BRIEF REPORT

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Posterior Perforation by Peptic Ulcer. Our 12-Year Experience of 6 Cases

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ABSTRACT

Background: Posterior perforation due to peptic ulcer are relatively rare, it remains one of the causes of acute upper quadrant pain, and it should always be included in the differential diagnosis in high risc patients. Our paper represents a retrospective study and evaluates: age and gender of the patients, begin of symptomatology, clinical manifestation, radiological imagies, supposed diagnosis, operative discovery, operation and outcomes. Literature data were researched using PubMed, Google Scholar, ResearchGate, Publons, Academia.edu, SemanticScholar, Sherpal/Romeo, Scopus. Our outcomes were compared to the previous literature results.
Methods: Six patients were admitted in emergency and underwent surgery at Helios Hospital Pforzheim in Germany from October 2008 to January 2021, because a perforated dorsal peptic ulcer. Clinical records are presented.
Results: Upper abdominal pain was a common manifestation. An acute abdomen and peritonism was observed on 3 cases. In the other 3 patients, abdominal clinical examinations were equivocal on admission. Delayed presentation and insidious onset was recorded in 5 patients. Intraperitoneal or retroperitoneal free air and contrast on CT-Scan was a crucial diagnostic indicator of gastric/duodenal perforation in 5 cases. One presentation was characterized by upper GI bleeding and an upper GI endoscopy was performed here. Dorsal perforation could be diagnosed preoperatively on 5 cases. In one case, the diagnosis was established intraoperative. A good outcome is noted in spite of overall peritonitis, delayed presentation, elderly patients and mandatory removal of the stomach. Survival was recorded in all cases.
Conclusions: When a pneumoperitoneum associated with peritoneal or retroperitoneal free fluids/contrast/air is noted at CT scan, a posterior perforation of the stomach or duodenum should be actively excluded. A high index of suspicion is important and mandatory.
Key words: posterior perforation, peptic ulcer

INTRODUCTION

Surgeons in the emergency room often encounter patients with acute abdominal pain located in the upper quadrant, also with a long history of comorbidities. One of the major causes of acute abdomen include stomach perforation. Perforation of the stomach is a full-thickness injury of the wall of the organ, creating a communication between the gastric lumen and the peritoneal cavity and is often associated with peptic ulcer disease, iatrogenic

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causes, trauma and cancer (1). Peptic ulcer is the most common cause of stomach perforation. During acute perforation, the gastric contents freely enter the peritoneal cavity, causing chemical peritonitis with severe abdominal pain. If posterior wall gastric ulcers perforate, they leak gastric contents into the lesser sac, which tends to confine the peritonitis. These patients may present with less marked clinical symptoms (2). It is a challenging condition to diagnosis and treatment because many conditions and current evidence can cause such less marked clinical symptoms. Although clinically, posterior perforation due to stomach ulcer is relatively rare, and remains one of the causes of acute upper quadrant pain; it should always be included in the differential diagnosis. Perforation may be suspected based upon the patient's clinical presentation, or the diagnosis become obvious through a report of extraluminal "free air" or " free contrast" on diagnostic imaging performed to evaluate for abdominal pain or another symptom. Early diagnosis and surgical intervention in these cases is imperative to improve patient's chances of survival. Treatment is a surgical repair.

METHODS

We reviewied the clinical case records and the operative records log from the patients admitted and operated in emergency by peptic perforation at Helios Hospital Pforzheim in Germany from October 2008 to January 2021. Operative documentation of dorsal perforation represented the exclusively inclusion criteria.The data retrieved included age and gender of the patients, begin of symptomatology, clinical manifestation, radiological imagies, supposed diagnosis, operative discovery, operation and outcomes.

Interval between begining of symptomatology and operation was registered as duration of perforation. We reviewed CT-Scan imagies to look for the presence of free air and contrast inside peritoneal space or retroperitoneal. Outcome ist presented after reviewing postoperative courses.

RESULTS

A total of 6 patients with posterior perforation by peptic ulcer were operated on emergency our hospital during the 12-year and 3 months period, from October 2008 to January 2021. Gastric perforation may occur at any anatomical location of the posterior wall. Of these, 4 patients had perforation of prepyloric or pyloroduodenal region, and 2 patients had a posterior perforation of the gastric corpus region. Patient profile like age and gender, duration of symptoms, also clinical manifestation, radiologic imagies, operative findings, operation and outcomes is described looking "The table". Range of patients age was 45 to 100. History of chronic medical illnesses was recorded in all patient. Two of them present a history of previous ulcer disease. One patient had a stomach operation years ago by perforated peptic ulcer. Hospital admission 24 hours later after onset of symptoms was recorded on 5 cases. Main clinical symptom by presentation was upper abdominal pain or back pain with gradual onset. In one patient was associated an acute upper gastrointestinal bleeding (Case 4). Clinical manifestation on admission was equivocal in 3 cases. An acute abdomen and peritonism was recorded in the other 3 patients convincing enough for the diagnosis. One patient described back pain and upper abdominal tenderness (Case 2).

Five patients undergone CT-scan demonstrating pneumoperitoneum. On 4 patients was demonstrated free air and also contrast in lasser sac and retroperitoneal space (*fig. 1,2,3,4,5*). Location of a posterior gastric or duodenal perforations was diagnosed preoperatively in 5 cases (83,3% of cases).

Once diagnosticated, all patients were operated in emergency. Laparotomy was performed in 5 patients. One patient underwent exploratory laparoscopy. The laparoscopic procedure was converted to laparotomy for the reason that included technical difficulty (Case 5). In all 6 cases a dorsal perforation was confirmed after laparotomy. At celiotomy, generalised peritonitis and contamination of the lasser sac secondary to the posterior perforation was noted in 5

Figure 1 - Abdominal CT demonstrating free air and contrast in the intraperitoneal space

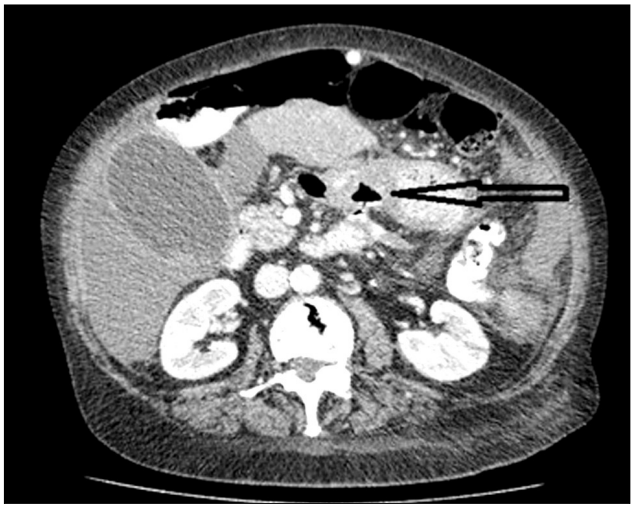

Figure 2 - Abdominal CT demonstrating a dorsal stomach perforation with free contrast and air in lasser sac

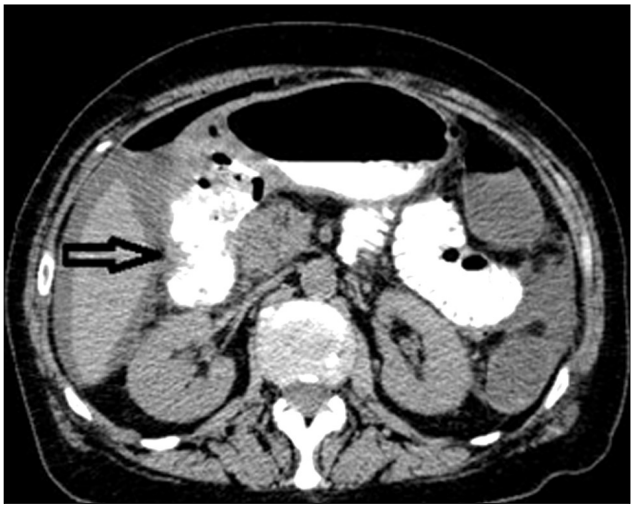

Figure 4 - Abdominal CT demonstrating a dorsal stomach perforation with free air intraperitoneal; free air and contrast in lasser sac

Figure 3 - Abdominal CT demonstrating free air under the liver and in the retroperitoneal space

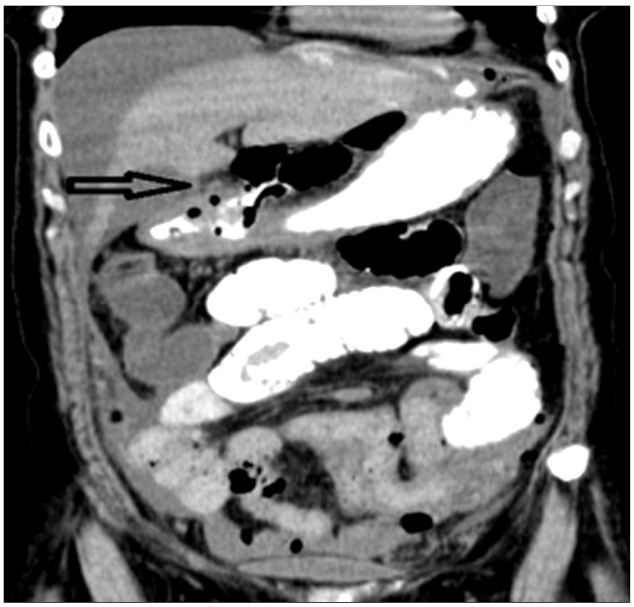

Figure 5 - Abdominal CT demonstrating a dorsal stomach perforation with free contrast and air in lasser sac

patients. Localized lasser sac abcess with local peritonitis was noted in 1 patient (Case 2). Posterior perforated gastric peptic ulcer with bleeding and penetration to tranverse colon was found in one patient, here was no peritonitis (Case 4). In the patient with a history of previous operation for perforated peptic ulcer, was observed a double perforation in region of stomach fundus and prepyloric region (Case 1). Ulcerectomy and primary closure were performed in 3 patients. Gastrectomy was necessary in other 3 patients. Two of these patients underwent Billroth II gastrectomy with gastro-jejunostomy (Case 1, 3), the other one patient underwent Billroth I gastrectomy (Case 5). In one patient a re-laparotomy and primary closure of duodenal leackage was necessary after gastrectomy (Case 3). In one patient was recorded a spontaneous splenic rupture after ulcer operation and a re-laparotomy with splenectomy was mandatory (Case 2). Fascial dehiscence by refractory ascites was recorded in one patient, a new operation was required. The abdominal wall was successfully multilayer reconstructed and reinforcement with Vicryl-Mesh (Case 6).

All patients habe been released after surgery. None patient died. In the 6 months follow-up was a good outcome recorded.

Table 1

Case No.	Age and Gender	Begin of symptomatology	Clinical manifestation	Radiological imagies	Supposed diagnosis	Operative discovery	Operation and Outcome
1	100 years old Male	< 24 hours	Peritonismus, upper abdominal pain	CT-Scan, free air and contract intraperitoneal	Gastric perforation	2 cm perforation of stomach fundus and 1.5 cm posterior prepyloric perforation, generalised peritonitis	Laparotomy, Billroth II gastrectomy, Roux-Y-gastro-jejunostomy *Survival*
2	78 years old Female	10 days	No peritonismus, back and upper abdominal pain	CT-Scan, free air and contrast in lasser sac, no free air/contrast intraperitoneal	Posterior gastric perforation	0.5 cm posterior pyloric perforation, local peritonitis	Laparotomy, drainage of abcess, ulcerectomy and primary closure *Survival*
3	67 years old Female	>24 hours	Peritonismus, upper abdominal pain	CT-Scan, free air and contrast intraperitoneal and lasser sac	Posterior gastric perforation	1 cm posterior pyloric perforation, generalised peritonitis	Laparotomy, Billroth II gastrectomy, Roux-Y gastro-jejunostomy *Survival*
4	73 years old Male	4 days	No peritonismus, upper GI bleeding, upper abdominal pain	Upper GI endoscopy, posterior perforated and penetrated bleeding ulcer	Posterior perforation of a bleeding gastric ulcer	3 cm dorsal stomach perforation ulcer with bleeding and penetration to tranverse colon, no peritonitis	Laparotomy, Ulcerectomy and primary closure of the stomach and transverse colon *Survival*
5	45 Years old Male	3 days	Peritonismus, upper abdominal pain	CT-Scan, free air and contrast in lasser sac and intraperitoneal	Posterior gastric perforation	2 cm posterior prepyloric perforation, generalised peritonitis	Laparotomy, Billroth I gastrectomy *Survival*
6	65 years old Female	>24 hours	No peritonismus, right upper abdominal pain	CT-Scan, free air and contrast intraperitoneal and lasser sac	Posterior gastric perforation	2 cm posterior prepyloric perforation, perforation transverse mesocolon, generalised peritonitis	Laparotomy, Ulcerectomy and primary closure *Survival*

DISCUSSION

Helicobacter pylori infection, alcohol abuse, smoking, the use of non-steroidal anti-inflammatory drugs (NSAIDS), history of chronic medical illnesses, chronic stress, age >60 years are the main predisposing factors for peptic ulcer perforation (3,4). Its occurrence may be masked by acute accompanying disease and the diffuse nature of symptoms of this pathology leading to delays in patient presentation to the surgeon and attendant increase in morbidity and mortality. The more common type of perforation associated with the stomach is an anterior perforation (5). Approximately 5 -8 % of ulcers lie in the posterior wall of the stomach or duodenum and untreated, may also perforate. High morbidity and mortality rates are still reported for this uncommon condition of dorsal perforation by peptic ulcer (6,7).

Our paper presented and analized six patients with posterior perforation by peptic ulcer who were operated on emergency our hospital from October 2008 to January 2021. We reported an incidence of 8,9% from all cases of perforated peptic ulcer during the 12-year and 3 months period. An incidence of 1.7% was reported from Chin-HoWong et al in 2003 in their series (8). During a 12½-year period, in only 3 patients was a dorsal gastric perforation recorded from a total of 532 patients operated on for perforated peptic ulcer at Singapore General Hospital (8). M. Zimmermann et al (9) in 2014 reported during a period of 15 years (01/1996–12/2010), 45 patients who were operated because of a perforated gastric or duodenal ulcer at University Hospital Lübeck in Germany, only 3 patients (6.7%) with a posterior gastric perforation were reported. Despite Helicobacter pylori ist one of the main predisposing factors for peptic ulcer perforation entcountered by Chin-HoWong (88) and M. Zimmermann (9), in our reports a Helicobacter pylori infection was discovered in 33.3% of cases. Our patient age range was 45 to 100, and falls within the age range of 18-91, reported by Chin-HoWong (8) and M. Zimmermann (9). History of chronic medical illnesses was recorded in all patient. History of stomach ulcer disease was evident in two of them. History of stomach operation years ago by perforated peptic ulcer was registered in 16,6% of our cases.

Such an uncommon disease could perforate or penetrate to peritoneal space through the lesser sac or meso-transverse. Perforation could happen into the retroperitoneal space. Bursa omentalis represents a potential space. All this explains insidious onset of symptoms (10). The most common misdiagnoses, gallbladder stones or cholecystitis, appendicular and kidney diseases, aortic aneurysm etc. occur because presenting with pain in the upper abdomen and

common symptoms like nausea, loss of appetite, or vomiting. In one patient was associated upper gastrointestinal bleeding. Abdominal clinical examination results were equivocal in 50% on admission. The other 50% of cases developed an acute abdomen. Chin-Ho Wong et al (8) could not described the sign of peritonitis in 25% of their cases. Pneumoperitoneum is pathognemonic for gastric and intestinal perforation. In the absence of these radiographic signs, emergency CT scan should be performed. Five of our patients supported the use of routine CT scan of abdomen with contrast, representing 83.3% of cases. In 16,6% of cases underwent superior endoscopy. The abdominal CT demonstrated free air and contrast in the intraperitoneal and retroperitoneal space, clue of perforation in our patients. CT scan can also identify other intraperitoneal and retroperitoneal pathology, and Abdominal is more accurate in the detection of pneumoperitoneum than abdominal radiography (11,12). Posterior site of the perforation was demostrated preoperatively in 83,3% of cases.

Our patients underwent an emergency exploratory laparotomy in 83.3%. The laparoscopic procedure was performed and converted to laparotomy in 16,6% of cases. The treatment of choice for all patient reported by Chin-HoWong (8) and M. Zimmermann (9) with posterior gastric perforation was exploratory laparotomie. Generalized peritonitis was described in 66.6% of our cases. Chin-HoWong (8) reported massive peritoneal contamination in 66% and M. Zimmermann (9) in 70% of their patient. The range of the perforation in size was 0,5 cm to 3 cm. 50% of our patients underwent ulcerectomy with primary closure. 33,3% underwent a Billroth II gastrectomy with Roux-Y-gastro-jejunostomy, and in 16,6% of them a Billroth I gastrectomy was performed. Nonresective therapy should be considered when feasible in the management of dorsal perforations (8). Generalized peritoneal contamination requires diligent peritoneal lavage and can complicate gastric perforation. Leakage after our ulcerectomy with primary closure was not recorded, even if there is some controversy whether repaired large ulcers, because of the risk for re-leak (13). We reported duodenal leack after Billroth II gastrectomy wich represented 16,6 %. None patient died. All patients habe been released after surgery. In the 6 months follow-up was a good outcome recorded.

Medical staff should be aware, particularly in high-risk patients, that potential source of any persistent upper abdominal pain should be a posteriorly perforated ulcer. Such a perforation may be missed because of their atypical manifestation and dorsal anatomical location. Careful evaluation of imaging findings and clinical symptoms is necessary in this patients to prevent misdiagnosis. Understanding the diagnostic findings and common pitfalls, along with a knowledge of the differential diagnoses, can improve diagnostic accuracy and prevent unnecessary therapies.

CONCLUSION

Our paper described 8,9% incidence of all cases of perforated peptic ulcer. 50% of cases were admited with equivocal history and abdominal symptoms. A high degree of suspicion is required to make an advanced pre-operative diagnosis of posterior gastric perforation, even if other acute accompanying disease was reported. Abdominal CT scan of abdomen with contrast should be done in high-risk patients with non-specific abdominal symptoms; therefor a posterior perforations was diagnosed preoperatively in 83,3% of all cases. Emergency surgical exploration gives the best chance for survival of the patient.

Author contributions

Dr. medic Ovidiu-Angel Matei: manuscript drafting, translate, review. Dr. Dr. Lorena Matei: manuscript design and drafting, translate. Prof. Dr. med. Wolfram Lamade: review the manuscript.

Conflict of interest

All authors have no conflict of interest to declare. All authors read and approved the final manuscript.

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Compliance with ethical standards

Informed consent was obtained from patient. Human rights All procedures have been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki andits later amendments.

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