Endoscopic Treatment for Bleeding Peptic Ulcers

Dr. S.C.S. Chung, MB, BCh, BAO, FRCS (Ed), MRCP (UK)
Department of Surgery

Dr. J.W.C. Leung, MD, MRCP (UK)
Department of Medicine

Prince of Wales Hospital
The Chinese University of Hong Kong
Shatin, N.T.

Upper gastrointestinal haemorrhage is a common medical emergency. At the Prince of Wales Hospital, Shatin, upper gastrointestinal (GI) haemorrhage accounts for approximately 5% of all emergency admissions through the Accident and Emergency Department. The commonest cause of GI bleeding is peptic ulceration, which accounts for three-quarters of patients admitted with GI bleeding. Duodenal ulcers are twice as common as gastric ulcers.

The mortality rate of GI bleeding worldwide remains constant at around 10%[1,2]. The results in specialised units with a special interest in GI bleeding may be better[3,4]. High mortality is associated with old age, concomittent medical conditions and continued bleeding in hospital.

Developments in fibreoptic endoscopy have put the oesophagus, stomach and the proximal duodenum within easy reach of the endoscopist. In experienced hands emergency fibreoptic endoscopy can identify the bleeding source in more than 90% of patients suffering from GI bleeding[5]. Endoscopy has now replaced barium studies as the investigation of choice in the these patients. Prior to the development of endoscopic haemostasis, surgery has been the only practical way to stop GI bleeding. With the bleeding point so tantalisingly reachable many methods have been tried to control the bleeding through the endoscope. Endoscopic methods is clearly very attractive since it avoids the hazards of general anaesthesia and laparotomy.

Method of Endoscopic Haemostasis

In the past decade many methods of controlling haemorrhage from bleeding ulcers have been investigated. The great variety of modalities used reflects the ingenuity of the pioneer endoscopists and the instrument manufacturers. These methods can be classified into three groups (Table 1).

1. Mechanical	—	Clips
		Tissue glue
		Clotting factors
		Sewing machine
2. Thermal	—	Laser
		Electrocoagulation
		Heat Probe
3. Injection	—	Sclerosants
		Adrenaline

Table 1: Methods of Endoscopic Haemostasis

a) *Mechanical methods:*

Arterial clips can be applied endoscopically by a spring-loaded system. The technique is cumbersome to use and cannot be applied in the duodenum or in a large ulcer[6]. The endoscopic application of tissue glue[7] has been tried but was found to be ineffective. Likewise the spraying of clotting factors[8] and collagen[9] has been disappointing. An endoscopic sewing machine and banding device has been described but not been used clinically[10].

b) *Thermal methods:*

Among the methods used for endoscopic haemostasis, laser has attracted the most attention both in the medical literature and in the lay press. The method involves directing high energy laser light through a flexible quartz fibre that has been passed through the biopsy channel of the endoscope. The light energy is absorbed by the target tissue and

(turn to page 3190)

changed into heat which coagulates the bleeding vessel. Two types of laser have been used for haemostasis. The Nd-YAG laser (Figure 1) is more powerful than the Argon

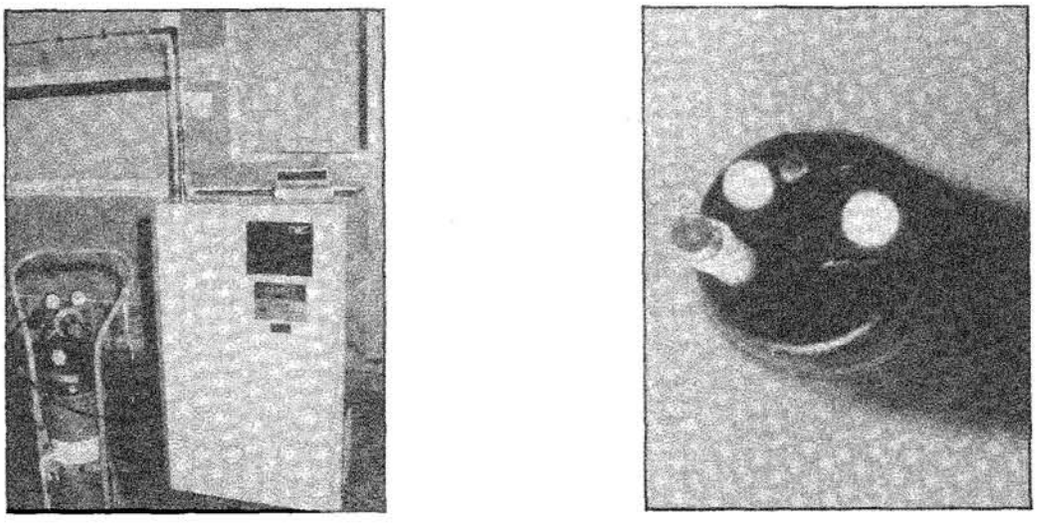

Figure 1: Neodymium — Yag Laser

laser and can coagulate vessels of up to 3mm in diameter. The laser unit is expensive (cost: HK$1M), requires special plumbing and electricity outlets, and require an *en face* endoscopic view of the bleeding point. Collected experience in a world-wide survey indicates that the Argon laser is successful in 70-100% of patients and the Nd-YAG laser in 84% of patients[11]. However, other controlled trials have reported contradictory results[12, 13].

Another method of using heat to coagulate the bleeding vessel utilises probes which maintain direct contact with the bleeding point. In contrast with the laser, the contact method allows the bleeding vessel to be compressed by the probe before coagulation. A tighter seal of the vessel can therefore be achieved. The probe can also be applied at any angle, avoiding the problems of *en face* endoscopic access. The most popular contact

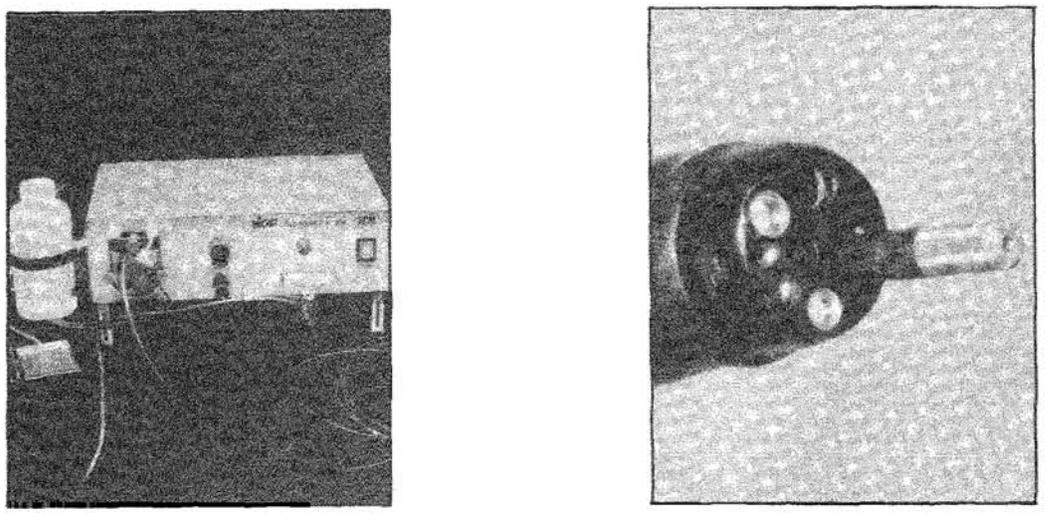

Figure 2: BICAP Haemostasis Probe

thermal probes are the BICAP (ACMI) and Heater probe (Olympus). In the BICAP system (Figure 2) the probe consists of six electrodes of alternating polarity arranged in circumferential array and heat is generated by diathermy. The Heater probe (Figure 3) consists of a teflon coated copper tip containing a heating coil. Both devices have a wash channel which allows the lesion to be washed clean prior to coagulation. The cost of the heater probe or the BICAP probe is approximately 10% of the cost of a laser unit. Reports on the clinical use of these devices have been most encouraging[14,15]. The BICAP probe has been shown to reduce rebleeding, blood transfusion and emergency surgery in a randomised controlled trial[15]. Comparative studies of laser, BICAP and heater probe indicate that they are similar in efficacy[16,17].

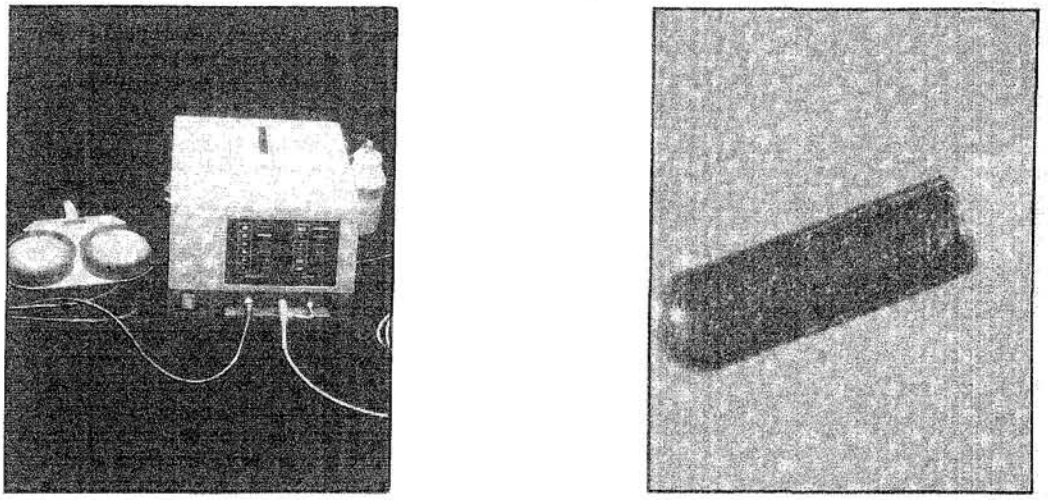

Figure 3: Heater Probe

c) *Injection:*

Although injection sclerotheraphy has been used extensively in the control of bleeding from haemorrhoids and oesophageal varices, the use of injection in controlling ulcer bleeding has only recently attracted attention. Agents that have been used included absolute alcohol[18,19], polidocanol[20], adrenaline followed by polidocanol[21], mixtures of adrenaline and hypertonic saline[22] and adrenaline alone[23] (Figure 4). These substances are injected directly into the

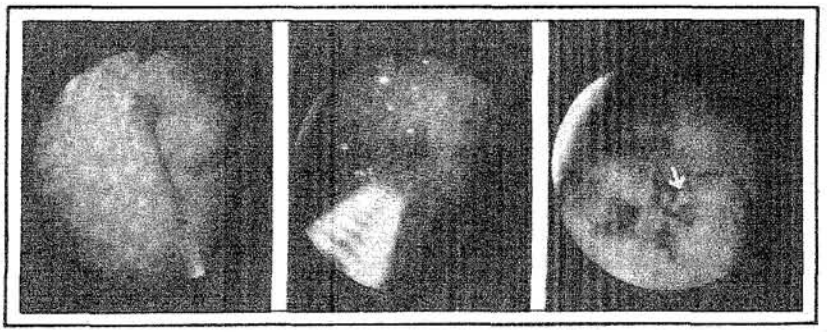

Figure 4: Gastric ulcer with arterial spurter, before (left), during (middle) and after (right) adrenaline injection. White arrow indicates the artery.

(turn to page 3194)

bleeding area by a flexible injection needle inserted through the biopsy channel of the endoscope. The obvious advantage of this method is that no specialised instrument or endoscope is necessary. Success of 80-100% has been claimed in uncontrolled series. The use of sclerosants may lead to enlargement of the ulcer[20] or even perforation[18]. Only the use of adrenaline has been studied in a randomised controlled trial. In a trial involving only actively bleeding ulcers, the use of adrenaline injection reduced the emergency operation rate from 41% to 15% and the transfusion requirement from 5.9 to 3.8 units[24].

Discussion

The advent of endoscopic means of stopping bleeding from ulcers heralds a new era in the treatment of this common condition. We believe that endoscopic haemostasis is the first line treatment of ulcer bleeding. Surgery should be reserved for those in whom endoscopic haemostasis is unsuitable or unsuccessful.

1) *When to start:*

Resuscitation of the patient must be given top priority. While the temptation to stop the bleeding in an unstable patient is great, endoscopy should not be carried out until blood volume replacement is achieved or at least in progress. Emergency endoscopy in bleeding patients is more difficult and potentially more hazardous than routine diagnostic endoscopy. These examinations should not be performed by trainee endoscopists without supervision. Therapeutic manoeuvers to stop bleeding require additional endoscopic skills. We recommend that these procedures should only be undertaken by experienced endoscopists who have performed more than 500 routine examinations.

2) *What to use:*

The ideal method should be effective, inexpensive, easy to use and safe. Laser is expensive and difficult even in expert hands. The choice is between one of the contact thermal probes and injection. We ourselves favour adrenaline injection because of its safety, low cost and easy availability.

3) *Who to treat:*

It must be remembered that 80% of ulcers stop bleeding spontaneously. If an unselective policy is adopted patients may undergo unnecessary treatment. If active bleeding is seen at the time of endoscopy, endoscopic treatment is indicated. In patients who are not bleeding actively, the chance of rebleeding can be predicted by the presence of stigmata of recent haemorrhage such as the presence of an exposed blood vessel[25, 26]. It is reasonable to treat these lesions prophylactically in an attempt to prevent rebleeding. Ulcers without stigmata of recent haemorrhage have a negligible chance of rebleeding[27] and should not be treated.

4) *When to stop:*

The endoscopist must not be preoccupied with endoscopic treatment to the peril of the patient. Surgery remains the most definite method of controlling ulcer bleeding. Emergency surgery should be carried out without delay if a) the lesion cannot be seen because of massive bleeding, b) active bleeding cannot be controlled endoscopically, or c) rebleeding occurs after initial success with endoscopy. Moreover, unlike surgery, endoscopic treatment cannot influence the ulcer diathesis. Patients with a long ulcer history or significant ulcer complications in the past should be treated by surgery. An elective ulcer curing operation should be offered during the same admission even if haemostasis has been achieved endoscopically. ■

References

1. Silverstein FE, Gilbert DA, Tedesco FJ et al. The National ASGE Survey on Upper Gastrointestinal Bleeding. II Clinical Prognostic Factors. Gastrointest Endosc 1981; 27: 80-95
2. Morgan AG and Clamp SE. OMGE International Upper Gastro-Intestinal Bleeding Survey 1978-1982. Scand J Gastroenterol 1984; 19 (suppl 95: 41-58).

3. Hunt PS, Hansky J, Korman MG et al. Bleeding Duodenal Ulcer: Reduction in Mortality with a Planned Approach. Br J Surg 1979; 66: 633-635.
4. Rofe SB, Duggan JM, Smith ERM, Thursby CJ. Conservative Treatment of Gastrointestinal Haemorrhage. Gut 1985; 26: 481-484.
5. Cotton PB, Rosenberg MT, Waldram RPL et al. Early Endoscopy of the Oesophagus, Stomach and Duodenal Bulb in Patients with Haemetemesis and Melaena.
6. Hajiro K, Matsui H, Tsujimura D. Endoscopic Haemostasis with Hemoclips, Local Injection and Other New Techniques. The Japanese Experience. Endoscopy 1986; 18: 62-67.
7. Portell RL, Silverstein FE, Guldesik C et al. Failure of Cyanoacrylate Glue (Flucrylate MBR4197) to Stop Bleeding from Experimental Cannine Gastric Ulcers. Am J Dig Dis 1978; 23: 903-908.
8. Jensen DM, Machicado G, Taipa J. Clotting Factors Fail to Control Bleeding from Standard Ulcers or Gastric Erosions. Gastroenterology 1980; 78: 1187.
9. Klein FA, Druels RI, Dunn JK, Brewer RI, Schilli R: Control of Gastrointestinal Bleeding with Avitenne. Gastrointest Endosc 1980; 26: 70.
10. Swain CP, Mills TM, Gastrointestinal Wound Closure and Anastomosis at Flexible Endoscopy with Sewing Machine, Stapler and Compression Button. Gastrointest Endosc 1987; 33: 178.
11. Dwyer RM, Haverback BJ, Bass M et al. Laser-Induced Hemostasis in the Canine Stomach. JAMA 1975; 231: 486-489.
12. Macleod IA, Mills PR, Mackenzie JF et al, Neodymium-Yag Laser Photocoagulation for Major Haemorrhage from Peptic Ulcers and Single Vessels. Br Med J 1983; 286: 355-348.
13. Ihre T, Johansson C, Seligson U et al. Endoscopic YAG Laser Treatment in Massive Upper Gastrointestinal Bleeding. Scand J Gastroent 1981; 16: 633-640.
14. Shorvon PJ, Leung JWC, Cotton PB. Preliminary Clinical Experience with the Heater Probe at Endoscopy in Acute Upper Gastrointestinal Bleeding. Gastrointest Endosc 1985; 31: 364-366.
15. Laine L. A Controlled Trial of Multipolar Electrocoagulation in the Treatment of Upper Gastrointestinal Hemorrhage. Gastroenterology 1986; 90: 1508.
16. Rutgeerts P, Vantrappen G, Van Hootegem Ph, Broeckaert L Coremans G. Randomised Trial of BICAP Electrocoagulation and Neodymium-YA Photocoagulation for Hemostasis of Severly Bleeding Ulcer. Gastronintest Endosc 1986; 32: 150.
17. Jensen DM, Machicado GA, Silpa M et al. BICAP vs Heater Probe for Hemostasis of Severe Ulcer Bleeding. Gastrointest Endosc 1986; 32: 143.
18. Asaki S, Nishimura T, Satoh A et al. Endoscopic Control of Gastrointestinal Haemorrhage by Local Injection of Absolute Alcohol: a Clinical Study. Tohoku J Exp Med 1983; 141: 373-383.
19. Sugawa C, Fugita Y, Ikeda T, Walt AJ. Endoscopic Hemostasis of Bleeding of the Upper Gastrointestinal Tract by Local Injection of Ninety Eight Per Cent Dehydrate Ethanol. Surg. Gynecol Obstet 1986; 162: 161-163.
20. Wordehoff D and Gros H. Endoscopic Haemostasis by Injection-Therapy in High Risk Patients. Endosocopy 1982; 14: 196-199.
21. Soehendra N, Grimm H and Stenzel M. Injection of Nonvariceal Bleeding Lesions of the Gastronintestinal Tract. Endoscopy 1985; 17: 129-132.
22. Hirao M, Kobayashi T, Masuda K, et al Endoscopic Local Injection of Hypertonic Saline-epinephrin Solution to Arrest Hemorrhage from Upper Gastrointestinal Tract. Gastrointest Endosc 1985; 31: 311-317.
23. Chung SCS, Leung JWC. Local Epinephrine Injection in Bleeding Peptic Ulcer. Gastrointest Endosc 1986; 32: 151.
24. Chung SCS, Leung JWC, Steele RJC, Crofts TJ. Epinephrine Injection for Actively Bleeding Ulcers: a Randomised Controlled Study. Gastrointest Endosc 1987; 33: 146.
25. Griffiths WJ, Neumann DA, Welsh JD et al. The Visible Vessel as an Indicator of Uncontrolled or Recurrent Gastrointestinal Haemorrhage. N Engl J Med 1979; 300: 1411-1413.
26. Storey DW, Bown SG, Swain CP et al. Endoscopic Prediction of Recurrent Bleeding in Peptic Ulcers. N Eng J Med 1981; 305: 915-916.
27. Harris DCH, Heap TR. Significance of Signs of Recent Haemorrhage at Endoscopy. Med J Aust 1982; 2: 35-37.

NEXT ISSUE

1. Age-Sex Register of a Practice
2. The Diagnosis of Mild Hypertension in General Practice
3. Consultation Pattern of Private Practitioners in Hong Kong and its Implication to Opportunistic Health Maintenance
4. Day Surgery: Review and a Local Practice
5. Percutaneous Nephrostomy