RADIOLOGICAL CASE

CLINICS IN DIAGNOSTIC IMAGING (7)

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CASE REPORT

A 52-year-old woman had total hysterectomy and bilateral salpingo-oophorectomy performed in China in December 1991. She had been told that she had an ovarian tumour and was treated with four cycles of chemotherapy till September 1992. Upon her return from China in January 1993, no recurrence was detected on clinical evaluation or computerised tomography (CT). During physical examination in August 1993, she was found to have ascites and a mass in the Pouch of Douglas. What do CT scans of the abdomen show (Fig 1 and 2)?

Fig 1 – CT of the upper abdomen

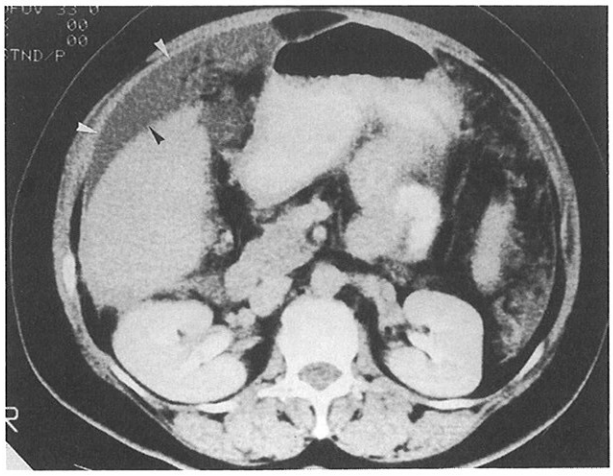

Fig 2 – CT of the mid-abdomen, (a) and (b) are taken at contiguous 10 mm intervals.

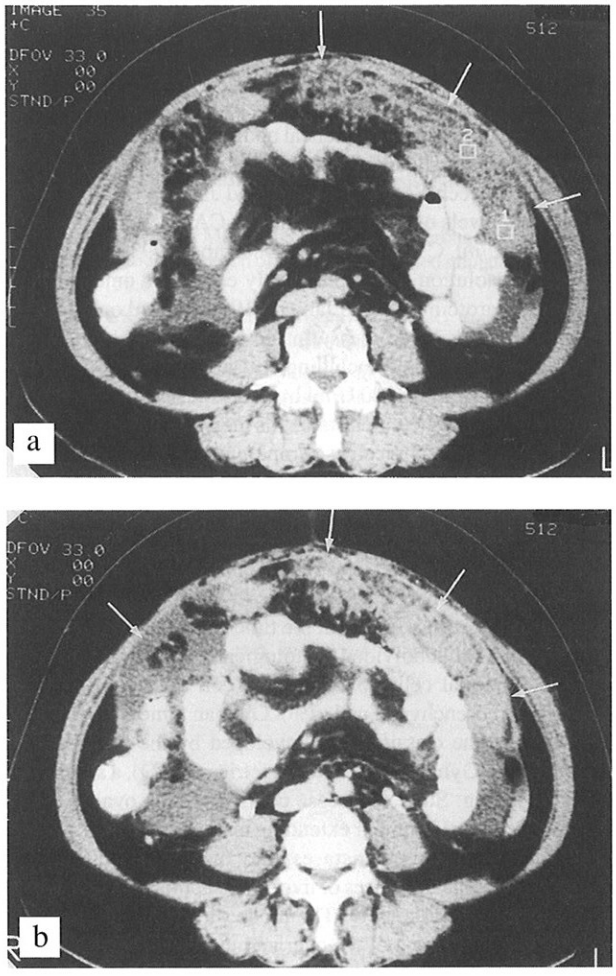

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IMAGE INTERPRETATION

Free ascitic fluid (arrowheads) was present in the anterior subphrenic space (Fig 1). Lower CT sections showed a large soft tissue mass situated (arrows) between the anterior abdominal wall and opacified loops of bowel. This mass extended to the right and left intraperitoneal cavity, and contained small pockets of omental fat (Fig 2). The location, shape and appearance of this solid enhancing mass was typical of tumour infiltrating the omentum, so-called "omental cake".

Diagnosis

Omental caking due to ovarian carcinoma

CLINICAL COURSE

Biopsy of the lesion in the Pouch of Douglas showed poorly differentiated adenocarcinoma. Laparotomy performed in September 1993 confirmed the presence of recurrent, inoperable ovarian tumour. A large omental cake measuring 20cm x 5cm x 1.5cm and several small peritoneal nodules were found. She was given chemotherapy consisting of four cycles of cisplatin and cycloxan between September 1993 and January 1994. During this period, levels of the tumour-marker CA-125 fell from 6000 U/ml to 88 U/ml. CT performed in December 1993 showed near complete resolution of the previously enormous omental cake (Fig 3). Laparotomy done in January 1994 showed only a small residual omental plaque, measuring 4cm x 1.5cm. Despite further cycles of chemotherapy, including utilisation of adriamycin, her CA-125 level rose to 8200 U/ml by August 1994. As the tumour was thought to be chemoresistant, this therapy was discontinued. The patient currently receives symptomatic treatment only.

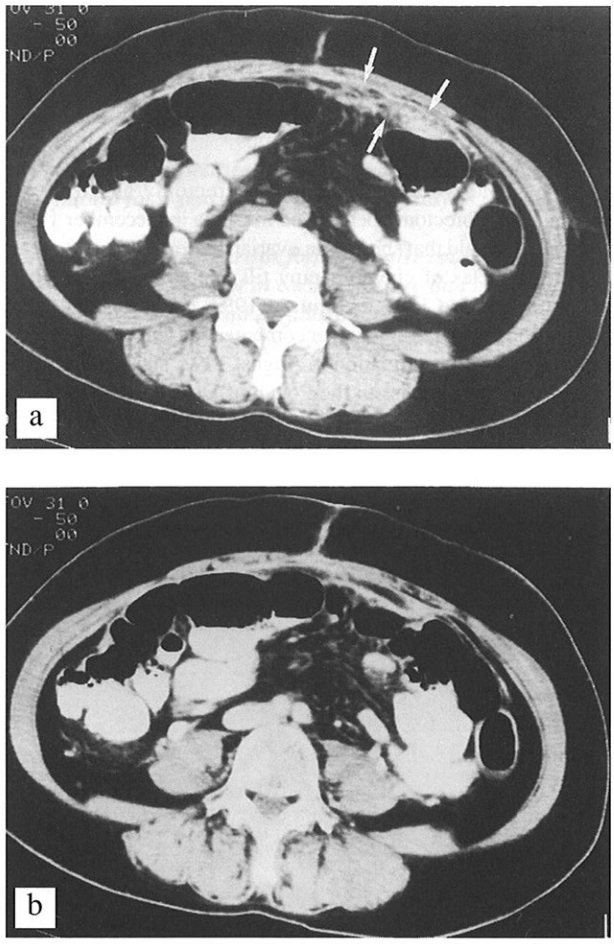
DISCUSSION

Cancer of the ovary has the highest mortality among the gynaecological tumours. This is due partly to extensive spread of disease upon cancer detection, with about 75% of patients having disseminated disease at the time of diagnosis[1]. Ovarian tumours can be subdivided histologically into the following groups: epithelial cell (85%), stromal cell (<10%), germ cell (<5%) and mesenchymal cell (2%). Ovarian tumours are staged according to the classification developed by the International Federation of Gynaecology and Obstetrics (FIGO), a simplified summary being: Stage I: disease confined to the ovaries (15% incidence); stage II: tumour extending into the true pelvis (10%); stage III: spread or metastases into the abdominal cavity, including peritoneal surfaces of liver and diaphragm (70%); stage IV: distant metastasis (5%). The mode of treatment employed depends on the staging of the ovarian tumour. Other prognostic factors are histological tumour grade and biologic markers, useful in documenting tumour burden and response to therapy[1,2].

CT provides excellent demonstration of extraluminal abdominal masses located in the peritoneum, omentum and mesentery. The most frequent sites of peritoneal seeding are the right subphrenic space, greater omentum and Pouch of Douglas. The presence of ascitic fluid is an important aid to the detection of these metastases[3]. Generally, overlap in imaging appearances makes it difficult to distinguish between mesenteric and omental masses. Greater omental masses may be identified by their topographic relationship, lying in-between the anterior abdominal wall and the bowel loops[4]. If a mass appears to be completely surrounded by bowel and is separated from the retroperitoneum, mesenteric origin should be highly suspected. A stellate pattern in the mesentery may also be seen. An important caveat is that oral contrast should fill the entire small bowel in order to delineate the mesentery accurately[5].

In ovarian cancer, the role of CT at presentation is to make the diagnosis pre-operatively, to evaluate the extent of disease, and post-operatively, to assess residual disease and response to adjuvant therapy. CT is generally preferred to ultrasound for investigation of disease progression and judging treatment endpoint, with its main advantage being scan section reproducibility[2]. Although 'second-look laparotomies' remain the standard means to confirm disease remission, the utilisation of meticulous CT scanning techniques can reduce significantly the number of second-look laparotomies in patients clinically disease-free but having abdominal recurrence[6].

Fig 3 – CT of the mid-abdomen taken after 4 months of chemotherapy, (a) and (b), at corresponding levels to Fig 2a and 2b. There is marked reduction in abdominal girth in general, as well as in the size of the omental cake. Small amount of residual tumour is arrowed.



The most common sign of peritoneal tumour detected on CT is ascites, seen in three-quarters of patients with peritoneal malignancy. In about half of these cases, ascitic fluid tends to be loculated. Peritoneal thickening and contrast enhancement, representing confluent peritoneal metastases, is present in about 60% of cases. Other frequent findings are discrete peritoneal nodules or masses (42%), permeation of omental fat (30%), omental nodules (26%) and omental cake (12%)[7]. Although relatively rare, calcified peritoneal spread, sometimes seen in patients with metastatic ovarian cystadenocarcinoma, may be confused with contrast-opacified bowel loops[8]. In such cases, air insufflation of the colon, prior to CT, is a potentially useful technique.

Three CT patterns of omental tumour involvement have been described. The classic 'omental cake' is seen as a single solid mass located between opacified small bowel and the anterior abdominal wall. It displays contrast enhancement and contains

small pockets of residual omental fat. The second pattern consists of multiple, well-defined nodules along the omentum and the third presents as multiple, small ill-defined nodules, resulting in CT appearance of thickened or 'smudged' omentum[4].

The use of magnetic resonance imaging (MRI), using only T1-weighted sequences, in demonstration of peritoneal metastases has recently been described. The entire gastrointestinal tract is distended by introduction of air, with injection of scopolamine to suppress artifacts induced by bowel peristalsis. The usefulness of the paramagnetic contrast media, gadolinium-DTPA, depends on the tumour location, being most effective for lesions in direct contact with ascites[9].

Although much less common than metastases, primary tumours such as leiomyoma, neurofibroma, leiomyosarcoma, fibrosarcoma, mesothelioma and haemangiopericytoma should be considered in the differential diagnosis of solid omental masses. Benign tumours are usually well-defined and localised while malignant ones frequently have ill-defined margins, with involvement of surrounding structures[4]. In developing countries, among the immigrant population and in immunocompromised patients, especially those with HIV infection, tuberculous infection should always be considered. As tuberculous omentitis may be indistinguishable from malignant omental caking, the diagnosis of tuberculosis depends on CT findings of disproportionate mesenteric lymphadenopathy, detailed clinical information and a pattern of multi-organ involvement[4,10].

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ABSTRACT

A 52-year-old Chinese woman with previously resected ovarian carcinoma was found to have ascites and a mass in the Pouch of Douglas on follow-up examination. A large omental cake was detected on computerised tomography (CT), and subsequently confirmed during laparotomy. After completion of four cycles of chemotherapy, a near complete resolution of omental metastases was demontrated on both CT and laparotomy. The role of CT in ovarian cancer is discussed and the CT appearances of omental tumour are described.

Keywords: *computerised tomography, mesenteric neoplasm, omental neoplasm, ovary neoplasm, ovary adenocarcinoma, peritoneal neoplasm*