### TITLE OF CASE

Barium Peritonitis: A Complication of Perforated Small Bowel Obstruction

### AUTHORS OF CASE

*Please indicate corresponding author by *

Breanna Bailey

### SUMMARY

**Up to 150 words summarising the case presentation and outcome**

Patient is a 60 year-old female recently hospitalized for a several month history of nausea, vomiting, and a 75 pound weight loss. In addition, labs indicated an elevated CA-125. During her hospitalization, an exploratory laparoscopy was performed finding ascites and enteritis without any identifiable cause and the patient was thought to have a gastroenteritis. Five days after discharge, she returned to the hospital for continued symptoms. She was admitted for possible Small Bowel Obstruction (SBO) and treated conservatively.

Three days after conservative management was attempted, a Small Bowel Follow Through (SBFT) was obtained with barium contrast. This study indicated perforated viscous as the barium entered the peritoneal cavity.

An urgent exploratory laparotomy was performed demonstrating an internal hernia secondary to adhesive band at the terminal ileum with terminal ileum perforation. A section of bowel was resected and an end-ileostomy was created. The patient spent several days in the ICU, her recovery was long, and she was discharged 4 weeks later.

### BACKGROUND

**Why you think this case is important – why you decided to write it up**

SBO is a very common diagnosis in surgery. The majority of patients are treated successfully with conservative management. However, this case demonstrates the consequences of insufficient conservative management and forces us to look at current guidelines for diagnosis and management of SBO. With this, I think it’s important to look at whether a diagnostic laparoscopy is an appropriate procedure for diagnosing SBO. It also points to the importance of using a water-soluble contrast vs. Barium for contrast studies in patients with suspected SBO or other conditions in which perforated viscous is likely or possible.

### CASE PRESENTATION

**Presenting features, medical/social/family history**

**HPI:**
- G.L. is 60 y/o female recently hospitalized (8/24-8/27) for a several month history of nausea, vomiting and abdominal distention.
- 75-pound history of weight loss during this time.
- During previous admission:
  - CA-125 was found to be elevated.
  - Diagnostic laparoscopy performed showing ascites and mild-to-moderate distension of small bowel with enteritis. No other pathology was identified.
- Patient discharged home POD #1 (8/27)
- Re-admitted (9/2/08) for intractable nausea, vomiting, obstipation, anorexia and abdominal pain.
- She continued to lose weight (10 lbs since discharge).

**PMH/PSH:**
- TAH and BSO
- Colonoscopy 2006 with biopsy of 2 polyps
- Diagnostic laparoscopy 8/26/08
Meds: None
Allergies: Iodine
Family Hx:
- + DM, Heart Disease
- - CA
- - Inflammatory bowel disease, Crohn’s, U.C.

Social Hx:
- Denies ETOH, tobacco, or illicit drug use.
- Married and lives at home.

ROS:
- Gen:
  - Total of 85 lbs wt. loss over several months. 10 lb loss since discharge.
  - + fatigue/weakness.
  - -fever/chills/night sweats
- Cardiac:
  - - CP/edema
- Resp:
  - -SOB/cough/hemoptysis
- GI:
  - + anorexia, N/V. Emesis described as bilious green.
  - + Abd. Pain: colicky and localized to suprapubic region.
  - + Obstipation (small BM w/suppository before discharge, otherwise, no BM x10 days)
  - -hematochezia/melena
- Otherwise, unremarkable.

PE:
- Vitals on admission: T: 100.2 F   P: 82   R: 16   BP: 89/53
- Gen: Non-toxic, NAD, A&O X3
- HEENT: Neck supple, trachea midline
- Heart: RRR, no MRG
- Lungs: CTA B/L
- Abd: Soft, distended, tympanic to percussion, Generalized TTP, inc. in suprapubic region. No guarding or rebound
- DRE: neg. hemoccult, good rectal tone, no masses.

### INVESTIGATIONS If relevant

**Laboratory Studies:**
- Sodium: 126 (L)
- Potassium: 2.9 (L)
- Chloride: 77 (L)
- HCO3: 38 (H)
- LFTs WNL
- WBC: 6.4
- CEA: 0.5
- CA-125: 153 (H)
- CA 19-9: 5

**Radiological Studies:**
- Multiple AXRs: All demonstrating multiple dilated loops of small bowel with air-fluid levels.
- Barium SBFT: Demonstrated viscous perforation evidenced by barium in peritoneal cavity.

### DIFFERENTIAL DIAGNOSIS If relevant
N/A, Barium peritonitis was obvious during the radiological study.
### TREATMENT

If relevant

After identification of barium peritonitis:

- The patient was started on IV antibiotics with fluid resuscitation.
- She was taken to the operating room for an emergent exploratory laparotomy
- A single adhesive band in the RLQ was released
- A 10cm section of small bowel just prior to the ileocecal valve was resected and end-ileostomy was created

### OUTCOME AND FOLLOW-UP

- The patient spent several days in the ICU, four of which she was on a ventilator. Her recovery went well as she slowly made progress and was sent home after approximately four weeks in the hospital.

### DISCUSSION

*including very brief review of similar published cases (how many similar cases have been published?)*

1. What are the current guidelines for diagnosis & management of small bowel obstruction?
2. Is diagnostic laparoscopy an appropriate diagnostic tool for small bowel obstruction?
3. What is Barium peritonitis?
4. Have incidences similar to this occurred in the past?

1. In June 2008, practice guidelines were created for diagnosis and management of SBO. The guidelines were published based on 550 articles on this topic. They developed the following guidelines for diagnosis of SBO: (1) Plain films on all patient suspected of having SBO. (2) All patients with inconclusive plain films should have a CT scan. (3) MRI & US as an alternative to CT. (4) Contrast studies should be considered for patients who fail to improve after 48 hrs of conservative management. (5) Nonionic low osmolar weight contrast is alternative to barium for contrast studies.

Likewise, guidelines were created for the management of SBO. These include: (1) Patients with plain film finding of SBO and clinical markers (fever, leukocytosis, tachycardia, metabolic acidosis, and continuous pain) or peritonitis on physical exam warrant exploration. (2) Patients without the above mentioned clinical picture with a partial SBO or complete SBO can undergo nonoperative management safely. (3) Patients with resolution of their SBO by day 3 to 5 of nonoperative management should undergo water soluble study or surgery. A small bowel series is considered gold standard for determining degree of obstruction (4) In a highly selected group of patients, the laparoscopic treatment of SBO should be considered and leads to a shorter hospital length of stay.

2. There was limited literature that looked at the use of diagnostic laparoscopy in the diagnosis of SBO. One study looked to evaluate the feasibility, efficacy, and safety of laparoscopy in diagnosis and treatment of recurrent SBO. It was a retrospective study of 253 patients that identified a success with a laparoscopic approach to diagnosis of obstruction in all patients except three. Of the three, one of the patients with a negative diagnostic laparoscopy presented with features of peritonitis on POD #2. This incidence is essentially what happened with the patient presented in the case study. The study concluded that diagnostic laparoscopy offers surgeon and patient a significant value with minimal risk.

Another study identified was a retrospective study of 167 patients who underwent laparoscopy for diagnosis and/or treatment of intestinal obstruction over a 10 year period. The study found that laparoscopy successfully diagnosed the site of obstruction in all patients. In addition, 154 patients (92.2%) were successfully treated laparoscopically without conversion to laparotomy.

3. Barium Peritonitis represents the clinical and pathological sequence of events that attends the escape of barium sulfate, any regional bacteria, and enteric content into
the peritoneal cavity\textsuperscript{6}. The incidence is 2-8 per 10,000\textsuperscript{8}. The process occurs when peritoneal contamination produces a marked chemical peritonitis which can lead to exudation of large volumes of extracellular fluid and albumin, resulting in hypovolemia and extreme peritoneal irritation\textsuperscript{9}. Signs and Symptoms mimic those of general peritonitis\textsuperscript{3}. Patients lie motionless, often with knees flexed to chest. Voluntary & involuntary guarding with rebound tenderness is present. The patient may be febrile with marked leukocytosis\textsuperscript{9}. Treatment includes immediate aggressive fluid resuscitation with broad spectrum antibiotics and early laparotomy with removal of barium and GI contents to reduce morbidity and mortality\textsuperscript{6,8,9}.

4. There is limited literature published on similar cases. Of those identified, the cases were not current and I was unable to find any exact cases where the barium peritonitis was specifically from a SBO. An article published in 1996 stated only 30 case reports have been published\textsuperscript{8}. Their article published two case reports of Barium Peritonitis. Both incidences were due to a perforated peptic ulcer. One patient was a 32 year old female who spent 12 days in hospital and had no further complications 10 years later. The other was a 63 year old male was discharged on post operative day 31 and required ventilatory support and enteral nutrition, he also had no further complications three years later\textsuperscript{8}.

Further case studies were presented in an article published in 1983\textsuperscript{6}. Of the seven cases presented, six resulted in barium peritonitis secondary to barium enemas. The other case was a result of an upper gastrointestinal series with resulting pyloric ulcer perforation\textsuperscript{6}.

Another article identified was a review of complications of barium enema published in 1991\textsuperscript{11}. Their review determined that perforation of the bowel is the most frequent serious complication of barium enema. However, the incidence is difficult to determine because most cases remain unreported. Bowel weakened by iatrogenic trauma or disease is more likely to perforate and the result of intraperitoneal perforation leads to severe, acute peritonitis, with intravascular volume depletion, leading to rapid shock\textsuperscript{6,11}. It appears that the best way to avoid barium peritonitis is by the use of water-soluble contrast studies in patients with possible or likely perforation. There is no risk of chemical peritonitis if water soluble contrast material is spilled in the peritoneal cavity, because it will be absorbed\textsuperscript{3}. Likewise a study on morbidity and mortality of contrast media in the peritoneal cavity further demonstrated that water-soluble contrast has significantly less deleterious effects than barium in the setting of potential fecal peritoneal soiling\textsuperscript{7}.

As described earlier, there have been no case studies of barium peritonitis as a result of SBO and limited data exists on incidences of this condition at all. Most cases published are a result of perforated peptic ulcers or bowel perforation secondary to barium enemas. However, all cases resulted in a chemical peritonitis with the potential for severe consequences.

In regards to the patient presented in the case study, it appears that diagnostic laparoscopy was a reasonable approach with this patient given the diagnosis of incomplete obstruction and questionable ovarian cancer with a 75-pound weight loss. However, because the laparoscopy was not diagnostic for obstruction, the patient was most likely managed conservatively for too long since an operation had already occurred. The bowel distension and decreased blood supply, as well as this patient’s poor nutritional status (albumin of <1.0) most likely contributed to her perforation. Furthermore, a bowel series was an appropriate next step as this diagnostic tool is considered to be gold standard for differentiating partial versus complete obstruction. In retrospect, she likely would have perforated with either barium or a water-soluble contrast, but the resulting peritonitis may have been reduced with a water-soluble contrast. As identified barium peritonitis is a rare complication of barium studies, however, one should have this complication in mind when performing such tests.

**LEARNING POINTS/TAKE HOME MESSAGES 3 to 5 bullet points**

- Barium peritonitis is a rare complication, however, has the potential for fatal...
outcomes. These patients need to be managed with fluids and antibiotics immediately after recognition of the condition and sent to surgery as soon as possible.

- For any patient with suspected SBO or other conditions in which perforated viscous is likely or possible, a contrast study with water-soluble contrast versus barium should be performed.

- Do not let the results of one study deter you from your original diagnosis or treatment plan.

REFERENCES


Date: October 30, 2008

PLEASE SAVE YOUR TEMPLATE WITH THE FOLLOWING FORMAT:

Author’s last name and date of submission, eg,

Smith_June_2008.doc