

# Case Report of Multimodality Imaging in Omental Cake: Plain Radiograph, Computed Tomography, and Ultrasonography

## *A Care-Compliant Article*

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**Abstract:** The imaging finding of omental cake has been demonstrated in other modalities, such as computed tomography, magnetic resonance imaging, and ultrasonography. However, to the best of our knowledge, the image presentation of omental cake on a routine kidney-ureter-bladder film has not been reported before in the literature.

We presented a unique case of a 61-year-old woman, with known advanced cecal colon mucinous adenocarcinoma, presented to our institution with abdominal fullness, poor appetite, and decreased stool passage for 20 days. Physical examination was unremarkable, except distended abdomen. Subsequent study revealed massive post-pigtail catheter drainage ascites with a prominent soft-tissue mass-causing centralization and tethering of focally distended small bowel gas, suggestive of omental cake on plain radiograph. The imaging finding in plain radiograph corresponds to the findings in other imaging modalities, including abdominal sonography and computed tomography. The patient underwent subtotal colectomy and ileostomy during later courses of chemotherapy due to adhesion ileus and possible intraabdominal abscess, and pathologic study confirmed the diagnosis of cecal mucinous adenocarcinoma and peritoneal carcinomatosis.

Although the image finding of omental cake on plain radiograph has never been described, this image finding is unique and should be recognized, as it may suggest the presence of omental cake when first identified in the emergency department from patients with abdominal distension and warrant further evaluation to evaluate the underlying cause.

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## INTRODUCTION

Omental cake, or diffuse peritoneal infiltration, occurs most commonly secondary to intraperitoneal tumor spread;

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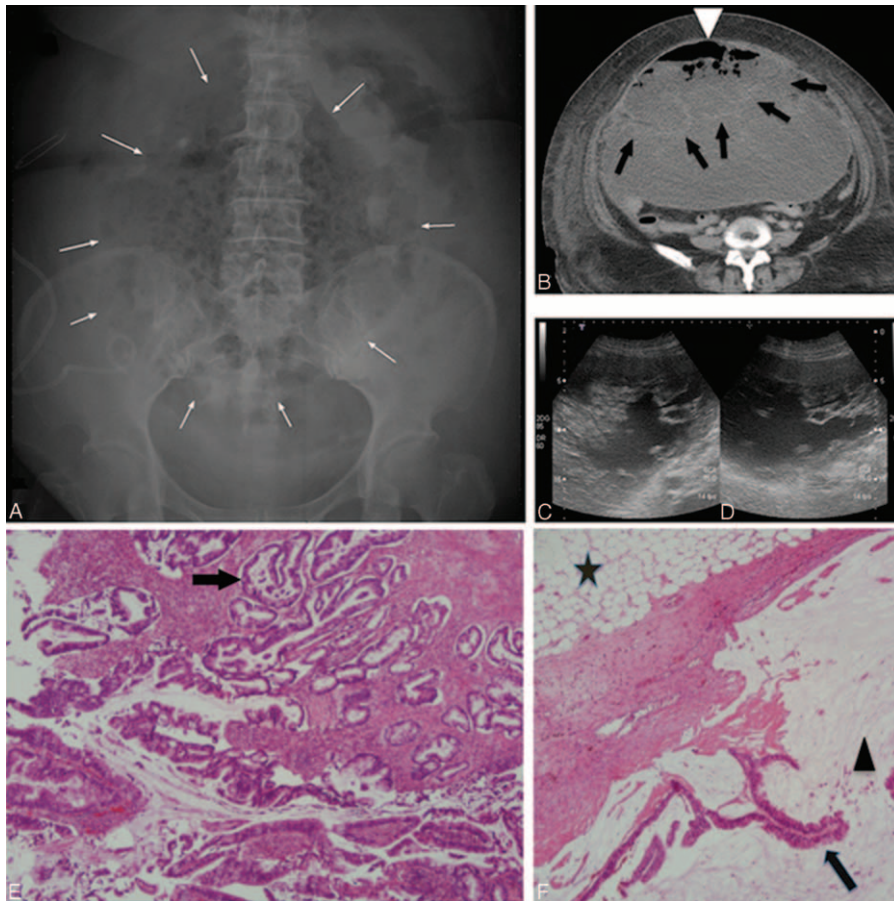
other causes include primary malignancy, inflammatory conditions, and other less-common benign conditions.<sup>1,2</sup> The imaging finding of omental cake has been well demonstrated in other modalities, such as computed tomography, magnetic resonance imaging, and ultrasonography. Walkey et al<sup>3</sup> reviewed the computed tomography findings of 60 patients and reported the following common findings of peritoneal malignancy, including loculated or nonloculated ascites (most common), peritoneal thickening and enhancement, and bowel involvement, including distortion with or without obstruction. However, to the best of our knowledge, this report describes the first case of omental cake presenting on a routine kidney-ureter-bladder film, which is the most commonly used imaging modality for the initial survey of a distended abdomen in emergency department.

## CASE PRESENTATION

The institutional review board (Chang Gung Memorial Hospital) approved this work and waived the need for informed consent. A 61-year-old woman with known advanced cecal colon mucinous adenocarcinoma presented to the emergency department with abdominal fullness, poor appetite, and decreased stool passage for 20 days. Tracing back to the history, she underwent chemotherapy due to peritoneal carcinomatosis detected on computed tomography. Physical examination was unremarkable, except distended abdomen. A kidney-ureter-bladder radiograph taken during treatment follow-up revealed massive post-pigtail catheter drainage ascites with a prominent soft-tissue mass-causing centralization and tethering of focally distended small bowel gas (Fig. 1A). Abdominal computed tomography confirmed the corresponding finding of omental cake with a mass resulting in traction and encasement of the adjacent bowel, accompanied by massive ascites and peritoneal enhancement (Fig. 1B), in which the centrally dilated bowel is correlated both in kidney-ureter-bladder radiograph and computed tomography (comparing Fig. 1A and B). Transabdominal ultrasonography revealed soft-tissue nodules and infiltration of bowel walls (Fig. 1C, D). The patient underwent subtotal colectomy and ileostomy during later courses of chemotherapy due to adhesion ileus and possible intraabdominal abscess. Patient tolerated the surgery well with resolution of intraabdominal abscess, improved appetite and constipation status. A pathologic study confirmed the diagnosis of cecal mucinous adenocarcinoma and peritoneal carcinomatosis with metastatic mucinous adenocarcinoma (Fig. 1E and F).

## DISCUSSION

Peritoneal carcinomatosis is the dissemination and implantation of tumor cells throughout the peritoneal cavity. Omental



**FIGURE 1.** Multipanel imaging of omental cake in plain radiograph, computed tomography, and abdominal ultrasonography with histopathology study: (A) A routine kidney-ureter-bladder film revealed massive postpigtail catheter drainage ascites with a prominent soft-tissue mass-causing centralization and tethering of focally distended small bowel gas (arrows). (B) Abdominal computed tomography confirmed the finding of omental cake with a mass resulting in traction and encasement of the adjacent bowel, accompanied by enhancing peritoneum (arrows), and loculated ascites in the omentum. Note the centrally dilated bowel gas in panel B, which correlated with the image finding of centrally dilated bowel in panel A. (C, D) Transabdominal ultrasonography revealed soft-tissue nodules and infiltration of bowel walls. (E, F) Histopathology of cecal mucinous adenocarcinoma with peritoneal carcinomatosis: (E) Hematoxylin and eosin staining (40×) showed neoplastic villoglandular structures in the resected cecal mass (arrow), compatible with cecal adenocarcinoma. (F) Hematoxylin and eosin staining (40×) showed the omentum with visible omental fat (star) and neoplastic villoglandular structures in the omentum (arrow) within the abundant mucin pool (arrowhead). These findings are compatible with mucinous adenocarcinoma in the omentum.

cake refers to soft tissue thickening of the omentum secondary to tumor seedings or omental fat infiltration.<sup>4</sup> A previous study reported the occurrence of peritoneal carcinomatosis in 50% of patients with colorectal cancer and the peritoneal cavity as the only site of recurrence in up to 25% of patients.<sup>5</sup> Metastatic colon cancer can present as mucinous implants,<sup>4</sup> as reported in our case, but such metastatic mucin-producing tumors may also originate from the ovary, uterus, gastrointestinal tract (appendix), and organs (pancreas).<sup>3,5</sup>

The typical imaging presentation of omental cake has been described as a thickened omentum with diffuse tumor infiltration in advanced peritoneal carcinomatosis.<sup>3</sup> However, the differentiation of peritoneal carcinomatosis from adjacent soft tissue or bowel gas has not been reported by kidney-ureter-bladder radiograph alone. Thus, its diagnosis depends heavily on the findings of other imaging modalities, such as computed tomography, ultrasonography, and magnetic resonance imaging, but these

modalities are either much more expensive or more time consuming.<sup>5,6</sup> Other indirect evidence of omental metastases has been reported, such as the presence of ascites or extracellular mucin and mesenteric thickening.<sup>5</sup> As described above, the findings of bowel tethering and distortion in the case described here with kidney-ureter-bladder film were due to loculated ascites with tumor encasement and infiltration along the small bowel, which is compatible with previously described computed tomography findings.<sup>3</sup> Omental vascular pedicle sign has been proposed in patients with metastatic or primary omental mass.<sup>7</sup> Our presented case shows omental cake with a massive ascites mass resulting in traction and encasement of the adjacent bowel, accompanied by peritoneal enhancement, although dilated omental vein was not observed. This could probably be due to the omental cake formation in our patient was due to diffuse omental caking from metastatic mucinous adenocarcinoma rather than the various pathologies proposed by Karcaaltincaba et al.

## CONCLUSION

Our report presents the first known case of this imaging finding on a routine kidney-ureter-bladder radiograph. It may suggest the presence of omental cake when identified and warrant further evaluation to evaluate the underlying cause.

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