Cystic Ovarian Teratoma with Floating Globules

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ABSTRACT

A 73-year-old elderly female patient is presented with a rare ovarian cystic teratoma with the unusual radiologic appearance of intracystic floating globules. Imaging investigations were performed with ultrasonography and magnetic resonance imaging.

Case Report

A 73-year-old multiparous woman presented with a history of constipation and abdominal distention for several months. Physical examination revealed a palpable mass over the right lower abdomen without accompanying tenderness. Pelvic examination showed a soft palpable mass behind the uterus. The patient had no notable medical conditions or past surgeries. All laboratory findings were within normal limits, including serum tumor markers, namely CA 125 and CA 19-9.

Sonography showed a large, well-defined cystic mass containing multiple spherical globules, each measuring about 1 to 3 cm in diameter and containing hyperechoic spots (Fig. 1). Color Doppler study revealed no vascularization within these globules, thus suggesting a benign nature.

Magnetic resonance imaging (MRI) was performed for further characterization of the lesion (Fig. 2). T1-weighted images (T1WI) showed a 16x10 cm mass containing multiple spherical structures in the pelvic cavity, which has caused compression to the uterus. The outer regions of the spherical structures were slightly hyperintense relative to the surrounding fluid but not as intense as subcutaneous fat. The centers of the spherical structures were relatively hypointense compared with the outer regions (Fig. 2a). On T2-weighted images (T2WI), the outer regions of the globules were hypointense, and the centers were relatively hyperintense (Fig. 2b). The globules were seen to be floating in high signal intensity fluid within the cyst on T2WI images. Fat saturation T1WI imaging demonstrated signal intensity of the globular structures to be slightly diminished compared to non-fat saturation imaging (Fig. 2c). Based on the aforementioned features, it is deduced that these globules are probably composed of intracystic, non-dependent spheres of lipid material, suggesting that this is a case of a mature cystic teratoma. The ovaries could not be identified, but the cystic mass was clearly separate from other pelvic and abdominal organs. No other abnormal radiologic findings were detected.

Laparotomy revealed a large cystic tumor of the right ovary. Macroscopically, the tumor contained multiple lipid globules of various sizes (Fig. 3a), and hair was present.
Figure 1. Sonography shows a large cystic mass in the pelvic cavity containing multiple spherical globules, each measuring about 1 to 3 cm in diameter with hyperechoic spots.

Figure 2. a. In axial T1-weighted images without fat saturation, the outer regions of the spherical structures are slightly hyperintense relative to the surrounding fluid but not as hyperintense as subcutaneous fat. The center of the spherical structures is relatively hypointense compared with the outer regions. b. In sagittal T2-weighted images without fat saturation, the outer regions of the globules are hypointense and the centers are relatively hyperintense. c. Fat saturation T1-weighted imaging reveals that the globular structures are slightly diminished in signal intensity compared to the non-fat saturation images.
Mature cystic teratoma

Pathology analysis showed that the tumor was composed of mature somatic tissues derived from all three germ cell layers, including the skin and its appendages, fat, smooth muscles, and neural tissues. These findings suggest the diagnosis of a benign mature cystic teratoma.

DISCUSSION

The mature cystic teratoma is one of the most common human germ cell tumors, accounting for approximately 10-15% of ovarian neoplasm. They occur most frequently during the reproductive years. Although these tumors contain well-differentiated derivatives of the three germ layers, ectodermal elements generate predominate. Therefore, they are also referred to as dermoid cysts. The diagnosis can generally be reached without much difficulty by means of sonography [1], CT [2, 3] or MRI [4]. Sonographically, an ovarian cystic teratoma appears as a mass with fat-fluid leveling, hair-fluid leveling, or as a solid mural component that is usually echogenic and associated acoustic shadowing resulting from the hair and sebum contained in the lesion. Echogenic mural protrusions, known as Rokitansky protuberances or dermoid plugs, containing hair and other atypical tissue components [1].

CT findings of ovarian teratomas vary greatly, depending on the present components within the lesion. A definitive CT diagnosis of cystic teratoma can be made when fat is observed. In addition, curvilinear calcifications, teeth or abortive bone are often seen. MR imaging has an advantage over sonography and CT with its better soft tissue contrast and multiplanar imaging. On MR imaging, cystic teratomas vary in signal intensity depending on their tissue components. The majority of cystic teratomas appear as masses with high signal intensity in T1WI due to their fat content. On the other hand, calcifications, bone, hair and fibrous tissue appear as low-intensity foci.

Unusual associated findings of the mature cystic teratoma may occasionally result in difficulty in reaching a diagnosis. To the best of our knowledge, only a small number of cases of ovarian cystic teratomas with multifocal mobile spherules or globules have been reported. Muramatsu et al. first reported this unusual tumor in 1991 [5] using CT imaging. In 2000, ultrasound imaging of mobile globules in an ovarian cystic teratoma was reported by Otigbah et al. [6]. Subsequently, a few studies reported similar features on sonography, CT, or MRI [7-11]. The fat globules in all these publications have been described as being 1.5 to 2 cm in diameter and composed of cheese-like sebum and hair. Amongst these cases, only three are post-menopausal women [8, 10, 11].

In the cases found in the literature as well as our patient, the center of the spherical structures showed relatively lower signal intensity on T1WI, corresponding to hair or a softer tissue component [5-7, 10, 11]. The reason for this non-uniformity in the sizes of the globules is unclear, but it has been speculated that each globule was formed by an aggregation of sebum around a tiny focus of debris, squames, or a fine hair shaft. The spherules appear to have been modeled into discrete nodules rather than remain amorphous masses because of the differences in physical and thermal properties of the material being deposited around each nidus. The lower specific gravity of these
spherules compared with the surrounding fluid within the
cyst at body temperatures could account for their mobility.
Furthermore, in all reported cases in the literature, the
fat globules have occurred in rather large cysts. It is thus
possible that the fatty nodules require a substantial amount
of space to undergo remodeling.

According to Kawamoto et al. [7], the appearance of
multiple spherules floating within a pelvic cystic tumor
has not been found in other ovarian tumors. Therefore, this
feature is pathognomonic for a dermoid cyst. In addition
to the ovaries, the mature cystic teratoma with multiple
floating globules has also been reported in the retroperi-
toneum [12], in the mediastinum [13], and the floor of
the mouth [14]. None of these reported tumors turned out to be
malignant.

In summary, we present in this report a rare case of
mature cystic teratoma of the ovary containing numerous
spherules floating in the cyst found in a post-menopausal
woman. The radiologic appearance has been suggested to
be pathognomonic for the mature cystic teratoma.

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