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WHAT'S YOUR DIAGNOSIS?

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FIGURE 1. Ultrasound of the pelvis: longitudinal oblique scan of the right para-uterine region.

FIGURE 2. CT of the pelvis.

History

A 62-year-old woman presented with post-menopausal bleeding of three months' duration. On clinical examination, the cervix looked patulous. The uterus was bulky and irregular with mostly firm consistency. Pap smear showed inflammatory change with no abnormal cell. Ca 125 rate was 20 U/mL. Transvaginal and transvesical sonography demonstrated enlarged, heterogeneous uterus distorted by multiple variable size fibroids, with a large para-uterine heterogeneous 8 cm mass (Figure 1). The left ovary looked normal, but the right ovary was not visible. Diagnostic hysteroscopy showed hemorrhagic, polypoid and sometimes dimpled endometrium. Fractional curettage revealed endocervical mucous polyps, as well as endometrial adenocarcinoma. Chest radiograph, abdominal sonography, proctoscopy and cystoscopy were normal. CT of the pelvis is shown (Figure 2).

1. What does the pelvic sonography show?
2. What does the CT of the pelvis show?
3. What's your diagnosis?
4. What would you expect to see on T_1- and T_2-weighted MR images?

ANSWER TO WHAT'S YOUR DIAGNOSIS? (PREVIOUS PAGE)

FIGURE 1. Ultrasound of the pelvis: longitudinal oblique scan of the right para-uterine regions shows a large well-defined lobulated hyperechoic mass (black circle) connected to the uterine corpus (arrow).

FIGURE 2. CT of the pelvis reveals a large heterogeneous pelvic mass showing multiple areas of fatty density (same attenuation as subcutaneous and intrapelvic fat).

FIGURE 3A. MRI of the pelvis: sagittal scan done in T_1-weighted sequence.

FIGURE 3B. MRI of the pelvis: sagittal scan done in T_2-weighted sequence.

MRI Findings: Both scans showed a large well-circumscribed mass arising from the uterine fundus and corpus. This mass was heterogeneous and contained rounded areas showing high-signal intensity on T_1-weighted image and low-signal intensity on T_2-weighted image, paralleling the subcutaneous fat and representing the fatty component of the lipoleiomyoma. Note a lower crescentic zone showing low-signal intensity on T_1-weighted image and T_2-weighted image (black circle) corresponding to the fluid-filled uterine cavity compressed by the mass. T_2-weighted image demonstrated the presence of an intracervical formation of low-signal intensity (arrowhead) below the big mass, corresponding to a fibroid. The endometrial cancer was not well identified (early carcinoma confined to the endometrium).

Radiological Findings: Ultrasound (Figure 1) showed a large well-defined markedly hyperechoic mass. CT (Figure 2) demonstrated multiple areas of fatty density within the tumor. On MRI (Figure 3), these fatty areas showed high-signal intensity on T_1-weighted images and low-signal intensity on T_2-weighted images.

Surgical Findings: Surgical operation revealed enlarged uterus containing multiple fibroids, the largest arising from the anterior wall, measuring 8 cm in diameter and showing subserosal exophytic growth. Both ovaries and tubes looked normal. Total hysterectomy with bilateral salpyngo-oophorectomy, peritoneal wash and nodal sampling were performed.

Pathological Findings: Early endometrioid adenocarcinoma with no myometrial invasion (grade 2, stage IA) associated with multiple leiomyomas. Sections of the largest subserosal fibroid displayed a mixture of smooth muscle and mature adipose tissue corresponding to lipoleiomyoma.

Diagnosis: Subserosal uterine lipoleiomyoma fortuitously associated with endometrial carcinoma.

Discussion: The presence of fatty tissue in the myometrium is anomalous. This alteration has been interpreted as a lipomatous degeneration, a metaplasia of smooth muscle cells, or as a real neoplasm frequently associated with leiomyoma, the so-called lipoleiomyoma.[1]

In a pathological series, the incidence of lipoleiomyomas was estimated at 0.8% of all leiomyomatosis. The prevalence of lipoleiomyomas in menopause, the association with multiple leiomyomas and preferential onset in the subserosa, have also been described.[1] To our knowledge, fewer than 10 cases of lipoleiomyomas have been reported in the imaging literature,[2,3] and none was associated with endometrial carcinoma. Sometimes, the lipomatous component consists predominantly of brown fat and the tumor is termed a leiomyohibernoma.[4] Presence of a fatty area with a uterine mass on CT and MRI was considered as diagnostic of lipoleiomyoma. Typically, uterine leiomyoma shows soft-tissue density on CT scan and low-signal intensity relative to myometrium on both T_1- and T_2-weighted spin-echo images on MRI. However, cellular leiomyoma have been reported to show homogeneous high-signal intensity on T_2-weighted images.[5] CT is specific of lipoleiomyoma when it shows one or several zones of negative attenuation within the tumor.[2,4] On MRI, these fatty areas show high-signal intensity on T_1-weighted images and decreased signal on T_2-weighted images.[2,3] If T_2-weighted images are performed by using fast spin-echo sequences, signal intensity of fatty areas will remain high.[5] However, it is worth remembering that on MRI, areas of hemorrhagic degeneration in a leiomyoma may equally display either high-signal intensity on both T_1- and T_2-weighted fast spin-echo images or high-signal intensity on T_1-weighted images and low-signal intensity on T_2-weighted images, mimicking fatty degeneration.[5] Also, cystic degeneration in a uterine leiomyoma may exhibit high-signal intensity on both T_1- and T_2-weighted spin-echo images, if there is high content in protein or cholesterol. In those cases, only the presence of chemical shift artifact and/or loss of signal intensity on T_1-weighted sequences with fat suppression can confirm the presence of fat within the tumor.[5] Our observation was remarkable because:

1) The subserosal lipoleiomyoma was associated with an endometrial adenocarcinoma. This association was purely coincidental and may be explained by the common prevalence of fibroid degeneration and endometrial carcinoma in menopause.[5,6] It raised a problem of differential diagnosis with extra-uterine extension of the carcinoma. Involvement of the right parameter and adnexa may have been suspected but the smooth and regular outlines of the mass, the early stage of the endometrial carcinoma which was difficult to identify on MRI, as well as the presence of definite fatty areas within the mass contradicted this hypothesis. Due to its excellent contrast resolution and multiplanar capabilities, MRI is acknowledged to be superior to transvaginal ultrasound and CT for staging endometrial carcinoma.[7] Its accuracy for differentiating early disease (stage 1A = tumor limited to endometrium and 1B = invasion inferior to 50% of myometrium) from deep myometrial invasion ranges from 74% to 91%.[6] However, MRI does not perform as well in the following cases: myometrium thinned by a large polypoid tumor or obstructed endometrial cavity, poor tumor-myometrial contrast on gadolinium-enhanced T_1-weighted images, absent junctional zone and/or multiple or large fibroids distorting the uterus.[8]

2) The lipoleiomyoma showed exophytic growth mimicking a well-defined right ovarian mass containing fat, and, therefore suggesting teratoma of the ovary. The latter typically exhibits fat or sebum content, which parallels on MRI the signal intensity of fat on all pulse sequences. T_1-weighted images with fat suppression are helpful in certain cases to make the diagnosis with confidence by demonstrating the presence of fat.[9,10] In most of the cases, transvaginal and transvesical ultrasound are able to distinguish an ovarian mass from a pedunculated uterine mass. However, in doubtful cases, MRI may aid in the differentiation of a pedunculated leiomyoma and a solid ovarian mass by showing the presence of a fat cleavage plane on T_1-weighted images.[5] MRI may also contribute in establishing the myometrial origin of a mass by demonstrating splaying of the uterine serosa or myometrium.[5,11] In our patient, the patient's age as well as the association with multiple leiomyomas, strongly indicated the diagnosis of subserosal lipoleiomyoma.

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