POSTMENOPAUSAL UTERINE LEIOMYOMA WITH HEMORRHAGIC CYSTIC DEGENERATION MIMICKING OVARIAN MALIGNANCY

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Fibroid is the most common neoplasm of the uterus in the female pelvis during reproductive age. It is usually the major problem and the reason for visiting a gynecologist. It is nearly impossible to determine their true incidence accurately, although the frequently quoted incidence of 50% found at postmortem examinations seems reasonable [1]. Uterine fibroid is a benign tumor composed mainly of smooth muscle cells but containing varying amount of fibrous connective tissue. The diagnosis is often easily confirmed noninvasively by ultrasonography, and the accuracy and sensitivity is high especially when the uterus is less than 10 weeks' size. However, localization of fibroids in a larger uterus or when there are many tumors is limited [2]. The characteristics of fibroids are commonly well-defined, concentric, solid, and hypoechoic.

The most common degeneration of fibroids is hyaline change. These may become liquefied and form cystic cavities filled with clear liquid or gelatinous material. Sometimes, the cystic change would be great or with multiple thin septa. Such variable appearances would mislead the clinicians in making an entirely different diagnosis. We report a uterine fibroid with cystic degeneration and hemorrhagic infarction mimicking ovarian malignancy.

A 55-year-old woman, gravida 6, para 4, had lower abdominal fullness for about 3 months. She also complained of progressive urinary frequency. She denied having abdominal pain, nausea, vomiting or abnormal uterine bleeding. There had been no change in bowel movements. Furthermore, menopause had occurred one year previously, and she denied receiving hormone replacement therapy or Chinese herbs. She first presented at a local clinic, where an ovarian mass was palpated and she was referred for further management.

Pelvic-vaginal examination showed an enlarged pelvic mass of about 20 weeks' gestational size. Transabdominal ultrasonographic study revealed a huge pelvic mass measuring 20 cm with multiple thick septa and soft tissue components over the dependent part (Figure 1). There was no obvious ascites. An abdominopelvic computed tomography (CT) study displayed a huge pelvic mass, measuring $12 \times 29 \times 32$ cm in size, which contained fluid and soft tissue components (Figure 2). Her serum level of CA-125 was 120 U/mL. Ovarian malignancy was highly suspected. She had a history of right thyroid papillary adenocarcinoma and had received a total thyroidectomy and radical lymph node dissection 11 years previously. She was regularly followed up at the outpatient department, and no evidence of disease recurrence had been noted.

After complete study, an exploratory laparotomy with midline longitudinal incision was performed. We found multiple myomas in the uterus and one huge mass with a stalk of about 2 cm connected to the uterine fundal area. The capsule surrounding the mass was intact with irregular contours, and there were complex cystic and soft tissue components in the mass. The cystic portion was about $30 \times 30 \times 15$ cm, and about 8,000 mL of old bloody fluid was aspirated from the tumor. The soft tissue portion measured about $12 \times 10 \times 10$ cm. The cut tumor surface revealed multiple septa with smoothed out surface and hemorrhagic fluid content. Bilateral adnexa were normal in size and contour (Figure 3). A frozen section of the specimen showed leiomyoma with hemorrhagic cyst. Abdominal total hysterectomy and bilateral salpingo-oophorectomy were consequently performed. The patient stood the procedure well and was discharged 6 days after surgery. Permanent microscopic examination revealed leiomyoma

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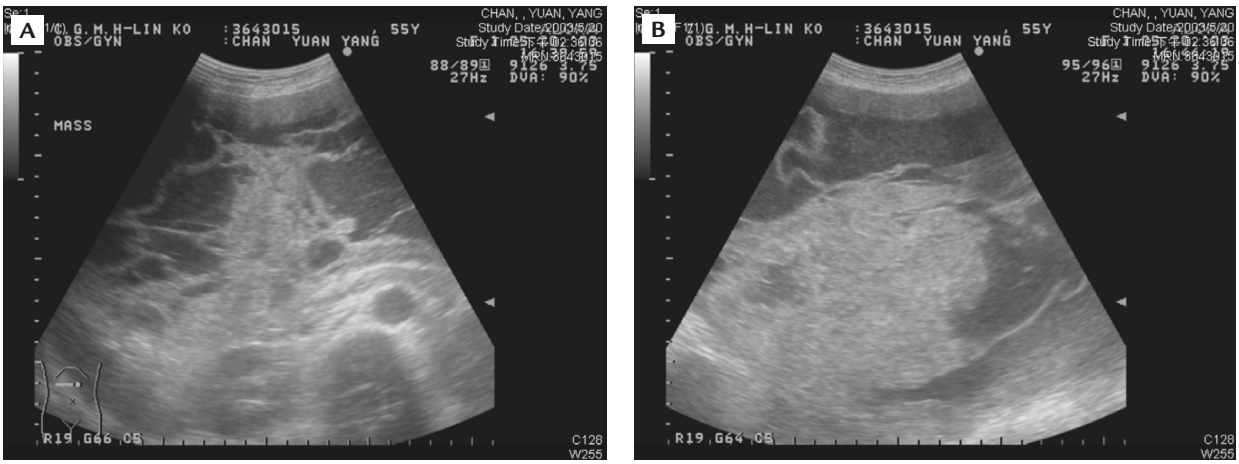

Figure 1. Transabdominal ultrasonography. (A) Several thick and irregular septa within the mass. (B) One soft tissue component covering the dependent part of the mass. No obvious ascites is present.

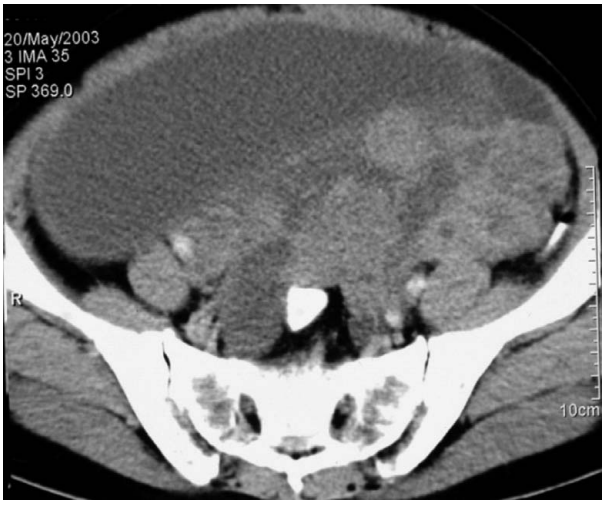

Figure 2. A huge pelvic mass measuring 12 × 29 × 32 cm in size containing fluid and soft tissue components. No ascites is noted.

with cystic tumors containing extensive degeneration and hemorrhage with infarcts (Figure 4). Her serum level of CA-125 dropped to 16.3 U/mL 8 months later.

Uterine leiomyoma is the most common gynecologic neoplasm in women of reproductive age. It is a major reason for visits to the gynecologists. It is a kind of overgrowth of smooth muscle or connective tissue of the uterus and is benign in nature. The precise etiology of leiomyoma is unclear. Estrogen can stimulate the growth of leiomyoma, so growths may be noticed after menarche, with progression during pregnancy and shrinkage after menopause. The regrowth is observed after starting hormone therapy. Most commonly, degeneration occurs when the fibroid outgrows its blood supply [3]. The result is various types of degeneration: hyaline or myxoid degeneration, calcification, cystic degeneration, and red degeneration (hemorrhagic infarction) [4]. The degenerations accompany changes of hormonal status. The most common type of degeneration is focal or generalized hyalinization [5]. Hyalinization occurs in more than 60% of fibroids and is usually extensive [6–8]. At the microscopic level, hyalinization begins in the stromal component that separates the smooth muscle cells and then progresses on to the extensive replacement of smooth muscle cells [9]. The combination of hyalinization with liquefaction may result in cystic degeneration because of a decreased blood supply, so we can regard cystic degeneration as a late stage of hyaline degeneration. Cystic degeneration is observed in about 4% of leiomyomas [4]. Large or small cystic spaces develop in the edematous and acellular center [6–8]. Red or carneous degeneration results from massive hemorrhagic infarction of a leiomyoma due to obstruction of drainage veins at the periphery of the lesion [5].

Magnetic resonance (MR) imaging is the most accurate technique to detect and localize leiomyomas. Degenerating leiomyomas have variable appearances on T2-weighted images and contrast-enhanced images [10]. However, ultrasonography is the best choice for gynecologists to detect and evaluate pelvic lesions, because it is simple and noninvasive. Under ultrasonic imaging, a uterine myoma frequently appears as a concentric, solid, hypoechoic mass. There are various changes in their degree of echogenicity, depending on the amount of fibrous tissue, calcification or necrosis present. Generally, the ultrasonic appearance of uterine fibroids is typical, making diagnosis uncomplicated. Unfortunately, irregular areas of cystic degeneration can appear as a bizarre mixture of cysts, multiple thin septa, and solid components with variable echogenicity [11]. These ultrasonic characteristics of leiomyomas undergoing cystic degeneration can mislead diagnosing physicians in an entirely different direction, as it is quite challenging to

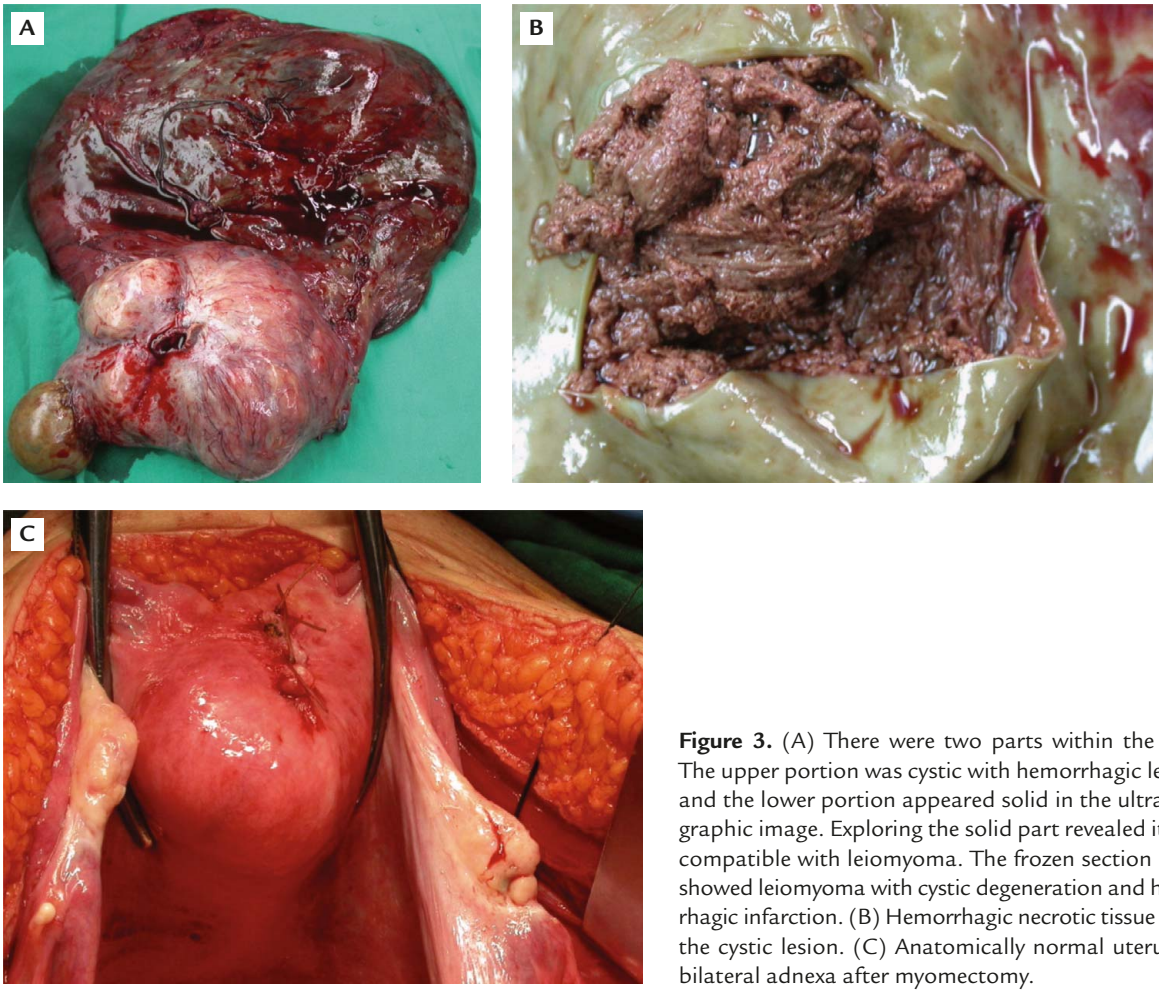

Figure 3. (A) There were two parts within the mass. The upper portion was cystic with hemorrhagic lesions, and the lower portion appeared solid in the ultrasonographic image. Exploring the solid part revealed it to be compatible with leiomyoma. The frozen section report showed leiomyoma with cystic degeneration and hemorrhagic infarction. (B) Hemorrhagic necrotic tissue within the cystic lesion. (C) Anatomically normal uterus and bilateral adnexa after myomectomy.

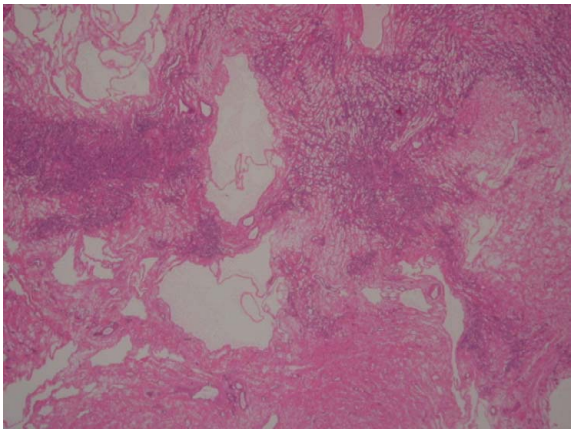

Figure 4. Photomicrograph of the cystic leiomyoma reveals several cystic cavities. The cystic tumors contain extensive degeneration and hemorrhage with infarcts. There are residual areas of smooth muscle bundles present in the wall (hematoxylin and eosin, ×20).

distinguish a benign leiomyoma from a malignant one. Furthermore, by using ultrasonography, the nature of the lesion is at least partially defined by viewing the continuity of the mass with the uterus [12], but this may be difficult with some patients, especially those with a huge mass. Our patient's lesion was the largest cystic leiomyoma of the uterus we could find in the literature. Careful inspection of the walls of a mass and looking for its pedicle may provide an opportunity to discover its anatomic source. In reviewing past case reports, subserosal and submucosal leiomyomas may also be considered as ovarian tumors, endometrial hyperplasia or variable gestational abnormalities, including ectopic pregnancy, blighted ovum or hydatidiform mole [3,12]. However, we can easily distinguish gestational abnormalities from other possibilities by serum levels of beta-hCG.

CT scanning plays only a limited role in the diagnosis of uterine leiomyoma. Unless there is necrosis or calcification, it is difficult to distinguish leiomyoma from normal myometrium tissue. Compared with CT scans, MR imaging plays a more important role in differentiating the anatomy of the uterus and ovaries. Each type of secondary change within leiomyomas shows distinctive MR findings through heterogeneous signal intensity on T2-weighted images, although clear distinctions between each type of degeneration cannot be made with this modality [13]. Additionally, color Doppler

examination can identify the vascular supply and often visualize a mass defect that might not be detectable with grayscale images [14]. Based on economic considerations, color Doppler examination may be preferable to CT and MR imaging. Besides imaging studies, clinical symptoms and signs also play an important part in making a differential diagnosis.

Besides malignancy, elevated CA-125 levels have been linked to various benign gynecologic and non-gynecologic diseases, including endometriosis, leiomyoma, pelvic inflammatory disease and cirrhosis [15]. A MEDLINE search of the English medical literature from January 1966 to December 2006 failed to identify any reports of degenerative change of uterine fibroid and elevated level of serum CA-125, apart from Pseudo-Meigs syndrome. Ours is the only case of elevated levels of serum CA-125 with degenerative changes in a uterine fibroid, and it does not match the criteria for Pseudo-Meigs syndrome. Ghamande et al presented a case report of parasitic fibroid with a high level of CA-125 [16]. The sustained fall and normalization of CA-125 levels after myomectomy described by Ghamande et al is just like that of our case. CA-125 has been shown by immunohistochemistry to be localized in the epithelium of the fallopian tube, endometrium, cervix, and the mesothelial cells of pleura, pericardium and peritoneum [17]. Ghamande et al supposed that the most likely source of elevated CA-125 seemed to be the peritoneum responding to persistent stimulation by the large parasitic fibroid [16]. Unfortunately, the absence of staining of the fibroid with CA-125 by immunohistochemistry did not support the theory.

In conclusion, to the best of our knowledge, this is the largest cystic degeneration combined with hemorrhagic infarction in a uterine fibroid reported in the literature. Transabdominal and transvaginal sonography are the primary and most cost-effective imaging modalities for the detection of leiomyomas [18]. Degenerative changes further result in a heterogeneous or unusual appearance that contributes to diagnostic confusion [19]. Color Doppler imaging can expand the information available in our clinic. MR imaging is the most accurate technique for differentiating degenerative fibroids prior to surgical intervention.

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