



Surgical Treatment of Complicated Duodenal Ulcers: Controlled Trials

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Abstract. Indications for surgery of duodenal ulcer (DU) have changed radically because of the efficacy of H₂-antagonists, endoscopic procedures, and eradication of *Helicobacter pylori*. The aim of this study was to analyze the current literature to determine if definitive surgery is still relevant for complicated DU (bleeding, perforation, gastric outlet obstruction). Two studies have compared early to late surgery in terms of bleeding. One recommended early surgery (significant reduction in mortality) in the elderly, but no statistically significant difference was found when analyzed with “intention to treat.” In the other, mortality with early surgery was five times higher than with expectant therapy (when it was possible). Two studies comparing different surgical techniques for bleeding favored the radical procedure. Of at least 15 studies comparing endoscopic treatments, however, none has compared endoscopic therapy to surgical intervention for bleeding DU. One trial, comparing nonoperative to surgical treatment for perforation, found similar rates of morbidity, intraabdominal abscess, and mortality; but the hospital stay was longer ($p < 0.001$). Nonoperative treatment failed more often ($p < 0.05$) in patients over age 70. In three trials, postoperative morbidity (excepting wound sepsis in one) was not significantly increased by definitive surgery, with less ulcer recurrence ($p < 0.05$) compared with simple closure. Laparoscopy (versus laparotomy) was shown to take longer ($p < 0.001$) but required less postoperative analgesics ($p < 0.03$); there were no statistically significant differences as concerns the duration of nasogastric aspiration, intravenous drips, hospital stay, time to resume normal diet, Visual Analogous Scale pain scores for the first 24 hours after surgery, morbidity, reoperation rate, or mortality. Of 48 laparoscopic patients, 11 (23%) underwent conversion to open surgery. Three surgical techniques [highly selective vagotomy (HSU) + gastrojejunostomy (group 1), HSV + Jaboulay gastroduodenostomy (group 2), or selective vagotomy (group 3) + antrectomy] for gastric outlet obstruction (GOO) showed that although postoperative results were similar (except wound sepsis in one trial), long-term Visick scores were significantly ($p < 0.01$) better in group 1 than in group 2, but not in group 3. Further studies are needed to determine the exact prevalence of *Helicobacter pylori* in complicated DU and to compare (1) definitive to minimal surgery (stop the bleeding or close the perforation) combined with antisecretory drugs and eradication of *H. pylori*; (2) surgery to endoscopic treatment combined with eradication of *H. pylori*; and (3) for GOO, surgery to balloon dilatation combined with eradication of *H. pylori*.

Peptic ulceration is an infectious disease. *Helicobacter pylori*, a motile flagellar bacillus that dwells in the mucous layer of the stomach, is found in more than 90% of patients with duodenal ulcer (DU). When the bacteria are eradicated, ulcer recurrence is dramatically reduced [1].

Complications of peptic ulcer disease are seen in an estimated

11% of patients [2]. Indications for surgery of DU have changed radically during the last decades, essentially because of the efficacy of antisecretory drugs [3]. As several controlled trials have determined that radical or definitive surgical treatment was indicated for bleeding or perforated duodenal ulcers, and as new pathogenic aspects of peptic ulceration (*H. pylori* infection) surface, a new outlook is needed. The aim of this report was to determine if the results of these controlled surgical trials are still relevant in view of the infective pathogenesis of peptic ulceration.

Bleeding Peptic Ulcers

Upper gastrointestinal (GI) bleeding, occurring at an annual incidence estimated at 100 per 100,000 people [4], is often a life-threatening emergency with a 10% mortality rate [5] despite modern advances in endoscopic and pharmacologic intervention. Persistent or recurrent bleeding, occurring in 20% to 33% [6] of patients, is associated with a mortality rate between 10% and 14% when rebleeding occurs without treatment and 10% and 44% when rebleeding occurs despite treatment [7].

Alternative to Surgical Treatment: Endoscopic Hemostasis

Approximately 80% of patients with clinically probable peptic ulcer bleeding stop bleeding spontaneously [8]; surgical or endoscopic intervention is not necessary for these patients. On the other hand, another 80% of patients with active bleeding at endoscopy continue to bleed or rebleed in hospital [9], and 50% of those who have a nonbleeding visible vessel also rebleed [9]. Endoscopic injection treatment stops active bleeding and prevents further hemorrhage in most of these patients. The mechanism of action is heterogeneous, comprised of tamponade, vasoconstriction, sclerosis, tissue dehydration, and thrombogenesis; substances injected include epinephrine, sclerosants, alcohol, thrombin, or a combination thereof. Although trials often define the need for surgery as the result of injection treatment failure, an alternative view is that endoscopic control may facilitate safe, early elective surgery [9]. No studies to date have compared surgery with endoscopic therapy.

In 1995 the cumulative meta-analysis by Lau et al. [10] was highly in favor of the reduction of overall mortality by endoscopic treatment of upper GI hemorrhage. Kubba and Palmer reviewed

the literature on controlled trials of endoscopic injection therapy for bleeding peptic ulcer in 1995 [9]. Epinephrine was used with success for the first time by Chung et al. [11]. Four studies compared epinephrine plus sclerosant versus conservative treatment in nearly 300 patients [12–15], and all four found that epinephrine plus sclerosant was effective, reducing the need for emergency surgery. Three other studies compared epinephrine injection alone to epinephrine plus a sclerosant [16–18] without finding any significant difference in results. At least three other studies [19–21] compared alcohol injection and reported reduced mortality rates [21] and a reduced need for surgery [20]. Direct injection of thrombin has been shown to be effective as well [22–24], but the number of patients in these studies was relatively small, and the studies therefore lacked power [9]. According to another study by the same team [25] endoscopic interventional treatment should be offered to all high risk bleeding ulcer patients. A posterior location of the ulcer, however, was significantly more often associated with failed endoscopic therapy than when it was in an anterior location [25]. At least two controlled trials indicated that repeat injection could increase the success rate [26, 27].

Results of Surgical Trials

In one of the earliest studies on record, Morris et al. [28] conducted a randomized study to determine the optimal timing of operation for bleeding peptic ulcer. In this study [28] a total of 142 patients with a proved duodenal or gastric ulcer, hospitalized between October 1980 and September 1983, were randomized to early (aggressive) or delayed (conservative) surgical management. Operation was carried out in each group whenever specific operative criteria were attained. The limits of these criteria were 4 units of blood or plasma expander required to correct acute blood loss in 24 hours, one rebleed, endoscopic “red” stigmata (active bleeding, visible vessel, adherent clot, spots), previous upper GI hemorrhage plus 2-year history of dyspepsia for the “early, aggressive” policy compared with 8 units of blood, two rebleeds, persistent hemorrhage requiring transfusion of 12 units in 48 hours or 16 units in 72 hours for “late, conservative” surgical management. The type of operation in each group was decided by the surgeon (vagotomy + underrunning of the ulcer in 44, gastric resection with Billroth I reconstruction in 8, with Polya reconstruction in 3 and total gastrectomy in 1). Significantly more operations ($n = 42$, 60%) were performed in the early surgery group than in the delayed surgery group ($n = 9$, 20%) ($p < 0.01$). There were no deaths among the 42 patients under age 60. The overall mortality in the 100 patients aged 60 was 10%. Operative mortality in the elderly was 7% in the early group compared with 43% in those treated by the delayed policy. The authors concluded that for patients over age 60 an aggressive surgical policy is associated with a significant reduction in mortality. This was the case overall when one death due to bleeding colonic polyp was excluded and in the group of elderly patients with gastric ulcer disease. The difference in patients with DU was not found to be statistically significant. Moreover, when analyzed on an “intention to treat” basis, there was no longer any difference between early and delayed surgery.

Saperas et al. [29] compared early surgery (suture of the bleeding lesion plus truncal vagotomy and pyloroplasty in all patients within 4 hours of admission) to expectant management. They

studied patients for whom endoscopy revealed active nonarterial bleeding or evidence of recent hemorrhage from a duodenal ulcer without a visible vessel in 69 of 305 patients over 50 years old seen during a 3-year period. Overall mortality was 8.6%. Mortality in patients undergoing early surgery was five times higher than in those allocated to expectant therapy (14.7% vs. 2.9%; risk ratio 5.07). These results suggest that expectant management is advisable in patients with a bleeding duodenal ulcer that is not bleeding massively and in whom endoscopy does not disclose spurting arterial bleeding or a visible vessel.

Millat et al. [30] compared oversewing the ulcer and vagotomy (O+V) with distal gastric resection (GR) in patients undergoing emergency surgery for massive, persistent bleeding or recurrent bleeding from a bulbar peptic ulcer. Of 202 patients with bleeding duodenal ulcer during a 10-year period, 120 were enrolled in a prospective randomized trial, 59 being assigned to O+V and 61 to distal GR. One patient in each group was excluded after randomization. The two groups were well matched with respect to clinical and prognostic factors. The rate of postoperative bleeding recurrence was 17% after O+V compared with 3% after GR ($p < 0.05$). The duodenal leak rate was higher after GR (13%) than after O+V (3%) ($p < 0.01$) but was not statistically significantly different when the morbidity of reoperations for bleeding recurrence after O+V was considered on an intention-to-treat basis (12% vs. 13%). Overall mortality was similar (22% for O+V vs. 23% for GR). Postoperative mortality was not different between O+V (27%) and GR (30%). Of 82 nonrandomized patients seen during the same period, 10 were not analyzed. Of the remaining 72, bleeding recurrence, duodenal leakage, and postoperative mortality rates were consistent with the results of the randomized study. The authors concluded that GR with ulcer excision is the procedure of choice for emergency surgical treatment of bleeding duodenal ulcer because postoperative bleeding recurrence is lower and the overall rates of mortality and duodenal leakage were the same in the two groups. In both randomized and nonrandomized groups, there was only one bleeding recurrence among 20 patients undergoing oversewing and vagotomy associated with gastroduodenal and right gastroepiploic artery ligation. Although this so-called Weinberg procedure [31] was not randomized in this study, it might be an appropriate alternative when GR cannot be performed.

Of the 202 patients with bleeding duodenal ulcers requiring emergency surgical hemostasis, 145 ulcers (72%) were located on the posterior duodenal wall. According to univariate analysis, the posterior (compared with anterior) localization was significantly associated with older age ($p < 0.001$), a higher proportion of women ($p < 0.02$), a lower preoperative red blood cell count ($p < 0.05$), higher preoperative blood requirements ($p < 0.001$), and higher postoperative mortality ($p < 0.02$). With multivariate analysis, however, when age and blood requirements were taken into consideration, the posterior localization was no longer an independent predictor of mortality. The authors concluded that the posterior location of duodenal ulcers was a poor prognostic factor only because these ulcers have a strong tendency to bleed and are associated with aged and poor risk patients.

In one multicenter study published in 1991 [5], the outcomes of 62 patients allocated to minimal surgery (underrunning the vessel or ulcer excision and adjuvant rantidine) were compared to that of 67 undergoing conventional surgery (vagotomy and pyloroplasty or partial gastrectomy). Among them, 29 patients died: 16 (26%)

after minimal therapy and 13 (19%) after conventional operations. The only significant difference between the groups was the incidence of fatal rebleeding, which occurred in six patients after minimal surgery compared with none after conventional surgery ($p < 0.02$, Fisher's exact test). There was no correlation between rebleeding and ulcer site or size, duration of symptoms, status of the surgeon or anesthesiologist, or age of the patient. Subcutaneous heparin did not predispose to rebleeding. The trial was discontinued in view of the high rates of rebleeding after minimal surgery in this interim analysis.

Helicobacter pylori and Bleeding

Eradication of *H. pylori* in patients with uncomplicated ulcers results in recurrence rates of $< 10\%$, suggesting that eradication of *H. pylori* in patients with bleeding ulcers may virtually prevent recurrence of both the disease and its complications. Several randomized trials clearly show that in patients with bleeding *H. pylori*-positive ulcers cure of the infection prevents both the recurrence of the ulcer and bleeding [32–35]. In a study from Spain [36], 6 of 84 patients (7.1%) in whom *H. pylori* was eradicated had recurrence, two with rebleeding (2.3%), compared with 13 of 41 patients (31.7%) receiving ranitidine maintenance therapy, five with rebleeding (12.5%). Although the difference between ulcer recurrence rates was statistically significant ($p < 0.01$), the difference between the two rebleeding rates was not. In another randomized study from Germany [37], one (5%) patient had recurrence without rebleeding in the eradicated group compared with six with recurrence (21%), three with rebleeding, in the ranitidine (150 mg) maintenance group. In both of these studies, however, half of the recurrences occurred in patients who did not follow their treatment correctly. In one study from Turkey [38] the incidence of *H. pylori* was studied in 50 patients admitted for bleeding duodenal ulcer compared with 64 patients with a nonbleeding duodenal ulcer. *H. pylori* was detected by both the rapid urease (CLO) test and biopsies in 44 (88%) patients with bleeding duodenal ulcer compared with 43 (67.2%) duodenal ulcer patients without a bleeding history ($p < 0.05$). Although there remains doubt as to whether *H. pylori* infection can be incriminated in the bleeding tendency in duodenal ulcer patients, the authors concluded that eradication therapy should be applied to all *H. pylori*-positive duodenal ulcer patients to prevent bleeding episodes.

Although the prevalence of *H. pylori* infection approaches 100% in duodenal ulcer patients (and 80–90% of gastric ulcer patients) not using nonsteroidal antiinflammatory drugs (NSAIDs) [39], the prevalence of the organism in bleeding ulcers is still not well defined. It has been reported to be lower than that of noncomplicated ulcers, ranging from 40% to 90%. The reasons for this might be multiple: (1) Many ulcer bleeding episodes reported in the literature are due to NSAIDs or aspirin, which are known to cause ulcers in the absence of *H. pylori* [40]; (2) the optimal number of biopsy specimens for diagnosis of *H. pylori* infection cannot be obtained because the procedure is performed under emergency conditions [41]; or (3) the presence of blood leads to false-positive results with the rapid urease test [42, 43].

Two randomized trials in 1995 [33, 35] concerning the treatment of *H. pylori* infection in patients recovering from duodenal ulcer hemorrhage showed that these patients experienced a 0% rate of recurrent bleeding during the year following randomization. This figure contrasted with the 33% and 27% rates of

recurrence in the control groups in these studies. When the results of the two studies were combined, Howden [44] calculated the relative risk reduction (1.0, or 100%), the absolute risk reduction (0.3, or 30%), and the number of patients required to treat in order to prevent one (bleeding) event [45, 46], which was only 3.3.

Perforated Duodenal Ulcers

The operative mortality for perforated DU is approximately 5% [47], although figures higher than 30% of in-hospital mortality have been reported, notably in the elderly [48, 49]. Mortality is related to patient condition and the adequacy of intensive care, rather than to the procedure used to repair the perforation. Risk factors predicting mortality include concurrent major medical illness, the presence of shock on admission to hospital, and a presentation delayed of more than 24 hours [47, 49]. Mortality rates of less than 1% can be expected in patients with none of these risk factors.

Nonoperative treatment for perforated DU consists of resuscitation with intravenous fluids, intravenous antibiotics, and nasogastric suction. Simple closure through laparotomy, with peritoneal lavage, is the standard and quickest operation. Laparoscopic repair of perforated DU was proposed as an alternative to the open approach as early as 1989 by Mouret et al. [50]. The high rate of symptomatic relapse after simple closure, however, has led to advocacy of immediate definitive surgery of peptic ulcer disease in the emergency setting. Nonoperative treatment was evaluated in one randomized controlled trial [51] and immediate definitive surgery in three [52–54]. One surgical team has compared laparotomy to laparoscopic procedures [55].

Arguments favoring a nonsurgical approach were advanced by Taylor [56] nearly 50 years ago, at a time when the mortality rate for surgical treatment was close to 20%. The fall in the overall mortality rate for patients treated surgically since then, together with advances in ulcer treatment and antibiotic therapies, justified a comparative evaluation [51]. Over a 13-month period patients with a clinical suspicion of perforated peptic ulcer were randomly assigned to conservative treatment ($n = 40$) or to emergency surgery ($n = 43$). In the surgically treated group, 40 patients had DU, 2 had gastric ulcers, and one had a perforated gastric carcinoma. The operations performed were 24 simple omental patch repairs, 15 vagotomies plus pyloroplasty, and four partial gastrectomies. Eleven patients (27.5%), including three with an erroneous diagnosis (two perforated gastric carcinomas, one perforated sigmoid cancer), who had no improvement within 12 hours of conservative treatment underwent operation (eight omental patch repairs, one vagotomy plus pyloroplasty, and one partial gastrectomy). Morbidity was similar in the nonsurgical and surgical groups (20 vs. 17 patients); intraabdominal abscesses developed in six and two patients, respectively. Two deaths occurred in each treatment group, for an overall mortality rate of 4.8%. The duration of the hospital stay was significantly longer ($p < 0.001$) in the nonsurgical group (12.0 days) than in the surgically treated group (7.8 days). Failures of the nonoperative policy were significantly ($p < 0.05$) more frequent in patients over 70 years of age (6/9, 67%) than in the younger patients (5/31, 16%).

Simple closure of a perforated DU was compared to definitive surgery in three randomized trials [52–54]. Patients with risk factors were not included in two of these studies [52, 54]. In truth, only one postoperative death was reported among the 328 pa-

tients included in these three randomized trials. Postoperative morbidity was not significantly increased by definitive surgery, except for wound sepsis in one trial [53]. Chest infection was the most frequent complication (36/328, 11%). In two trials, patients were eligible for entry only if they had a history of chronic ulcer [52, 54]. With a mean follow-up of 20 months [52] and 39 months [54], ulcer recurrence was reported in 61% (38/62) and 6% (6/92) of cases following simple closure and definitive treatment, respectively.

Operation for perforated peptic ulcer is required in an emergency setting when laparoscopic facilities and surgical staff trained in laparoscopic procedures are not available. Within these limitations, Lau et al. [57] analyzed a total of 100 consecutive patients with perforated duodenal ulcers treated by laparotomy and omental patch repair (group 1, $n = 44$), laparoscopic suture patch repair (group 2, $n = 35$), or laparoscopic fibrin glue repair (group 3, $n = 21$). Patients in the three groups were comparable as regards the Acute Physiology And Chronic Health Evaluation (APACHE-II) score and as regards risk factors such as shock on admission, delayed presentation, and associated underlying medical illness. Operative mortality and morbidity data were identical in all groups. The mean operating time was significantly longer in the two laparoscopic groups. Conversion to laparotomy was necessary in 6 of 35 patients and in 1 of 21 patients in groups 2 and 3, respectively. Postoperative analgesic requirements were less with the laparoscopic repair compared with the open repair. Intraabdominal abscess or leakage of repair was reported in 1 of 44 patients (2%) in the laparotomy group (group 1) versus 5 of 56 patients (9%) in the laparoscopic groups (groups 2 and 3). A randomized study was then undertaken when the on-call surgeons had acquired sufficient experience in laparoscopy to perform the procedure. From August 1992 to December 1994 a series of 134 patients with a clinical diagnosis of perforated peptic ulcer were considered for inclusion [55]. Patients with a history of chronic ulcer ($n = 13$), uncertain clinical diagnosis ($n = 10$), poor pre-morbid state ($n = 4$), or refusing to consent to randomization ($n = 4$) were not included. Altogether 103 patients were randomly allocated to laparoscopic or open repair and, inside each group, between suture and sutureless repair (plug of gelatin sponge and fibrin glue). Four patients in the laparoscopic group and six in the open repair groups were excluded after randomization, either because the ulcer closed spontaneously ($n = 5$) or an incorrect diagnosis ($n = 5$). Of 48 patients in the laparoscopic group, 11 (23%) were converted to open surgery. Partial gastrectomy for gastric ulcers was performed in two and four patients randomized for laparoscopic or open surgery, respectively. Definitive ulcer surgery was performed in seven patients with laparotomy. Laparoscopic repair of perforated peptic ulcer took significantly ($p < 0.001$) longer than open repair (94 vs. 54 minutes, respectively). Patients who had laparoscopic repair required fewer analgesic doses postoperatively than those who had open surgery ($p < 0.03$). There were no statistically significant differences noted between the laparoscopic and open groups as concerns the duration of nasogastric aspiration, intravenous drips, hospital stay, time to resume normal diet, and Visual Analogous Scale pain scores for the first 24 hours after surgery. There was no significant difference in morbidity, reoperation rate, or mortality between patients who underwent laparoscopic and open repair. One patient in each group underwent repeat operation for leakage. Three patients in

the study died: one due to multiorgan failure 17 days after open repair and two due to heart failure following laparoscopic surgery.

Controversy exists regarding the relation between *H. pylori* and perforated DU. The *H. pylori* infection rate demonstrated by intraoperative and antral biopsies in 73 patients was 70% in one Hong Kong study and rose to 80% if NSAID users were excluded [58]. This prevalence was not much higher than the 55% prevalence of infection in the local population and lower than would be expected among all patients with DU. The urea breath test carried out 8 days after simple closure of the perforation was positive in 24 of 29 patients in a study from the United Arab Emirates [59]. The urease test performed on mucosal biopsy samples was positive in 12 of 14 patients with upper GI endoscopy 6 weeks after discharge. Seven of these twelve patients had persisting duodenal ulceration. In contrast with these studies, Reinbach et al. [60], in a series of patients of whom 40% were taking NSAIDs, claimed that acute perforated DU was not associated with *H. pylori* infection. No correlation was found between the incidence of *H. pylori* infection in perforated DUs detected by enzyme-linked immunosorbent assay (ELISA) and polymerase chain reaction (PCR) and control (nonsurgical gastroduodenal) groups, as 47% of perforated DUs were positive for *H. pylori* detected by ELISA, similar to the value of 50% in control patients in the United Kingdom [60]. However, only 9 of 23 (39%) had a history of peptic ulcer or acid inhibitory drug therapy [61]. *H. pylori* and NSAIDs are the two major causes of perforated DU and are independent risk factors of peptic ulceration with different ulcerogenic mechanisms [62].

According to what is now known regarding *H. pylori*, few surgeons would embark on definitive ulcer operation in the emergency setting, notably if this definitive ulcer operation was to be performed laparoscopically. In the present-day setting, however, one must not forget that the previous controlled trials [52–54] established and confirmed a high recurrence rate when only simple repair was performed. Younger patients (< 40 years) without NSAIDs are the most prone to be infected [58] and should theoretically benefit from a nonoperative approach [51] with *H. pylori* eradication. Patients > 40 years of age should undergo operation. The attractive laparoscopic sutureless procedure using a plug of gelatin sponge with fibrin glue is feasible and appears to be easier and quicker than suture procedures; as yet, however, no clinically demonstrable benefit for the patient has been shown [55]. In patients not receiving NSAIDs, proton pump inhibitors should be given postoperatively in association with *H. pylori* eradication, either as a routine or depending on the operative or postoperative demonstration of infection. The patient with intractable recurrent symptoms of DU despite adequate medical treatment, but without *H. pylori* infection (a patient using NSAIDs), is probably the only remaining indication for elective definitive surgical treatment of peptic ulcer disease. Patients with risk factors should be treated with simple closure.

Gastric Outlet Obstruction

Gastric outlet obstruction (GOO) has been reported to occur in 6% to 8% of patients with DUs [63]. The double aim of proposed operations include relieving obstruction while controlling peptic ulcer disease [64, 65]. Evaluation of the effectiveness of surgical treatment was based on recurrence and restenosis rates.

Surgical Trials

Three surgical techniques for the treatment of GOO secondary to duodenal ulcer were compared in a prospective randomized study [66]. After laparotomy, patients underwent either highly selective vagotomy (HSV) + gastrojejunostomy ($n = 30$), HSV + Jaboulay gastroduodenostomy ($n = 30$), or selective vagotomy (SV) + antrectomy ($n = 30$). There were no differences in the postoperative course of the groups. One patient died after HSV + Jaboulay gastroduodenostomy. With a mean follow-up of 98 months (range 30–156 months) the clinical state of all patients was graded using the Visick classification. Outcome was significantly ($p < 0.01$) better after HSV + gastrojejunostomy (80% Visick I) than after Jaboulay anastomosis (70% Visick I) but not after SV + antrectomy (75% Visick I). When compared with pyloroplasty, gastrojejunostomy was recommended as the drainage procedure of choice after vagotomy [67]; but unlike patients in Csendes et al.'s study [66], those in Kenedy et al.'s study [67] did not show any evidence of GOO.

Endoscopic balloon dilatation has been proposed as an alternative to surgical treatment [68–70]. In the latter study, however, only 50% of patients treated with balloon dilatation remained without recurrent ulceration and outlet obstruction at 3 years [70].

Helicobacter pylori and GOO

There is little information available on the relation between *H. pylori* infection and GOO. In unpublished data found in the editorial by Chung and Li [71], 50% of patients with pyloric stenosis in the Department of Surgery of the Chinese University of Hong Kong were infected with *H. pylori*. Reversal of GOO after eradication of *H. pylori* infection has been reported [72]. This observation suggests that oral eradication of *H. pylori* might be indicated as a first-line treatment in patients with GOO and those with *H. pylori*-associated gastritis and peptic ulcer, and it could decrease the risk of recurrence if endoscopic balloon dilatation is indicated. In the future, surgery might be compared to balloon dilatation combined with eradication of *H. pylori*.

Conclusions

With bleeding duodenal ulcers, even if it can be shown that *H. pylori* is responsible for bleeding, endoscopic or surgical hemostasis is still necessary in certain cases. The major aim of urgent surgery for a severely bleeding DU is to stop life-threatening hemorrhage and to prevent rebleeding during the immediate postoperative period. The goal of gastric resection with ulcer excision in this setting is to stop bleeding but should no longer be performed as definitive treatment of peptic disease. Eradication of *H. pylori* is, at best, expected to decrease the number of patients requiring elective and emergency surgery.

Whether a radical definitive treatment operation at the time of perforation is necessary, however, remains to be shown. Moreover, we need to know whether minimal surgical treatment (to stop the bleeding or to close the perforation) combined with antisecretory drugs and eradication of *H. pylori* is sufficient for these patients and, if so, for how long. Second, we need to know whether this treatment (antisecretory drugs plus eradication of *H. pylori*) also works when bleeding or perforation has warranted a surgical procedure.

Résumé

Les indications de la chirurgie pour ulcère duodénal ont changé radicalement en raison de l'efficacité des antagonistes H₂, des procédés endoscopiques et de l'éradication d'*Helicobacter pylori*. Le but de cette étude a été d'analyser la littérature actuelle pour déterminer si la chirurgie définitive a toujours un rôle dans les complications de la maladie ulcéreuse compliquée (hémorragie, perforation, sténose pylorique). Deux études ont comparé la chirurgie précoce à la chirurgie retardée pour hémorragie. L'une était en faveur de la chirurgie précoce (réduction significative de la mortalité) chez le sujet âgé, mais était sans aucune différence statistiquement significative lorsque les résultats étaient analysés en «intention de traiter». Dans l'autre, la mortalité après chirurgie précoce était cinq fois plus élevée que pour l'abstention, appliquée chaque fois que possible. Deux études, comparant de différentes techniques chirurgicales hémostatiques ont conclu en faveur du procédé radical. Parmi les 15 études comparant les différentes méthodes endoscopiques, aucune n'a comparé cette méthode à la chirurgie dans le cadre de l'ulcère gastroduodénal hémorragique. Dans un seul essai pour perforation, comparant le traitement non chirurgical au traitement chirurgical, les taux de morbidité, d'abcès intra-abdominal et de mortalité étaient similaires, mais la durée d'hospitalisation était plus longue ($p < 0.001$). Il y avait plus d'échecs avec le traitement non-opératoire ($p < 0.05$) chez les patients de 70 ans et plus. Dans trois essais, la morbidité postopératoire (excepté le taux d'abcès de paroi dans un) n'était pas augmentée de façon significative par la chirurgie définitive, la récurrence étant moindre ($p < 0.05$) comparée aux résultats de la simple fermeture de la perforation par suture. Par rapport à la laparotomie, la laparoscopie prenait plus de temps ($p < 0.001$), mais nécessitait moins d'analgésiques en période post-opératoire ($p < 0.03$), cependant, sans différence statistiquement significative en ce qui concerne la durée d'aspiration nasogastrique, la durée de perfusion intraveineuse, la durée d'hospitalisation, la durée du temps avant la reprise d'une alimentation normale, le score d'échelle visuelle analogue pour les 24 heures post-chirurgicales, la morbidité, le taux de réopération ou de mortalité. Onze des 48 patients du groupe laparoscopique (23%) ont nécessité une conversion à la chirurgie ouverte. En ce qui concerne la comparaison de trois techniques chirurgicales pour la sténose d'origine ulcéreuse, à savoir, 1) la vagotomie ultra-sélective (VUS) + anastomose gastrojéjunale (groupe 1), 2) la VUS + anastomose gastroduodénale selon Jaboulay (groupe 2), ou 3) la vagotomie sélective + antrectomie (groupe 3), les scores de Visick à long terme étaient significativement ($p < 0.01$) meilleurs dans le groupe 1 que dans groupe 2, mais pas dans groupe 3. Par contre, les résultats postopératoires étaient similaires (excepté l'abcès de paroi dans un essai). Conclusions: D'autres études sont nécessaires pour déterminer la prévalence exacte de l'*H. pylori* dans l'ulcère duodénal compliqué et pour comparer : 1) la chirurgie définitive à la chirurgie à minima (arrêter l'hémorragie ou fermer la perforation) combinée à des médicaments antisécrétoires et l'éradication de l'*H. pylori*; 2) La chirurgie versus le traitement endoscopique combiné à l'éradication de l'*H. pylori*, et 3) dans la sténose du pylore, la chirurgie versus la dilatation au ballonnet combinée à l'éradication de l'*H. pylori*.

Resumen

La indicación quirúrgica en el tratamiento de la úlcera duodenal (DU) se ha modificado radicalmente como consecuencia de la eficacia de los antagonistas H₂, de los procedimientos endoscópicos y de los tratamientos erradicadores del "*H. pylori*". El objetivo de este estudio fue analizar la bibliografía actual, con objeto de determinar si la cirugía desempeña algún papel en el tratamiento de las úlceras duodenales complicadas (sangrantes, perforadas, con estenosis pilórica). Dos estudios comparan los resultados precoces y tardíos de la cirugía en úlceras sangrantes. Uno, recomienda un tratamiento quirúrgico precoz, sobre todo en pacientes añosos, pues la mortalidad es significativamente menor; sin embargo, no se encontraron diferencias estadísticamente significativas, por lo que se refiere a la intención curativa del tratamiento. En el otro trabajo, la mortalidad con cirugía precoz fue 5 veces mayor que con terapia conservadora, siempre que ésta estuviese indicada. Dos estudios que comparan las diferentes técnicas quirúrgicas para el tratamiento de la úlcera sangrante, postulan un procedimiento radical. Existen al menos 15 trabajos, que comparan los resultados que se obtienen con diferentes tratamientos endoscópicos. Sin embargo, no hay un solo estudio comparativo entre el tratamiento endoscópico vs. quirúrgico en la úlcera duodenal sangrante. Un ensayo efectuado comparando, en úlceras perforadas, el tratamiento quirúrgico vs. conservador, demostró tasas semejantes de morbilidad, abscesos intraabdominales y mortalidad; sin embargo, la estancia hospitalaria fue mayor con el tratamiento conservador ($p < 0.001$). La eficacia del tratamiento conservador es menor en pacientes mayores de 70 años ($p < 0.05$). En 3 ensayos, la morbilidad postoperatoria (excepción hecha de una infección de la herida) no aumentó significativamente con la cirugía radical vs. a la simple sutura de la perforación. Sin embargo, la recidiva ulcerosa fue menor con cirugía radical ($p < 0.05$). La cirugía por vía laparoscópica vs. laparotómica requiere un mayor tiempo ($p < 0.001$), mientras que las necesidades analgésicas postoperatorias fueron menores ($p < 0.03$); por el contrario, no se encontraron diferencias estadísticamente significativas por lo que se refiere: a la duración de la aspiración nasogástrica, de la infusión intravenosa, estancia hospitalaria, tiempo transcurrido hasta la reanudación de una ingesta normal, dolor durante las primeras 24 horas tras cirugía valorado mediante la escala Analógica Visual, morbilidad, tasas de reintervenciones o mortalidad. Once (23%) de 48 pacientes intervenidos laparoscópicamente hubieron de ser reconvertidos a cirugía abierta. Tres técnicas quirúrgicas: 1) Vagotomía supraselectiva (HSV) más gastroyeyunostomía (grupo 1); 2) HSV más gastroduodenostomía a lo Jaboulay (grupo 2) y 3) Vagotomía selectiva más antrectomía (grupo 3). Estas tres técnicas empleadas como tratamiento de la estenosis pilórica (GOO) demostraron, que si bien los resultados postoperatorios fueron similares, excepción hecha de una infección de la herida en un ensayo, los resultados a largo plazo, utilizando la escala de Visick fueron significativamente mejores ($p < 0.01$) en el grupo 1 que en el grupo 2, pero no en relación al grupo 3. Conclusiones: Se precisan más estudios para averiguar con exactitud la prevalencia del "*H. pylori*" en las úlceras duodenales complicadas, así como para comparar lo siguiente: 1) Cirugía radical definitiva o cirugía mínima (sutura del vaso sangrante o de la perforación) asociada a drogas antsecretoras y erradicadoras del "*H. pylori*". 2) Cirugía vs. tratamiento endoscópico combinado con la erradicación del

"*H. pylori*" y 3) En la estenosis pilórica cirugía vs. dilatación con balón, combinada con erradicación del "*H. pylori*".

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