Primary serous papillary carcinoma of the peritoneum: MDCT findings
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Patient: 72 years, female

Clinical History:
Although primary peritoneal malignancies are rare, the presence of extensive peritoneal carcinomatosis and the absence of an ovarian mass on CT examination, in a postmenopausal woman should include in the differential diagnosis primary serous papillary carcinoma of the peritoneum.

Imaging Findings:
A 72-year old woman was admitted to hospital with enlargement of the abdomen and vague abdominal pain. Serum level of CA-125 was considerably increased (3.168 U/ml, normal range: 1-21 U/ml). Multidetector CT of the abdomen was performed on a 16-row CT scanner, including scanning after the intravenous administration of iodinated contrast material, during the portal phase, using a detector collimation of 16 X 0.75 mm and a pitch of 1.2. The presence of extensive peritoneal involvement, with ascites and peritoneal masses that ranged in size from few mm (Fig. 1a) to extensive omental infiltration (Fig. 1b) was revealed. The ovaries were not indentified. Based on the presence of extensive peritoneal infiltration, the absence of an obvious primary malignancy and the normal appearing ovaries the diagnosis of primary serous peritoneal carcinoma was suggested. Exploratory laparotomy disclosed the presence of extensive peritoneal carcinomatosis and optimal debulking surgery, with total hysterectomy and bilateral salpingo-oophorectomy was undertaken. The presence of serous surface papillary carcinoma of the peritoneum, with microscopic invasion of the adnexa was proven histologically.

Discussion:
The peritoneal cavity is a common location for metastases originating from various malignancies, particularly from the gastrointestinal tract and ovaries. The presence of peritoneal metastases implies an increased morbidity and mortality, the mean survival rate being 1 - 8 months [1]. Although rare, primary tumors of the peritoneum (peritoneal mesothelioma, papillary serous carcinoma, desmoplastic small round cell tumor, benign and malignant mesenchymal tumors) should be included in the differential diagnosis of peritoneal carcinomatosis [2]. Nevertheless, because both neoplastic and nonneoplastic diseases share the same routes in peritoneal involvement [3, 4], most of the diseases have a non-specific appearance on imaging, making differential diagnosis difficult. Primary serous papillary carcinoma of the peritoneum is a rare epithelial malignancy, which is defined as a primary tumor of the peritoneum diffusely infiltrating the peritoneal surface, but sparing or only superficially invading the ovaries [5-9]. The majority of patients present with advanced disease and the prognosis is poor [5-10]. Although the CT findings of the disease are non-specific, the presence of extensive peritoneal involvement in the absence of an obvious primary site and macroscopically normal ovaries, in a post-menopausal woman, as in our case should suggest the diagnosis of primary papillary peritoneal carcinoma [5-10]. The coexistence of extensive peritoneal calcifications is also considered a feature of primary peritoneal carcinoma of the peritoneum [9, 10]. Nevertheless, laparotomy is required
to make the final diagnosis. Single-detector row CT scanners demonstrated a sensitivity of 85-93% for the detection of peritoneal implants, but the sensitivity was dramatically reduced (25-50%) for tumor implants of 1 cm or smaller in diameter [1] Multidetector row CT scanners improved the sensitivity of CT in detecting peritoneal carcinomatosis [11], due to the acquisition of thin slices and the creation of high quality MPRs, therefore allowing the recognition of sub centimeter implants and the detailed evaluation of curved structures, like diaphragm, paracolic gutters and pelvis. Multiplanar reformatted images in this case, allowed the detailed evaluation of different peritoneal compartments in multiple planes and the reliable recognition of any minimal nodularity of peritoneal surfaces, the last implying peritoneal infiltration (Fig. 2a). Special MPRs are used for the detailed evaluation of certain anatomic regions, such as the diaphragm (coronal and sagittal MPRs, Fig. 2b, c), the paracolic gutters (coronal MPRs, Fig. 2a) and the pelvis (coronal and sagittal images, Fig. 2d).

**Differential Diagnosis List:** Primary serous papillary carcinoma of the peritoneum.

**Final Diagnosis:** Primary serous papillary carcinoma of the peritoneum.

**References:**


Description: Transverse multiplanar reformatted (MPR) images show the presence of extensive ascites and soft tissue omental masses, ranged in size from a few mm (arrow) (a), to large omental plaques (asterisk) (b). Origin:
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Figure 2

Description: Coronal MPR (a) depicts the presence of minimal thickening and nodularity in the right paracolic gutter (black arrow) and the presence of diaphragmatic implants (white arrow).

Origin:
Description: Sagittal and coronal reformatted images (b, c) permit a detailed evaluation of the diaphragms, enabling the recognition of even small nodularity of the diaphragmatic surfaces, as well as the detection of nodular or sheetlike masses (arrow). A soft-tissue omental mass (asterisk) is also seen.

Origin:
Description: Sagittal and coronal reformatted images (b, c) permit a detailed evaluation of the diaphragms, enabling the recognition of even small nodularity of the diaphragmatic surfaces, as well as the detection of nodular or sheetlike masses (arrow). A soft-tissue omental mass (asterisk) is also seen.

Origin:
Description: Coronal MPR (d) shows the presence of diaphragmatic implants (arrow) and extensive irregular peritoneal thickening in the Douglas space (small arrows). Origin: