

Laparoscopic Management of Perforated Peptic Ulcer Case Report

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ABSTRACT

A perforated peptic ulcer is the second leading cause of perforation, with an incidence of 2–4% of peptic ulcers. It can be managed with a simple suture or placement of a Graham patch. However, the primary suture with a Graham patch is one of the main preferences of surgeons. The laparoscopic approach offers a great advantage in rapid recovery and a low morbidity rate with respect to conventional open surgery. We present the clinical case of a male patient who was admitted with clinical symptoms of acute abdomen due to perforated peptic ulcer and was taken to emergency surgery for laparoscopic management.

Keywords: Acute abdomen, *Helicobacter pylori*, Laparoscopy, Nonsteroidal antiinflammatory agents, Omentum, Perforated peptic ulcers, Peritonitis, Pneumoperitoneum.

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CLINICAL CASE DESCRIPTION

A 54-year-old male patient of Danish nationality, a pensioner with no known history of drug allergies, who, as a risk factor, presents anabolic abuse in the plan to increase muscle mass over physical exertion that conditioned the daily intake of nonsteroidal anti-inflammatory drugs, who decides to consult for 2 days of evolution of high-intensity abdominal pain 10/10 in analog verbal scale that starts in the epigastrium and radiates in the band in upper hemiabdomen that then migrated to right iliac fossa and right flank that does not improve after intake of analgesics usually consumed by the patient, associated with nausea, multiple emetic episodes, intolerance to oral intake of solids and liquids, which limits the daily activities of the patient who was a tourist in the city.

On physical examination, the patient was in regular general condition, very algic, with vital signs that showed sinus tachycardia, blood pressure figures with a tendency to high predominantly systolic, tachypnea with use of accessory muscles, complete body and facial flushing, alert and oriented in the three spheres, afebrile with conscious grade II dehydration, abdomen with voluntary and involuntary defense, painful to superficial and deep palpation in the upper abdomen and exacerbated in the right iliac fossa, which limits its complete assessment, signs of peritoneal irritation, eutrophic symmetrical extremities, distal pulses present, no evidence of vascular or neurological deficit, capillary filling <3 seconds.

Laboratory tests showed leukocytosis of 58.05, with 93% neutrophils, hemoglobin 15.6, hematocrit 42.9, platelets 4,72,000, no ionic alterations, renal function with creatinine elevation of 2.74 with urea nitrogen 30.44, prolonged coagulation times with partial thromboplastin time 9 seconds longer than control, prothrombin time twice its reference value with INR 1.98, amylase not elevated near the upper limit of normality, lactic acid at 1.30, arterial gases with mixed alkalosis, transaminases within normal

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limits, corrected coagulation times were requested which were slightly elevated and prolonged to which it was decided to request a reserve of four units of plasma cross samples.

Computed axial tomography of the abdomen showed marked pneumoperitoneum in the upper abdomen. Free fluid from subphrenic spaces to the pelvis (Figs 1 to 3). Given the high diagnostic possibility of perforated peptic ulcer, risk of instability, and acute abdomen, the patient was taken to surgery for laparoscopic surgery.

SURGICAL TECHNIQUE

The patient is under general anesthesia and continuous monitoring. The patient is placed in the French position. Pneumoperitoneum 14–15 mm Hg through 12 mm umbilical trocar placed with Hasson open technique. Three additional trocars were placed under direct laparoscopic vision (2 of 5 mm in the right flank, anterior axillary line, and midclavicular and another of 12 mm in the left flank).

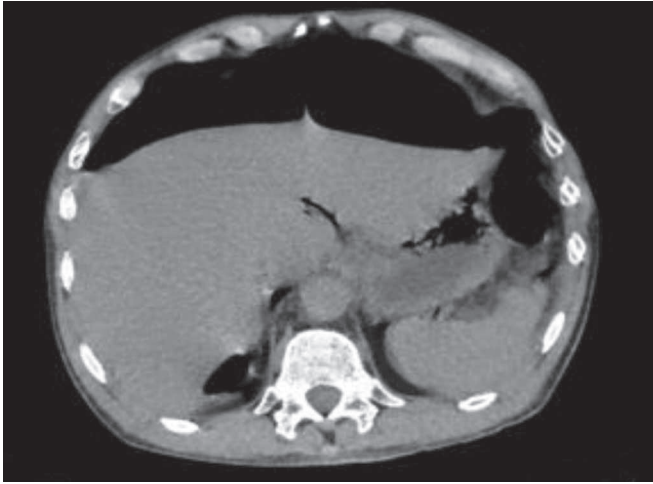


Fig 1: Pneumoperitoneum in simple abdominal computed tomography (CT)

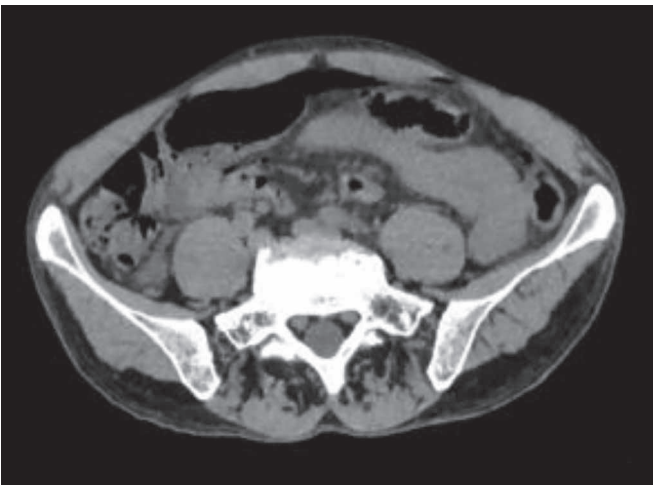


Fig 2: Pneumoperitoneum in simple abdominal CT

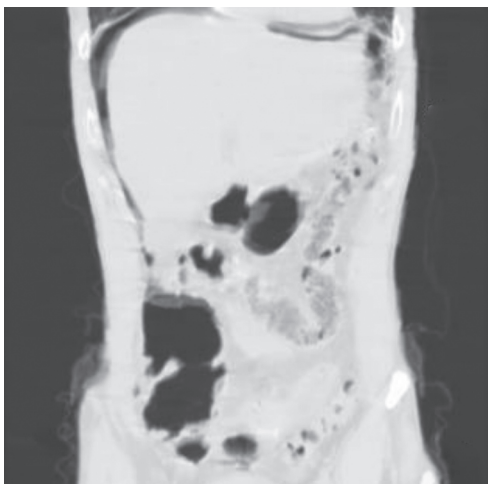


Fig 3: Pneumoperitoneum in simple abdominal CT coronal view

Thorough lavage was performed with 2000 cc of SSN and suction of the four quadrants in a clockwise direction starting with the upper right quadrant. A transmural perforation with regular

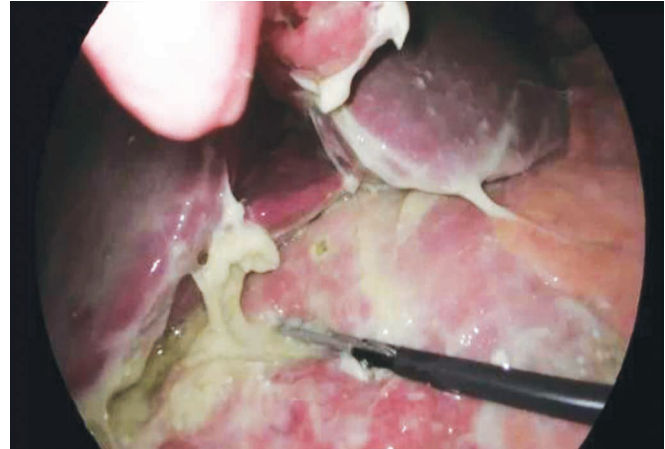


Fig 4: Perforated peptic ulcer-laparoscopic view

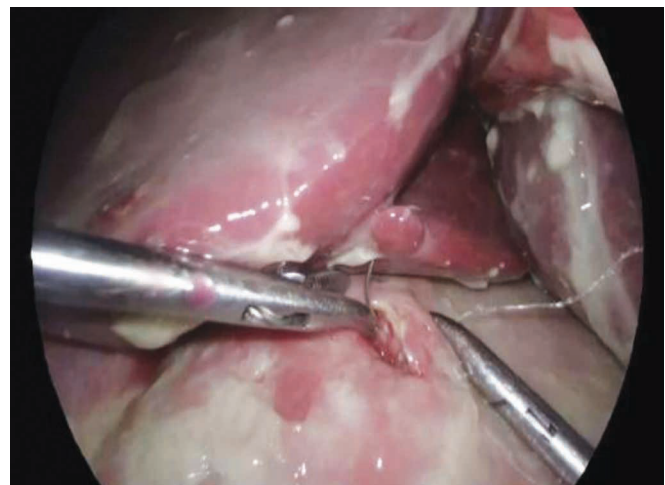


Fig 5: Stratafixlaparoscopic suture of perforated peptic ulcer

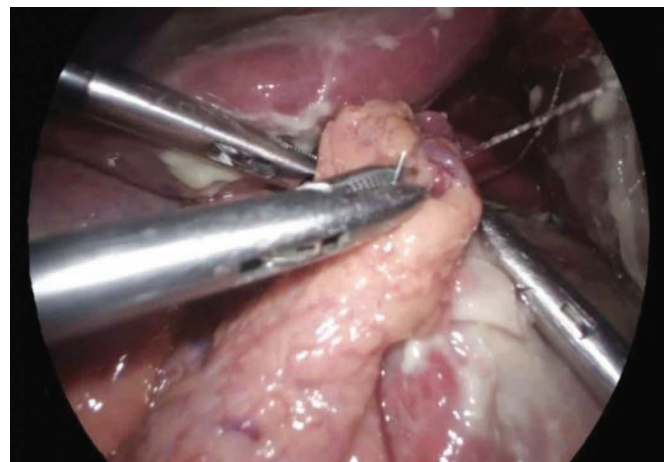


Fig 6: Graham patch with the omentum

edges of approximately 4 mm was found (Fig. 4). For closure of the perforation, full-thickness continuous stitches were made with PDS plus Spiral Suture (Stratafix) at 1 cm from the edge of the perforation (Fig. 5). Then Graham patch was placed over the ulcer, and the suture was tied (Fig. 6). Finally, a Blake-type drainage system was left in place (Fig. 7), and Trocars were removed. The umbilical fascia was

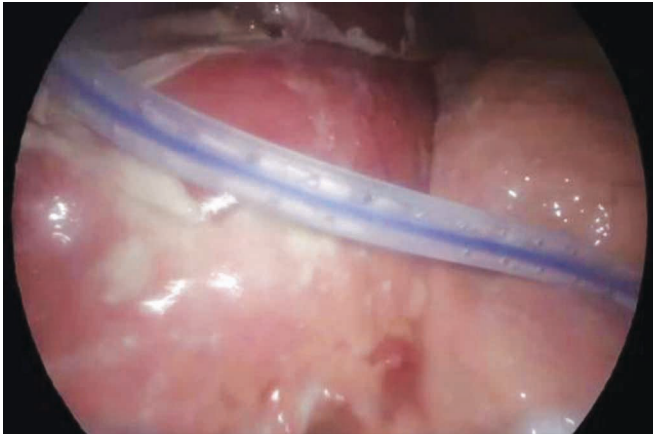


Fig 7: Blake drain

closed with polydioxanone monofilament suture, and the skin of the ports was with Monosyn 3.0.

During surgery, the patient presented low blood pressure requiring pharmacological management with noradrenaline as vasopressor support and was transferred to the intensive care unit extubated. He continued antibiotic treatment with piperacillin-tazobactam and analgesia. On the 2nd postoperative day, the patient was started on an oral liquid diet with adequate tolerance without abdominal pain or significant biochemical alteration. On the 3rd day, the patient was transferred to the general hospital ward without the need for invasive monitoring; on the 6th postoperative day, the patient was discharged without any reported complications, with adequate tolerance of the oral route for solids and liquids, without the presence of pain, walking and leaving the clinic by his own means.

DISCUSSION

Peptic ulcers are a clinical condition that results from an imbalance between the ulcerogenic factors and the defense barriers of the mucosa of the stomach and duodenum. Within the ulcerogenic factors, we find gastric acid itself, pepsin, the consumption of nonsteroidal antiinflammatory drugs, and the presence of *Helicobacter pylori* (*H. pylori*) on the other hand. Within the barrier factors, we have two subgroups, those of defense formed by bicarbonate, blood flow, mucus, cellular unions, and apical resistance and repair, which is constituted by restitution, mucosal lining, cellular proliferation, and growth factors.¹

It has been shown that the prevalence of peptic ulcers has decreased thanks to the current and different management of peptic acid disease, with special emphasis on the eradication of *H. pylori* and the use of pump inhibitors (PPIs). Thanks to this, the age of presentation of peptic ulcer cases has increased from 40 to 60 years.^{2,3}

By way of history, the first case report of perforated gastric ulcer was reported in 167 BC, and it was not until 1886 that the first successful case of gastric ulcer repair by Taylor was made known. The first report of epiploasty by laparoscopic approach takes us to Mouret in 1990, where he refers to five cases handled by this route, of which four patients evolved satisfactorily, and the fifth one died 2 months later due to a laryngeal carcinoma of the base that he presented. In Colombia, Zundel et al.⁴ in 1993 presented clinical cases of two patients diagnosed with a perforated peptic ulcer who underwent suturing, epiploasty, lavage and drainage

of the abdominal cavity laparoscopically at the Fundación Santa Fe de Bogotá, who evolved satisfactorily in the postoperative period.

In Latin America, a case report published in Mexico City in 2011 stands out where a case of a 66-year-old patient is presented, who was admitted for acute abdominal pain accompanied by signs of systemic inflammatory response and on examination with "board abdomen," reason for which he was taken to the emergency department for laparoscopic intervention, where they showed a perforated antral gastric ulcer and was managed with peritoneal lavage + gastrorrhaphy + epiploasty without presenting subsequent or intraoperative complications; She was started on the oral route on the 6th day and was discharged on the 7th day with favorable clinical evolution. Subsequent endoscopic control showed *H. pylori* infection that merited eradicating treatment.

Given the above, we can show that peptic ulcer perforation is the most frequent complication after hemorrhage but represents the main indication for emergency surgery, with mortality rates of up to 30 and 50%, respectively. Some perforations may resolve spontaneously and even be managed nonsurgically. However, sepsis, generalized peritonitis, or failure of conservative treatment are some of the indications for emergency surgery, where time plays a vital role, changing the morbidity and mortality figures after the first 6 hours of surgery.⁵

Within the surgical corrections, we find multiple mechanisms to repair a perforated peptic ulcer, such as suture or primary raffia of the same, truncal vagotomy, application of patches (Graham's patch), omental or nonmental.⁶ The latter is the ideal procedure for most of the cases, having as a differentiation that Graham's patch does not require the confrontation of the ulcer's raw edges nor the confrontation with stitches of the same; it is only the application of stitches with the omentum only; another way, also accepted, is the application of primary raffia of the same and application of omentum to reinforce the sutures. In the laparoscopic approach to perforated peptic ulcer, it is considered that the primary closure of the lesion with the Graham patch can be performed with relative ease and probably constitutes an effective treatment.^{7,8}

The article by Being-Chuanlin et al. concluded in their study that out of 118 patients with perforated peptic ulcer treated by laparoscopic repair, 27 were performed by simple closure and 91 by epiploasty, with a mortality rate of 0% and leak rates of 2.5%; when comparing epiploasty with simple closure, it was found that the latter is a safer procedure and shortens the operating time with values of $p < 0.5$ being statistically significant. Five being statistically significant; however, for greater safety and if the intraoperative clinical condition of the patient allows it, both procedures can be performed.⁹

These procedures can be performed laparoscopically or by laparotomy. Initially, the management was performed by supra umbilical laparotomy that allowed exploring the abdominal cavity, correcting the defect, washing the abdominal cavity, and closing it; however, with the advance of laparoscopic surgery, it has been evidenced and demonstrated the significant reduction of postoperative complications, infections, hospital time, pain quantified in analogous verbal scale, and late complications derived from the laparoscopic surgery.^{10,11}

In the meta-analysis published by Galk et al. in 2019, a comparison was made between the open vs laparoscopic approach for perforated peptic ulcer, where they managed to obtain results that show the absence of impact on mortality, but in terms of morbidity, noting a decrease in wound complications such as infection and the decrease in the incidence of incisional hernia;

there were other secondary findings within which is described the shorter hospital stay and less postoperative pain.

This is also supported by the article by Varcus and Beuran et al., which found that the laparoscopic surgical approach for perforated peptic ulcer is of great impact in reducing morbimortality figures, intra and postsurgical complications, hospital stay, return of the oral route and the patient's daily routine, even stating that the laparoscopic approach should be the gold standard in the management of this pathology for patients with Boey score 0–1, or ASA I and II.

Further confirming what was previously stated, Siow and Mahendran et al., in their study, compared the results obtained in patients who underwent laparoscopic versus open repair of perforated peptic ulcer. In a retrospective view, data were collected on patients who had this pathology and underwent surgery by both routes from December 2010 to February 2014. Here, a total of 131 patients were obtained, where 63 (48.1%) of them were repaired laparoscopically, and 68 (51.9%) were repaired by open surgery. In the results, it was observed that, although the impact on mortality was not so marked, there was a significant difference between the postsurgical complications since laparoscopically; there were only nine cases where all of them were associated with respiratory complications. However, in the patients who were repaired by open surgery, 25 patients had postsurgical complications between respiratory, cardiovascular, and infectious. Likewise, the difference and improvement in pain control with respect to the number of days postsurgery is evidenced.^{12,13}

Another meta-analysis published in 2016 by Than et al. showed a decrease in postoperative complications, in general, lower in the laparoscopic technique compared to the open approach, one of the most important of which was a lower operative site infection in the laparoscopic group compared to the open group. Another data to highlight in this analysis is that they found that the time of the surgical intervention and the length of hospital stay was similar in laparoscopic than open, and there were no significant differences in terms of reoperation rates and the lower postoperative pain in the laparoscopic approach continues to be superior.^{14–16}

In the most current guidelines that we have in the literature published by the World Society of Emergency Surgery on the management of perforated peptic ulcer in 2020, we denote behaviors that were taken for the management of the particular case of this patient. Among these, we found the initial imaging study, since we had the resource of computed axial tomography of the abdomen, where we were able to demonstrate findings compatible with pneumoperitoneum that made us orient the diagnosis. In addition, to almost following this guide completely, we observed that the recommendation for these patients is, first of all, to make a targeted approach with rapid detection that allows resuscitating the patient promptly, as we have done in our case from the approach by the general practitioner who receives the patient in the priority consultation as well as the timely response by the specialist in general surgery.² In terms of management, we can also consider that we took into account the recommendations of the guidelines regarding primary repair with sutures when we present ulcers smaller than 2 cm, but in this opportunity, we preferred to adhere to more classic management such as complementing the primary suture with the placement of an omental patch, which is still highly debated because studies show that there is little or no benefit of doing so and that this only prolongs the surgical time.^{17–19}

CONCLUSION

We can see that peptic ulcer has decreased its incidence of presentation, but this does not mean that it is a condition that requires special attention; Like any process that conditions an acute abdomen, the time of action is of vital importance for the patient's prognosis, so it is our duty to be in a position to know and suspect cases of perforated peptic ulcer, performing an adequate anamnesis, a good physical examination, requesting the pertinent paraclinical tests and in case of a diagnostic impression, requesting the corresponding diagnostic aids that allow me to conclude with an accurate diagnosis.

As for management, the laparoscopic approach is still preferred, as we performed in this case, evidencing a shorter hospital stay, better pain modulation, and a lower rate of complications.

As for closure, there is still a lack of evidence to conclude the benefit of reinforcement with omentum over the hole to be sutured. However, the results evidenced in this case were satisfactory, allowing tolerance to the oral route earlier and therefore decreasing the patient's length of stay in the clinic.

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REFERENCES

1. Lanas A, Chan FKL. Peptic ulcer disease. *Lancet* 2017;390(10094): 613–624. DOI: 10.1016/S0140-6736(16)32404-7
2. Tarasconi A, Coccolini F, Biffl WL, et al. Perforated and bleeding peptic ulcer: WSES. *World J Emergency Surg* 2020;15. DOI: 10.1186/s13017-019-0283-9
3. Kempenich JW, Sirinek KR. Acid Peptic Disease. *Surg Clin North Am* 2018;98(5):933–944. DOI: 10.1016/j.suc.2018.06.003
4. Zundel N, Escallan J, Salazar JM, et al. Úlcera péptica perforada, tratamiento laparoscópico. *Revista Colomb Cir* 1993;8(4): 263–266. <https://www.revistacirugia.org/index.php/cirugia/article/view/1537/1173>
5. Kavitt RT, Lipowska AM, Anyane-Yeboah A, et al. Diagnosis and treatment of peptic ulcer disease. *Am J Med* 2019;132(4):447–456. DOI: 10.1016/j.amjmed.2018.12.009
6. Demetriou G, Chapman M. Primary closure versus Graham patch omentopexy in perforated peptic ulcer: a systematic review and meta-analysis. *Surgeon* 2022;20(3):e61–e67. DOI: 10.1016/j.surge.2021.04.006
7. Varcus F, Paun I, Duta C, et al. Laparoscopic repair of perforated peptic ulcer. *Minerva Chir* 2018;73(2):188–193. DOI: 10.23736/S0026-4733.18.07603-4
8. Wang A, Yerxa J, Agarwal S, et al. Surgical management of peptic ulcer disease. *Curr Probl Surg* 2020;57(2):100728. DOI: 10.1016/j.cpsurg.2019.100728
9. Pan CW, Liou LR, Mong FY, et al. Simple laparoscopic repair of perforated peptic ulcer without omental patch. *Asian J Surg* 2020;43(1):311–314. DOI: 10.1016/j.asjsur.2019.08.007
10. Quah GS, Eslick GD, Cox MR. Laparoscopic repair for perforated peptic ulcer disease has better outcomes than open repair. *J Gastrointest Surg* 2019;23(3):618–625. DOI: 10.1007/s11605-018-4047-8
11. Smith RS, Sundaramurthy SR, Croagh D. Laparoscopic versus open repair of perforated peptic ulcer: a retrospective cohort study. *Asian J Endosc Surg* 2019;12(2):139–144. DOI: 10.1111/ases.12600
12. Gouta EL, Dougaz W, Khalfallah M, et al. Management of perforated duodenal peptic ulcer treated by suture. *Tunisie Med* 2018;96(7):

- 424–429. <https://www.latunisiemedicale.com/article-medicale-tunisie.php?article=3415>
13. Manco G, Caramaschi S, Rolando G, et al. Primary laparoscopic approach to repair perforated peptic ulcer. A retrospective cohort study. *Minerva Chir* 2020;75(6):436–441. DOI: 10.23736/S0026-4733.20.08287-5
14. Pereira A, Santos Sousa H, Gonçalves D, et al. Surgery for perforated peptic ulcer: is laparoscopy a new paradigm. *Minim Invasive Surg* 2021;2021:8828091. DOI: 10.1155/2021/8828091
15. Sazhin AV, Ivakhov GB, Stradymov EA, et al. Comparison of laparoscopic and open suturing of perforated peptic ulcer complicated by advanced peritonitis. *Khirurgiia (Mosk)* 2020;(3):13–21. DOI: 10.15116/hirurgia202003113
16. Sanabria A, Villegas MI, Morales Uribe CH. Laparoscopic repair for perforated peptic ulcer disease. *Cochrane Database Syst* 2013;28(2). DOI: 10.1002/14651858.CD004778
17. Choi YS, Heo YS, Yi JW. Clinical characteristics of primary repair for perforated peptic ulcer: 10 year experience in a single center. *J Clin Med* 2021;10(8):1790. DOI: 10.3390/jcm10081790
18. Castro LG, Acosta MAG, Cuenca JAM, et al. Abordaje laparoscópico de úlcera gástrica perforada. *Rev Fac Med (Mex)* 2011;54(2):41–45. https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0026-17422011000200006
19. Kamada T, Satoh K, Itoh T, et al. Evidence-based clinical practice guidelines for peptic ulcer disease 2020. *J Gastroenterol* 2021;56(4):303–322. DOI: 10.1007/s00535-021-01769-0