

Case Report

## Pediatric Peptic Ulcer Resulting in Massive Upper Gastrointestinal Bleeding: A Case Report with Clinical Management Insights

### *Pediatric Peptik Ülserin Masif Üst Gastrointestinal Kanama ile Sonuçlanması: Klinik Yönetim İçgörülerini ile Bir Olgu Sunumu*

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#### ABSTRACT

Pediatric peptic ulcer disease (PUD) resulting in massive upper gastrointestinal bleeding (UGIB) is an uncommon yet critical condition that necessitates prompt and targeted intervention. We present a case of a 16-year-old female with severe hematemesis, melena, and hemodynamic instability, ultimately diagnosed with a duodenal ulcer via endoscopy. Initial resuscitation involved intravenous fluids, blood transfusions, proton pump inhibitors (PPIs), and tranexamic acid, followed by definitive hemostasis via endoscopic hemoclippping. This case underscores the significance of early recognition, timely resuscitation, and appropriate endoscopic intervention in managing pediatric UGIB. A literature review was conducted to contextualize the clinical approach, highlighting optimal treatment strategies in resource-limited settings. This case contributes to the growing body of knowledge on pediatric UGIB and provides clinically practical insights for improving patient outcomes.

**Keywords:** Upper gastrointestinal bleeding, peptic ulcer disease, pediatric endoscopy, case report

#### ÖZET

Masif üst gastrointestinal kanama (UGIB) ile sonuçlanan pediatrik peptik ülser hastalığı (PUD), nadir görülen ancak kritik bir durumdur ve hızlı ve hedefe yönelik müdahale gerektirir. Şiddetli hematemez, melena ve hemodinamik instabilite ile başvuran 16 yaşında bir kız olgusu sunuyoruz; endoskopi ile sonuçta duodenum ülseri tanısı konuldu. Başlangıç resüsitasyonu intravenöz sıvılar, kan transfüzyonları, proton pompa inhibitörleri (PPI'ler) ve traneksamik asidi içerdi; ardından endoskopik hemoklip uygulaması ile kesin hemostaz sağlandı. Bu olgu, pediatrik UGIB yönetiminde erken tanımanın, zamanında resüsitasyonun ve uygun endoskopik müdahalenin önemini vurgulamaktadır. Klinik yaklaşımı bağlama oturtmak için bir literatür taraması yapıldı ve kaynakların kısıtlı olduğu ortamlarda optimal tedavi stratejileri öne çıkarıldı. Bu olgu, pediatrik UGIB üzerine artan bilgi birikimine katkıda bulunmakta ve hasta sonuçlarını iyileştirmeye yönelik klinik olarak pratik içgörüler sunmaktadır.

**Keywords:** Üst gastrointestinal kanama, peptik ülser hastalığı, pediatrik endoskopi, olgu sunumu

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## INTRODUCTION

Upper gastrointestinal bleeding (UGIB) is a rare yet potentially grave, life-threatening disease in pediatric patients [1]. The prevalence of UGIB in the pediatric population is not well defined. Up to 20 percent of all cases of gastrointestinal bleeding in children originate from an upper gastrointestinal source. One prospective study noted UGIB in 63 out of 984 (6.4%) pediatric intensive care unit hospitalizations [2]. The global mortality rate for UGIB in children ranges from 5% to 21%, indicating the heterogeneous populations affected by disorders related to UGIB [1]. The vast majority of these are benign and self-limiting. Common clinical manifestations include hematemesis (73%), melena (21%), and hematochezia (6%) [3]. Gastrointestinal bleeding may escalate to an emergency when there is a decrease in hemoglobin or intravenous access proves challenging [3].

The causes of pediatric UGIB vary by age and demographic group. Neonatal upper tract bleeding is attributed to maternal blood ingestion and a protein-based milk allergy; in toddlers, prevalent causes include Mallory-Weiss tears and reflux esophagitis [4]. In adolescents, the pathogenesis is frequently attributed to variceal hemorrhage (portal hypertension), peptic ulcer induced by medications (NSAIDs, aspirin, iron, doxycycline), stress or mechanical trauma from foreign body ingestion, and *H. pylori* infection [5]. Independent risk factors for bleeding include elevated Pediatric Risk Mortality score, coagulopathy, pneumonia, and multiple trauma. Two case series involving critically ill pediatric patients not receiving prophylactic therapy reported higher rates of UGIB [2]. This study seeks to illustrate the clinical manifestations and accessibility of effective treatments for gastrointestinal bleeding, especially in resource-constrained healthcare settings. By providing management insights, this report aims to contribute to the limited body of knowledge on pediatric UGIB, supporting improved outcomes while highlighting its diagnostic and therapeutic challenges.

## CASE REPORT

A 16-year-old female presented to the emergency room with a 2-day history of vomiting fresh blood mixed with clots, accompanied by epigastric pain and melena. The patient displayed no previous concomitant systemic disorders or prescription history (NSAIDs, steroids, SSRIs, acetylsalicylic acid, and

anticoagulants); nonetheless, there was a history of consuming spicy foods and bottled drinks. She engaged in moderate daily activity and had no history of lifting substantial weights.

Upon examination, the patient exhibited hemodynamic instability, presenting with a blood pressure of 90/50 mmHg and episodes of hematemesis. The general examination revealed anemic conjunctiva, a grade 4 pansystolic murmur, and epigastric discomfort. No clinical evidence of ascites or organomegaly was observed. Laboratory results are presented in Table 1. The patient received initial therapy, comprising oxygen support and nasogastric tube placement for monitoring upper gastrointestinal aspirate and production. Two intravenous lines were established for isotonic fluid administration and a 550-cc transfusion of packed red blood cells (PRBC). Intravenous antibiotics (Ceftriaxone) were administered alongside intravenous tranexamic acid and intravenous proton-pump inhibitor (PPI) due to a suspected bleeding ulcer.

On the initial day of treatment, the patient experienced four episodes of hematemesis, with each episode involving an estimated blood volume of approximately 250 cc. The patient exhibited signs of weakness yet remained fully conscious. Physical examination indicated that vital signs were normal, but epigastric discomfort persisted with dark red production from the nasogastric tube. The medication was maintained, and three bags of PRBC transfusion (550-cc) were administered. The post-transfusion hemoglobin level exhibited no improvement (Table 1).

The patient developed hematuria the following day (day 2-3 of treatment). Following urinalysis and renal function tests revealed blood findings, with renal function remaining within normal limits (Table 1). Subsequent treatment involved a three-day administration of Vitamin K and a re-transfusion of three units of 750cc PRBCs.

On treatment day 3 to 4 following transfusion, an increase in the patient's hemoglobin level was observed (Table 1). Subsequent manifestations, including hematemesis, melena, and hematuria, were absent. Epigastric pain had also subsided. Therapy was maintained, and the patient received a soft diet.

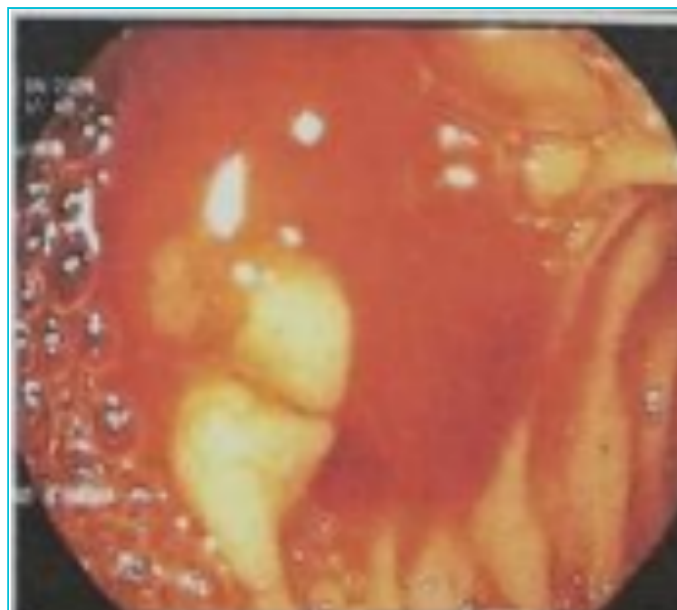
During days 5 to 6 of treatment, the patient underwent a transfusion of 300 cc of whole blood cells (WBCs). An elevation in post-transfusion hemoglobin

levels was observed (Table 1). The patient demonstrated a stable condition upon physical examination; therefore, she was scheduled for referral to a tertiary health facility for endoscopy. Endoscopic examination revealed duodenal bleeding attributed to an ulcer with active and radiating hemorrhage, classified as Forrest class 1A, alongside erosive gastritis (Figure 1). A hemoclippping procedure was performed (Figure 2).

**Table 1.** Laboratory Findings (by day of treatment)

Variables	Findings
Time of Admission	
Hemoglobin	4.9 g/dL
Leukocyte	16.800/ $\mu$ L
Urinalysis	Erythrocytes (+3)
Renal Function Tests	Within normal range
Treatment Day 1	
Hemoglobin	4.9 g/dL
Treatment Day 2-3	
Urinalysis	Erythrocytes (+3)
Renal Function Tests	Within normal range
Treatment Day 3-4	
Hemoglobin	6 g/dL
Treatment Day 5-6	
Hemoglobin	8.1 g/dL

The patient underwent continuous monitoring over 24 hours, receiving a soft diet, intravenous PPIs, and intravenous tranexamic acid. Monitoring revealed a recurrence of active bleeding from the nasogastric tube aspirate, accompanied by hypovolemic shock. The patient received fluid resuscitation and dobutamine as an inotropic agent. No additional endoscopic examination was conducted after the rebleeding event. Following five days of observation in the Intensive Care Unit (ICU), the patient's condition showed improvement, leading to her discharge with supplementary blood tablets to address anemia.



**Figure 1.** Bulbous bleeding in Duondeum (Forrest class 1A)



**Figure 2.** Hemoclip application to stop the bleeding

## DISCUSSION

Upper gastrointestinal bleeding (UGIB) denotes lesions in the digestive tract extending from the esophagus to the ligament of Treitz and is a common indication for hospitalization in pediatric patients. Worldwide, UGIB constitutes 20% of pediatric hospital admissions related to gastrointestinal hemorrhage, with a mortality rate between 5% and 10% [6]. However, there remains a lack of comprehensive data concerning the precise incidence of UGIB in pediatric populations.

Several factors influence the prevalence of UGIB across various regions and countries globally. UGIB can be categorized into two primary groups based on etiology: variceal and non-variceal. A study conducted in Vietnam and a large cross-sectional study in Turkey identified the leading causes of UGIB as esophagitis (47%), PUD (18.1%), and esophageal varices (11.1%). PUD is especially common in children older than five years [7,8]. Another 10-year retrospective multicenter cohort study conducted in China identified erosive gastritis as the most prevalent endoscopic finding in children with UGIB, followed by duodenal ulcer [9]. These statistics align with the findings in this case, where endoscopic examination revealed the presence of an ulcer and erosive gastritis with no evidence of variceal bleeding.

Many studies have identified few risk factors for PUD resulting in UGIB within the pediatric population, notably age, NSAID consumption, and *H. pylori* infection. PUD was reported to affect patients aged 10 to 20 years predominantly. A retrospective cohort study indicated that the median age of individuals with gastric ulcers was lower than those with duodenal ulcers. The likelihood of PUD is also reported to rise with a positive family history or concurrent drug administration [10]. In this instance, the patient had no concurrent history of NSAID use. Testing for *H. pylori* was not conducted due to inadequate facilities, thus preventing confirmation of the exact etiology. However, previous research in Saudi Arabia has indicated that certain food consumption, particularly spicy foods, may exacerbate or increase the risk of developing peptic ulcers [11].

Upper gastrointestinal bleeding demands specific care in clinical practice [12]. Initial UGIB management should include a systematic assessment of the airway, breathing, and circulation. Installation of intravenous access is critical, as it facilitates rapid administration of fluids, blood, and pharmacologic agents necessary for resuscitation in cases of severe bleeding, thereby potentially saving lives [13]. Immediate fluid resuscitation using crystalloids or colloids should be initiated via two IV lines. Blood transfusion is recommended for hemodynamically unstable patients. The transfusion volume should be carefully determined to maintain the post-transfusion hemoglobin levels between 8 and 9 g/dL [14]. The objective of this conservative hemogram is based on the premise that

excessive transfusion may elevate variceal pressure, thereby increasing the risk of rebleeding. Patients exhibiting active bleeding and coagulopathy should be considered for fresh frozen plasma transfusion. Platelet concentrate transfusions are indicated in cases of thrombocytopenia, an INR exceeding 1.5, or persistent bleeding [15,16]. In this case, the patient experienced recurrent active bleeding; therefore, a transfusion was administered during therapy with a target hemoglobin of 8 g/dL to prevent further bleeding during endoscopy [14].

Additional investigations, such as blood glucose, electrolytes, and blood gas analysis, should be conducted, and any abnormalities should be corrected promptly. Fluid input and output must be closely monitored. Pharmacological therapy includes an initial octreotide infusion of 1 mcg/kg IV over five minutes and a continuous infusion of 1-3 mcg/kg/hour. Other medications include IV antibiotics (e.g., co-amoxiclav, cephalosporin, or piperacillin/tazobactam), PPIs or Histamine-2 blockers, and vitamin K. A nasogastric tube (NGT) may be inserted as part of the management. If bleeding continues and does not respond to prior interventions, the consideration of a Sengstaken tube for additional management is warranted. Oral intake should be withheld, including food, drink, and medication [16].

A previous investigation on pyloric stenosis resulting from peptic ulcer disease in a 5-year-old child indicated that the treatment of omeprazole, in conjunction with a gastric mucosal protector, yielded minimal to no improvement. Nonetheless, using PPI and Cephalosporin antibiotics post-operatively, along with blood transfusion, results in complete recovery [17]. A further investigation on peptic ulcer in a 2.5-month-old infant revealed that the administration of intravenous omeprazole, blood transfusion, vitamin K, and antibiotics (clarithromycin and amoxicillin) during 14 days resulted in clinical improvement and hemodynamic stability [18]. Guidelines suggest that Vitamin K and PPIs may be administered empirically in cases of substantial bleeding, as implied in this instance. Tranexamic acid usage in patients with UGIB is documented to reduce the likelihood of rebleeding and mortality, whereas high-dose PPIs have demonstrated superior efficacy over histamine receptor antagonists in specific trials to decrease rebleeding incidence, treatment duration, and clinical outcomes [19].

Endoscopy is recommended for all significant and recurrent bleeding cases that necessitate resuscitation and hemodynamic stabilization. The American Society of Gastrointestinal Endoscopy (ASGE) recommends esophagogastroduodenoscopy in the presence of melena and hematemesis due to its utility in diagnosis, therapy, and surveillance. Endoscopy is an effective initial diagnostic method for localizing gastrointestinal bleeding in pediatric patients [20]. Endoscopy served as both a diagnostic and therapeutic instrument in this instance, as active bleeding was identified in the duodenum (bulbous/Forrest class IA) in conjunction with erosive gastritis. In instances of recurrent bleeding, the administration of vasoactive agents, such as somatostatin analogs, may induce vasoconstriction of the splanchnic arteries, thereby reducing the likelihood of subsequent bleeding [21,22].

## CONCLUSION

This case report underscores critical importance of the a rapid, multidisciplinary approach in managing pediatric UGIB caused by peptic ulcer disease. Early resuscitation using intravenous fluids, blood transfusions, and pharmacologic therapy (PPIs and tranexamic acid) played a pivotal role in stabilizing the patient, while endoscopic intervention provided definitive hemostasis. The literature review reinforces the efficacy of endoscopic therapy as the gold standard for managing significant UGIB, especially in pediatric patients and settings of resource-limited facilities. Clinicians should maintain a high index of suspicion for PUD in children as pediatric patients presenting with severe UGIB and ensure timely endoscopic evaluation. Given the risk for recurrence, long-term follow-up with *H. pylori* testing (where feasible) and preventive strategies, such as lifestyle modifications and pharmacologic prophylaxis in high-risk patients, are crucial to reducing morbidity and enhancing clinical outcomes.

### Patient Consent Form / Hasta Onam Formu

The parents' of this patient consent was obtained for this study.

### Conflict of Interest / Çıkar Çatışması

The authors declared no conflicts of interest with respect to authorship and/or publication of the article.

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