

# Barium Peritonitis - Following Barium Enema of the Proximal Colon Through a Colostomy

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## Summary

Perforation with extravasation of barium is a rare complication of contrast enema examination of the large bowel with a high associated mortality rate. The experience of performing a re-laparotomy in a patient previously exposed to barium peritonitis is even less common. We describe an elderly male patient with a Hartmann's procedure performed a year previously, presenting with peritonitis following barium enema evaluation of the proximal colon via an end descending colon stoma. Emergency laparotomy, segmental bowel resection and liberal peritoneal toilet resulted in a satisfactory outcome. The patient had a subsequent successful reversal of his Hartmann's procedure nine months later despite the presence of dense barium induced adhesions. This potentially preventable iatrogenic complication is discussed in this report, which is supplemented by a brief review of the English literature.

## Introduction

Perforation with contrast extravasation is a rare but life threatening complication of barium enema examination of the large bowel<sup>1</sup>. The mortality rate of this iatrogenic complication can be as high as 50% especially in octogenarians<sup>2</sup>. If the patient survives the initial episode, dense intraperitoneal adhesions ensues that may result in intestinal obstruction.

We describe a case of iatrogenic barium peritonitis that was managed with minimal resulting morbidity. Despite the fear of dense adhesions, an attempt at reversing the patient's Hartmann's procedure was undertaken nine months later. The cause of the iatrogenic perforation, management strategy and the subsequent problems encountered during stoma reversal is discussed in this case report.

## Case report

A 65-year-old man was referred to our surgical unit with generalised peritonitis following barium enema

roentnography of the large bowel performed elsewhere. The referral letter stated that the patient was being evaluated prior to closure of his Hartmann's procedure performed 16 months earlier for traumatic rectal perforation. He had no past medical history of note. A contrast enema examination via the proximal colostomy was requested in view of the paucity of information pertaining to his previous surgical history. During the procedure, a size 20 F Foley's catheter was inserted into the end stoma and the balloon inflated with 20mls of water. The patient developed severe abdominal pain a few minutes following the introduction of barium with associated bleeding from the colostomy. Radiological evidence of barium leak into the peritoneal cavity was evident and confirmed by clinical signs of peritonitis (Figure 1). The patient was resuscitated with intravenous crystalloids and transferred to our unit.

He was commenced on broad-spectrum antibiotics and subjected to immediate laparotomy. Intraoperative finding was that of a 2cm perforation of the descending colon approximately 8cm from the stoma (Figure 2). There was barium contamination of the peritoneal

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cavity, concentrated mainly to the left side of the abdomen by previous adhesions. The colon appeared normal apart from minor erythema around the perforation site. The colon distal to and including the perforation site was excised and a healthy proximal end stoma was created. Liberal peritoneal and removal of the extravasated barium was then performed, the latter by using wet gauze and wiping away the barium residue from the serosal surface of the small bowel.

Post-operative recovery was uneventful and subsequent histopathology of the resected colon confirmed an ulcerated region just proximal to the stoma that corresponded with the site of perforation. Nine months later, the patient returned for reversal of his Hartmann's procedure. At surgery, dense adhesions were noted between small bowel loops with the presence of barium granuloma on its serosal surface. The reversal was carried out successfully and achieved primarily by meticulous sharp dissection. The patient was discharged home on day 6 following surgery and he remains well a year following the procedure.



**Fig 1: Barium enema evaluation of the colon demonstrating leakage of barium (arrow) in the left paracolic gutter**



**Fig 2: Resected specimen demonstrating ulcerated area (arrow) which was the site of colonic perforation**

**Discussion**

Contrast examination of the gastrointestinal tract is rarely complicated by perforations. The reported incidence is between 0.02 to 0.04% with a high reported mortality and morbidity rate<sup>3</sup>. Experimentally, barium on its own has not been demonstrated to be toxic, producing granulomas similar to those caused by talcum and the deleterious effect is evident when barium is admixed with faeces<sup>4</sup>.

Among the reported cases of barium enema perforations, a significant number of cases have occurred following contrast introduced through colostomies. The use of a balloon catheter inflated just inside the stoma has been associated with many of the reported perforations and seems to be particularly hazardous<sup>3</sup>. Unlike the rectum, the sigmoid and descending colon is smaller in calibre and is less distensible and this may predispose this part of the large bowel to traumatic perforation during barium roentgenography. The plastic enema tip may cause rents in the bowel mucosa especially when the bowel wall has been thinned out by distension. Forceful and inexperienced insertion of the enema tip can impale the rectal or colonic wall and cause perforation<sup>5</sup>. Inflation of a retention balloon within a stricture, neoplasm, inflamed rectum or colostomy stoma is particularly hazardous and another predisposing factor is recent deep biopsy or polypectomy with electrocautery which renders the bowel at an increased risk of injury<sup>3</sup>. In our patient, the catheter was inserted into the stoma and the balloon inflated with 20mls of water, which could have accounted for the perforation of the descending colon. This complication is potentially preventable by careful insertion of the enema catheter and inflating the balloon outside the stoma and applying gentle pressure to aid retention of barium<sup>6</sup>.

While the older series has constantly reported a mortality exceeding 50%, recent reports have demonstrated better survival which has most likely been achieved by prompt diagnosis, aggressive resuscitation, antibiotic therapy and early operation when indicated. Dense bowel adhesions and ureteric obstructions are recognized late complications following recovery from barium induced peritonitis<sup>3</sup>. There has been a paucity of publications in the English literature on the subsequent management of a patient following recovery from barium peritonitis. Reversing a Hartmann's procedure under such circumstances may risk multiple bowel tears, further adhesion and fistula formation. The timing of the reversal is also controversial. Early re-laparotomy seems appropriate before the development of dense adhesions where else late intervention may theoretically allow the adhesions to stabilise and perhaps regress.

Perforation of the bowel with barium peritonitis is a preventable complication. The enema tip or retention balloon may injure rectal or colonic mucosa if inserted incorrectly and it is imperative that radiologist take appropriate preventative measures in avoiding this potentially lethal iatrogenic mishap.

**Conclusion**

Barium peritonitis following contrast examination of the colon is a rare but serious complication. Adherence to proper equipment and technique, and identifying 'at-risk' patients with underlying colonic abnormality can prevent this complication. Prompt diagnosis, aggressive resuscitation, antibiotic therapy and early operative intervention when indicated can minimize the mortality. Following barium peritonitis, dense adhesions of the bowel are to be expected but re-laparotomy is safe and feasible when performed by an experienced surgeon.

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**References**

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