

**Diffuse Peritonitis Associated Intra Abdominal Barium Leak
(An Abdominal Emergency Catastrophe Case)**

Abstract

Introduction : Barium peritonitis is a rare but life threatening complication of contrast examination of the gastrointestinal tract. The chemical peritonitis due to barium contamination is characteristically severe and difficult to treat. Such a complication has a high morbidity and mortality rate.

Case Report: A 64 years old, Indonesian male patient was referred immediately to our surgery department after extravasation was found during barium enema procedure. The patient underwent surgery after the diagnosis of acute abdomen was made. Exploratory laparotomy revealed perforation of the rectum with a diameter of 3 cm, located 12 cm above the anal port and barium covering whole intraabdominal organ.

Conclusion : Peritonitis associated intra abdominal barium leak could increased morbidity and mortality rate following the sepsis condition.

Keywords: peritonitis, barium leak, rectal perforation

Introduction

Barium peritonitis is a rare but life threatening complication of contrast examination of the gastrointestinal tract. The incidence of peritonitis following barium enema is in the order of 2-8 per 10.000 investigations. Barium, is a silver-white compound that outlines the colon and rectal wall on X-ray and is used for the detection of filling defects and other abnormalities. While it is a relatively less invasive procedure, complications can occur during and after Barium Enema examination.¹

Generalised peritonitis in such circumstances is rare, since most perforations are limited to the retroperitoneum. The chemical peritonitis due to barium contamination is characteristically severe and difficult to treat. However, the most important and life-threatening complication of barium examination is rectal perforation, which is caused by air used for insufflation of the rectum and the colon during the procedure to enhance imaging. Such a complication has a high morbidity and mortality rate.²

Case Report

A 64 years old, Indonesian male patient was referred immediately to our surgery emergency department after extravasation was found during barium enema procedure (**Figure 1**). The patient presented with complain of nausea, vomiting and abdominal pain. His vital signs included temperature of 37.4°C, blood pressure of 110/ 70 mmHg, pulse rate of 82 beats/min, respiratory rate of 24 breaths/min. On physical examination, the abdomen was distended and tenderness was noted to direct and rebound palpation with guarding in all quadrants. Routine hematological were within normal limits except for raised total leucocyte count (11.600/mm³). On biochemical examination showed decreased albumin (2.0 g/dl). A chest X-ray did not reveal any pneumoperitoneum (**Figure 2**). The patient underwent surgery after the diagnosis of acute abdomen was made.

Exploratory laparotomy revealed perforation of the rectum with a diameter of 3 cm, located 12 cm above the anal port and barium covering whole intraabdominal organ (**Figure 3 and 4**). After an effective abdominal washout, ileostomy was performed. Oral intake was given during first 24 hours after removing the nasogastric tube on the first postoperative day. On the second postoperative day, the patient is in stable condition and is allowed to move to the ward and well tolerated oral intake. On 7th post operative day, the patients could discharged from hospital with no post operative complication and well torelated oral intake.



Figure 1. Previous colon in-loop examination results in the patient showed contrast in the rectum to caecum, no visible mass or contrast extravasation



Figure 2. Abdominal x-ray examination results three days after colon in loop showed free air subdiaphragma, elongated air fluid level, and residual barium contrast intra and extra lumen of GIT.



Figure 3. After irrigated the gastro intestinal tract, there is still a barium attached to the intestinal wall, omentum, pelvic floor, and liver.

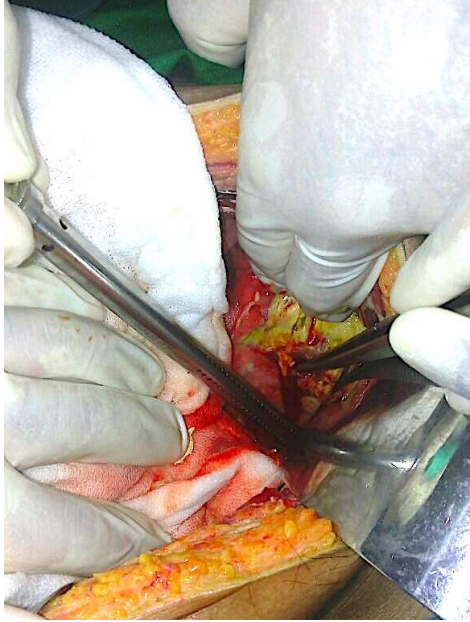


Figure 4. Perforated rectum 12 centimeters from anal port with a diameter of about 3 centimeters, around the hole there is a residual contrast barium

Discussion

Tadros and Watters suggested four mechanisms of injury : trauma from the enema, overinflation of the balloon, recent colonoscopic instrumentation especially associated with biopsy and the presence of rectal mucosal disease such as cancer, stricture, diverticulosis or inflammatory bowel disease.¹ Rarely the colon may burst due to excessive transmural pressure alone.² Different types of perforation have been described in the literature. One study classifies the perforation as either intramural (incomplete) or extramural (complete).³ Peterson et al. divided perforations into five categories: 1) perforations of the anal canal below the levator ani muscle, 2) incomplete perforations such as perforation of the rectal mucosa, 3) perforations into the retroperitoneum, 4) transmural perforations into the adjacent viscera and 5) perforations into the free intraperitoneal cavity. The clinical signs, radiological findings, treatment strategies and prognosis may vary in each category.⁴

Surgery is not always required. In intramural or small retroperitoneal perforations, good results are reported with conservative treatment consisting of bowel rest, combined with total parenteral nutrition, intravenous fluid treatment, and broad-spectrum antibiotics.^{5,6} Surgical debridement is only required in case of large amounts of extravasation and intramural abscesses, or in patients not responding to conservative treatment.^{7,8}

In retroperitoneal perforations with considerable extravasation of barium a subgroup with a much poorer prognosis the extravasation should be drained and a diverting colostomy is advised, however, treatment by rectosigmoid resection, primary anastomosis, and proximal colostomy also has been reported.^{9,10,11}

Our patient is suspected of having chronic diarrhea before, in the history we get nausea, vomiting, and flatulence before entering the hospital. Overinflation of the balloon is not recorded during barium-enema by the doctor and trauma from the enema in the mucosa is not suspected because the perforation site is 12 cm above the anal port. Disturbance of bowel wall tensile strength. However, in our patients, a plain abdominal X-ray revealed an excessive amount of barium that dilates the rectum and sigmoid accompanied by extravasation. Possible causes of excessive amount of intraluminal barium and rectal perforation are excessive pressure during the procedure and thinning of the intestinal wall due to inflammation of the previous intestine which makes the intestinal wall more fragile to become perforated.

Fry et al demonstrated that the incidence of colorectal perforation during barium-enema radiography can be reduced by 1) performing proctoscopy before barium enema, 2) avoiding the use of anal bubbles in patients with known rectal lesions, using safe-balloon tip designs insert it after careful rectal examination 3) avoid barium studies in patients with active colitis, 4) delay examination for at least six days in case of biopsy in or polypectomy, 5) avoidance of pressure formation greater than that made by barium suspension column one meters, and 6) using lower barium concentrations whenever possible.^{11,12}

Conclusion

Peritonitis associated intra abdominal barium leak could increased morbidity and mortality rate following the sepsis condition. Emergency operation was needed in the management of this case and also post operative nutritional support.

REFERENCES

1. Tadros S, Watters JM: Retroperitoneal perforation of the rectum during barium enema examination. *Can J Surg* 1988, 31:49-50
2. Williams S, Harned R: Recognition and prevention of barium enema perforations. *Curr Probl Diagn Radiol* 1991, 20:121-151.
3. Vora P, Chapman A. Complications from radiographer-performed double contrast barium enemas. *Clin Radiol* 2004; 59: 364-8.
4. Peterson N, Rohrmann CA Jr, Lennard ES. Diagnosis and treatment of retroperitoneal perforation complicating the double-contrast barium-enema examination. *Radiology* 1982; 144: 249-52.
5. Fry RD, Shemesh EI, Kodner IJ, Fleshman JW, Timmcke AE. Perforation of the rectum and sigmoid colon during barium-enema examination. Management and prevention. *Dis Colon Rectum* 1989;32:759-64.
6. Brunton FJ. Retroperitoneal emphysema as a complication of barium enema. *Clin Radiol* 1960;11:197 – 9.
7. Carter RW. Barium granuloma of the rectum: a complication of diagnostic barium enema examinations. *AJR Am J Roentgenol* 1963;89:880-2.
8. Levine S, Simpson DB. Barium sulfate granuloma of rectum. *Am J Proctol* 1960;11:485 – 90.

9. Rosenklint A, Buemann B, Hansen P, Baden H. Extraperitoneal perforation of the rectum during barium enema. *Scand J Gastroenterol* 1975;10:87 – 90.
10. Levy MD, Hanna EA. Extraperitoneal perirectal extravasation of barium during a barium enema examination: natural course and treatment. *Am Surg* 1980;46: 382–5.
11. Fry RD, Shemesh EI, Kodner IJ, Fleshman JW, Timmcke AE. Perforation of the rectum and sigmoid colon during barium-enema examination. Management and prevention. *Dis Colon Rectum* 1989;32:759–64.
12. Williams S, Harned R: Recognition and prevention of barium enema perforations. *Curr Probl Diagn Radiol* 1991, 20:121-151