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The efficacy of steroids for postoperative persistent inflammatory reaction in a patient with barium peritonitis: A case report



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ABSTRACT

INTRODUCTION: Barium peritonitis is a serious and life-threatening disease requiring intensive care. Residual barium in the intraperitoneal cavity can cause persistent inflammation, postoperatively.

PRESENTATION OF CASE: An 80-year-old woman was admitted to our hospital because of abdominal pain and vomiting after barium meal examination. Physical and radiographic examination showed sigmoid colon perforation. Barium sulfate extravasation was noted in the intraperitoneal cavity. We diagnosed the patient with barium peritonitis, and performed Hartmann's procedure and thorough lavage of the intraperitoneal cavity with 20-L saline. Postoperative blood examination results were not readily improved because of the residual barium in the intraperitoneal and retroperitoneal cavities. We excluded the presence of any other inflammation origin, except that from residual barium. Methylprednisolone 500 mg/body/day was administered for 3 days and the dose was gradually decreased thereafter. The white blood cell count and serum C-reactive protein levels immediately improved to normal levels.

DISCUSSION: Barium peritonitis is associated with high mortality. Residual barium in the intraperitoneal cavity can cause chemical peritonitis, leading to granuloma formation and ileus, postoperatively. Therefore, complete removal of barium in the abdominal cavity with aggressive drainage and large quantity of saline is necessary to prevent postoperative inflammatory reaction. The use of steroids improves the persistent inflammation caused by residual barium, unless any infectious origins are present, which can worsen with steroid-use.

CONCLUSION: Residual barium in the intraperitoneal cavity causes persistent inflammatory reaction in patients with barium peritonitis. The use of steroids is effective for postoperative persistent inflammation due to the residual barium.

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1. Introduction

Barium meal examination for the gastrointestinal tract is widely performed to detect the presence of various gastrointestinal diseases. We occasionally encounter cases of barium peritonitis caused by gastrointestinal or colorectal perforation after barium

Abbreviations: WBC, white blood cell; CRP, C-reactive protein; CT, computed tomography; POD, postoperative day; PET, Positron emission tomography.

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meal examination. Barium peritonitis due to intra-abdominal perforation has been reported to be associated with a high morbidity and mortality, ranging from 35% to 50% [1]. Patients with barium peritonitis generally need intensive care, including the management of sepsis, adequate intravenous feeding, surgical debridement for barium in the intraperitoneal cavity, and postoperative management for infection. Residual barium in the intraperitoneal or retroperitoneal cavity can be a persistent inflammatory source postoperatively for patients, leading to granuloma formation and intestinal adhesion [2,3].

We herein report a case of barium peritonitis due to colonic perforation with postoperative prolonged inflammatory reaction, which was successfully treated with steroids. In this case report, all information was reported in line with the SCARE criteria [4].

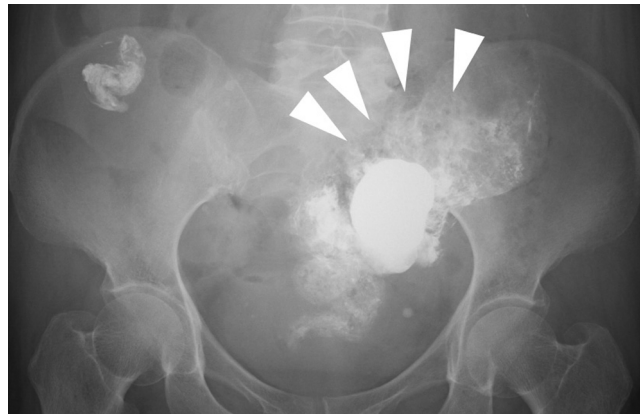


Fig. 1. Barium is extravasated around the sigmoid colon (arrowheads).

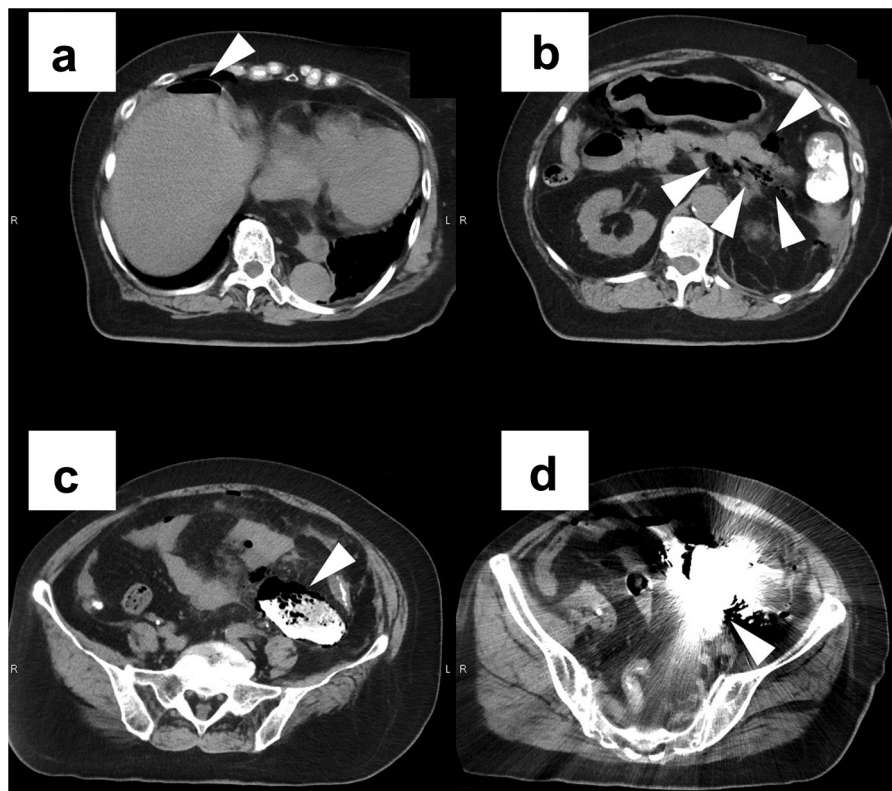


Fig. 2. Free air was detected anterior to the liver (arrowhead).
 (a) Abundance of free air was detected in the intraperitoneal cavity (arrowheads).
 (b) Free air and extravasated barium were detected around the sigmoid colon (arrowhead).
 (c) A large amount of barium was extravasated around the sigmoid colon (arrowhead).

2. Presentation of case

An 80-year-old woman was admitted to our hospital because of abdominal pain and vomiting after a barium meal examination was performed at another hospital. Physical examination showed peritoneal irritation signs, including tenderness and guarding in the abdomen. Blood examination showed reduced white blood cell (WBC) count and increased serum C-reactive protein (CRP) level, which indicated sepsis. Abdominal X-ray findings showed barium leakage from the sigmoid colon (Fig. 1). Abdominal computed tomography (CT) findings showed abundance of free air in the intraperitoneal cavity, such as at the liver surface and around the sigmoid colon. We confirmed barium leakage from the sigmoid colon on abdominal CT (Fig. 2). We diagnosed the patient

with barium peritonitis with sigmoid colon perforation, and we performed an emergency surgery. The Hartmann's procedure and intraperitoneal drainage, which intended to remove as much barium as possible was performed. A large amount of barium was noted in the intraperitoneal and retroperitoneal cavities. We performed thorough lavage of the intraperitoneal cavity with 20-L saline. Impipenem/cilastatin sodium followed by doripenem was administered postoperatively. Although the serum CRP level was gradually decreased until postoperative day 10, it increased again. In contrast, the WBC count continued to increase until postoperative day 13 (Fig. 3). Systemic CT examination was performed to detect other inflammation origins, although no inflammation origins were found, except that from the residual barium sulfate in the intraperitoneal and retroperitoneal cavities (Fig. 4). Methyl-

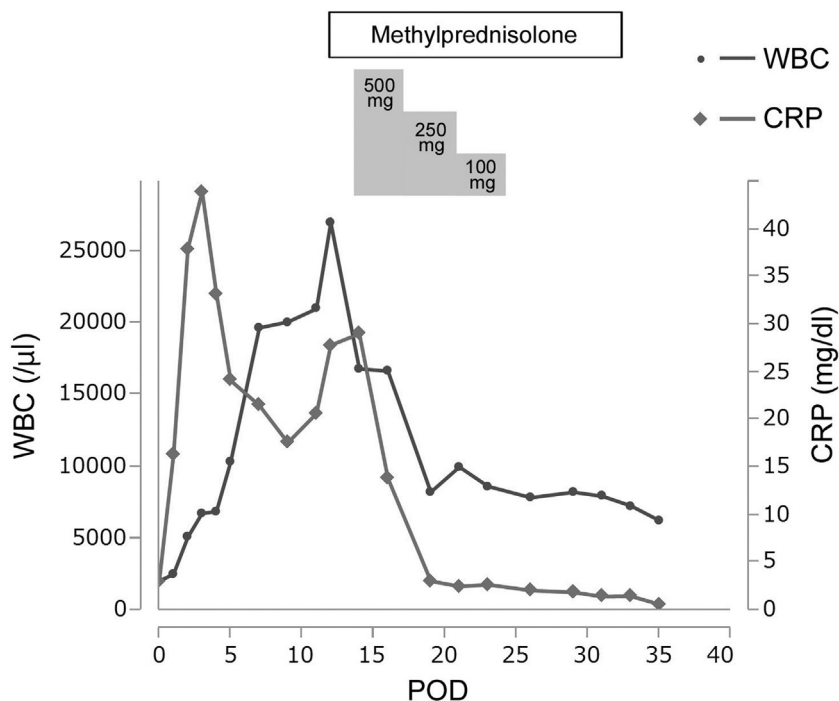


Fig. 3. Postoperative transition of the WBC count and serum CRP level; POD, postoperative day.

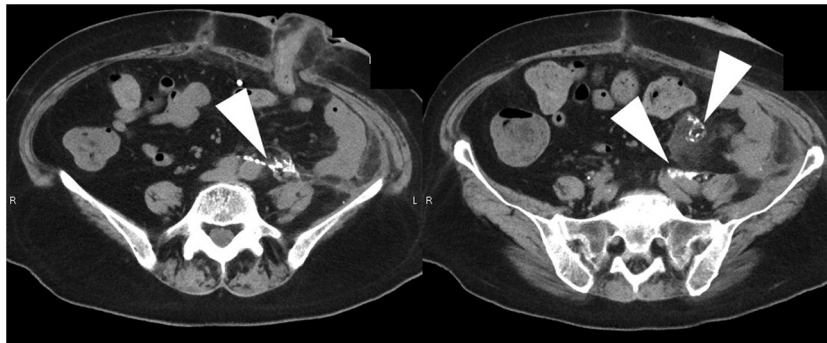


Fig. 4. Postoperative CT shows residual barium in the intraperitoneal and retroperitoneal cavities (arrowheads).

prednisolone 500 mg/body/day was injected intravenously for persistent inflammatory reaction for 3 days from postoperative day 13. Medicated methylprednisolone dose was gradually decreased every 3 days as the following: 500 mg/body/day, 250 mg/body/day, and 100 mg/body/day. Both WBC count and serum CRP level immediately improved to normal levels. She was discharged on postoperative day 35.

3. Discussion

Barium sulfate is widely used for contrast examination to detect digestive tract diseases. Barium meal examination remains a relatively safe and non-invasive procedure for patients. The incidence of peritonitis following barium meal examination ranges from 0.02% to 0.08% [5,6], although barium peritonitis due to colorectal perforation is considered as a serious and life-threatening complication. The mortality associated with barium peritonitis due to intra-abdominal perforation is reported as approximately 50% [1]. Patients with barium peritonitis require various intensive care including treatment with broad-spectrum antibiotics, adequate intravenous fluid treatment, surgical debridement for extravasated barium, and postoperative management for infection.

Barium sulfate is a hyperosmotic contrast medium, which is not absorbed from the digestive tract or peritoneum, which is reported to be associated with hyperosmotic dehydration and bacterial infection [7,8]. Residual barium in the intraperitoneal cavity has been reported to cause chemical peritonitis, which leads to granuloma formation and intestinal adhesion [2,3]. Residual barium in the peritoneal cavity frequently causes ileus [2,9]. Therefore, complete barium removal in the abdominal cavity with aggressive drainage and a large quantity of saline is necessary to prevent from postoperative inflammatory reaction.

In this case, incomplete debridement of barium in the intraperitoneal and retroperitoneal cavities led to persistent inflammatory reaction that was not responsive to antibiotics but extremely responsive to steroids. To our knowledge, this is the first reported case of a patient with persistent inflammatory reaction due to barium peritonitis who was successfully treated with steroids. We used methylprednisolone intravenously 500 mg/body/day for 3 days, which was decreased gradually afterwards. Currently, the quantity and the kind of steroids are uncertain, hence, even a small amount of steroid may be effective for improving persistent inflammatory reaction. The use of steroids for patients with sepsis is controversial because of their side effects, such as superinfections,

bleeding, and hyperglycemia [10,11], hence, we must carefully consider the indication for steroid therapy in patients with barium peritonitis in the postoperative state. In our case, we performed systemic CT examination, although PET scan might be more appropriate to detect other inflammation origins because of the high sensitivity [12].

4. Conclusion

Residual barium in the intraperitoneal cavity causes persistent inflammatory reaction in patients with barium peritonitis. Therefore, we must remove as much barium as possible by aggressive drainage and thorough lavage with a large amount of saline. Considering the results from our case, it is possible that the use of steroids is effective for persistent inflammation caused by residual barium in the intraperitoneal cavity, unless there is any infectious origin, which can worsen by using steroids.

Conflict of interest

All authors have no conflict of interest to declare.

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Ethical approval

This research does not require a deliberation by the ethics committee.

Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Author contributions

Hirofumi Kojima contributed to the study conception and design, performed the surgical procedures and postoperative patient care, and wrote the manuscript.

Shozo Hojo contributed to the study conception and design, obtained informed consent, performed surgical procedures and postoperative patient care, and reviewed the manuscript.

Takahiro Manabe performed the surgical procedures and postoperative patient care, and reviewed the manuscript.

Shiori Demura, Shinichi Sekine, Kazuto Shibuya, Isaya Hashimoto, Isaku Yoshioka, Tomoyuki Okumura, and Takuya Nagata reviewed the manuscript.

Tsutomu Fujii played contributed to the study conception and design and reviewed the manuscript.

Registration of research studies

Not applicable.

Guarantor

Tsutomu Fujii.

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Not applicable.

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