Portal venous gas during chemotherapy

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ABSTRACT

A 56-year-old woman was admitted to our hospital with abdominal pain, nausea and diarrhea. She had previously operated for the caecal cancer and performed chemotherapy with 5-fluorouracil (5-FU) and leucovorin (LV) after operation. She restarted chemotherapy with 5-FU and LV three weeks before, because size-up paraaortic lymphnode, lung metastasis and ovarian metastases were noted by follow-up CT scan. On physical examination at admission, mild tenderness located in the upper umbilicus was found. Blood examination showed leucocytopenia and neutropenia and C reactive protein level was slightly elevated. Under a diagnosis of enteritis as an adverse event of chemotherapy, conservative therapy including fasting and resuscitation was instituted. One day after admission, a high-grade fever was observed. A computed tomography (CT) of the abdomen showed portal venous gas (PVG). We did not suspect necrosis of the bowels and conservative therapy was continued. Follow-up CT imaging a day after revealed a disappearance of the PVG. It is believed that the radiographic detection of PVG is a life-threatening sign, but many of these cases do not require exploratory laparotomy. Contrast-enhanced CT should be performed to avoid unnecessary laparotomy.

Key words: Chemotherapy, conservative therapy, portal venous gas


INTRODUCTION

The addition of adjuvant chemotherapy to surgical resection improves the chances of curing colon cancer that has metastasized to regional lymphnodes. 5-fluorouracil (5-FU) is one of the most frequently used anticancer agents in the treatment of solid cancers and 5-FU-based therapy has been the cornerstone of adjuvant therapy for colon cancer. Adverse reactions to 5-FU-based therapy have included bone marrow suppression and diarrhea. In the present case, a patient suffered severe diarrhea and portal venous gas (PVG) was detected in an abdominal computed tomography after close examination of the source of abdominal pain. The finding of PVG has been associated with a high mortality rate and usually necessitates surgery. We herein report a case of PVG during chemotherapy, in which the patient survived without surgical intervention.

CASE REPORT

A 56-year-old woman was admitted to our hospital with abdominal pain, nausea and diarrhea. Cancer of the ceacum (well-differentiated adenocarcinoma, T3N2M0, stage III) had been diagnosed and treated with right hemicolecotomy 3 years before admission. Paraaortic lymphnode metastasis was noted by computed tomography (CT) scan after operation and treated with 5-FU and leucovorin (LV). After three cycles of chemotherapy, consisting of 5-FU (500 mg/mm²) and LV (250 mg/mm²) weekly, for 6 weeks, CT scan revealed partial remission of the lymphnode metastasis. Then, the patient was treated with oral administration of 5-FU and treatment continued until one month before admission, when size-up paraaortic lymphnode, lung metastasis and ovarian metastases were noted by follow-up CT scan. She started chemotherapy with intravenous administration of 5-FU and LV.
3 weeks before admission.

On physical examination, there was mild tenderness at umbilicus. Blood examination showed leucocytopenia and neutropenia (white blood cell count 1,900/mm³). C reactive protein (CRP) level was slightly elevated (1.53 mg/ml).

Under a diagnosis of enteritis as an adverse event of chemotherapy, conservative therapy including fasting and resuscitation was instituted. One day after admission, a high-grade fever was observed. She was administered antibiotics and gamma globulin, but her symptoms did not resolve and CT imaging was performed. A computed tomography of the abdomen showed PVG without pneumatosis intestinalis [Figure 1].

We did not suspect necrosis of the bowels because of the physical findings of her abdomen and conservative therapy was continued. Follow up CT imaging a day after the first CT revealed a disappearance of the PVG [Figure 2]. The patient recovered uneventfully and was discharged on the 21st hospital day.

**DISCUSSION**

Gas within the portal venous system is a life-threatening condition with an overall 75% mortality rate in instances due to noniatrogenic causes. A recent study, however, has reported mortality rates of PVG as low as 30%. In mortality rate, this decline is considered to be the result of recognition of an increasing number of clinically unimportant causes of PVG by frequent use of CT scanning and ultrasonography rather than due to improved therapy.

PVG is associated with non-iatrogenic causes such as ischemic bowel necrosis, necrotizing enterocolitis, inflammatory bowel disease, abdominal trauma or acute diverticulitis and also iatrogenic causes. In noniatrogenic causes, the detection of PVG, when associated with bowel ischemia, typically predicts a poor prognosis. To differentiate benign causes of PVG without ischemic bowel disease, such as primary mesenteric ischemia or secondary mesenteric ischemia, from strangulated bowel, reports in the literature have suggested that contrast-enhanced CT can be very useful. The sensitivities and specificities have been reported as 64% and 93% for primary mesenteric ischemia and as 83% and 93% for secondary ischemia, respectively.

Three factors predisposing the portal venous system to accumulation of gas have been reported to include gastrointestinal mucosal injury, sepsis and gas embolism resulting from increased intraluminal pressure in a distended bowel. These factors permit gas-forming microorganisms to gain access to the portal vein.

There are only three cases of PVG, including ours, that have occurred during chemotherapy. In these cases, patients suffered from severe enteritis as an adverse reaction of chemotherapy and were successfully treated without surgical intervention. We hypothesized that the gastrointestinal mucosal injury caused by diarrhea might have permits gas-forming microorganisms to gain access to the portal vein. And these reported cases demonstrate that the administration of the prophylactic antibiotics is appropriate for consideration for these patients without the evidence of the ischemic bowel disease to prevent bacteremia or sepsis.

Although it is believed that the radiographic detection of gas within the portal venous system is a life-threatening sign, many of these cases do not require exploratory laparotomy. Contrast-enhanced CT should be performed to avoid unnecessary laparotomy. Contrast-enhanced CT should be performed to avoid unnecessary laparotomy.

**REFERENCES**

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