

Case Report

Duodenal perforation: role of multi detector computed tomography (MDCT)

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ABSTRACT

Perforation of peptic ulcers, more specifically; ulcers of the first part of the duodenum carry mortality up to 11 %, with a higher mortality seen in patients over the age of 50 years. Main symptoms are acute onset abdominal pain and vomiting. Guarding & rigidity is present on examination. Conventional X-ray abdomen standing is the first investigation, which shows free gas under diaphragm. MDCT scan is required for identifying the presence, site and cause of gastrointestinal tract perforation. Early diagnosis and treatment is mandatory as it is a grave emergency condition.

Keywords: Duodenal perforation, X-ray, MDCT

INTRODUCTION

Secondary peritonitis remains a potentially fatal affliction and arises subsequently to loss of integrity of a hollow viscous. Perforation of peptic ulcers, more specifically; ulcers of the first part of the duodenum carry mortality up to 11%, with a higher mortality seen in patients over the age of 50 years and in those who present late to the hospital.¹

Perforation occurs in approximately 2 to 10 percent of peptic ulcers. It usually involves the anterior wall of the duodenum (60%), although it may also occur in antral (20%) and lesser-curve (20%) gastric ulcers.² Free peritoneal perforation and the resulting chemical and bacterial peritonitis both are a surgical emergency causing sudden, rapidly spreading, severe upper abdominal pain exacerbated by movement; the pain may

radiate to the right lower abdomen or to both shoulders. Generalized abdominal tenderness, rebound tenderness, board-like abdominal wall rigidity, and hypoactive bowel sounds are usually evident.²⁻⁵

To avoid unrecognized perforation and misdiagnosis, the emergency physician's primary role is to detect and stabilize these life-threatening conditions.⁴

CASE REPORT

A 45 year old male presented to the emergency centre with complain of acute abdominal pain, vomiting and fever. Pain was generalized in the abdomen, colicky in nature. No radiation or referred pain. Vomiting is non-projectile, non-bilious. No past history of tobacco chewing or alcohol drinking habit.

On general examination, patient had toxic look. Body temperature is 38.3°C (raised), pulse was 98/min & feeble, blood pressure was 100/72 mmHg. On per abdominal examination, generalized guarding and rigidity were present. No evidence of organomegaly.

On routine investigation Haemoglobin 11.2 gm%, total WBC count 8200 cell/cu.mm. Liver & renal function test were normal.

X-ray chest shows free gas under the both domes of the diaphragm (Figure 1). On ultrasonography of abdomen, mild amount of free fluid with internal echoes within was present in peritoneal cavity. Dilated small bowel loops with sluggish peristalsis.



Figure 1: Plain X-ray chest: free gas is seen under the both domes of the diaphragm. However bilateral lung fields appear normal.

Contrast enhanced CT scan of abdomen was advised to know the cause of free gas on X-ray. On CT scan of abdomen, stomach, first, second and proximal third part of duodenum was distended and fluid filled and show air fluid levels. A rent measuring 1.4 cm was seen in the wall of first part of duodenum with presence of adjacent free intraperitoneal air and fluid. Jejunal and ileal loops are also dilated and fluid filled and shows air fluid levels. Maximum diameter of ileal loops measures about 30 mm. Gross intraperitoneal free fluids with intraperitoneal free air was present (Figure 2, 3, 4, 5).



Figure 2: Axial CT abdomen arterial phase shows intraperitoneal free air, free fluid in peritoneal cavity, dilated jejunal & ileal loops.

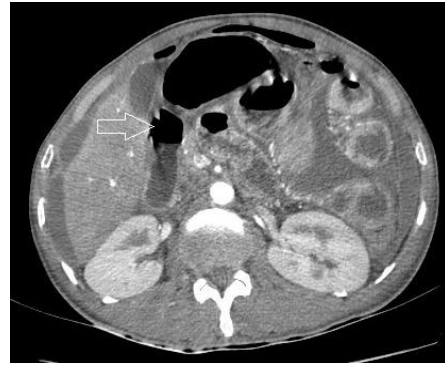


Figure 3: Axial CT abdomen arterial phase shows intraperitoneal free air, free fluid in peritoneal cavity, a rent is seen in the first part of the duodenum (arrow).

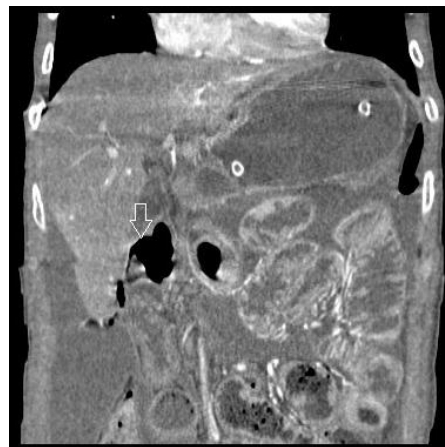


Figure 4: Coronal CT abdomen arterial phase shows a rent is in the first part of the duodenum (arrow) with intraperitoneal free air in right subhepatic region. Free fluid is present in the peritoneal cavity.



Figure 5: Sagittal CT abdomen arterial phase shows free intraperitoneal air in below the anterior abdominal wall (arrow) with dilated small bowel loops.

Surgical exploration by exploratory laparotomy was done. Dilated small bowel loops with few adhesions were seen in peritoneal cavity. There was a rent seen in the anterior wall of the first part of the duodenum, it was sutured and omentopexy done. The postoperative course was smooth with no postoperative complications. Patient was discharged with the definitive antiulcer treatment.

DISCUSSION

Perforation complicates duodenal ulcer about half as often as bleeding and most perforated ulcers are on the anterior surface of the duodenum. The patient population tends to be elderly (mean age 60-70), chronically, ill patients often (40-50%) taking ulcerogenic medication. High male: female ratio (approximately 8:1). *Helicobacter pylori* is implicated in 70-92% of all perforated duodenal ulcers even if those secondary to non-steroidal anti-inflammatory drugs are included. The second most common cause of perforated duodenal ulcer is the ingestion of non-steroidal anti-inflammatory drugs. The number of perforated duodenal ulcers related to non-steroidal anti-inflammatory drugs has increased greatly in developed countries such that 40-50% of perforated duodenal ulcers are caused by them. The least common cause is pathologic hypersecretory states, such as Zollinger-Ellison syndrome, although these should be considered in all cases of recurrent ulcer after adequate treatment.

Peptic ulcer disease is still the major cause of gastrointestinal perforation.⁶ Diagnosis of a perforated ulcer is easy when an acute onset of epigastric pain is observed in a patient with a known history of peptic ulcer disease.⁷ In that case, plain abdominal X-ray films to document the associated pneumo-peritoneum is sufficient.⁸

Clinical onset of a perforated gastric or duodenal ulcer may be atypical⁹ or subtle some times because of comorbidities¹⁰ and concurrent therapies.¹¹ In this situation, the contribution of imaging like MDCT is more valuable. Computed Tomography (CT) has been established as the most valuable imaging technique for identifying the presence, site and cause of gastrointestinal tract perforation, and this is particularly true since the advent of Multi-Detector CT (MDCT) technology.¹²

Using CT, diagnosis of alimentary tract perforation can be based on both direct¹² and indirect findings. Aside from free intraperitoneal air, direct findings of gastrointestinal tract perforation include the evidence of discontinuation of the bowel wall and/or the leakage of water-soluble contrast material. The former is now facilitated by the use of thin slice collimations with coronal and sagittal reformations as in multi-detector CT.¹² As far as the leakage of water-soluble contrast material is concerned, it simply relies on oral administration of iodinated contrast media; however, this

is considered a controversial practice in patients with a clinical suspicion of gastrointestinal tract perforation.

While most gastro duodenal perforations will manifest on CT with either direct or indirect findings, there may be cases in which they cannot be detected. In such cases, a self-sealed perforation site or a perforation contained by adjacent organs can be postulated.¹³

There have been a number of regimens proposed for the eradication of *H. pylori*. The most effective present first line regimen for eradicating *H. pylori*, with approximately 90% eradication rates, is a combination of bismuth, metronidazole and amoxicillin or tetracycline given for a period of 14 days with or without proton pump blocker. The traditional management of a perforated duodenal ulcer has been a Graham Omental patch and a thorough abdominal lavage. In the developing world the high morbidity and mortality experienced by patients with perforated duodenal ulcer is probably due to delayed presentation. Those in whom the diagnosis is overlooked almost always die.

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REFERENCES

1. Ramakrishnan K, Salinas RC. Peptic ulcer disease. *Am Fam Physician.* 2007;76:1005-12.
2. Martinez JP, Mattu A. Abdominal pain in the elderly. *Emerg Med Clin North Am.* 2006;24:371-88.
3. Newton E, Mandavia S. Surgical complications of selected gastrointestinal emergencies: pitfalls in management of the acute abdomen. *Emerg Med Clin North Am.* 2003;21:873-907, viii.
4. Pieracci FM, Barie PS. Management of severe sepsis of abdominal origin. *Scand J Surg.* 2007;96:184-96.
5. Baker SR. Plain films and cross-sectional imaging for acute abdominal pain: unresolved issues. *Semin Ultrasound CT MR.* 1999;20:142-7.
6. Malfertheiner P, Chan FKL, McColl KEL. Peptic ulcer disease. *Lancet.* 2009;374:1449-61.
7. Lau JY, Sung J, Hill C, Henderson C, Howden CW, Metz DC. Systematic review of the epidemiology of complicated peptic ulcer disease: incidence, recurrence, risk factors and mortality. *Digestion.* 2011;84:102-13.
8. Grassi R, Romano S, Pinto A, Romano L. Gastro-duodenal perforation: conventional plain film, US and CT findings in 166 consecutive patients. *Eur J Radiol.* 2004;50:30-6.
9. Bruner DI, Gustafson C. Respiratory distress and chest pain: a perforated peptic ulcer with an unusual presentation. *Intern J Emerg Med.* 2011;4:34-8.
10. Canoy DS, Hart AR, Todd CJ. Epidemiology of duodenal ulcer perforation: a study of hospital

- admission in Norfolk, United Kingdom. *Dig Liv Dis.* 2002;34:322-7.
11. Shen Y, Ong P, Gandhi N, Degirolamo A. Subphrenic abscess from perforated duodenal ulcer. *Cleveland Clin J Med.* 2011;78:6.
 12. Oguro S, Funabiki T, Hosoda K, Inoue Y, Yamane T, Sato M, et al. 64-slice multi-detector computed tomography evaluation of gastrointestinal tract perforation site: detectability of direct findings in upper and lower GI tract. *Eur Radiol.* 2010;20:1396-403.
 13. Yeung K-W, Chang M-S, Hsiao C-P, Huang J-F. CT evaluation of gastrointestinal tract perforation. *J Clin Imaging.* 2004;28:329-33.

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