care Unit.
- Resuscitation and stabilization by: Large bore venous access, crystalloid initially, blood transfusion and insertion of nasogastric tube.
- Correction of Coagulopathies: Vitamin K given empirically and Fresh Frozen Plasma (FFP).
- Pharmacotherapy: Octreotide in cases of Variceal bleed, Beta Blocker, PPI or H2 blocker in cases of Mucosal bleeding.
- Endoscopic techniques in cases of variceal bleeding: Endoscopic Variceal ligation alone and Endoscopic Sclerotherapy + Variceal ligation.

Inclusion criteria:

Children from 1 month to 18 years with hematemesis.

Results

The present study included 80 children with hematemesis who were admitted to Gastroenterology & Hepatology Unit of Assiut University Children Hospital over one year period from the 1st of March 2016 to the 28th of February 2017, 43 cases were males and 37 cases were females with age range from 1 month to 18 years.

The results of the present study are shown in (Tables 1-5).

Table (1): Findings of history in studied children (total number =80).

	Yes		No	
	No.	%	No.	%
• Recent or recurrent epistaxis.	13	16.3	67	83.7
• Recent onset of jaundice.	18	22.5	62	77.5
• Recent onset of change in stool color.	25	31.2	55	68.8
• History of easy bruising or bleeding from other orifices.	15	18.8	65	81.2
• History of liver disease.	24	30	56	70
• Liver cirrhosis.	9	37.5		
• Extrahepatic biliary atresia.	2	8.3		
• Portal vein thrombosis.	6	25.0		
• Wilson disease.	2	8.3		
• Autoimmune hepatitis.	1	4.2		
• Hepatitis C.	1	4.2		
• Congenital liver fibrosis.	1	4.2		
• Alpha-1 antitrypsin deficiency.	1	4.2		
• TORCH hepatitis.	1	4.2		
• Epigastric pain, food pain relationship.	17	34.7	32	65.3
• History of recent medications ingested (NSAID, Corticosteroid).	7	12.5	49	87.5
• History of previous attack of hematemesis.	34	42.5	46	57.5
• History of vomiting.	26	32.5	54	67.5

Table (2): Findings of examination in studied children.

	Yes		No	
	No.	%	No.	%
General examination:				
<i>Disturbed conscious level:</i>	18	22.5	62	77.5
Mild (GCS=13-15)	15	83.3		
Moderate (GCS=9-12)	2	11.1		
Severe (GCS=3-8)	1	5.6		
Pallor	53	66.3	27	33.7
Jaundice	18	22.5	62	77.5
Palmar erythema, spider nevi	11	13.8	69	86.2
<i>Pulse:</i>				
Tachycardia	17	21.3		
Normal pulse	63	78.7		
<i>Temperature:</i>				
Hyperthermia	9	11.3		
Normal temperature	71	88.7		
<i>Blood pressure:</i>				
Hypotension	7	8.8		
Normal blood pressure	73	91.2		
<i>Respiratory rate:</i>				
Tachypnea	13	16.3		
Normal respiratory rate	67	83.7		
<i>Chest examination:</i>				
Respiratory distress, fine crepitations	3	3.7		
Normal chest examination	77	96.3		
<i>Heart examination:</i>				
Normal heart examination	80	100		
<i>Abdominal examination:</i>				
Ascites	8	10	72	90
Hepatomegaly	24	30	56	70
Splenomegaly	13	16.3	67	83.7

Table (3): Findings of investigations in studied children.

Investigations	No.	%
<i>Complete blood count (CBC):</i>		
<i>WBC:</i>		
Range		3.1-33.1
Mean ± SD		10.91±6.63
- Leukocytosis	29	36.3
- Normal leukocytic count	51	63.7
<i>Haemoglobin level:</i>		
Range		4.5-13
Mean ± SD		9.37±2.18
- Anemia	58	72.5
- Normal haemoglobin level	22	27.5
<i>Platelet count:</i>		
Range		34-627
Mean ± SD		277.66±144.07
- Thrombocytopenia	11	13.8
- Thrombocytosis	12	15.0
- Normal platelet count	57	71.2
<i>Prothrombin time (PT), prothrombin concentration (PC):</i>		
- Prolonged PT, PC	17	25.4
- Normal PT, PC	50	74.6
Liver function tests:		
<i>Bilirubin level:</i>		
- Hyper bilirubinemia	18	29.0
- Normal bilirubin level	44	71.0

Table (3): Findings of investigations in studied children (Continue).

Investigations	No.	%
<i>Liver enzymes (ALT, AST):</i>		
- Raised liver enzymes	16	25.8
- Normal liver enzymes	46	74.2
<i>Kidney function tests:</i>		
- Raised kidney function tests	2	2.5
- Normal kidney function tests	78	97.5
Electrolytes:		
<i>Na (Sodium):</i>		
Hyponatremia	3	3.7
Hyponatremia	8	10
Normal Na level	69	86.3
<i>K (Potassium):</i>		
Hyperkalemia	1	1.2
Hypokalemia	4	5
Normal K level	75	93.8
<i>Ca (Calcium):</i>		
Hypercalcemia	0	0
Hypocalcemia	7	8.7
Normal Ca level	73	91.3
<i>Hepatitis markers: (Indicated cases=13):</i>		
Hepatitis A virus antibody IgM: +ve	6	46.2
Hepatitis C virus antibody: +ve	1	7.6
Negative hepatitis markers	6	46.2
<i>Abdominal ultrasound findings:</i>		
Hepatomegaly	24	30
Splenomegaly	13	16.3
Ascites	8	10
<i>Upper endoscopy:</i>		
Oesophageal varices	24	30.8
Gastritis	21	26.9
Duodenitis	20	25.7
Gastroduodenitis	4	5.1
Mallory Weiss syndrome	3	3.8
GERD	1	1.3
Normal endoscopic finding	5	6.4

Table (4): Treatment of all studied children.

	Done		Not done	
	No.	%	No.	%
• Admission at Intensive Care Unit.	0	0	0	0
<i>Resuscitation and stabilization:</i>				
• Large bore venous access.	80	100	0	0
• Crystalloid initially in indicated cases (indicated cases=47).	47	100	0	0
• Blood transfusion in indicated cases (indicated cases=45).	45	100	0	0
• Insertion of nasogastric tube.	38	47.5	42	52.5
<i>Correction of Coagulopathies:</i>				
• Vitamin K given	36	45	44	55
• Fresh Frozen Plasma (FFP) in indicated cases (indicated cases=30).	30	100	0	0
<i>Pharmacotherapy:</i>				
• Octreotide in cases of Variceal bleed (indicated cases=24).	24	100	0	0
• Beta blocker in cases of Variceal bleed (indicated cases=24).	20	83.3	4	16.7
• PPI or H2 blocker in cases of Mucosal bleeding (indicated cases=49).	49	100	0	0
• PPI in cases of mucosal bleeding.	16	32.7	33	67.3
• H2 blocker.	33	67.3	16	32.7
• Proton Pump Inhibitor (PPI).	47	58.8	33	41.2
• Aomicillin + Clarithromycin + PPI in cases of H. pylori (indicated cases=8).	80	100	0	0
<i>Endoscopic techniques in cases of Variceal bleed (indicated cases=24):</i>				
• Endoscopic Variceal ligation alone.	16	66.7	8	33.3
• Endoscopic Sclerotherapy + Variceal ligation.	8	33.3	16	66.7

Table (5): Findings in children presented with hematemesis.

The findings	Male (n=43)	Female (n=37)	Total (n=80)
Esophageal varices	15 (62.5%)	9 (37.5%)	24 (30%)
Gastritis	7 (33.3%)	14 (66.7%)	21 (26.3%)
Duodenitis	10 (50%)	10 (50%)	20 (25%)
Gastroduodenitis (gastritis and duodenitis)	2 (50%)	2 (50%)	4 (5%)
Mallory Weiss syndrome	3 (100%)	–	3 (3.8%)
Glanzeman thrombathenia	2 (66.7%)	1 (33.3%)	3 (3.8%)
Milk protein allergy	2 (100%)	–	2 (2.5%)
Gastroesophageal reflux disease (GERD)	1 (100%)	–	1 (1.2%)
Swallowed blood syndrome	1 (100%)	–	1 (1.2%)
Thrombathenia secondary to NSAID	–	1 (100%)	1 (1.2%)

Discussion

Regarding history taking; most data of the history were fulfilled except history of drug intake (NSAIDs and Corticosteroids) which was recorded in 70% of cases, history of epigastric pain and food pain relationship which were recorded in 61.3% of cases.

Many prescription and medications have been associated with gastritis, peptic ulcer and duodenitis [4]. Therefore, it is important to take into consideration the importance of history of drug intake in children with hematemesis. Unless the underlying liver disease is successfully treated, hematemesis is associated with a high risk of recurrence [1].

Regarding examination; in the present study all data of examination were fulfilled in 100% of cases.

Regarding investigations; most recommended investigations were done except coagulation profile which was done in 83.7% of cases and liver function tests which were done in 77.5% of cases in whom it was suspected that hepatic disorder was the cause of hematemesis. Upper endoscopy was done in 97.5% of cases (survived cases). Elevated liver enzymes may indicate underlying liver disease and prolonged PT/INR or PTT may indicate pre-existing coagulopathy. Hepatitis markers were done in cases that were suspected to have hepatitis and not in other cases that had a known cause as biliary atresia or portal vein thrombosis. So they were done in 100% of indicated cases. Upper gastrointestinal endoscopy is the gold standard for diagnosis and treatment of UGIB and this procedure can diagnose the etiology in 85-90% of cases. It is indicated to identify the site of the bleeding, to diagnose the specific cause of the bleeding, and to initiate therapeutic interventions when indicated. If endoscopic appearance suggests esophagitis, gastritis or duodenitis a biopsy should be obtained; in suspected peptic ulcer disease antral biopsies for *H. pylori* work up (histological examination,

rapid urease test, and culture) should be taken. Though there is no definite time frame given, in all cases of major upper GI bleed, an early endoscopy (within first 24h) is recommended by most of the reviews [1].

Regarding treatment; the international guidelines for the management of hematemesis have been followed by the Gastroenterology and Hepatology Unit of Assiut University Children Hospital in most treatment lines except admission to the Intensive Care Unit, no case was admitted to Intensive Care Unit (instead they all were admitted at Gastroenterology Intermediate Care Unit) so, prophylactic endotracheal intubation was not applicable.

Owensby et al., reported that; patients with active bleeding that leads to hemodynamic compromise require intravenous access for fluid resuscitation and transfusion. Insertion of large bore venous access was done in 100% of cases to restore blood volume. Crystalloid (20ml/kg) was given in 100% of indicated cases for fluid resuscitation in the cases of hypovolemia and shock [7]. Blood transfusion was given in 100% of indicated cases. Blood transfusion is appropriate for unstable patients and those with hemoglobin $< 8\text{g/dL}$ [6]. A nasogastric tube placement and lavage should be considered for all pediatric patients with suspected upper GI bleeding [7,8].

Lavage allows for sampling of gastric contents to confirm the presence of blood, localizing bleeding to the upper GI tract, estimating the rate of bleeding, check for ongoing or recurrent bleeding, to clear gastric field for endoscopic visualization, to prevent aspiration of gastric contents and preventing hyperammonemia and hepatic encephalopathy in patients with liver disease [7]. Insertion of nasogastric tube and lavagewere done in 47.5% of our cases because not all cases presented with active bleeding, in some cases the bleeding stopped spontaneously, so there was no need in those children to insert nasogasric tube because there was no ongoing blood loss in that moment. Also na-

sogastric tube was not inserted in children with suspected large oesophageal varices in this study because it is contraindicated, for fear of rupture of varices and increase risk of bleeding. Singhi et al., recommended that administration of intravenous vitamin K at a dose of 1 to 2mg/dose for infants and 5 to 10mg for children as vitamin K is necessary for synthesis of clotting factors II, VII, IX, and X. In the present study only 45% of children who had prolonged PT and PC were given intravenous Vitamin K. Other children with normal coagulation profile did not receive it. Our opinion for this, is that in the country with limited resources like us it is wise to limit the use of Vitamin K or other drugs to needed children only; not in all children who present with hematemesis especially that the outcome of other children was not affected by this lack of intake. Fresh Frozen Plasma (FFP) was given in 100% of indicated cases. Coagulopathy with an International Normalized Ratio (INR) higher than 1.5 or abnormal Partial Thromboplastin Time (PTT) should be corrected with fresh frozen plasma (10ml/kg initially). Octreotide was given in 100% of indicated cases (cases of variceal bleeding). It produces selective splanchnic vasoconstriction and decreases portal inflow, thereby indirectly reducing variceal blood flow, our data are in agreement with Romano et al., β -Blocker was given in 100% of indicated cases (cases of Variceal bleeding). It reduce portal pressures by decreasing cardiac output and vasoconstricting the splanchnic vessels via blockade of β -1 and β -2 receptors [9].

Proton Pump Inhibitors or H₂ Receptor Antagonists were given in 100% of indicated cases of mucosal bleeding. Proton Pump Inhibitors (PPIs) are more efficacious than H₂ receptor antagonists [7].

Endoscopic variceal ligation alone was done in 66.7% of cases (cases of variceal bleeding). Upper gastrointestinal endoscopy should be performed as soon as possible after initial stabilization. Endoscopic therapy should be done if variceal source of hemorrhage is confirmed [7]. In management of acute variceal bleeding, Endoscopic Variceal Ligation (EVL) is the treatment of choice [10,11]. Endoscopic variceal ligation and endoscopic sclerotherapy were done in 100% of indicated cases (cases of esophageal varices and fundal varices).

Conclusion:

The international guidelines for the management of hematemesis have been followed by the Gastro-

enterology and Hepatology Unit of Assiut University Children Hospital in most treatment lines and some of the defaults were due to poor resources.

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المراجعة الإكلينيكية لعلاج القيء الدموي لدى الأطفال المحجوزة بوحدة الجهاز الهضمي والكبد بمستشفى الأطفال جامعة أسيوط

القيء الدموي: هو نزيف بالجهاز الهضمي العلوي أعلى رباط ترينز الذي يقع في الثنية الإثنا عشرية الصائمية. ويتميز القيء باللون الأحمر الفاتح أو الأحمر الداكن أو بني مثل القهوة وهذه مشكلة غير شائعة في الأطفال ولكنها خطيرة وتهدد الحياة.

وتختلف أسباب القيء الدموي حسب إختلاف العمر ومكان النزيف. ومن الأمراض المسببة للنزيف الحاد أو الشديد للجهاز الهضمي العلوي عند الأطفال تشمل قرحة المعدة والإثنى عشر ونزيف دوالي المرئ وأيضا تمزق جدار المرئ المعروف ب (مالوري ويس تيزر) أو التقرحات المتعددة في الغشاء المخاطي.

ويمكن معرفة السبب عن طريق التاريخ المرضي والفحص الإكلينيكي ومن هذه الفحوصات صورة دم كاملة وزمن وتركيز بروتومبين ووظائف كبد كاملة وأشعة تلفزيونية على البطن ومنظار علوي (الذي يعد من أهم وسائل التشخيص ويجب العمل على الإستقرار الفوري للحالة قبل التشخيص. ويعتمد علاج القيء الدموي على حسب السبب مثل حقن دوالي المرئ ومعادلة الحمض المعدي.

شملت الدراسة الحالية ٨٠ طفلا مصابين بالقيء الدموي تمت معالجتهم بوحدة أمراض الجهاز الهضمي والكبد بمستشفى الأطفال بجامعة أسيوط على مدى سنة واحدة من ١ مارس ٢٠١٦ إلى ٢٨ فبراير ٢٠١٧ تتراوح أعمارهم بين شهر و١٨ سنة. عدد الذكور ٤٣ حالة وعدد الإناث ٣٧ حالة.

وقد كانت دوالي المرئ من أكثر أسباب نزيف الجهاز الهضمي العلوي (٣٠٪) يليها إلتهاب المعدة (٢٦.٣٪) يليها إلتهاب الإثنى عشر (٢٥٪).

في هذه الدراسة، تم إستيفاء البيانات الخاصة بالعمر والنوع في ١٠٠٪ من الحالات. تم إستيفاء البيانات الخاصة بالتاريخ المرضي في معظم الحالات فيما عدا تاريخ تناول العقاقير فلم يتم إستيفاءه في ٣٠٪ من الحالات، تاريخ ألم البطن وعلاقة الأكل بالقيء لم يتم إستيفاءه في ٣٨.٧٪ من الحالات. تم إستيفاء البيانات الخاصة بالفحص في كل الحالات.

وقد تم إستيفاء البيانات الخاصة بالتحاليل المعملية الأساسية اللازمة لتشخيص القيء الدموي في كل الحالات ما عدا فحص تخثر الدم ووظائف الكبد.

وقد إتبعنا المبادئ التوجيهية الدولية لإدارة القيء الدموي من قبل الجهاز الهضمي والكبد بمستشفى أطفال جامعة أسيوط في معظم خطوط العلاج بإستثناء القبول في وحدة العناية المركزة كإجراء وقائي في المرضى الذين يعانون من صدمة ناتجة من النزيف الشديد. كما لم يعطى فيتامين ك بالوريد لجميع المرضى ولم يتم تركيب أنبوية معدية لكل الحالات.

وقد خلصت هذه الدراسة إلى أن دوالي المرئ وإلتهاب المعدة وإلتهاب الإثنى عشر من أهم أسباب نزيف الجهاز الهضمي العلوي في الحالات المحجوزة بوحدة أمراض الجهاز الهضمي والكبد بمستشفى الأطفال بجامعة أسيوط. وتعتبر مناظير الجهاز الهضمي في الأطفال من الوسائل التشخيصية الهامة حتى السنة الأولى من العمر ويمكن أن يتم الفحص بشكل آمن وأيضا يمكن القيام ببعض الطرق العلاجية بواسطة المناظير مثل حقن الدوالي. معظم حالات نزيف الجهاز الهضمي العلوي تحسنت ما عدا حالتين من حالات دوالي المرئ.

وينصح بالآتي:

- يجب القيام بجميع المرضى الذين يعانون من القيء الدموي واللذين تم حجزهم بالمستشفى وإعطاء الأولوية لإستقرار الحالة قبل البحث عن وجود عامل مسبب ويتم حجز المريض المصاب بصدمة بوحدة العناية المركزة لعمل الإنعاش اللازم.
- يجب تسجيل التاريخ الدوائي في جميع المرضى الذين يعانون من القيء الدموي (الأنوية المتورطة في التسبب بقرح المعدة والإثنى عشر). ومن المهم أيضا تفعيل التثقيف الصحي حول خطر إساءة إستخدام خافضات الحرارة.
- يجب عمل فحص تخثر الدم ووظائف الكبد للحالات المتوقع أن سبب النزيف نتيجة مرض بالكبد.
- يجب إعطاء فيتامين ك للحالات التي تعاني من ضعف التخثر.
- يجب تركيب الأنبوية المعدية بأيدي متدربة في حالات النزيف المستمر.