

Research Article

# Efficacy and Safety of Mono-polar Coagulation Forceps in the Repair of Large Mallory-Weiss Tear in Patients with Massive Upper Gastrointestinal Bleeding, 2 Case Reports

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## Abstract

Mallory-Weiss tear (MWT) is a frequent cause of acute upper gastrointestinal (AUGI) bleeding and is defined as a longitudinal superficial mucosal tear that usually occurs at the gastroesophageal junction. MWT is usually associated with increased abdominal pressure. 50 to 70% of patients diagnosed with MWT have a history of heavy alcohol intake. MWT usually presents with bright red or coffee-ground vomitus, black tar-like stool, signs of anemia, chest pain, abdominal pain, or signs of shock. Bleeding from MWT can stop on its own, however, significant bleeding may require endoscopic management. Here, we present 2 cases of life-threatening upper GI bleeding secondary to MWT. Case 1 is a 55-year-old male with known Obesity Hypoventilation Syndrome who presented with a violent cough and was initially admitted with respiratory distress. He became hypoxic and hypercarbic while on the ward and was transferred to the Intensive care Unit (ICU). A copious amount of fresh blood was drained upon passage of a nasogastric tube. The second case is a 31-year-old male who abuses alcohol. He presented with five episodes of vomiting followed by 4 episodes of hematemesis. Initially, conservative management failed to stop the bleeding in both cases; hence, an upper Gastrointestinal (GI) endoscopy was done, which diagnosed a MWT in both cases. Haemostasis was achieved in both cases using monopolar coagulation forceps. The use of monopolar coagulation forceps is a safe and effective tool in combination with other endoscopic modalities in managing significant bleeding from MWT. Monopolar coagulation forceps are much easier to use over the bipolar heater probe.

## Keywords

Mallory Weiss Tear, Obesity Hypoventilation Syndrome, Upper Gastrointestinal Bleeding, Endoscopic Hemostasis, Endoscopic Electrocoagulation

## 1. Introduction

AUGIB is a major healthcare burden. Despite significant progress in its management, mortality due to all forms of AUGIB remains approximately 10% [1].

Mallory-Weiss tear (MWT) is a frequent cause of acute upper gastrointestinal (GI) bleeding, defined as longitudinal superficial mucosal tears usually occur at the gastroesopha-

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geal junction and extend proximally or distally to involve either the lower to mid esophagus or stomach respectively.

About 5% to 15% of upper GI bleedings are attributable to Mallory-Weiss tears. It is common in ages 40 to 60 years old and men are 2 to 4 times more likely to be affected. [2]

It is usually associated with increased abdominal pressure. Such as in retching, severe vomiting or straining, heavy lifting, chronic cough, hiatal hernia and trauma of the abdomen or chest. Up to 50 to 70% of patients diagnosed with MWT have a history of heavy alcohol intake. [3, 4]

MWT usually presents with bright red or coffee grounds vomitus, black or tar-like stool, symptoms and signs of anemia, or chest or abdominal pain. [5]

The gold standard in diagnosing it is an upper gastrointestinal (GI) endoscopy and this will help rule out other causes of gastrointestinal bleeding.

In most cases of Mallory-Weiss tear, the bleeding stops on its own within 72 hours and all that is needed is pharmacological treatment with either H2 receptor blockers or proton pump inhibitors. [6]

In the remaining cases where the bleeding continues or where there is rebleeding after an initial cessation of bleeding, endoscopic treatment is the treatment of choice. The different modalities are endoscopic injection therapy, endoscopic electrocoagulation, endoscopic hemoclip, and band ligation. [7]

If endoscopic treatments are unsuccessful, angiotherapy is considered. Surgery is the last option if both endoscopic treatment and angiotherapy fail. [7]

## 2. Case Description

### 2.1. Case 1

A 55-year-old male with a history of obstructive sleep apnea, essential hypertension, type 2 diabetes mellitus, and obesity hypoventilation syndrome was admitted to the medical ward with violent coughing, shortness of breath at rest, and bilateral lower limb swelling. Shortly after admission, he developed hypoxemia and hypercarbia and became drowsy and hemodynamically unstable. Laboratory workup showed severe respiratory acidosis. Echocardiography showed marked dilatation of the right ventricle with poor systolic function. He was transferred to intensive care unit and placed on mechanical ventilation with the diagnosis of type 2 respiratory failure secondary to Obesity Hypoventilation Syndrome with Cor Pulmonale.

Upon inserting a nasogastric tube, a large amount of fresh red blood was drained into the tube, so a gastric lavage using cool saline was done, also Omeprazole infusion at 8mg/h was initiated. The patient was resuscitated and monitored over the

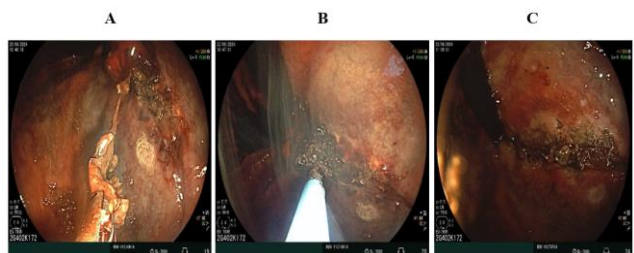
following 24 hours, his hemoglobin level dropped from 13.8g/dl to 10.3gm/dl and he passed melena stool. An upper GI endoscopy was done using endoscopy system (FUJIFILM 7000) that showed large amount of fresh blood in the stomach and -on retroversion- a large longitudinal cardia tear around 5-7 cm long on the lesser curvature that extends superiorly into the Gastroesophageal junction, whilst most of the tear is covered with a giant freshly formed blood clot (Forrest stage IIB) and active oozing of blood was coming from the edges and the base of the tear (Forrest stage IB) (Figure 1) (Table 1). Given these findings despite the ongoing pharmacological therapy, endoscopic intervention was necessary. First 1mg epinephrine diluted in 10 ml of normal saline was injected into the base of the clot from 4 quadrants and the oozing edges of the tear followed by using the monopolar coagulation forceps from (MICRO-TECH) connected to (ERBE VIO 200 S) electrosurgical unit to grasp the base of the clot then repeated (3-4 seconds) long soft coagulation pulses were applied until the blood clot was separated from its base which uncovered underlying active spurting blood vessel (Forrest stage Ia) that again was grasped by the coagulation forceps and same coagulation pulses were applied until the spurter and the surrounding area transformed to a white coagulum (Figure 2). After achieving hemostasis of the primary bleeding source, the forceps was used with the tips closed to apply soft coagulation pulses on the oozing base and along the edges of the tear until complete hemostasis was achieved (Figure 2). Given the large size of the tear and the high risk of rebleeding, seven rotatable hemoclips (MICRO-TECH, 10 mm opening width) were applied, starting from the esophageal side, progressing to the gastric side (Figure 3).

**Table 1.** Forrest Classification for Endoscopic findings and Re-bleeding Risks. [12]

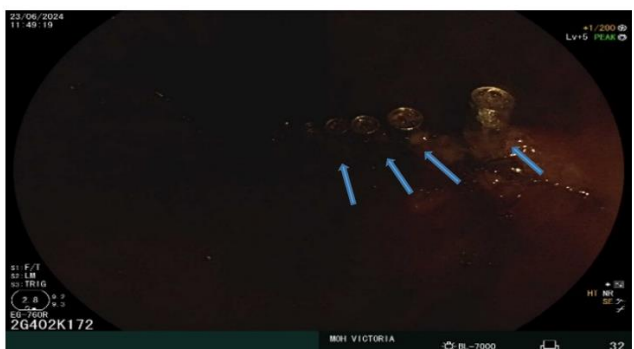
Forrest Stage	Re-bleeding risk
Stage I Active bleeding	
Ia Spurting haemorrhage	90-100%
Ib Oozing haemorrhage	80-85%
Stage II Signs of recent bleeding	
Ila Non-bleeding visible vessel	40-50%
Ilb Adherent clot on lesion	20-30%
Ilc Hematin - covered lesion	5%
Stage III	
Lesion without bleeding (flat spot, clean base)	≤ 3%



**Figure 1.** Retroversion view of the stomach shows blood at the fundus with giant sub-cardia blood clot (blue arrow) covering a large tear on the lesser curvature (Yellow arrows).



**Figure 2.** A. Separation of the blood clot, B. coagulating the base and edges of the tear using the monopolar coagulation forceps (the co-grasper), C. The tear after complete coagulation.



**Figure 3.** Closure of the tear using multiple through-the-scope clips (Blue arrows).

Feeding started from the next day via nasogastric tube. On day 13, he underwent a surgical tracheostomy to facilitate weaning off the ventilator. During his stay in the ICU, he was treated from pneumonia and septic shock.

He was discharged to the general ward on day 23, where he underwent rehabilitation for two weeks, during which the tracheostomy cannula was removed. The patient was discharged home on an outpatient follow-up plan and is well and fine 10 months post-discharge and at the time of writing this manuscript.

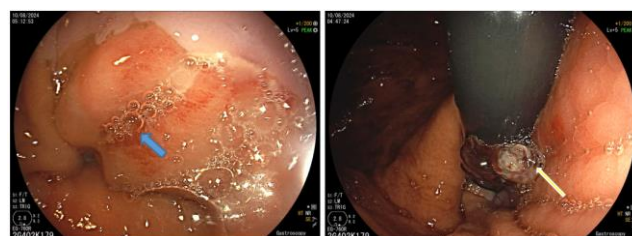
## 2.2. Case 2

A 31-year-old male with a history of heavy alcohol consumption was admitted to the medical ward with five episodes of vomiting followed by four episodes of hematemesis of

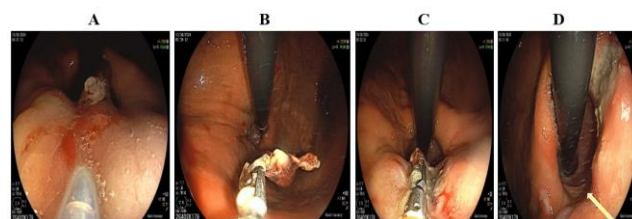
fresh bright red blood after heavy alcohol drinking.

He had tachycardia but normal rest of vital signs. Laboratory results showed anaemia with hemoglobin: 9.0 g/dl. He received blood transfusion, Omeprazole infusion at 8mg/h, and was taken for an emergency upper GI endoscopy as the hematemesis was ongoing using the same scope and instruments as in case 1.

An upper GI endoscopy was done under general anesthesia, whereby a small mucosal tear was seen at the Gastroesophageal junction (Figure 4) and the stomach was full of blood, which was aspirated, and gastric lavage using the water jet of the scope was done. There was a hiatus hernia grade III with cardia tear around 1 cm long with a fresh blood clot (Forrest stage IIb) covering most of the tear with a visible blood vessel at the base of the clot was seen (Figure 4). 1mg epinephrine diluted in 10 ml of normal saline was injected into the base of the clot from 4 quadrants and into the oozing edges of the tear followed by using the monopolar coagulation forceps connected to electrosurgical unit to grasp the base of the clot and the bleeding vessel, then repeated (3-4 seconds) long soft coagulation pulses were applied until the blood clot was separated from its base while the spurter and the surrounding area transformed to a white coagulum and complete hemostasis was achieved (Figure 5). Given the small size of the tear we did not apply hemoclips. Post endoscopy, the patient was kept nil by mouth overnight, then started a soft diet from the next morning, then a normal diet the day after, and he was discharged home after 48 hours on an outpatient follow-up plan and is well and fine 9 months post-discharge and at the time of writing this manuscript.



**Figure 4.** Mucosal Tear from the Esophageal side (Blue arrow) and retroversion view of the stomach shows a blood clot overlying a small sub-cardia tear (Yellow arrows).



**Figure 5.** A. Injection of epinephrine, B. Separation of the blood clot using the monopolar coagulation forceps, C. Coagulating the base and edges of the tear, D. The tear after complete hemostasi, notice the Hiatus hernia (Yellow arrow).

### 3. Discussion

Managing patients present with upper GI bleeding from Mallory Weiss tear starts with general resuscitative measures, triaging patients to the proper level of care either outpatient or inpatient which can be either in the general ward or in ICU for critically ill patients, then urgent upper GI endoscopy should be performed to reach the definitive diagnosis and perform endoscopic intervention if necessary.

Patients without risk factors for rebleeding (eg, portal hypertension, coagulopathy), severe bleeding (eg, hematochezia, hemodynamic instability), or active bleeding at endoscopy can be managed conservatively with an extended observation or brief hospitalization period (approximately 24 h) [8], while patients with such risk factors or actively bleeding Mallory-Weiss tears (ie, arterial spurting, streaming from focal point, diffuse oozing) usually require endoscopic intervention [9]. Studies show that different endoscopic options (injection therapy, endoscopic electrocoagulation, hemoclip, and band ligation) have relatively comparative data in terms of efficacy and safety, and future comparative studies are needed to establish treatment guidelines in patients presenting with Mallory-Weiss tears, [10] although electrocoagulation modality, such as multipolar electrocoagulation (MPEC) or heater probe, with or without epinephrine injection, is typically used to treat an actively bleeding Mallory-Weiss tear with the effectiveness and safety of such probes have been established in only a few randomized, controlled trials. [10] A recently introduced modality for electrocoagulation is the coagulation forceps (Referred to as soft coagulation) connected to a monopolar electrocoagulation system. With this forceps, the bleeding lesion or vessel can be grasped, and heat is applied, raising the temperature just below the boiling point, tissue dehydration and protein denaturation occur, creating a functional seal. This technique has been reported to stop ulcer bleeding successfully in case series and has superiority over the heater probes in achieving successful hemostasis. [11], although upon literature review we did not find enough data from case reports or clinical trials entailing its efficacy or safety in managing bleeding from Mallory Weiss tears. This manuscript describes our experience with two cases presented with massive life-threatening upper GI bleeding from a Mallory Weiss tear, which was successfully treated through the use of the monopolar coagulation forceps in combination with epinephrine injection in both cases and hemoclips in one case where the tear was large and rebleeding risk was high. In our experience, the use of monopolar coagulation forceps was superior to the heater probe due to its ease of use owing to its grasping property that facilitates targeting and capturing the bleeder and enables controlling bleeding in obscure sources as well as it can be easily manipulated in difficult, distant and tangential locations as it does not require application of pressure on the bleeding site prior to coagulation process which necessitate certain positioning (almost perpendicular) and distancing of the scope and the probe. In conclusion, in our experience, the monopolar coagulation forceps is a safe and effective tool in combination with other endoscopic modalities in

managing significant Mallory Weiss tears with much ease of use over the bipolar heater probe.

### 4. Learning Points

- 1) Despite its benign nature in most cases with spontaneous resolution, Mallory Weiss tear can lead to life-threatening upper GI bleeding that requires immediate endoscopic or surgical intervention.
- 2) Endoscopic intervention using a combination of therapeutic modalities, including electrocoagulation, can achieve good hemostasis, precluding the need for conventional surgery and ensuring rapid recovery and good quality of life.
- 3) The monopolar coagulation forceps might be preferred over bipolar probes in difficult hemostatic situations such as massive bleeding, unclear source of bleeding, or in tangential/distant locations.

### Abbreviations

AUGIB	Acute upper Gastrointestinal Bleeding
GI	Gastrointestinal
ICU	Intensive Care Unit
MPEC	Multipolar Electrocoagulation
MWT	Mallory-Weiss Tear

### Patient Consent

Appropriate consent was obtained for the publication of this case study and the use of clinical details from the patient and relevant authorities as well as ethical clearance was obtained from health research and ethics Committee.

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### Conflicts of Interest

The authors declare no conflicts of interest.

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