Transgastric Surgery for Posterior Juxtacardial Ulcers

A Minimal and Safe Approach

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Hypothesis: A transgastric approach may be used successfully for the treatment of posterior juxtacardial ulcers presenting with massive bleeding.

Methods: Eight patients were admitted during a 6-year period with acute massive upper gastrointestinal bleeding caused by posterior juxtacardial ulcers. All patients had signs of profound hypovolemic shock, and initial endoscopic control was achieved in 3 patients. They all underwent surgery after endoscopy. At operation, the ulcer was approached through an anteromedial gastrostomy and hemostasis was achieved by transfixing stitches. Ulcers were excised whenever possible, or excluded if adherent posteriorly. Four-quadrant biopsy was taken for frozen section to exclude malignancy. Both anterior and posterior gastric walls were then closed with nonabsorbable suture material.

Results: There were 6 men and 2 women with a mean age of 73 years. Hemoglobin levels ranged from 5.2 to 8.0 g/dL. Five patients underwent emergency surgery within 28 hours of admission. The diameter of the ulcers ranged from 2 to 5 cm. Ulcerectomy was performed in 6 cases. In the remaining 2 patients, the crater of the ulcer was adherent to the diaphragm and required exclusion from the gastrointestinal tract. None of the ulcers proved to be malignant, and there were no operative deaths. Patients were followed up for a mean of 3 years with no complications.

Conclusions: Satisfactory results can be achieved with a transgastric approach to these rare ulcers. This allows definitive treatment while avoiding major gastric resection with its potential complications.

Arch Surg. 2003;138:757-761

UXTACARDIAL ULCERS are defined as those located less than 2 cm from the esophagogastric junction or squamous-columnar mucosal junction, as a subgroup of high gastric, subcardial, or type IV gastric ulcers.1 Few studies report the incidence of these ulcers, which ranges from 0.5% to 3.56%.1-3 Despite a marked decrease in incidence of peptic ulcer disease and an improvement of both diagnostic methods and management, the overall mortality from acute massive hemorrhage from gastric ulcers has remained fairly constant, ranging from 15.2% to 22%.4,5 This may be partly explained by the increasing age at presentation. Factors that predict further hemorrhage and mortality are old age,6,7 endoscopic stigmata of recent hemorrhage,8 presence of clinical shock on admission,9,10 and rebleeding.9 Important endoscopic signs (ie, active, spurring hemorrhage from a peptic ulcer, visible vessel, fresh clot in ulcer base) are associated with an 80% risk of persistent or recurrent bleeding in patients with shock.9,11 The mortality in this group is about 30%.12

The treatment of patients with juxtacardial ulcers remains controversial with regard to whether surgery is indicated despite endoscopic control of active bleeding and what is the best surgical option, should endoscopic control fail. The timing of surgical intervention is also controversial. In this report, we present our surgical experience and a literature review in this type of gastric ulcer presenting with massive hemorrhage.

See Invited Critique at end of article

METHODS

PATIENTS

Eight patients were admitted during a 6-year period with acute massive upper gastrointestinal hemorrhage caused by a large (2.0-3.9 cm) or a giant (>4.0 cm) posterior juxtacardial ulcer. Six of them were men and 2 were women (ratio, 3:1), and their ages ranged from 62 to 85 years (mean, 73.12 years).
Two patients had long-standing symptoms of peptic ulcer disease, and 1 patient had been taking nonsteroidal anti-inflammatory drugs with a 1-month history of epigastric pain and vomiting before the episode. Coincidental pathological findings of note were present in only 1 patient (Table 1).

All patients presented with hematemesis, melena, and signs of hypovolemic shock: they were clammy, hypotensive (systolic blood pressure, \( \geq 100 \text{ mm Hg} \)), and tachycardic (pulse, \( \geq 100 \text{ beats/min} \)). Hemoglobin levels ranged from 5.2 to 8.0 g/dL on admission, with mean transfusion requirements of 7 U (range, 4-11 U).

Initial treatment of all patients included cardiovascular optimization with circulatory volume reposition. Once stabilized, all patients underwent emergency endoscopy. A bleeding point was identified in 5 cases and was injected with 1-mL aliquots of 1:10000 epinephrine by means of an endoscopic flexible needle injector up to a total of 10 mL or until the bleeding stopped.

Unequivocal persistent or recurrent bleeding was defined when hematemesis and/or melena continued and the patient was clinically in shock (ie, systolic blood pressure \( < 100 \text{ mm Hg} \)) despite fluid resuscitation, which warranted an emergency operation.

Endoscopic examination confirmed the gastric origin of the hemorrhage in all cases, although the bleeding vessel was accurately visualized in only 5 patients. Three patients had massive bleeding at the time of the procedure, making adequate visualization impossible despite vigorous washouts and suction.

Endoscopic control with epinephrine was obtained in only 3 cases. However, despite absence of clinical signs of rebleeding, these patients underwent semielective surgery within 72 hours of admission. The remaining 5 patients required emergency laparotomy between 80 minutes and 28 hours after admission. At laparotomy,

### TECHNIQUE

In all patients, the ulcer was visualized through an anteromedial longitudinal gastrostomy, which gave an excellent exposure. This was placed equidistant from both the lesser and greater curvatures across the upper third of the body of the stomach, avoiding the important vascular structures that run along both curvatures.

The surgery was performed in 3 phases. In the **hemostatic phase**, the bleeding was controlled by placing transfixing nonabsorbable stitches at the bleeding site. In the **exploratory phase**, a window was achieved in the loose upper part of the lesser omentum that gave quick access as well as direct assessment of the ulcer posteriorly. If a further window was required, this was established through the gastrocolic ligament to gain access to the lesser sac and the ulcer from below and behind. This allowed evaluation of whether the ulcer could be excised. In the **therapeutic phase**, if the ulcer bed was adherent posteriorly, mobilization by blunt digital dissection was attempted to allow excision of the ulcer (Figure 1). If mobilization failed, the ulcer was excluded (Figure 2A). The ulcer with its chronic, indurated, whitish, inflammatory, and relatively avascular halo was carefully dissected to make suturing easier and safer regardless of whether the ulcer was excised or excluded.

When firmly attached posteriorly (in 2 cases), the ulcer bed was left in situ and the gastric mucosa was diathermized and left behind. In these cases, a 4-quadrant biopsy specimen of the ulcer bed was taken for frozen-section examination to exclude malignancy. Both anterior and posterior gastric walls were closed with interrupted 1-layer nonabsorbable suture material (Figure 2B-D).

Postoperative management consisted of restricting oral intake, treatment with intravenous ranitidine, and nasogastric intubation with continuous low suction usually during the first 3 or 4 days or until normal peristalsis was regained.

### RESULTS

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Endoscopic control with epinephrine was obtained in only 3 cases. However, despite absence of clinical signs of rebleeding, these patients underwent semielective surgery within 72 hours of admission. The remaining 5 patients required emergency laparotomy between 80 minutes and 28 hours after admission. At laparotomy,
hemostasis was obtained in all the emergency cases by transfixing sutures after transgastric exposure through an anteromedial longitudinal gastrostomy. In 2 patients, surgery and resuscitation were performed simultaneously because of persistent shock.

The diameter of the ulcers ranged from 2 to 5 cm. Ulcerectomy (excision of the ulcer) was performed in 6 cases. In 2 patients the ulcer was firmly attached to the diaphragm, making its resection difficult and dangerous. In such cases the exclusion technique was performed, leaving the whole ulcer in situ after applying transfixing stitches and electrocoagulation of the remaining gastric mucosa.

Postoperative complications occurred in 5 patients (Table 2), and there was no perioperative mortality. One patient, a 68-year-old man with end-stage renal failure who was receiving peritoneal dialysis, died 2 months after surgery of small-bowel infarction secondary to mesenteric thrombosis. Another patient presented 5 years after surgery with postprandial dyspepsia, and a barium meal examination showed slow gastric emptying.

The mean hospital stay was 15 days (range, 8-33 days). Patients were followed up with an endoscopic assessment performed 12 months after surgery. The mean follow-up was 36 months (range, 13-72 months), and data were obtained by either outpatient appointments or telephone.

Figure 2. A, Close-up of the posterior gastric wall with a giant (4 × 5-cm) juxtacardial ulcer in situ. A transfixing stitch placed on the bleeding point for hemostasis can be seen. These features have been exposed through an anterior gastrostomy. B, After hemostasis has been achieved and ulcer bed excluded, interrupted nonabsorbable stitches have been placed for posterior gastric wall closure. Note the nylon tape hooking around the cardia. C, Everted edges of anterior gastric wall allow visualization of closed posterior gastrostomy. Nylon hooking tape is again visible. D, Anterior gastrostomy is closed.
Posterior juxtacardial ulcers are rare within peptic ulcer disease. They demonstrate unique clinical and pathological features that can be attributed to their anatomic location. They are frequently large or giant, chronic, deep, almost invariably benign, and relatively symptomless. They are typically associated with very low levels of acid gastric secretion and a slow rate of gastric emptying compared with other types of peptic ulceration.

In our experience, this type of gastric ulcer is mainly encountered in older patients and tends to have a very large crater when it presents with bleeding. Many of these chronic ulcers become complicated by an acute episode of bleeding, which in most instances is profuse or massive. The reason may be the rich blood supply to this part of the posterior gastric wall, which may be increased by the presence of the posterior gastric artery in more than 45% of patients in most series. Moreover, the position of the ulcer does influence the risk of rebleeding in up to 77.2% of high gastric ulcers.

Endoscopic therapy is the method of choice in treating active bleeding ulcers, which is successful in most cases. This is an effective and safe way of reducing the need for an emergency operation. Therefore, endoscopy is justifiable as the initial treatment of these patients.

Patients bleeding from juxtacardial ulcers constitute a high risk, since they are commonly elderly and present to the hospital with severe hemorrhagic shock. This is compounded by the technical difficulties that they present to both endoscopists and surgeons.

Up to one third of bleeding ulcers are unsuitable for endoscopic therapy, either because of their inaccessibility or because of profuse uncontrollable bleeding. The rate of rebleeding within 72 hours of initial treatment in patients with shock who are older than 60 years has been reported to be between 43% and 57%. Evidence of further hemorrhage in such patients carries a 6-fold increase in mortality. On the other hand, there is a strong temptation to delay the decision to operate in patients who, because of age, chronic comorbidity, or severity of clinical state, are poor surgical risks. However, most of these factors do not diminish when surgery is delayed.

Advocates of early surgery report an operative mortality of 14% within 24 hours after admission to 33% on day 4 and 52% on day 7, or a 60% mortality rate when surgery is delayed. Others have suggested that an aggressive surgical policy in bleeding peptic ulcer could, if anything, increase the overall mortality. We, like others, agree with the need for prompt surgical intervention particularly in the elderly with bleeding chronic gastric ulcers (ie, within 24 hours after admission). A good outcome can be achieved with early operative management.

Failure of endoscopic control in these patients makes surgery mandatory; however, the best surgical option still remains controversial. Not all gastric ulcers are managed alike; however, the aim of surgery should be not only to control the active hemorrhage, but also to ensure that a new episode does not occur.

Several authors have made a case for early elective surgery, since it carries a lower operative mortality as well as decreased morbidity and mortality rates from secondary hemorrhage compared with an emergency procedure. However, in our experience, these patients almost always represent true surgical emergencies.

Some have suggested limiting the surgical procedure to that necessary to achieve hemostasis (ie, oversewing of the ulcer), avoiding major resectional surgery. In our opinion, this approach is conceptually wrong, since it is well known that these chronic gastric ulcers have the tendency to inhabit one particular site and, whenever possible, excision of the ulcer is important in preventing its recurrence as well as its complications.

Vagotomy, even selective, is not suitable for high gastric ulcers, since these are consistently associated with high hemorrhage.
pochlorhydria and because it may cause persistent gastric atony even when pyloroplasty is added. Others have reported very good or good results when using vagotomy and ulcerectomy with or without pyloroplasty; however, the latter showed an ulcer recurrence rate of 20% at 8 years for type IV gastric ulcers. Even less justifiable is to leave the ulcer in situ and resect variable amounts of stomach below it, known as the Kelling-Madlener operation. Some advocate major resectional surgery such as distal partial gastrectomy with Roux-en-Y esophaagogastrojejunostomy, any variant of subtotal gastrectomy, or even total gastrectomy. Another group has reported good results with a pyloric sphincter preservation technique that preserves the blood supply to the gastric stump and pylorus with resection of the posterior gastric wall together with the ulcer, creating a gastric tube with the anterior gastric wall. In our opinion, none of these surgical modalities is necessary or justifiable.

Few reports have suggested a transgastric approach, either as an adjunct to more radical procedures or as part of the exploratory phase before definitive and more extensive surgery. We advocate such an approach for both hemostasis and definitive surgical treatment, which, whenever possible, will consist of ulcerectomy. If difficulties arise because of firm attachment to the posterior abdominal wall, the best choice is ulcer exclusion. Either of these will avoid ulcer rebleeding as well as to minimize both operative time and the risks of a more extensive and unnecessary surgery.

In this article, we describe much less aggressive surgical procedures for equally difficult ulcers in similarly complex cases, in which the “ulcer is everything.” Our results suggest that the key to successful treatment of patients with this type of ulcer, which will never regress but persevere, is to perform early surgery whether or not endoscopic control of the active hemorrhage has been achieved. Furthermore, we think that this approach is useful in the treatment of posterior juxta-cardiac ulcers; it seems to be effective, quick, and safe and carries a much lower morbidity and mortality.

Accepted for publication December 22, 2002.

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