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Cystic Ovarian Mature Teratoma with a « Floating Ball » Sign: about A Case Report

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Abstract **Case Report**

Mature cystic teratoma is one of the most common human germ cell tumors and is often found in the ovary in women of reproductive age. Ovarian cystic teratomas are usually cystic fatty tumors that can be diagnosed easily using imaging techniques. We present a case of a 44-year-old woman diagnosed with cystic ovarian mature teratoma associated with the floating ball sign.

Keywords: Cystic ovarian teratoma, floating ball sign, mobile spherules, MRI, US, CT.

INTRODUCTION

Mature cystic teratomas are the most commonly seen germ cell tumors of the ovary [1]. They account for at least 10% of all ovarian tumor [2]. They arise from two or three primitive embryonic germ cell layers, known as the endoderm, mesoderm, and ectoderm [3]. When the ectodermal component predominates, they are called dermoid cysts [2]. We present the case of an ovarian mature cystic teratoma with a floating ball sign that makes the particularity of this case.

CASE REPORT

We report the case of a 44 year old women,mother of six children, with regular periods, who presented to our department for abdominal distension evolving for six months. The clinical examination found a stable vitals with an abdomino-pelvic mass exceeding the umbilicus. The mass was firm, mobile and painless on palpation. The gynecological examination revealed a normal-looking cervix and found a right lateral uterine mass. The biological markers were normal except for an elevation of the CA 19-9 : 118 IU / ml.

The ultrasounds showed a large cystic mass with a thin and regular non vascularized wall with an heterogeneous content. Some mobile spherical structures of increased echogenicity were floating in the cystic mass (Figure-1).

MR imaging was performed and showed a complex cystic mass measuring 21 x 13 x 22 cm occuping the lower abdomen and pelvis, in hyposignal on T1 and hypersignal on T2 weighted images associated with thin septations and an enhanced vegetation measuring 8 x 6 mm. The mass contained also numerous small and non enhanced spherical structures floating in the cystic mass, in intermediate signal on T1 and T2 weighted images with a restricted diffusion.

It also found a second cystic mass with a calcified wall in the right para rectal region, measuring 4.7 x 3.6 x 6 cm, containing some floating non enhanced membranes in hypo signal on T1 and T2 weignted images. This second cyctic mass was surrounded by an effusion. The normal right ovary could not be identified. The uterus and the left ovary were of normal appearance.

The CT scan performed for further characterization showed a peripheral calcifications within the cyctic masses (Fig-3). Mature cystic teratoma was considered as a preoperative diagnosis.

Laparotomy revealed a large solid and cystic tumor of the right ovary associated with a right para rectal mass. The ovarian tumor contained numerous tissus. The diagnosis at pathology was mature cystic teratoma of the right ovary associated with a dermoid cyst of the right para rectal région.

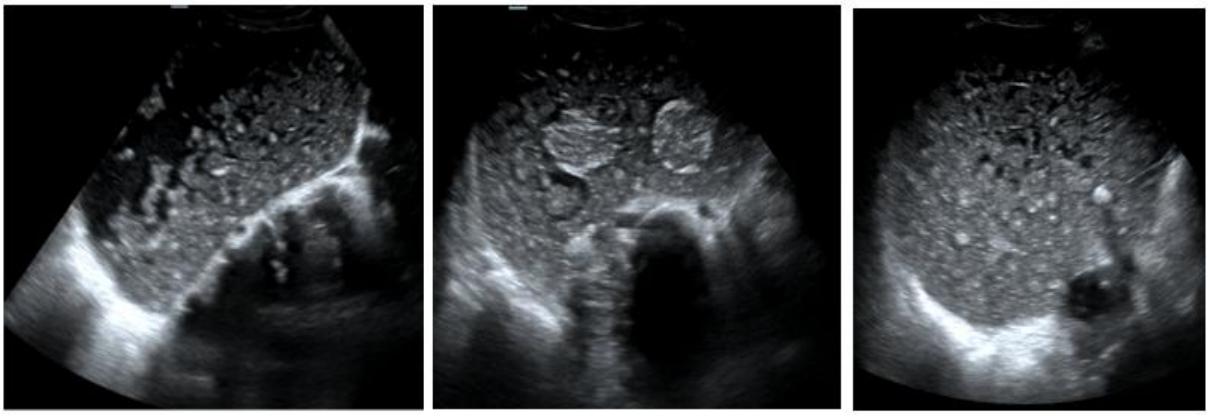

Fig-1: Sonogram shows a cystic mass containing multiple floating spherical hyperechoic globules, variable diameter, with some hyperechoic dots

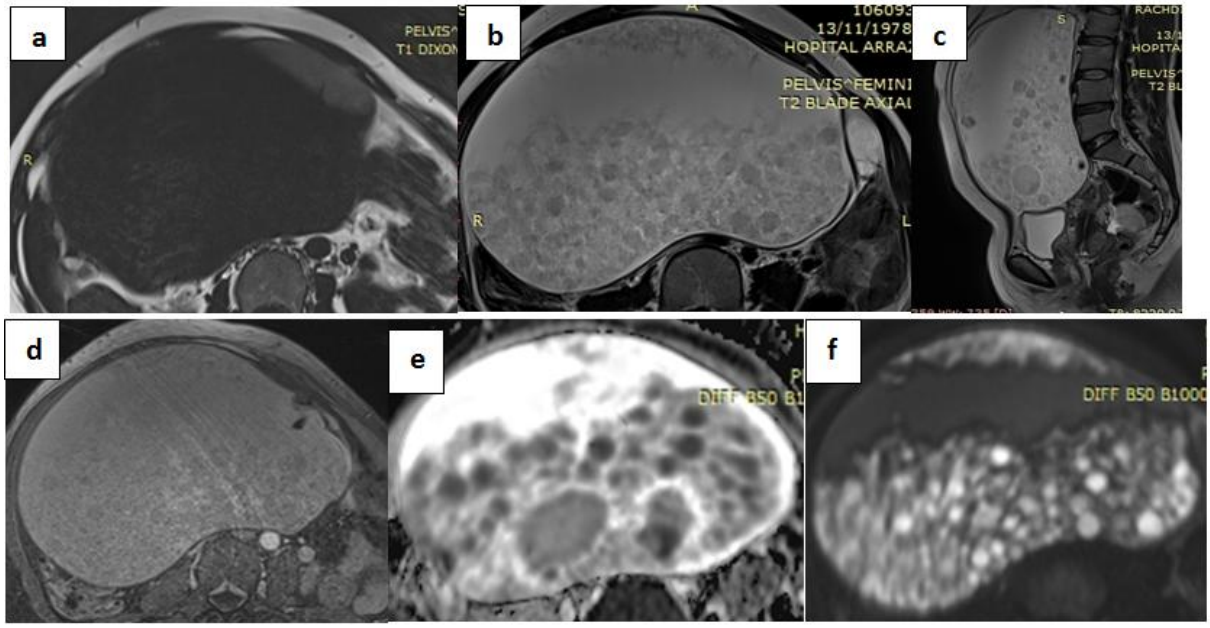

Fig-2: Axial T1 (a) T2 (b) sag T2 (c) axial T1 postcontrast(d) and axial diffusion(e) and ADC map (f) weighted magnetic resonance imaging. Reveals the heteregenous cystic mass containing the floating balls wich chows an intermediate signal intensity in the T1- and T2-weighted séquences and diffusion restriction regarding the kératin content

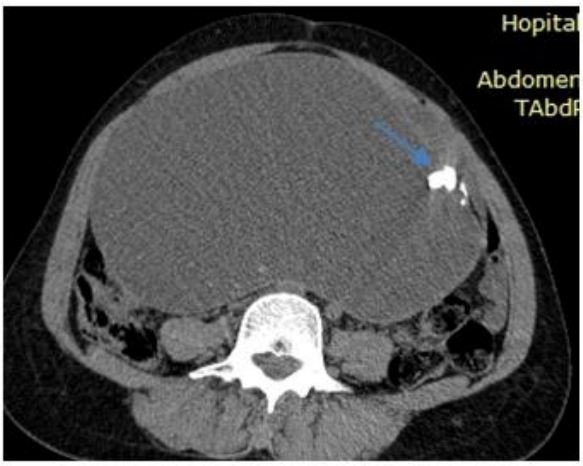

Fig-3: Axial ct scan shows the calcifications (arrow) within a cystic mass

DISCUSSION

The "floating ball" sign is an uncommon pathognomonic feature of ovarian mature teratoma which is defined by one or more small spherical structures floating in a cyst [4]. It may also be called the "meat ball" sign or the "truffle sign," referring to numerous small floating globules as it was the case of our patient, or "pokeball" sign, referring to a single ball floating in a fat-fluid interphase [5, 6].

First described with radiologic imaging in 1991 by Muramatsu *et al*., [7]; later, many case reports were written on the floating ball sign regarding its rarity. Recently, the study of Hilal Şahin and al. [8] over a 112 women with a pathologic diagnosis of ovarian mature cystic teratoma reviewed for the presence of the floating ball sign, showed that, with a 25% incidence rate, this sign is uncommun yet not rare, contrary to popular belief.

Floating balls are spherules with variable proportions of keratin, fibrin, hemosiderin, sebaceous material, hair, and fat [4]. According to the contents, these floating spherules take a gravity-dependent or gravity- independent position in the cyst.

Although the mechanism of their formation is still unknown, it is speculated that sphericules are made by the aggregation of sebaceous material around a nidus made up of debris, squames or hair shafts, while moving in the cystic cavity [4, 9]. Then, they are given a spherical form because of the difference in physical and thermal properties of the material being deposited [10].

In imagery, cystic teratoma can be diagnosed using ultrasounds, CT or MRI. Some specific features are important for diagnosis, like a cyst with intracystic mural nodule (dermoid plug), fat fluid level, « dermoid mesh sign » which is due to floating hair fibers gives appearance of multiple linear echogenic interface. Another specifc feature is distal acoustic shadowing due to mixture of echogenic matted hair and sebum (iceberg sign) [11]. Our case did not show any of these classical signs. Instead, the floating ball sign has helped us to diagnosis of a cystic ovarian teratoma on ultrasounds and MRI and the calcifications found on the complementary CT scan allowed us to obtain more elements to enable the correct diagnosis.

Floating ball sign can easily be recognized by imaging techniques. The spherules are approximately 1 to 3 cm in diameter and maybe more than 100 [12]. In ultrasounds, they appear as hyperechoic small vesicules floating above a cystic mass. In CT images they appear as hypodense structures. And in MRI, in T1-weighted images, the outer portion of the spherical structures is slightly hyperintense to the surrounding fluid, but not as hyperintense as the subcutaneous fat.The center of the spherical structures is relatively hypointense compared with the outer portion. In T2-weighted images the outer portion of the spherical structures is hypointense and the center relatively hyperintense [13].

Beside of its hight specifity to diagnosis ovrian teratomas, the floating ball sign was the subject of a statistical analysis in Şahin's cohort [8] to find wether there is a relashionship between this sign and tumor morphologic features. Some interesting outcomes came out from this study and floating ball sign seemed to develop in larger cysts. This correlates with evidence that enough space is essential for floating balls to form their globular shape [4, 14].

The floating ball sign was also significantly related to tumor wall thickness and given that these balls are made up of keratin and sebaceous material, a thick tumor wall containing skin derivatives such as sebaceous glands may provide these materials in sufficient amounts [8].

If this sign had been seen until now only in benign ovarian teratomas, in Şahin's cohort two cases of squamous cell carcinoma presented with this sign. Therefore, the radiologist should be careful while looking for malignancy signs.

CONCLUSION

The floating ball sign is an uncommun and pathognomonic sign for cystic teratomas. It can easily be seen in every imaging modality and in the absence of the classical signs specific to ovarian teratomas, its presence could help the radiologist to redress the diagnosis. Acording to a recent literature review, we noted that this sign can be seen in both benign and malignant cyctic teratomas. Therefore, each teratoma lesion including floating balls should be carefully evaluated for signs of malignancy.

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