CT FINDINGS OF CARCINOMATOSIS PERITONEI

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ABSTRACT

OBJECTIVE 1. To illustrate the CT findings in 15 cases of carcinomatosis peritonei
2. To determine the suggestive signs of carcinomatosis peritonei.

Abdominal CT scans in fifteen patients with proven carcinomatosis peritonei were reviewed retrospectively. CT findings were evaluated for: 1) the presence, amount and distribution of ascites; 2) the morphologic appearance of the peritoneum, omentum, mesentery and bowel 3) the presence of lymphadenopathy and hepatosplenic involvement.

The peritoneum was thickened and enhanced after intravenous contrast in all cases. Ascites was present in fourteen patients and was large in eight patients. Loculation of the fluid occurred in seven patients. In three patients, despite generalized ascites; there was a notable lack of ascitic fluid in the cul-de-sac. Mesenteric infiltration was noted in twelve cases. Omental involvement was visible as soft tissue permeation of fat, enhancing nodules and/or extrinsic omental masses in nine cases. Bowel wall thickening was present in three cases. Masses in the cul-de-sac were found in five cases and were believed to represent drop metastases. Lymphadenopathy was present in four cases, liver metastasis in five cases and splenic metastasis in three cases.

Carcinomatosis peritonei should be suspected when there is enhancing peritoneal thickening accompanied by a large amount of ascites, mesenteric infiltration or omental involvement. Although not always present, bowel wall thickening, lymphadenopathy and hepatosplenic metastases also support the diagnosis.

INTRODUCTION

Abdominal computed tomography has been chosen recently as an imaging examination in patients with a wide variety of clinical symptoms. Many researchers have described various CT findings separately for each disease entity.[1-3] The purpose of our study is to illustrate the CT findings of carcinomatosis peritonei and to determine the suggestive signs for the diagnosis of the disease on the basis of our experience with fifteen patients.

MATERIALS AND METHODS

The abdominal CT findings of fifteen cases of carcinomatosis peritonei were reviewed at Maharaj Nakorn Chiang Mai Hospital. CT findings were evaluated for : 1) the presence, amount and distribution of ascites; 2) the morphologic appearance of the peritoneum, omentum, mesentery and bowel; 3) the presence of lymphadenopathy and hepatosplenic involvement. The fifteen patients were between

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27 and 77 years old (mean 51 years old). Four were men and eleven were women. In nine patients, the site of primary carcinoma was known and in six, malignancy was diagnosed from fine needle aspiration biopsy of the peritoneal nodules or cytologic study of the ascites. Primary carcinoma in nine patients included two cases from the ovary and one each from the cecum, stomach, cervix, colon, breast and uterus. One case was from non-Hodgkin's lymphoma.

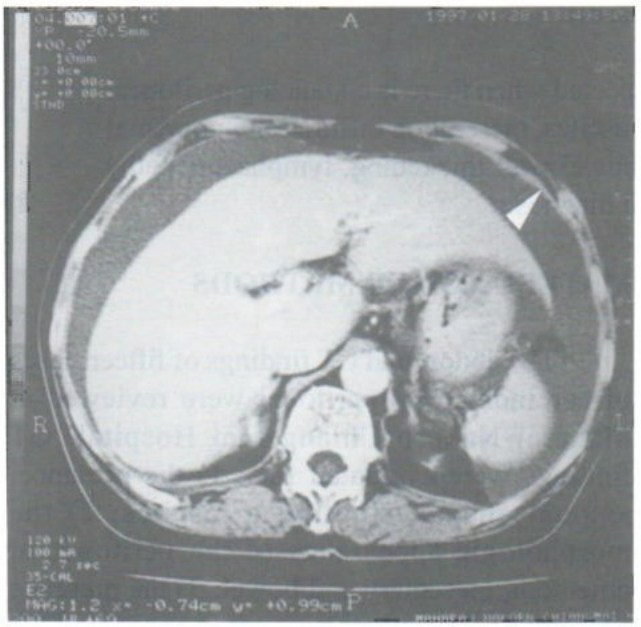
RESULTS

The most common CT findings of carcinomatosis peritonei were peritoneal thickening and enhancement (Fig 1A,2) present in all fifteen patients (100%). Thickening of the peritoneum could be either smooth, irregular or nodular and was detected along the anterior, lateral or posterior aspect of the peritoneum.

Ascites was the second most common CT finding (Fig.2) and was present in fourteen cases (93.3%). The amount was large in eight and loculation of the fluid occurred in seven. Absence of cul-de-sac fluid in the presence of generalized ascites was noted in three patients (Fig 1B).

Mesenteric infiltration was seen in twelve patients (80%) as soft tissue nodules in the mesentery, thickening of the mesenteric leaves or abnormal mesenteric configuration. (Fig 3,4)

Involvement of the greater omentum was present in nine cases (60%) and was manifest as soft tissue permeation of omental fat, enhancing nodules and/or an omental mass (Fig 2). Bowel wall thickening (Fig.4) was present in three patients (20%). Masses in the cul-de-sac were found in five patients (33.3%) and were believed to represent drop metastases. Lymphadenopathy was present in four patients (26.6%). Liver metastasis was seen in five patients (33.3%) and splenic metastasis in three patients (20%). Peritoneal tumor implant was calcified in one patient (6.6%)



A 66 -year-old woman with carcinomatosis peritonei due to metastatic adenocarcinoma.

Fig 1A. Showing parietal peritoneal thickening and enhancement (arrow head) and ascites.

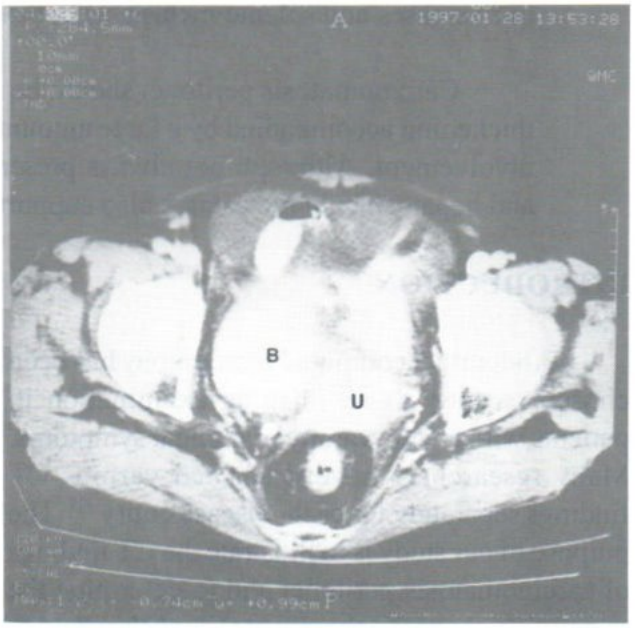


Fig 1.B. Showing absence of ascitic fluid in cul-de-sac in the presence of massive ascites. (B=urinary bladder, U = uterus)

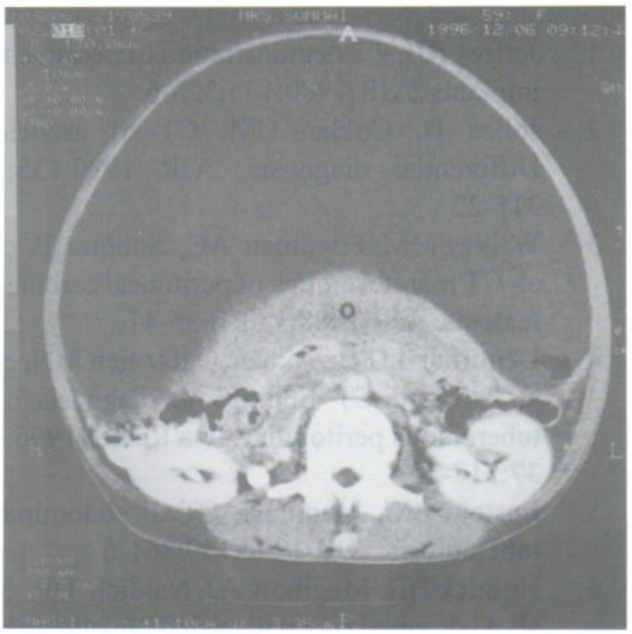


Fig 2. Carcinomatosis peritonei due to metastatic adenocarcinoma in 59-year-old woman. Contrast-enhanced CT scan shows massive ascites, omental cake (O) and thickened, enhanced parietal peritoneum (arrow).

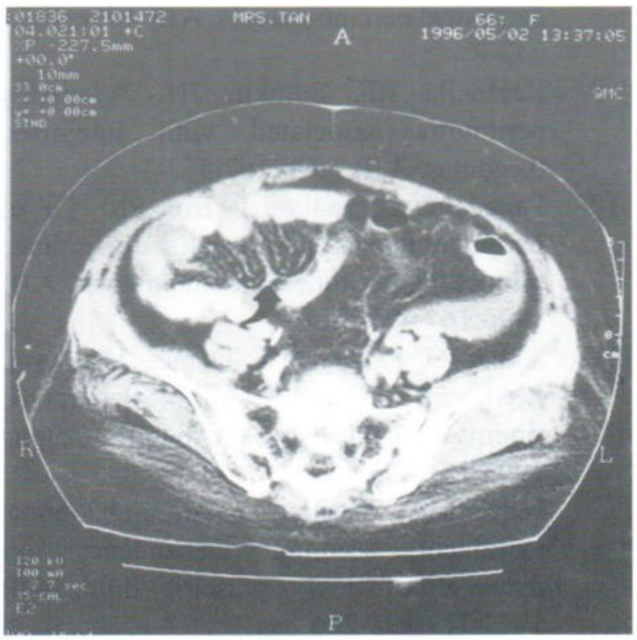


Fig 3. Contrast-enhanced CT scan demonstrates thickened mesenteric leaves (arrow).

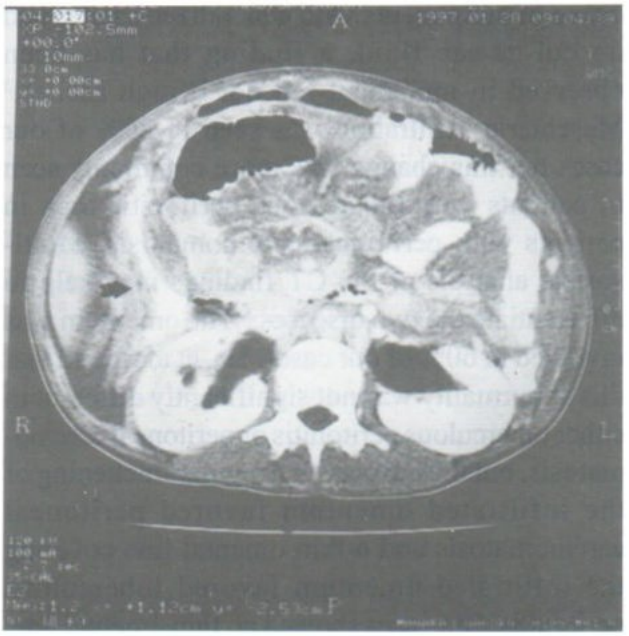


Fig 4. A 22-year-old woman with carcinomatosis peritonei due to disseminated NHL. Contrast enhanced CT scan shows thickened wall of ascending colon (arrow), ascites and thickened mesenteric leaves.

DISCUSSION

Thickening and contrast enhancement of the peritoneum were the most useful signs of malignancy.[1] However, this appearance is not specific and is known to occur in tuberculous peritonitis.[4-8] sclerosing peritonitis,[9] leiomyomatosis peritonealis disseminata,[10] and peritoneal mesothelioma.[11]

Ascites is common in many pathologic conditions ranging from abnormal cardiogenic, metabolic, inflammatory and neoplastic conditions. Although ascites alone is usually benign, ascites with co-existing mass can be either benign or malignant.[1,2,8,9] Tuberculous peritonitis is difficult to differentiate from peritoneal carcinomatosis. However, Ha, et al[8] reported that the amount of ascites in patients with tuberculous peritonitis was less than the amount in patients with peritoneal carcinomatosis. The amount of

ascites was large in more than half of our patients. Three of our patients with generalized ascites had no cul-de-sac fluid, a finding that has been observed in malignant but not benign ascites.[3] Mesenteric infiltration was seen in 80% of our cases but this change was more commonly seen in patients with tuberculous peritonitis than in patients with peritoneal carcinomatosis. Multivariate analysis of the CT findings may help to differentiate the two diseases.[8] The omentum was involved in 60% of our cases. Ha, et al[8] found that this abnormality was not significantly different in either tuberculous peritonitis or peritoneal carcinomatosis, but they observed irregular thickening of the infiltrated omentum favored peritoneal carcinomatosis and a thin omental line covering the infiltrated omentum favored tuberculous peritonitis. Our cases showed no thin omental line.

Bowel wall involvement was seen in three patients and was manifest by wall thickening without obstruction. One of these patients had NHL of the ascending colon. Masses in the cul-de-sac were found in five patients and were believed to represent drop metastases because the cul-de-sac is one of the four most common sites of malignant seeding in the peritoneum.[12] Lymphadenopathy, splenic and liver involvement were each found in less than half of the cases. Calcification of peritoneal tumor implant was seen in a case from a metastatic adenocarcinoma (primary unknown). This finding was not helpful in making a diagnosis because it can be mimicked by other conditions such as tuberculous peritonitis[8] or old intraperitoneal barium.[3]

CONCLUSION

CT findings in carcinomatosis peritonei include an enhanced thickened peritoneum, ascites, mesenteric infiltration, omental involvement, bowel wall thickening, lymphadenopathy and hepatosplenomegaly. Although most of the findings may overlap with other diseases, a combination of CT findings can make the diagnosis of carcinomatosis peritonei.

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