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Pleuroperitoneal Endometriosis: CT and MR Imaging

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= **Abstract** =A case of pleuroperitoneal endometriosis is presented with CT and MRI finding. In the case of disseminated pleuroperitoneal endometriosis, conventional radiographic findings are similar to those of disseminated metastases or granulomatous inflammations and usually obscure the correct diagnosis. However, characteristic MRI findings with heterogeneous high signal intensities of the mass in variable pulse sequence and periodic exacerbated symptoms at the time of menstruation could suggest the diagnosis, although this disease is extremely rare.

Key words: ***Pleura, Peritoneum, Endometriosis, CT, MR***

INTRODUCTION

Although the occurrence of extraabdominal endometriosis is well established, multisystem involvement of endometriosis is extremely rare (Heneghan and Teixidor 1979; Gitelis *et al.* 1985). In reviewing the radiologic literature, we could not find a single description of MRI and CT findings of endometriosis involving both pleural and peritoneal spaces. Endometriosis may present in various patterns because of the periodic bleeding related to menstrual cycle (Gitelis *et al.* 1985). This case report concerns a patient with pleuroperitoneal endometriosis, in which CT and MRI findings are discussed.

CASE REPORT

A 38-year-old woman was admitted because of dyspnea and right chest pain of 2 weeks duration. There was a history of dysmenorrhea and infertility. Ten months before admission, a laparoscopy revealed extensive pelvic endometriosis. For 5 months prior to admission, the patient had complained of intermittent mild right chest pain especially during menstruation.

Initial chest radiograph on admission showed a pleural effusion. Diagnostic thoracentesis produced a thick old blood-like aspirate without micro-organisms.

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A CT scan of the chest and upper abdomen showed a lobulated soft tissue mass intermixed with fluid in the right pleural and perihepatic spaces (Fig. 1-A, B). Pelvic CT showed fluid in the peritoneal cavity and an irregular soft tissue mass around the uterus (Fig. 1-C).

Transthoracic needle aspiration biopsy of the pleural mass revealed many sheets of glandular epithelial cells with hemorrhagic background consistent with endometrial tissue.

A laparotomy disclosed 800 ml of bloody fluid with old clots in the peritoneal cavity. Bilateral salpingo-oophorectomy and hysterectomy were performed. Pathologic examination revealed multifocal endometriosis of both adnexae, omentum, intestinal walls and outer surface of the uterus. Subsequently the dyspnea and chest pain improved slowly without any treatment of the pleural lesion.

The patient was seen 7 months later with abdominal pain and palpable mass. Follow-up CT of the chest and abdomen revealed multiple lobulated masses in both pleural and peritoneal cavities (Fig. 2-A, B). Magnetic resonance imaging was performed with a superconducting magnet operating at 2.0T (Camelot K2-S, Seoul, Korea) using multislice, multiecho technique. Spin echo (SE) scans with TR 2000 msec/TE 30 msec and TR 2000 msec/TE 60 msec revealed heterogeneous high signal intensity masses located in the pleural and peritoneal cavities that corresponded to the masses

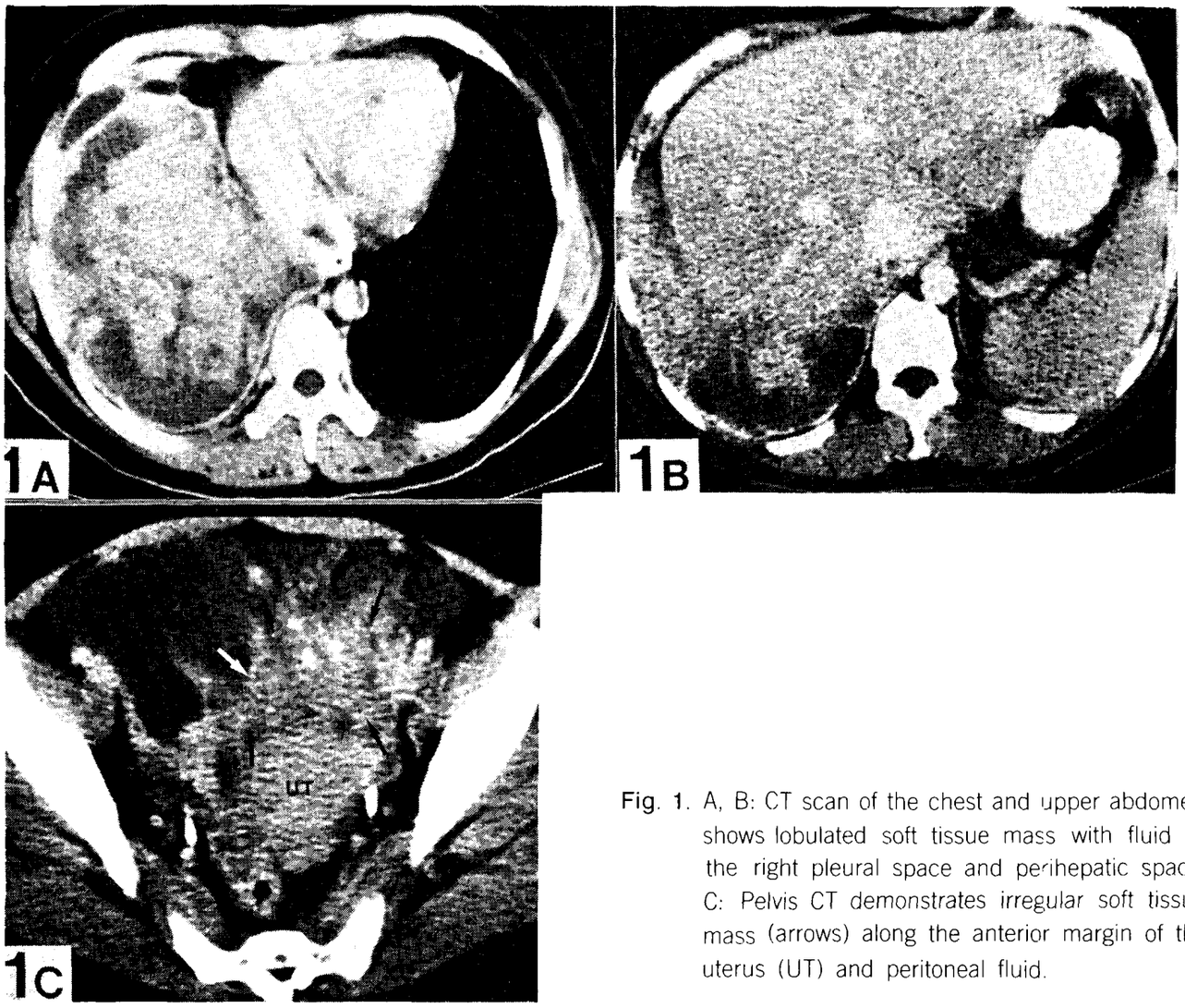

Fig. 1. A, B: CT scan of the chest and upper abdomen shows lobulated soft tissue mass with fluid in the right pleural space and perihepatic space. C: Pelvis CT demonstrates irregular soft tissue mass (arrows) along the anterior margin of the uterus (UT) and peritoneal fluid.

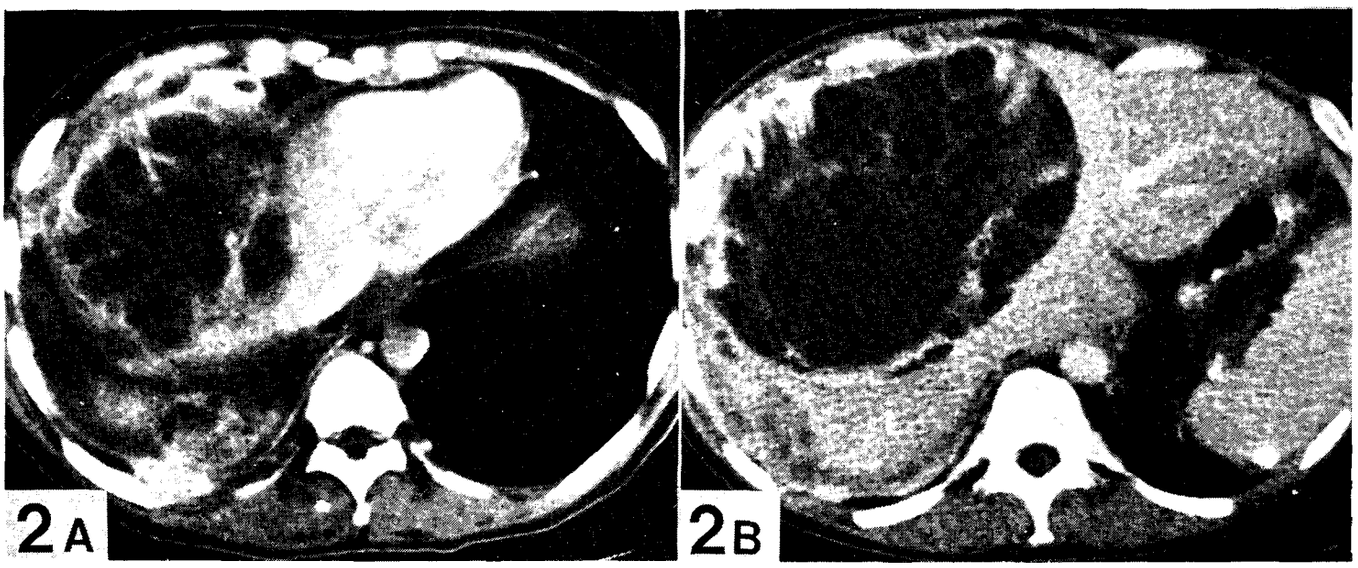

Fig. 2. A, B: CT scan of the chest and upper abdomen shows multiseptated soft tissue masses with fluid in right pleural space and perihepatic space. Liver (L) is compressed by the perihepatic mass.

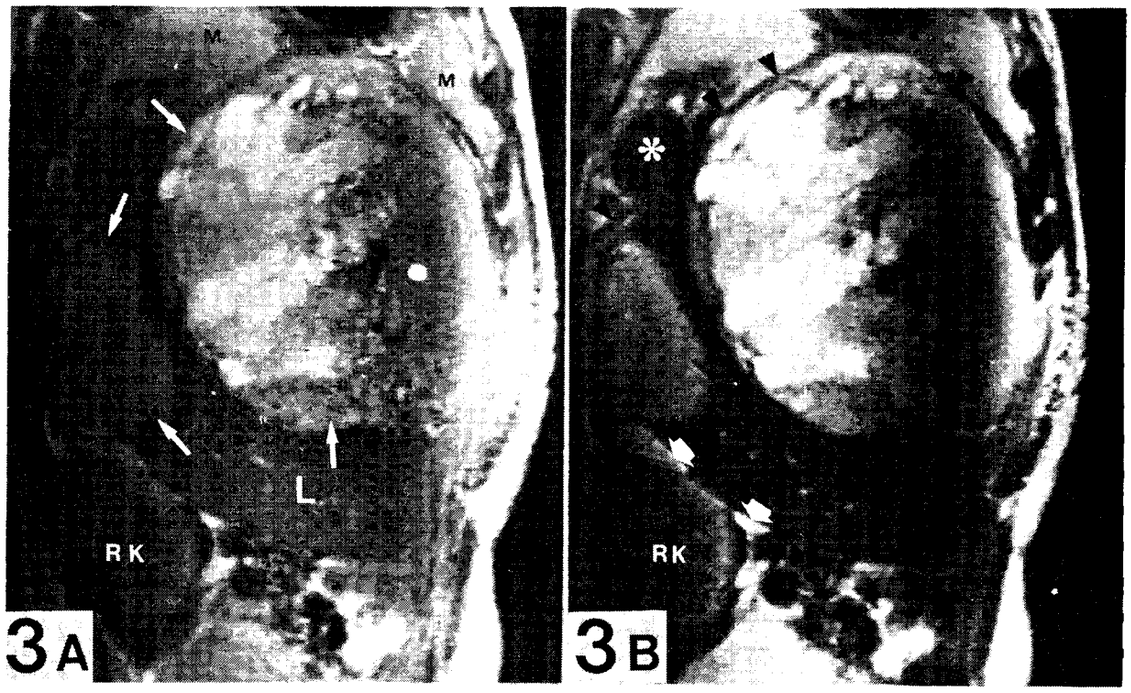

Fig. 3. Parasagittal MR image. A: SE TR 2000 ms, TE 30 ms. Multiple masses (M) with high signal intensity are seen in right lower pleural space. Large lobulated masses with variable high signal intensities (arrow) are also demonstrated in perihepatic space, compressing the liver (L). The right kidney (RK) shows downward displacement. B: SE TR 2000 ms TE 60 ms. Upper part of the liver (*) is herniated into the lower chest through the defect of right diaphragm (arrowhead). Peritoneal seeding (arrow) of the endometrioma is well visualized.

demonstrated on the CT (Fig. 3-A, B).

DISCUSSION

Endometriosis is a relatively common gynecologic condition. It is prone to occur in pelvic cavity, but the occurrence of extraabdominal endometriosis is extremely rare and 5 cases of disseminated pleuroperitoneal endometriosis with massive bloody ascites and hemorrhagic pleural effusions have been reported (Heneghan and Teixidor 1979).

The pathogenesis of pleuroperitoneal endometriosis has long been argued. A metaplastic theory, a regurgitation or implantation theory and a lymphatic or hematogenous theory have been proposed (Heneghan and Teixidor 1979; Gitelis *et al.* 1985). Pleural endometriosis most often occurs in the right chest (95%) and is thought to be due to migration of endometrial tissue from pelvic cavity through congenital muscular defects in the diaphragm which are more frequent on the right side (Foster *et al.* 1981). Our case shows classical route of spread of endometrial tissue from pelvis to pleura through the defect in the right diaphragm. The diaphragmatic defects are probably caused by sloughing of endometrial implants on diaphragm during menstruation.

In our case, CT shows multiloculated low density masses, and there is no significant difference of CT number in each locule-like space of endometriosis, which shows different signal intensity in MRI. MRI is an excellent method for imaging hemorrhage because of its superior contrast resolution relative to CT. MRI characteristics of hemorrhage have already been reported in renal cysts (Hilpert *et al.* 1986) and intracranial hemorrhage (Bradley and Schmidt 1985; Gomori *et al.* 1985) where the blood produces a high signal intensity, but literatures (Swensen *et al.* 1985; Cohen *et al.* 1986) provide conflicting information regarding T1 and T2 relaxation times of hemorrhage at various stages in its evolution. There are several conflicting reports on the appearance of endometriosis (Gitelis *et al.* 1985; Dooms *et al.* 1986; Butler *et al.* 1984; Hamlin *et al.* 1985). Gitelis *et al.* (1985) reported endometriosis of the thigh with low signal intensity regardless of pulse timings employed. The low signal intensity of the mass may possibly be due to the paramagnetism of the iron in the hemosiderin deposited

in the mass. Others (Dooms *et al.* 1986; Butler *et al.* 1984; Hamlin *et al.* 1985), however, reported endometriomas with heterogeneous high signal intensity in variable pulse timings. Our case also shows heterogeneous high signal intensity and this finding may be partly due to factors such as hematocrit, serum protein levels, stages of clot retraction, and paramagnetic effects of various hemoglobin compounds. The identification of those components may have significant implications for the future.

In conventional radiography including CT, several conditions can show similar findings to those of pleuroperitoneal endometriosis. Most are neoplastic such as metastatic carcinomas and lymphomas. Findings may be indistinguishable from those of tuberculosis. Diagnosis of pleuroperitoneal endometriosis is usually difficult. However, MRI could suggest the diagnostic clue because most neoplastic or inflammatory conditions show low signal intensity in the T1 weighted image and high signal intensity in the T2 weighted image. In contrast, MRI findings of endometriosis usually show heterogeneous high signal intensity regardless of the pulse timing employed.

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=국문초록=

늑막강과 복강을 침범한 자궁내막증 1예의 전산화단층촬영 및 자기공명영상

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늑막강과 복강을 동시에 침범하는 자궁내막증은 대단히 드문 질환으로 영문문헌상 5예가 보고되어 있다. 본 질환의 종래의 방사선학적 검사 소견은 미만성의 전이암이나 육아종성 염증성 질환과 유사하므로 정확한 진단이 어렵다. 그러나 자기공명영상을 시행할 경우 여러 스핀에코방식에서 특징적으로 불균일한 고신호강도를 보이므로 월경시마다 주기적으로 심해지는 증상과 더불어 이질환의 진단에 도움이 된다.