

# Arterial Ligation and Hemostatic Gastrectomy: Surgical Management of Upper Gastrointestinal Bleeding at Bouaké Université Hospital

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## Abstract

## Original Research Article

**Introduction:** Upper gastrointestinal bleeding, defined as bleeding originating proximal to the duodenojejunal flexure, constitutes a major medical and surgical emergency. Although therapeutic endoscopy and pharmacological treatment are the current mainstays of management, surgery retains a fundamental role when these approaches fail or are unavailable. The objective of this case series was to report three cases of upper gastrointestinal bleeding managed surgically at Bouaké University Hospital and to discuss the indications and modalities of surgical treatment. **Patients and Methods:** This case series analysis was conducted in the Department of General and Digestive Surgery at Bouaké University Hospital, Côte d'Ivoire, and included patients who underwent surgery for upper gastrointestinal bleeding that could not be controlled by well-conducted medical treatment, based on a review of historical hospital records from 2023 to 2025. **Results:** Three patients (two men aged 45 and 57 years, and one woman aged 38 years), transferred from the gastroenterology department, were included. All presented with hemodynamic instability or recurrent bleeding. Upper gastrointestinal endoscopy revealed a duodenal ulcer in two cases and a gastric tumor in one case. The first two patients underwent ligation of the gastroduodenal artery. The third patient required a total hemostatic gastrectomy with esophagojejunal anastomosis. The short-term outcome was satisfactory for all patients. **Conclusion:** Hemostatic surgery remains a valuable and highly effective alternative when conservative treatment fails, particularly in resource-limited settings in sub-Saharan Africa.

**Keywords:** Upper gastrointestinal bleeding; Duodenal ulcer; Gastric tumor; Arterial ligation; Gastrectomy.

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## INTRODUCTION

Upper gastrointestinal bleeding (UGIB) is defined as the external manifestation of bleeding originating proximal to the duodenojejunal flexure (angle of Treitz) [1]. It presents clinically with hematemesis and/or melena and represents a frequent cause of admission to medical and surgical emergency departments [2]. Among nonvariceal causes, gastroduodenal peptic ulcer disease remains the leading etiology, followed by mucosal erosions and gastric neoplastic processes [3].

Over recent decades, the advent of potent injectable proton pump inhibitors (PPIs) and the development of endoscopic hemostatic techniques (mechanical clips, thermocoagulation, sclerosant injection) have radically transformed the prognosis of this condition and reduced the need for emergency

surgery [4]. However, in many hospitals in sub-Saharan Africa, access to an interventional endoscopy platform available around the clock remains a major challenge [5]. Hemostatic surgery therefore retains its full clinical relevance as a last-resort treatment for catastrophic or refractory bleeding. This study aimed to analyze the diagnostic, therapeutic, and outcome-related aspects of three cases managed at Bouaké University Hospital, in order to reassess the role of surgery within the local therapeutic arsenal.

## PATIENTS AND METHODS

This case series analysis was conducted in the Department of General and Digestive Surgery at Bouaké University Hospital, Côte d'Ivoire, over a three-year period (January 2023 to December 2025), based on review of historical hospital records. Inclusion criteria comprised all patients older than 15 years admitted or

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transferred for active UGIB who underwent esophagogastroduodenoscopy (EGD) and emergency or necessity surgical treatment after failure of well-conducted medical treatment.

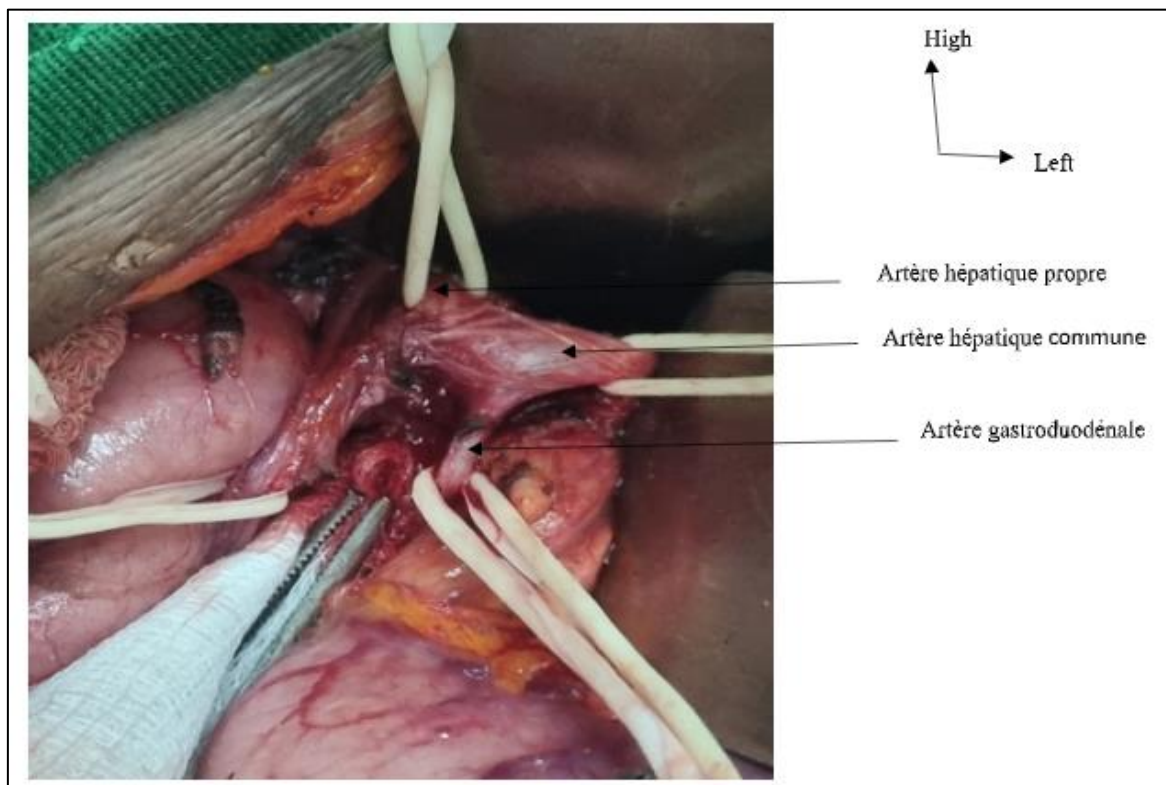
Well-conducted medical treatment was defined as active fluid and electrolyte resuscitation, restrictive blood transfusion targeting an adequate hemoglobin level (7-8 g/dl), and administration of high-dose intravenous PPIs. Incomplete records were excluded from the analysis. Data were collected from hospitalization registers and operative reports.

## RESULTS

The series included three patients transferred from the gastroenterology department for persistent or recurrent bleeding with hemodynamic repercussions.

### Case 1:

A 45-year-old man with no notable medical history was admitted for repeated melena associated with severe anemia (hemoglobin 6.2 g/dL). Despite transfusion of three units of packed red blood cells and continuous infusion of omeprazole, hemodynamic instability persisted. Endoscopy revealed a large posterior duodenal ulcer (Forrest Ib/Ia) with active sheet-like bleeding. The patient was transferred to the operating room, where exploration confirmed erosion of the gastroduodenal artery. The procedure consisted of an anterior duodenotomy followed by direct ligation of the gastroduodenal artery (figure 1) with nonabsorbable X-shaped sutures. The immediate postoperative course was uneventful, with immediate cessation of bleeding and discharge on postoperative day 7.



**Figure 1: Showing the dissection of the arteries: common hepatic, proper hepatic, and gastroduodenal**

### Case 2:

A 57-year-old man, a chronic smoker, presented with large-volume hematemesis. Initial medical management failed to stabilize his pulse or blood pressure. Endoscopy revealed a deeply excavated bulbar ulcer. In the absence of a platform for emergency interventional endoscopic hemostasis, a midline laparotomy was performed, and suture ligation of the gastroduodenal artery by transfixion was carried out using polypropylene sutures. The patient had a favorable clinical course, confirmed by normalization of biological parameters and the absence of recurrence in the short term.

### Case 3:

A 38-year-old woman was admitted for recurrent episodes of hematemesis associated with marked deterioration of her general condition. Endoscopy revealed an ulcerated, bleeding tumoral process of the greater gastric curvature extending toward the body of the stomach. Given this malignant tumoral UGIB, uncontrollable by general hemostatic treatment, surgery with both hemostatic and oncological intent was decided upon. A total hemostatic gastrectomy encompassing the tumor was performed, followed by digestive reconstruction with a Roux-en-Y esophagojejunal anastomosis. Histopathological

examination of the specimen concluded intestinal-type gastric adenocarcinoma. The short-term course was satisfactory, allowing prompt referral to the medical oncology department.

## DISCUSSION

Management of UGIB has evolved considerably in recent years. According to current international recommendations from the European Society of Gastrointestinal Endoscopy (ESGE) and the American College of Gastroenterology (ACG), early upper gastrointestinal endoscopy, performed within 24 hours of admission after adequate resuscitation, constitutes the therapeutic cornerstone [4, 6]. It allows not only etiologic diagnosis but also thermal, mechanical (Ovesco clips), or pharmacological hemostatic intervention [7]. In high-resource countries, failure of endoscopy preferentially leads to arterial embolization by interventional radiology [8].

Nevertheless, our series illustrates the realities of practice in sub-Saharan settings, where emergency surgery remains the only available recourse when medical treatment fails or minimally invasive emergency techniques are inaccessible [5]. The operative indications retained in our patients corresponded precisely to the classic criteria: refractory hemodynamic instability, failure of maximal medical treatment, and tumoral origin of the bleeding [9].

Posterior duodenal ulcer eroding the gastroduodenal artery (cases 1 and 2) represents a classic life-threatening emergency. The technique of choice consists of duodenotomy followed by triple ligation or transfixing suture-ligation of the bleeding vessel [10]. Although some authors describe a risk of recurrent bleeding of up to 20% when the ulcer exceeds 2 cm, direct ligation remains the least morbid and fastest procedure in an unstable patient [10, 11]. Major surgical techniques such as antrectomy or vagotomy performed from the outset are now reserved for failures of simple suturing or for associated stenosis, owing to their greater operative burden [12].

UGIB of tumoral origin (case 3) poses a distinct therapeutic challenge. Malignant gastric tumors account for fewer than 3% of causes of UGIB, but their bleeding is often diffuse, making endoscopic hemostasis with clips ineffective and prone to early recurrence [13]. In this context, total hemostatic gastrectomy, although associated with non-negligible morbidity and mortality, stands as the treatment of choice in physiologically fit patients, as it ensures both definitive control of bleeding and local oncological control [14]. The satisfactory short-term survival observed in our three cases demonstrates that carefully performed surgery by an experienced team can achieve excellent results, confirming data from contemporary African literature [15].

## CONCLUSION

Although relegated to a secondary role by medical and endoscopic advances in international guidelines, hemostatic surgery retains a crucial life-saving place in developing countries. It offers a robust, immediate, and definitive therapeutic alternative when well-conducted medical treatment fails or in the presence of malignant tumoral disease. Improving the prognosis of these patients requires early transfer between gastroenterology and digestive surgery departments before the onset of multiple organ failure related to hemorrhagic shock.

## DECLARATIONS

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**Competing interests:** The authors declare that they have no relevant financial or non-financial competing interests to disclose.

## Ethics approval:

This study was conducted retrospectively on data obtained after each patient had received routine clinical care. Ethical approval was waived by the Institutional Ethics Committee of Bouaké University Hospital in view of the retrospective, observational nature of the study and because all procedures performed were part of routine clinical care.

**Consent to participate:** Written informed consent was obtained from all patients, or their legal representatives, prior to inclusion in this case series.

**Consent for publication:** Written informed consent for publication of clinical details was obtained from all patients, or their legal representatives.

**Authors' contributions:** Anzoua KI and Assouhoun KT designed the study;

Ahou NB, Amos KB and Ekra AS collected the cases; Bamba I, Akowendo E, and Kouakou KB, supervised the work and revised the manuscript. All authors read and approved the final manuscript

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