



THE MANAGEMENT OF LARGE PERFORATIONS OF DUODENAL ULCERS: AN EXPERIENCE FROM A TERTIARY CARE CENTER IN BIHAR.

Surgery

Kamlesh Kumar Sahu

Senior Resident, Deptt. of Surgery, DMCH.

Qamruddin Ansari* Assistant Professor, Deptt. of Surgery, DMCH. *Corresponding Author

Vijay Shankar Prasad

Associate Professor, Deptt. of Surgery, DMCH.

ABSTRACT

Duodenal perforation is a common surgical emergency. It can be secondary to an ulcer, endoscopic procedure, trauma, or surgery for a non-gastrointestinal condition and carries a mortality rate ranging from 4% to 30% reported in Western countries. However, there are few reports comparing its outcome depending on the cause of the perforation. **Methodology:** From a retrospective analysis of prospectively maintained data, we identified all patients who were operated for duodenal perforation admitted to our department at Darbhanga Medical College & Hospital, Darbhanga, Bihar between October 2017 and March 2021. **Results:** During the total study duration, a total of 112 patients underwent emergency surgery for duodenal ulcer perforations at our hospital. Male female ratio was 3.9:1. The average age of the patients was 44.3 years ranging from 19 to 62 years, with an almost equal age of occurrence for males (38.5 years) and females (42.7 years). **Conclusion:** Perforation of the duodenum is a common surgical emergency with a varied etiology. We found that older age, the presence of preoperative organ failure, delayed presentation, and postoperative leak were factors associated with poor outcomes.

KEYWORDS

Perforations Of Duodenal Ulcers, Management.

INTRODUCTION

Duodenal perforation is a common surgical emergency. It can be secondary to an ulcer, endoscopic procedure, trauma, or surgery for a non-gastrointestinal condition and carries a mortality rate ranging from 4% to 30% reported in Western countries. However, there are few reports comparing its outcome depending on the cause of the perforation.

It was previously a major complication of peptic ulcer (DU) disease; although it is now becoming progressively rarer with the increasing use of acid-lowering drugs, it still affects 2%–10% of such patients. Different authors have reported mortality rates in this condition ranging from 1.3% to 20% [1, 2]. It is also a feared complication of endoscopic retrograde cholangiopancreatography (ERCP), and in a review of 21 prospective studies, the incidence of post-ERCP duodenal perforation was 0.6%, and the perforation-related mortality was 9.9% [3]. Overall, 20% to 50% of these patients required surgery [4–6].

Trauma and abdominal surgery are other causes of duodenal perforation in 0.2%–3.7% of all trauma-related laparotomies, and the associated mortality of duodenal injuries was in the range of 11.2%–26% [7–9].

Advanced age, preoperative shock, coexisting medical illness, and delay in treatment are common risk factors associated with poor outcomes in patients with duodenal perforation [10]. We reviewed our experience of surgical management of the different causes of duodenal perforation to try and focus on various factors of the patients intraoperatively and post-operatively that may have altered the prognosis.

METHODOLOGY

From a retrospective analysis of prospectively maintained data, we identified all patients who were operated for duodenal perforation admitted to our department at Darbhanga Medical College & Hospital, Darbhanga, Bihar between October 2017 and March 2021. The patients were sorted into four groups according to the size of the perforation noted intra-operatively – Group 1 (less than 1 cm perforation); Group 2 (1 cm to 2 cm); Group 3 (2 cm to 3 cm); and Group 4 (more than 3 cm perforation). No cases of anterior and posterior ulcers, or multiple perforations were encountered while reviewing the operative notes. Their demographic details, cause of perforation, preoperative variables such as organ failure, and the interval before surgery were collected. Intraoperative findings such as the site of the perforation and type of surgery were collected. Postoperative variables recorded included the total length of hospital

stay, time in the intensive care unit (ICU), postoperative leak rate, need for re-exploration, postoperative complications (according to the Clavien–Dindo grades), duration of drainage, and in-hospital mortality.

Operative Procedure

The technique of omentopexy was essentially the same in all the cases – a total of three sutures were placed onto the normal, healthy duodenum on either side of the perforation, a strand of omentum was placed directly onto the perforation, and the sutures were knotted above this. No attempt was made to close the perforation prior to placing the omentum as a graft.

RESULTS

Demographic Details

During the total study duration, a total of 112 patients underwent emergency surgery for duodenal ulcer perforations at our hospital. Male female ratio was 3.9:1. The average age of the patients was 44.3 years ranging from 19 to 62 years, with an almost equal age of occurrence for males (38.5 years) and females (42.7 years).

Size Of Perforation

All the patients were divided into three groups as explained above. Group A was deemed to be the small perforation group, Group B was called 'large' perforations, and Group C, 'giant' perforations. The majority of patients came under the 'small' perforation group, but there were 42 patients (37.5%) with large perforations as per our definition. These patients had a higher age of presentation (49.2 years) than the patients with smaller perforations (37.6 years). Giant perforations, or perforations greater than 3 cm in size were seen only 4 cases, accounting for a small percentage (3.6%) of all cases seen.

Pre-operative Condition

The most common cause for duodenal perforation was peptic ulcer (55.5%), followed by ERCP-associated perforations (17.5%), inadvertent injury during surgery for adjacent organs (23.8%), and trauma (3.2%). Out of all, 25.0% had preoperative organ failure, 18 had acute kidney injury (AKI) alone, 7 patients had AKI with respiratory insufficiency requiring respiratory support, and 3 patients had circulatory failure requiring inotropic support.

However, none of the patients needed dialysis preoperatively. The mean duration between the onset of symptoms and surgery was 3.9 days (range 0–22), and the majority of perforations found were in the second part of the duodenum, i.e., D2 (n=28, 51%) followed by D1 (n=27, 49%). All patients had broad-spectrum antibiotics before surgical intervention, along with supportive measures.

Intra-operative Findings

The most commonly performed procedure was a primary repair of the duodenal perforation with diversion, e.g., a gastrojejunostomy (57%), followed by primary repair of perforation only (39%), diversion only (3.7%), and a resectional procedure (0.34%). In all patients, wide-bore abdominal drains were placed. The decision to extubate or ventilate in the immediate postoperative period was taken in consultation with the critical care team.

Post-operative Findings

The mean length of hospital stay was 21 days (7–61), and the mean ICU stay was 7.2 days (0–31). Abdominal drains placed during the surgery drained for a mean duration of 14 days (5–60). Duodenal leak developed in 18 (16.1%) cases during the postoperative period. Of the 18 patients who developed a leak, 10 (55.5%) underwent re-exploration with lavage, drain placement, and a feeding jejunostomy, and we managed the remaining 8 patients conservatively. 27 (24.1%) patients had minor complications (Clavien grades I and II), and 16 (14.3%) had major complications (Clavien grades III and IV). Of the 112 patients, 28 patients (25.0%) died.

DISCUSSION

Duodenal perforation is commonly due to a peptic ulcer but is now changing with the progressive increase in the availability and usage of endoscopic, diagnostic, and interventional procedures. In addition, perforations are encountered due to inadvertent injury at an operation, for instance, adjacent or a retroperitoneal organ. Although there is a substantial literature on each of these causes, they are generally dealt with separately, and there are few reports to our knowledge comparing the outcomes of duodenal perforation from these different causes with each other mainly from the developing world.

We found that duodenal ulcer was found to be the most common etiological factor leading to perforation and carried the best prognosis. Though the overall numbers of peptic ulcer perforations are not as expected in this part of the world, at the same time, we have a comparably higher number of ERCP and surgery-associated perforations that is due to the reason that most perforated peptic ulcer occurring in the low socioeconomic group generally seek treatment at public health care facility [11].

In this study, we observed that the mean age was 44.3 years, and the male: female ratio was 3.9: 1. However, few South Asian studies have reported a lower mean age of 40–43.4 years and a higher gender ratio of 10.5:1 [12, 13]. These studies were done exclusively on peptic ulcer perforations. The present study findings are comparable to that of Nuhu and Kassama in which they reported a mean age of 45.5 years, and the male: female ratio at 4.8:1 in the West African population [14]. The discrepancy could be due to the higher socioeconomic strata of patients seeking treatment at this institute and also an increase in the use of aspirin and anti-inflammatory medications in this age group.

In the inadvertent duodenal injury group, the majority ($n=4$, 36%) occurred in the course of laparoscopic cholecystectomy, and none were recognized intraoperatively and were identified at a mean duration of 5.08 days (range 3–7) after the surgery. It is a well-recognized entity, and common duodenal perforation is secondary to a thermal injury with delayed manifestation. In a review of literature, the incidence of duodenal injury reported was 0.04% (range: 0.001%–4%) [15] and was generally identified during surgery or up to 5 days postoperatively in this study [16]. The associated mortality varied from 8.3 to 75%, as reported in a few studies [16], and in the present study, it is 25%.

CONCLUSION

Perforation of the duodenum is a common surgical emergency with a varied etiology. We found that older age, the presence of preoperative organ failure, delayed presentation, and postoperative leak were factors associated with poor outcomes. Patients with ERCP-associated perforation, the second part of duodenum perforation, and those treated with repair and diversion, ICU stay, and longer duration of drains in situ had a significantly extended hospital stay.

Conflict Of Interest

None of the authors declared any conflict of interest

Sources Of Support

Nil

REFERENCES

1. V. Rajesh, S. S. Chandra, and S. R. Smile, "Risk factors predicting operative mortality in perforated peptic ulcer disease," *Tropical Gastroenterology Official Journal of Digestive Diseases Found*, vol. 24, pp. 148–150, 2003.
2. S. Hermans, S. Christer, and M. Christer Staël, "Surgical approach and prognostic factors after peptic ulcer perforation," *The European Journal of Surgery*, vol. 165, no. 6, pp. 566–572, 1999.
3. A. Andriulli, S. Loperfido, G. Napolitano et al., "Incidence rates of post-ercp complications: a systematic survey of prospective studies," *The American Journal of Gastroenterology*, vol. 102, no. 8, pp. 1781–1788, 2007.
4. A. Polydorou, A. Vezakis, G. Fragulidis, D. Katsarelias, C. Vagianos, and G. Polymeneas, "A tailored approach to the management of perforations following endoscopic retrograde cholangiopancreatography and sphincterotomy," *Journal of Gastrointestinal Surgery*, vol. 15, no. 12, pp. 2211–2217, 2011.
5. R. Enns, M. A. Eloubeidi, K. Mergener et al., "ERCP-related perforations: risk factors and management," *Endoscopy*, vol. 34, no. 4, pp. 293–298, 2002.
6. M. Ercan, E. B. Bostanci, T. Dalgic et al., "Surgical outcome of patients with perforation after endoscopic retrograde cholangiopancreatography," *Journal of Laparoendoscopic & Advanced Surgical Techniques*, vol. 22, no. 4, pp. 371–377, 2012.
7. G. S. Allen, F. A. Moore, C. S. Cox, J. R. Mehall, and J. H. Duke, "Delayed diagnosis of blunt duodenal injury: an avoidable complication," *Journal of the American College of Surgeons*, vol. 187, no. 4, pp. 393–399, 1998.
8. B. Bozkurt, B. A. Özdemir, B. Kocer, B. Unal, M. Dolapci, and O. Cengiz, "Operative approach in traumatic injuries of the duodenum," *Acta Chirurgica Belgica*, vol. 106, no. 4, pp. 405–408, 2006.
9. M. Testini, "Significant factors associated with fatal outcome in emergency open surgery for perforated peptic ulcer," *World Journal of Gastroenterology*, vol. 9, no. 10, p. 2338, 2003.
10. J. C. B. Dakubo, S. B. Naaeder, and J. N. Clegg-Lamprey, "Gastro-duodenal peptic ulcer perforation," *East Afr Med J*, vol. 86, pp. 100–109, 2010.
11. S. J. Rosenstock, L. P. Andersen, C. V. Rosenstock, O. Bonnevie, and T. Jørgensen, "Socioeconomic factors in *Helicobacter pylori* infection among Danish adults," *American Journal of Public Health*, vol. 86, no. 11, pp. 1539–1544, 1996.
12. S. Arveen, S. Jagdish, and D. Kadambari, "Perforated peptic ulcer in South India: an institutional perspective," *World Journal of Surgery*, vol. 33, no. 8, pp. 1600–1604, 2009.
13. S. Gupta, R. Kaushik, and R. Sharma, "The management of large perforations of duodenal ulcers," *BMC Surgery*, vol. 5, p. 15, 2005.
14. A. Nuhu and Y. Kassama, "Experience with acute perforated duodenal ulcer in a West African population," *Nigerian Journal of Medicine: Journal of the National Association Resident Dr Niger*, vol. 17, pp. 403–406, 2008.
15. M. Testini, G. Piccinni, G. Lissidini et al., "Management of descending duodenal injuries secondary to laparoscopic cholecystectomy," *Digestive Surgery*, vol. 25, no. 1, pp. 12–15, 2008.
16. N. O. Machado, "Duodenal injury post laparoscopic cholecystectomy: incidence, mechanism, management and outcome," *World Journal of Gastrointestinal Surgery*, vol. 8, no. 4, p. 335, 2016.