

# Comparison of endoscopic injection therapy versus the heater probe in major peptic ulcer haemorrhage

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## Abstract

**One hundred and twenty patients presenting with major peptic ulcer haemorrhage were randomised in a clinical trial comparing endoscopic injection and heater probe therapy. The two groups were well matched with regards to age, admission haemoglobin concentration, the presence of shock, non-steroidal anti-inflammatory drug usage and endoscopic findings. Permanent haemostasis was achieved in 87% of the injection group and 85% of the heater probe group. Hospital mortality, transfusion requirement and duration of admission were similar in both groups. Endoscopic injection and the heater probe represent equally effective therapy for peptic ulcer bleeding.**

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The prognosis of patients presenting with bleeding peptic ulcer is improved by a range of therapeutic endoscopic techniques, but the best and most practical method is unclear. Endoscopic injection with adrenaline alone,<sup>1,2</sup> sclerosants,<sup>3</sup> or a combination of the two<sup>4,5</sup> is effective and cheap. Thermocoagulation using the heater probe performs better than endoscopic injections in experimental ulcer bleeding.<sup>6</sup> Clinical trials have shown that heater probe treatment reduces rebleeding rates in bleeding peptic ulcer<sup>7,8</sup> and the technique is also relatively versatile and inexpensive.

Two clinical trials have compared injection therapy with the heater probe. The first, reported by Chung *et al*<sup>9</sup> concluded that injection of dilute adrenaline around the bleeding point was superior to the heater probe in arresting active ulcer bleeding. In direct contrast, the study reported by Lin *et al*<sup>10</sup> suggested that the heater probe was more effective than endoscopic sclerosant injection in a group of patients presenting with a range of stigmata of recent haemorrhage. The design of these studies differ in several critical respects, but we felt it important to clarify the relative merits of the two techniques by performing a third trial in which high risk bleeding ulcer patients were randomised to endoscopic injection or heater probe therapy.

## Methods

### DESIGN AND INCLUSION CRITERIA

Between June 1990 and November 1991 patients presenting with significant peptic ulcer bleeding were considered for inclusion into the study. These patients presented to the four major admitting units of the Lothian Region (St John's Hospital, Livingston, Royal Infirmary of Edin-

burgh, Eastern General Hospital and the Western General Hospital). After resuscitation one of two experienced therapeutic endoscopists (CPC or CR) performed endoscopy under benzodiazepine sedation using Olympus XQ10 forward viewing gastroscopes. Patients who were found to have a peptic ulcer which was either actively bleeding or which contained a non-bleeding protuberant vessel were entered into the study if they had at least one other risk factor. These risk factors were age over 60 years, initial haemoglobin concentration less than 100 g/l or shock, defined as a pulse rate greater than 100 beats/minute and/or a systolic blood pressure less than 100 mm Hg. A history of smoking, use of non-steroidal anti inflammatory drugs and evidence of major cardiorespiratory disease were recorded. Patients with known severe liver or renal disease, primary malignancy of the upper gastrointestinal tract or extensive metastatic disease were excluded.

Patients were randomised to endoscopic injection therapy or heater probe treatment by opening a sealed envelope (Table I).

### ENDOSCOPIC TECHNIQUES: INJECTION THERAPY

Injection therapy was given using a disposable variceal injection needle (4 mm in length, 23 gauge, KeyMed Ltd, Southend-on-Sea). Four injections of 1:100 000 adrenaline to a maximum of 10 ml were placed around the ulcer. This invariably caused blanching and usually stopped active bleeding. A total of 0.5-2 ml of 5% ethanolamine was then injected around and into the bleeding area.

### HEATER PROBE THERMOCOAGULATION

The KeyMed Unit with 8F probe was used. After vigorous washing of the ulcer the probe was placed directly over the bleeding point and pulses of energy were given according to the tissue effect. A median of 225 joules (range 150 to 300) was used.

### FOLLOW UP

Patients thought to be at particularly high risk (large, protuberant vessels) or those in which initial therapy was deemed suboptimal, underwent repeat endoscopic therapy within 12-48 hours; the same modality was used as at the first treatment session.

After endoscopy all patients received H<sub>2</sub> receptor blocker therapy in standard doses.

Whenever possible the admitting team were unaware of which endoscopic treatment had been given. All management decisions were left to these physicians and surgeons. The follow-

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TABLE I Patient details in each group

	Injection therapy	Heater probe
Randomised (n)	60	60
Median age (range) years	65 (17-88)	65 (18-90)
Male	40	42
Mean admission haemoglobin (SD), g/l	91 (20)	88 (19)
Shocked (n)	40	44
NSAID users	22	23
With cardio/respiratory disease (n)	20	23
Active bleeding	30	27
Non-bleeding protuberant vessel	30	33
Gastric ulcer	20	22
Duodenal ulcer	39	37
Stomal ulcer	1	1

NSAID=non-steroidal antiinflammatory drug.

TABLE II Results of therapy

	Injection therapy	Heater probe
Technical success	58	57
Number rebleeding (%)	8 (13)	9 (15)
Number retreated	4	4
Permanent haemostasis (%)	52 (88)	52 (86)
Emergency surgery	7	7
Hospital mortality (%)	2 (3.4)	3 (5)
Median units of blood transfused (range)	5.2 (0-9)	5.1 (0-7)
Median duration of admission (range) days	7 (2-85)	7 (2-35)

ing end points were determined: (i) Rebleeding: this was defined as fresh haematemesis and/or melaena, with either shock (pulse rate greater than 100 beats/minute, systolic blood pressure less than 100 mm Hg) or a fall in haemoglobin concentration of at least 20 g/l over a 24 hour period. (ii) Surgical operation: The decision to perform a surgical operation (like all management decisions) was left entirely to the admitting clinicians. Continuous bleeding or rebleeding were the only indications for surgery. (iii) Units of blood transfused. (iv) Duration of hospital admission (days). (v) Thirty day mortality (from time of admission).

#### POLICY AFTER REBLEEDING

Rebleeding was treated either by a surgical operation or (if requested by the admitting unit) by endoscopic therapy. Endoscopically treated rebleeding patients received the same form of endoscopic therapy as was given at the time of admission.

#### STATISTICAL ANALYSIS

Differences in outcome were analysed using the  $\chi^2$  test.

The study was approved by the Ethics of Medicine and Oncology Committee of the Lothian Health Board. Where possible written consent was obtained from each subject. Otherwise permission was obtained from a relative or in rare circumstances, retrospectively.

#### Results

Two hundred and four patients were considered for inclusion into the study of whom 120 were randomised (60 to injection therapy, 60 to heater

probe). The major reasons for exclusions were lack of endoscopic stigmata within a peptic ulcer (30 patients) and other causes of bleeding (54 patients). Five further patients had torrential peptic ulcer bleeding which obscured the bleeding area and prevented adequate diagnosis; all five were subjected to emergency surgery.

After randomisation endoscopic therapy was technically unsuccessful in five patients because the ulcer was inaccessible to injection (two patients) or the heater probe (three patients). The outcome of therapy, including these technical failures, is summarised in Table II. Eight patients (13%) in the injection group and nine (15%) in the heater probe group rebled. Four rebleeders from each group were retreated using the same treatment and one in each group responded and did not rebleed during their hospital admission. Fourteen of the remaining subjects who rebled were subjected to emergency surgery and one elderly high risk patient who rebled after initial heater probe treatment was successfully treated by arterial embolisation.

There were no differences in transfusion requirements or duration of hospital stay. No significant complications followed endoscopic therapy.

Mortality was similar in the two groups. All deaths were the result of postoperative complications of emergency surgery and occurred in elderly or frail subjects who had multiple medical problems.

#### Discussion

This randomised, prospective trial has shown similar efficacy for endoscopic injection and heater probe therapy in patients presenting with major peptic ulcer haemorrhage. Our hospital mortality of 4% is acceptable because this subgroup represents approximately 30% of all patients admitted with peptic ulcer bleeding. The remaining 70% have more modest bleeding, unassociated with endoscopic stigmata and have an excellent prognosis.<sup>11</sup>

This study differs in several respects from those reported by other centres. Chung *et al*<sup>8</sup> studied only actively bleeding patients and found that initial haemostasis was better with adrenaline injection therapy than with the heater probe. In the subgroup of patients presenting to us with active haemorrhage we also found haemostasis to be more easily achieved using adrenaline although the prognosis in our hands was similar using either technique. In the study reported by Chung *et al*, the eventual outcome was similar in both groups suggesting that the advantage of better acute haemostasis with injection therapy was balanced by a lower rebleeding rate in the heater probe group. This suggests that the acute vasoconstricting action of dilute adrenaline was not followed by arterial thrombosis and an optimum therapy may be a combination of an adrenaline injection which will stop active bleeding, followed by heater probe treatment causing arterial damage, thrombosis and prevention of rebleeding. Our study used injection therapy with adrenaline and ethanolamine, which was designed to produce an acute vasoconstrictor effect and endarteritis leading to a

reduced risk of rebleeding, and this combination was compared with the heater probe.

The Lin *et al*<sup>10</sup> study compared a sclerosant injection and the heater probe in patients presenting with a range of endoscopic stigmata of recent haemorrhage. Although a few studies have used sclerosants alone,<sup>3,12</sup> most authorities include adrenaline because of its superior effect in stopping active bleeding. In animal studies, sclerosants injected alone may exacerbate rather than ameliorate, active bleeding<sup>13</sup> and these factors may account for the rather poor performance of injection study in Lin *et al*'s study.

Despite the conclusions of our study it is our impression that specific clinical situations may be more appropriately treated by one or other technique; injection therapy and the heater probe are complementary not competitive techniques. For example the powerful washing facility of the heater probe is particularly useful for removing blood clot over an ulcer and awkwardly positioned ulcers can sometimes be amenable to heater probe therapy when an adequate injection is not feasible. In contrast, acute haemostasis is generally more easily achieved with injection and this technique is virtually universally available in all endoscopy units. Combined treatment by initial adrenaline/sclerosant injection followed by heater probe thermocoagulation may be the correct option for large protuberant vessels, particularly as sclerosants may not always cause adequate arterial thrombosis.<sup>13</sup>

Both treatments are safe and no significant complications followed endoscopic therapy. Published series are based upon the results of therapy performed by experts and anecdotal

reports of disasters after poor technique in inexperienced hands<sup>14</sup> emphasise that good results are dependent upon appropriate and careful treatment. In such careful hands, either endoscopic injection therapy or the heater probe represent first line treatment for patients presenting with major peptic ulcer haemorrhage.

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