# A MULTIMODALITY APPROACH TO ENDOSCOPIC TREATMENT OF BLEEDING PEPTIC ULCERS

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*ABSTRACT*

***The role of endoscopic haemostasis in the treatment of bleeding peptic ulcers is widely studied. Many trials to date have compared one or more modalities against a medical control with variable results. To date, no single modality has been shown conclusively to be superior to others. As such, in this study we have not confined the endoscopist to one modality of treatment but allowed him to customize the method of endoscopic haemostasis according to the configuration, accessibility and rate of bleeding in any particular patient.***

***Seventy-three patients with non-variceal upper gastrointestinal (GI) bleeding were admitted to the National University Hospital in Singapore between May 1, 1988 and April 30, 1989. All were gastroscoped and 48 were found to have chronic peptic ulcer. Twenty-nine (60%) with actively bleeding peptic ulcer or stigmata of recent haemorrhage (SRH) were treated endoscopically. Initial haemostasis was achieved in 27 (93%) patients. Seven patients rebled (26%) of which four underwent repeat endoscopic treatment. Of these four patients only one rebled again and required surgery. Permanent haemostasis was achieved in 23 of 29 patients (79%). The multimodality approach for the treatment of bleeding peptic ulcers gives the endoscopist flexibility in deciding on the best way to deal with a bleeding gastric or duodenal ulcer. Each instrument has its strengths and weaknesses and the right choice of instrument is often a critical factor especially in treating a bleeding ulcer in a situation where access poses a problem.***

*Keywords : endoscopic treatment, nonvariceal upper gastrointestinal bleeding, bleeding peptic ulcers, duodenal ulcers and gastric ulcers.*

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## INTRODUCTION

Fiberoptic endoscopy has rapidly become the diagnostic procedure of choice in the management of upper gastrointestinal (GI) bleeding [1-6]. Yet improvements in accuracy and speed of diagnosis have not been converted to a survival advantage in these patients [1,2,7-10]. The development of various endoscopic procedures such as topical therapy, injection sclerotherapy [11-20], mechanical [21] as well as thermal methods [22-33] to arrest bleeding at the time of endoscopy has led to new optimism that the morbidity and mortality of non-variceal upper GI haemorrhage may be reduced. Furthermore the fact that these therapeutic procedures can be "piggy-backed" to diagnostic endoscopy leads to its great appeal [34]. We review our results with the use of endoscopic haemostasis in the management of non-variceal upper GI haemorrhage.

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## MATERIALS AND METHODS

Seventy-three patients with upper GI bleeding were admitted to the Department of Surgery, National University Hospital in Singapore, between May 1, 1988 and April 30, 1989. Upper GI endoscopy established the diagnosis in 71 patients. In 2 patients no obvious source of bleeding was found on initial endoscopy (Table I). However, further investigations which included a barium meal in one patient and angiography in the other revealed the cause of bleeding to be due to a duodenal diverticulum and a vascular malformation in the fundus of the stomach respectively.

**Table I Diagnosis at Initial Endoscopy**

| Diagnosis | | No. of Patients |
|---|---|---|
| Chronic Peptic Ulcer | | 48 |
| Duodenal Ulcer | 34 | |
| Gastric Ulcer | 12 | |
| Combined Ulcer | 2 | |
| Acute Mucosal Erosions | | 11 |
| Gastric Carcinoma | | 5 |
| Hemorrhagic Gastritis | | 4 |
| Mallory-Weiss Lesions | | 2 |
| Bleeding at Anastomotic Ulcer | | 1 |
| No Abnormalities Detected | | 2 |
| **Total** | | 73 |

The mean age of the patients was 57 years (range: 24 to 86). There were 57 male and 16 female patients. All patients were endoscoped by one of the trained staff of our unit using either therapeutic fiberoptic or videoendoscopes.

Patients bleeding from ulcers were subjected to endoscopic haemostasis. This was performed at the time of diagnostic endoscopy when continued bleeding could be visually localised or if stigmata of recent haemorrhage (SRH) was present. (ie visible vessel, adherent clot, red, black or blue spot in the ulcer base)[35]. In 3 patients no haemostasis was attempted because of 1) torrential bleeding, 2) inability to identify a bleeding point despite active bleeding or 3) inaccessibility of the lesion to endoscopic haemostatic techniques.

**Table II Characteristics of patients admitted with bleeding peptic ulcers (n=48)**

| | Patients with SRH | No SRH |
|---|---|---|
| Total No. | 32 | 16 |
| Sex : Male | 26 | 10 |
| Female | 6 | 6 |
| Age : Mean (yrs) | 54 | 59 |
| Range | 29-80 | 24-86 |
| Haemoglobin | | |
| Mean (g%) | 10.2 | 10.9 |
| Range | 4.9-16.0 | 5.6-16.8 |
| Blood Pressure | | |
| > 100mmHg | 27 | 16 |
| < 100mmHg | 5 | 0 |
| Transfusion | | |
| No. Requiring | 20 | 7 |
| Mean (pints) | 4.0 | 2.5 |
| Range | 0-9 | 0-5 |

The endoscopic haemostatic techniques used were:

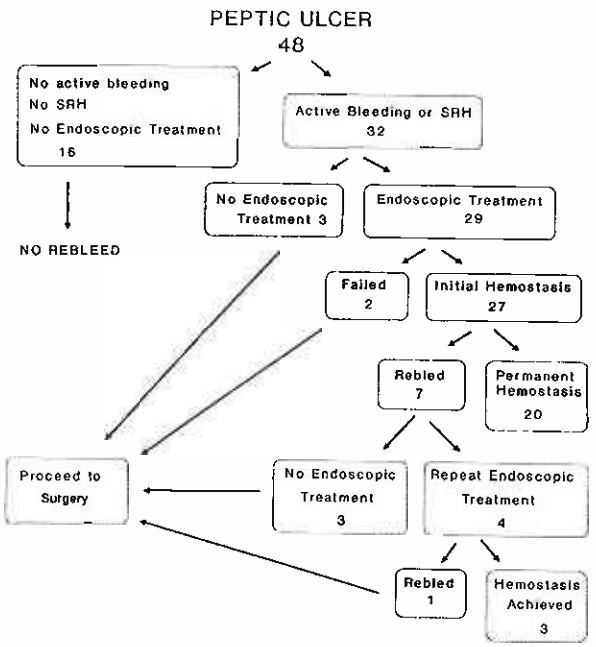
1) Injection with 5-10mls of adrenaline (1:10,000) or 1 ml of absolute alcohol.
2) Heater probe set to deliver 25 joules of thermal energy.
3) Non-contact Nd-YAG laser at 40 watts. An average of 3 shots were needed (range 2-8).
4) Contact Nd-YAG laser at 15 watts. An average of 3 shots (range 2-8).

One or more of the above techniques was used in each patient depending on the configuration and location of the bleeding lesion.

## RESULTS

Bleeding from chronic peptic ulcers (66%) and acute mucosal erosions (15%) form the main diagnoses in the study population (Table I). Of the 48 patients diagnosed to have gastric or duodenal ulcers, 16 (33%) were not actively bleeding and no SRH was found at the time of endoscopy. Thirty-two patients (67%) had either active bleeding or SRH (Table II). The mean ages were comparable. There was no significant difference in the haemoglobin levels on admission between the two groups. Five patients in the SRH group had blood pressures below 100mmHg. None of the patients in the other group was in shock at admission. There were more patients in the SRH group (20 patients) requiring blood transfusion than in the group without SRH (7 patients). The amount of blood transfused was also more in the SRH group.

**Fig 1 - Flow Chart of Patients with Bleeding Peptic Ulcers**




The source of bleeding was a duodenal ulcer in 26 (81%), and a gastric ulcer in 6 (19%) of these patients. One of the bleeding duodenal ulcers was a combined gastric and duodenal ulcer, but the bleeding was clearly identified from the duodenal site, and the gastric ulcer did not contain any SRH.

Three patients (9%) with bleeding duodenal ulcers were subjected to emergency surgery without attempts at endoscopic haemostasis because of torrential haemorrhage or inaccessibility of the lesion. Initial haemostasis was achieved in 27 of 29 (93%) patients (Fig 1). Haemostatic methods used in these cases are summarized in Table III. In two patients (7%), attempts at haemostasis failed due to poor access. Both of them had duodenal ulcers situated on the posterio-inferior aspect of the duodenal bulb close to the pylorus.

Seven patients (26%), all with duodenal ulcers, rebled. In 6 of them, a single modality was used (Table III). Of these 7 patients, 3 proceeded to surgery without further attempts for endoscopic haemostasis. This was due to factors such as old age and low haemoglobin levels which rendered them in high risk for further bleeding. The remaining 4 patients underwent a repeat endoscopic haemostasis which was successful. Only one of these 4 patients rebled again and required surgery. Although the risk of rebleeding after initial haemostasis was 26% (7/27), permanent haemostasis was eventually achieved in 79% (23/39) of bleeding peptic ulcers with endoscopic treatment.

**Table III - Haemostasis Methods Used in 27 Patients with Bleeding Peptic Ulcers**

| | No of Patients | No of Rebleed |
|---|---|---|
| Single Method | | |
| Adrenaline injection | 6 | 3 |
| Alcohol injection | 3 | - |
| Heater Probe | 2 | 1 |
| Nd-YAG Laser | 2 | 2 |
| 2 Methods | | |
| Adrenaline + Heater Probe | 9 | - |
| Adrenaline + Nd-YAG Laser | 2 | - |
| 3 Methods | | |
| Adrenaline + Alcohol + Heater Probe | 1 | 1 |

In all, nine patients (28%) out of 32 who presented with active bleeding or SRH ultimately required surgery. Six of these patients were initially treated endoscopically. The rate of eventual surgical treatment in the group of patients with initial haemostasis was 15% (4/27). One of the patients who received initial surgical treatment without attempts at endoscopic haemostasis died during the post-operative period from sepsis. There was no death due to bleeding. The overall mortality in patients with peptic ulcers was 2.1%.

## DISCUSSION

In this study, the authors have not confined themselves to any one modality and have not hesitated to use more than one

modality at a single treatment session. This flexible approach allows the therapeutic endoscopist to customize the treatment according to the configuration, accessibility and rate of bleeding in any particular patient. The initial learning curve of the therapeutic endoscopist may be slower if he has to learn more than one technique, but the eventual result would be an endoscopist equipped with full armamentarium to deal with a wider range of cases.

Our initial and permanent haemostasis rates were 93% and 79% respectively. Initial haemostasis was achieved in all the patients with bleeding gastric ulcers and no rebleeding was encountered, but this was not the case with duodenal ulcers. Haemostasis was not attempted in 3 patients with duodenal ulcers due to torrential bleeding and inaccessibility of the bleeding lesions and failed in another 2 due to poor access to any one of the treatment methods. All 7 patients who rebled were also from the duodenal ulcer group.

The majority of trials comparing one or more modalities against a medical control have generally shown better control of bleeding and a decrease in the rate of emergency surgery in patients having endoscopic treatment[13,16,27,29,36-38]. However it has not been shown conclusively that any modality is vastly superior to the rest. Each modality has its strengths and drawbacks[34,39,40].

Injection sclerotherapy with 1:10,000 adrenaline is very useful when the bleeding is brisk and the vessel is obscured by blood. There is no need to be absolutely accurate and injecting liberally around the bleeding point will usually either stop the bleeding or slow it down [13]. This is sufficient to allow the endoscopist to see the lesion clearly and apply a thermal device to achieve more definitive coagulation. The drawback for the local injection of adrenaline is that its pharmacological and tamponade effect will wear out after a short time and if thrombosis of the vessel is not well established, further bleeding may be inevitable. In our series, 3 out of 7 patients who rebled were intially treated with local adrenaline injection alone.

Of the thermal devices, the heater probe and the laser are advocated [27,29,38,39]. Thermal energy will coagulate the bleeding vessel and seal the bleeding point. Excessive use of either modality on a single bleeding point can often aggravate bleeding by cutting the bleeding vessel open once again. The heater probe has the facility of co-axial water jets which are very useful in washing clots away and can be tangentially applied. The broad teflon coated tungsten tip is also useful as a temporary tamponading device when trying to determine the course of a bleeding vessel at the ulcer base. It is very useful in duodenal lesions where access is often very problematic. Nine patients with bleeding duodenal ulcers in our study were treated with heater probe alone or in combination with prior injection of local adrenaline with initial success in all of them. One of these patients with heater probe treatment alone rebled and repeat endoscopic haemostasis with a combination of local adrenaline injection and the heater probe achieved permanent haemostasis. The laser on the other hand is effective when treating lesions from a distance with easy access such as in the fundus of the stomach or cardia with the scope retroflexed. Having all the modalities at hand will allow the endoscopist a greater chance of stopping any bleeding lesion he encounters as he will not be hampered by the inherent defects of any single device.

There are three unsolved problems remaining in the field of endoscopic haemostasis. Firstly, the problem of torrential bleeding where the stomach or duodenum is full of blood and clots and the bleeding point is obscured. Endoscopic haemostasis is only possible if the bleeding point can be localized, at least approximately down to a 2 square cm area. Where localization to this extent cannot be done, then endoscopic treatment is impossible and immediate surgery is still the best option. This problem was encountered in 2 of our patients presenting with active bleeding and both of them went for emergency surgery. The second problem concerns the significant rebleeding rate of 15% to 30% [40] which seems inherent in any treatment using endoscopic haemostatic devices. One of the factors responsible here may be large vessels at the base of the ulcer which are difficult to seal either by laser or the heater probe. The third situation is the ulcer in an inaccesible location, ie the pyloric channel or the posterior wall of the duodenum. It is interesting to note that all the failures of endoscopic haemostasis and rebleeds in our study occurred in patients with bleeding duodenal ulcers and none in the gastric ulcer group.

Endoscopic haemostasis of bleeding peptic ulcers can be the definitive treatment in some patients with bleeding peptic ulcers. In others, the temporary haemostasis buys time to stabilize the patient and prepare him for definitive surgery. A multimodality approach allows great versatility to the therapeutic endoscopist who can select the right modality or combination for each patient depending on the ulcer location, configuration and bleeding rate.

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