

Brief clinical report

Posterior perforation of peptic ulcers: Presentation and outcome of an uncommon surgical emergency

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Background. Posterior perforation of peptic ulcer is a distinct clinical entity not commonly encountered. This report evaluates the presentation, diagnosis, management, and outcome of this acute surgical condition.

Methods. We reviewed records of 9 patients with posterior perforations who were treated at our institution from January 1990 to June 2002.

Results. This condition was characterized by insidious onset of upper abdominal pain and delayed presentation. Abdominal examinations were equivocal in 7 patients on admission. Pneumoperitoneum on chest roentgenogram, when present, was a crucial diagnostic indicator of intra-abdominal pathology. The diagnosis was made intraoperatively in all cases; findings were sealed perforation, localized retroperitoneal abscess, or generalized contamination of the lesser sac and peritoneal cavity. Observed adverse operative risk factors included prolonged perforation (>24 hours), pre-existing chronic medical illnesses, and preoperative hypotension. In addition, significant peritoneal contamination at celiotomy, major resection (gastrectomy), and gastric perforations were noted to be associated with a poor outcome: 4 of the 9 patients died.

Conclusion. A high index of suspicion is important. When a retroperitoneal collection is noted at celiotomy, posterior perforation of peptic ulcer should be actively excluded. (Surgery 2004;135:321-5.)

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ELECTIVE OPERATIONS FOR PEPTIC ULCER DISEASE have undergone significant decline with the advent of antisecretory therapy and the eradication of *Helicobacter pylori* infection. The incidence of peptic ulcer perforations however has remained relatively unchanged.¹ Most perforations occur on the anterior wall of the duodenum or stomach.¹ Posterior perforation is rare with fewer than 30 such cases reported in the literature.²⁻⁶ This report evaluates our institutional experience of the presentation, diagnosis, management, and outcome of this uncommon but important surgical entity.

METHODS

All patients who underwent surgery for perforated peptic ulcers at our institution from January 1990 to June 2002 were identified from operative record logs; their clinical case records were then reviewed. Inclusion criteria were operative diagnosis of peptic ulcer perforation and documentation of posterior perforation in the operative notes. Malignant perforations and iatrogenic perforations were specifically excluded.

The data retrieved included patient profile, associated medical illnesses, and clinical, radiologic, and operative findings. The duration of perforation was determined from the time of onset of acute abdominal pain to the time of surgery. Preoperative x-rays were retrieved and independently reviewed for all patients to look for the presence of pneumoperitoneum, pneumomediastinum, and retroperitoneal air. Patients' postoperative courses were reviewed and the eventual outcome recorded.

Accepted for publication November 26, 2003.

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0039-6060/\$ - see front matter

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doi:10.1016/j.surg.2003.11.001

Table. Summary of the clinical, radiologic, and operative findings of patients with posterior perforations of peptic ulcer

Case No.	Age	Duration of symptoms	Abdominal signs	Chest x-ray findings	Preoperative diagnosis	Operative findings	Procedure performed	Outcome
1	40	5 days	No peritonism, tender RIF	PP	Perforated viscus	Retroperitoneal abscess with sealed posterior perforation of D1 of duodenum, no intraperitoneal contamination	Drainage of retroperitoneal abscess	Survival
2	55	3 days	No peritonism	PP	Perforated viscus	Kissing D1 duodenal ulcer with posterior perforation, retroperitoneal abscess with intraperitoneal contamination	Bilroth II gastrectomy	Survival
3	55	<24 hours	No peritonism	PP	Perforated viscus	Posterior perforation of duodenum (D2) ulcer, retroperitoneal and paraduodenal abscess, no intraperitoneal contamination	Drainage of abscess, patch repair D2 ulcer, pyloric exclusion, truncal vagotomy, gastro-jejunostomy	Survival
4	60	3 days	No peritonism	No PP, distended stomach and small bowel	Intestinal obstruction	Large 2-cm posterior perforation of gastric ulcer at the antrum, abscess in the lesser sac, no intraperitoneal contamination	Bilroth II gastrectomy	Survival
5	68	3 days	Positive peritonism	PP	Perforated viscus	Perforated posterior gastric ulcer 2-cm in diameter at the antrum, pus in the lesser sac, severe peritoneal contamination	Bilroth II gastrectomy	Mortality
6	69	<24 hours	No peritonism, positive right renal punch	No PP, CT scan: D2 mass with retroperitoneal free air	Perforated viscus	2-cm posterior D1 perforation, large retroperitoneal hemorrhagic abscess involving the right kidney, peritoneal contamination	Duodeno-jejunostomy	Mortality
7	71	<24 hours	Positive peritonism	No PP, dilated small bowel	Acute abdomen	Posterior perforation of chronic D1 duodenal ulcer, retroperitoneal abscess with peritoneal contamination	Antrectomy, gastro-jejunostomy	Survival

(continued)

Table (continued)

Case No.	Age	Duration of symptoms	Abdominal signs	Chest x-ray findings	Preoperative diagnosis	Operative findings	Procedure performed	Outcome
8	76	3 days	No peritonism	PP	Perforated viscus	1.5-cm perforated posterior gastric ulcer, retroperitoneal abscess with peritoneal contamination	Ulcerectomy and primary closure	Mortality
9	83	3 days	No peritonism	PP	Perforated viscus	Perforated chronic posterior pyloric ulcer (2.5-cm in diameter), bile-stained peritoneal and lesser sac contamination	Bilroth II gastrectomy	Mortality

RHC, Right hypochondrium; RIF, right iliac fossa; PP, pneumoperitoneum on an erect chest X-ray; D1, first part of duodenum; D2, second part of duodenum.

RESULTS

During the 12½-year period, a total of 532 patients were operated on for perforated peptic ulcer. Nine patients (1.7%) had posterior perforation. Of these, 6 patients had posterior perforation of duodenal or pyloroduodenal ulcers, and 3 had perforated nonmalignant gastric ulcers. The Table gives a summary of the relevant clinical, radiologic, and operative findings of our patients. The median age was 68 years (range, 40 to 83). Seven patients had at least 1 chronic medical illness. Six patients had a prior history of peptic ulcer disease. None of the patients had concomitant frank acute gastrointestinal bleeding.

Delayed hospital admission (>24 hours from the onset of symptoms) was evident in 6 of the patients. The common presentation was nonspecific abdominal pain of gradual onset over the right hypochondrium or epigastrium. Abdominal examination findings were equivocal in 7 patients on admission. Only in 2 patients were the abdominal signs convincing enough for the diagnosis of an acute abdomen to be made on clinical grounds alone at the time of admission. The site of pain can be misleading: 1 patient had tenderness over the right iliac fossa (case 1), and another had a positive right renal punch (case 6).

Pneumoperitoneum was demonstrated by erect chest roentgenograms in 6 patients. In 5 of these patients, the abdominal signs were equivocal, and the chest roentgenogram finding (pneumoperitoneum) was crucial for an early decision for surgery. In 1 patient, retroperitoneal air tracking along the right crus of the diaphragm was noted

(Fig 1). Computed tomography (CT) scan of the abdomen of 1 patient demonstrated free retroperitoneal air and retroperitoneal abscess (Figs 2 & 3).

Once admitted, most (8 patients) were operated on within 12 hours. While none of the patients with posterior perforations was diagnosed preoperatively, 7 patients were operated on with a presumptive diagnosis of a perforated viscus. Definitive diagnosis of posterior perforation was made at celiotomy in all cases. When examination of the common sites of perforation was negative, a thorough intraoperative exploration that involved entering the lesser sac and mobilizing the duodenum (Kocher's maneuver), revealed the diagnosis.

At celiotomy, retroperitoneal abscess with minimal to severe peritonitis secondary to the posterior perforation into the lesser sac was noted in 6 patients. Bile-stained peritoneal contamination was noted in 1 patient. Localized retroperitoneal abscess was found in 2 patients (1 duodenal perforation; 1 gastric perforation), and a spontaneously sealed duodenal perforation was found in 1 patient. Definitive ulcer operations (partial gastrectomy, pyloric exclusion with truncal vagotomy, and antrectomy with gastrojejunostomy) were performed in the majority of patients with posterior perforations (6 patients). Definitive ulcer operations were necessary because of the following circumstances: ulcer size greater than 10 mm (1 patient), gastric ulcer perforation (3 patients), previous operation for perforated peptic ulcer (1 patient), and kissing duodenal ulcer with posterior perforation (1 patient). Four patients died in this series: 2 had pyloroduodenal posterior perforation,

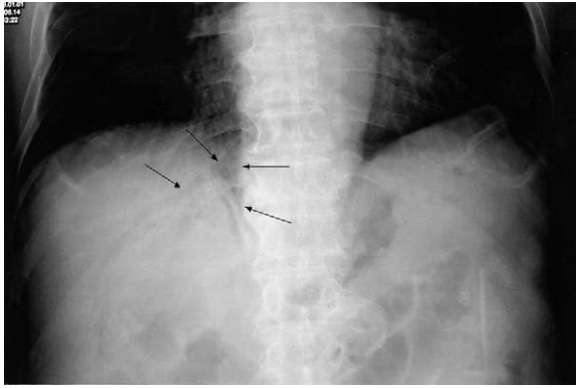


Fig 1. Abdominal roentgenogram of 1 patient. Note the retroperitoneal air tracking along the right crus of the diaphragm (*arrows*). This is an important and specific diagnostic clue of a retroperitoneal perforation.

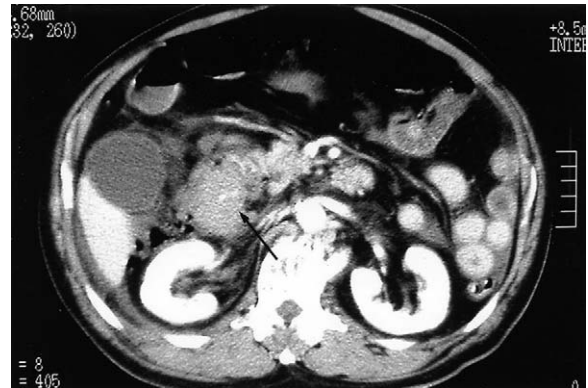


Fig 3. Abdominal CT scan showing a retroperitoneal abscess anterior to the right kidney (*arrow*), with surrounding pockets of free gas.



Fig 2. Abdominal CT scan of a patient with posterior perforation of a duodenal ulcer demonstrating free air collection in the retroperitoneal space (*arrows*). Free intraperitoneal air was also demonstrated.

and 2 had gastric perforations. All 4 patients had generalized peritoneal contamination at celiotomy. Two of these patients underwent gastrectomy, 1 underwent a partial antrectomy and gastrojejunostomy, and 1 underwent a duodenojejunostomy (Table).

DISCUSSION

Spontaneous nontraumatic posterior perforation of peptic ulcer is rare, and high morbidity and mortality rates are reported for this condition in the literature.²⁻⁶ Posterior perforations tend to present late due to the insidious onset of symptoms. These ulcers penetrate into the retroperitoneal space or the lesser sac. Local inflammatory reaction and fibrosis of the surrounding adherent retroperitoneal tissue tend to seal off

these perforations. This explains the rarity of this entity and the vague complaints that characterize such perforations when they occur.³ Gastric perforations were relatively more frequent in posterior perforations (3 of 9 patients) when compared with anterior perforations.¹ This may be related to the anatomy of this region. The lesser sac posterior to the stomach represents a potential space. In contrast, the pyloroduodenal channel usually abuts the retroperitoneal tissue, and any potential perforation may be aborted by inflammation and fibrosis of the surrounding adherent tissues.

Our report supports the use of routine erect chest and abdominal roentgenograms in the evaluation of patients with equivocal clinical abdominal findings. Pneumoperitoneum is a crucial sign in clinical decision-making. Free retroperitoneal air, when present, is an important and specific diagnostic clue of a retroperitoneal perforation.⁷ In the absence of these radiographic signs, particularly in high-risk patients (those with a history of peptic ulcer disease or use of nonsteroidal anti-inflammatory drugs), an urgent CT scan should be considered. A CT scan is more accurate than chest roentgenogram in the detection of pneumoperitoneum and can also identify other intraperitoneal and retroperitoneal pathology.⁸

Posterior perforations may be missed because of their rarity and anatomic location.²⁻⁶ The most common misdiagnoses, appendicular diseases, perinephric abscess, and retrocolic abscess,²⁻⁶ occur because a posteriorly perforated ulcer can extravasate and track in the retroperitoneal space. The resulting inflammatory collection or abscess can distract the surgeon from the true perforation site.²⁻⁴ It is therefore important for the surgeon to

be aware that a potential source of any retroperitoneal collection is a posteriorly perforated peptic ulcer. Kocher's maneuver should therefore be undertaken in all cases of unexplained intraperitoneal and retroperitoneal collections.

Established adverse operative risk factors for perforated peptic ulcers included preoperative shock, perforation for more than 24 hours, and associated chronic medical diseases.⁹ While these factors were noted to be associated with mortality, other factors (presence of peritoneal contamination and extent of operation performed) seemed to be significant factors in posterior perforation (Table). In our patients, spontaneous sealing of the perforation and formation of localized abscess appeared to be favorable prognostic factors. All mortality cases had significant peritoneal contamination at celiotomy. Our observations suggested that posterior gastric perforations have a higher mortality than duodenal perforation. Two factors may contribute to this observation. First, the lesser sac is less effective in sealing off and preventing the spillage of gastric content into the peritoneal cavity with consequent generalized peritonitis. Second, more extensive surgery (eg, gastrectomy) was frequently necessary in patients with posterior gastric ulcer perforation. Therefore, in the management of such perforations, nonresective options should be considered when feasible.

CONCLUSION

Posterior perforation of peptic ulcer is rare. The incidence in our series was only 1.7% of all cases of perforated peptic ulcer. Awareness of this serious condition, however, is important because the best chance for survival of the patient lies in prompt, thorough surgical exploration and drainage and,

when appropriate, definitive surgery. The majority of patients in this study presented with equivocal history and abdominal symptoms; therefore, a high index of suspicion should be maintained. An erect chest and abdominal roentgenograms should be done for patients with nonspecific abdominal symptoms. The diagnosis is often difficult even at celiotomy. When a retroperitoneal collection is found, a posteriorly situated perforated peptic ulcer should be excluded.

REFERENCES

1. Svanes C, Salvesen H, Stangeland L, Svanes K, Soreide O. Perforated peptic ulcer over 56 years: time trend in patients and disease characteristics. *Gut* 1993;34:1666-71.
2. Weston-Davies WH, Perkiewicz M, Szczygiel B. Retroperitoneal extravasation from perforated duodenal ulcer. *Br J Surg* 1988;75:878-9.
3. Hashmonai M, Abrahamson J, Erlik D, Schramek A. Retroperitoneal perforation of duodenal ulcers with abscess formation: a report of 4 cases and survey of the literature. *Ann Surg* 1971;173:409-14.
4. Britt LG, Wolf RY. Postbulbar ulcer with retrocecal abscess: a case report. *Arch Surg* 1966;92:98-100.
5. Mistry BM, Holloway RF, Caravella PA, Riskin DJ, Mazuksi JE, Johnson FE. Perforated posterior duodenal ulcer: case report and literature review. *Contemporary Surg* 2001; 57(9):453-5.
6. Yoshida H, Onda M, Tajiri T, Tani N, Matsukura N, Tokunaga A, et al. A case of abscess caused by a penetrating duodenal ulcer. *Hepatogastroenterology* 1999 Jul-Aug; 46(28):2379-81.
7. Feldman M. Perforation of peptic ulcer—a roentgenographic consideration of various forms and uncommon types of perforation. *Radiology* 1950;55:217.
8. Chen CH, Huang HS, Yang CC, Yeh YH. The features of perforated peptic ulcers in conventional computed tomography. *Hepatogastroenterology* 2001 Sep-Oct;48(41):1393-6.
9. Lee FYJ, Leung KL, Lai BSP, Ng SSM, Dexter S, Lau WY. Predicting mortality and morbidity of patients operated on for perforated peptic ulcers. *Arch Surg* 2001;136:90-4.