

Mature Ovarian Teratoma

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Abstract: *Teratomas are the most common ovarian germ cell tumors, presenting a variety of histological aspects. They are often multicystic and contain sebaceous fluid, skin, hair and teeth. Most of them are asymptomatic and rarely manifest with abdominal pain. Imaging plays the main role in the diagnosis with ultrasonography (US) as the first and magnetic resonance imaging (MRI) as the preferred method of choice as a valuable adjunct for further characterization of these lesions. Our case demonstrate the supplementary role of MRI of a mature cystic teratoma origination from the left ovary.*

Keywords: teratomas, germ cell tumor, sonography, MRI

1. Background

Teratomas are a variety of histological variants, all of which contain mature or immature tissues from germ cell origin. The most common variant is the mature cystic teratoma which is made up of ecto-, endo- and mesodermal tissues. Magnetic resonance imaging is the method of choice used to characterize these lesions after initial ultrasound diagnostics, because of its bigger field of view and better resolution.

2. Case

On a routine gynecological checkup a tumor formation arising from the pelvis was diagnosed via ultrasound. The tumor expresses mass effect on the uterus and reaches the level of the umbilicus.

The patient was sent to our radiology department for further evaluation with MRI and surgical planning.

At ultrasound a homogenous hyperechoic mass with fine contours and margins is visualized (fig.1a). There is a nodule demonstrating itself with an "egg shell" sign with distal acoustic shadowing in the base of the tumor (fig.1b). The uterus is of normal size and shape (fig.1c). In the right ovary there are a few follicular cysts which are normal findings correlating with the menstrual cycle (fig.1d).

On MRI the formation was seen to originate from the left ovary. The tumor is of high signal intensity on T1 and T2 (fig. 2a,b,c,d). On T1 and T2 FAT SAT sequences the high intensity regions were suppressed (fig.3 a,b,c). The Rokitansky nodule is seen as a round lesion included in the mass with absence of signal intensity on all sequences, representing solid components of hair, skin and probably teeth. The uterus is shifted dorsally and the bladder is compromised from the above. There are no signs of invasion to the surrounding structures. The right ovary is with an appearance with full correlation with the ultrasound image. (fig.3b).

Cystectomy was performed as the next level of treatment and diagnosis.

In-situ, the uterus was of normal size, form and mobility and shifted dorsally from a 25cm in size cystic formation arising from the left ovary (fig 5). The formation was well demarcated and with dense consistency. The fallopian tubes and the right ovary were with no pathological changes.

The histological report is of a mature cystic teratoma.

3. Discussion

Mature cystic teratomas are made up of different types of well differentiated derivatives of at least two germinative cell types. They are 4 to 5cm in size, but can become as large as 45cm in diameter. They develop most often in the 3rd and 4th decade of life (5,7). Dermoid cysts are the most common ovarian germ-cell tumor and most frequent abdominal mass in infants (2, 7, 9, 17). They originate from one germinative cell after the first mitotic division (10). Most teratomas are asymptomatic. Abdominal pain or other subjective complaints are rare (5).

Dermoids have a characteristic appearance. They are uniloculated in 88% of cases. The wall of the cyst is made up of squamous epithelium and is filled with sebaceous materials which are liquid to body and semi-solid to room temperature (4). Hair follicles, oil glands, muscles and other tissues lie upon or make up the wall of the cyst. A characteristic appearance is the presence of a knob in the tumor known as the "Rokitansky nodule" in which hair is included. When there are teeth or/and bones present, they are part of this nodule (11).

Ectodermal tissues are invariably present in these formations; mesodermal tissues are present in 90%, while teeth and other components are present in 31% of cases (1, 4, 7, 11).

The majority of teratomas are diagnosed with ultrasound, but sometimes the diagnosis may be hard to make, because these lesions in rare cases can have a non-characteristic appearance.

Teratomas are visualized as hypo or anechoic cystic masses with a hyperechoic Rokitansky nodule inside the lesion with distal acoustic shadowing (7). They can also be seen as par-

tially or diffusely hyperechoic masses containing sebaceous material (6,13). The third type of manifestation presents with discrete hyperechoic drags representing hair inside the tumor (16). In some cases liquid-liquid levels may be seen which are a result of sebum lying above pure liquid substances and is more hyperechoic than water (6). The nodule is hyperechoic with distal acoustic loss, because of solid compartments making up the lump.

On CT the diagnosis is straight forward, because of the bigger field of view favoring a much better spatial orientation and the ability to measure density of different tumor structures. The fat is measured as negative Hounsfield units and positive for the solid compartments. (3,12) (fig 4a,b,c).

On MRI, sebum demonstrates a high T1 and T2 intensity close to that of retroperitoneal fat which on sequences like T2 and T1 with fat suppression are of low signal intensity. Hemorrhage needs to be excluded with GE and T2* sequences which are sensitive to breakdown products of hemoglobin in cases when chocolate cysts in endometriosis are suspected (7, 8, 14, 15, 17, 18). A very small percent of dermoid cysts do not contain sebaceous materials, but in

these cases they contain fat in the cyst wall or the Rokintansky nodule (7). These tumors hide a risk of several complications which are all extremely rare, but do exist. The most common complication is rupture of the cyst and subsequent development of granulomatous peritonitis (5) or isolated infection of the cyst may also be a case. Malignant degeneration from the cells covering the cyst wall into carcinoma or sarcoma (15) or torsion of the ovary from the mass effect of the tumor are very rare complications (5).

4. Conclusion

Mature cystic teratomas via all imaging modalities are seen as masses containing fat which is of sebaceous material inside the cavity, the wall of the cyst and inside the Rokintansky nodule. CT and MRI are methods which are dominant to all other non-invasive diagnostic methods because of their bigger field of view, hence excellent spatial orientation and better depiction of the tissues making up the tumor which is the key to the diagnosis.

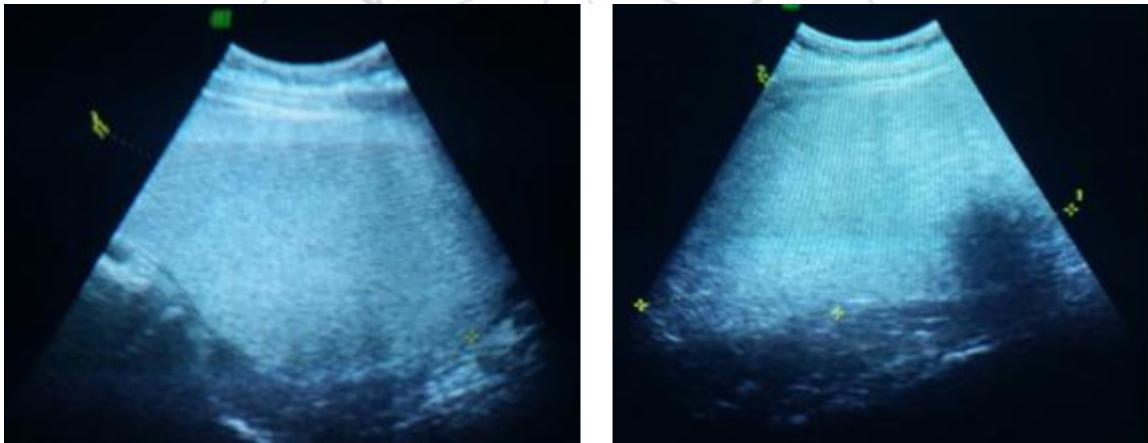


Figure 1a and b: a hyperechoic mass with fine margins and contours with an “egg shell” embodiment in the base of the mass with distal acoustic shadowing, corresponding with the Rokintansky nodule.

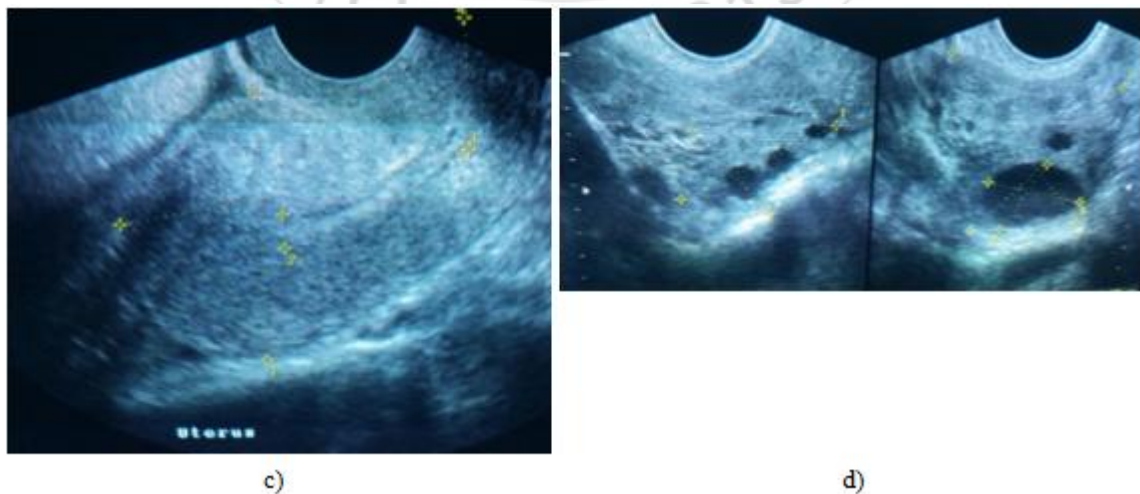


Figure 1: c and d demonstrate the normal uterus and the right ovary with follicular cysts.



(a)



(c)

Figure 2: a COR T1, 2b COR T2, 2c AX T2, 2d SAG T2 – a high intensity on T1 and T2 formation arising from the left ovary and causing mass effect on the uterus and bladder.



(b)



(a)



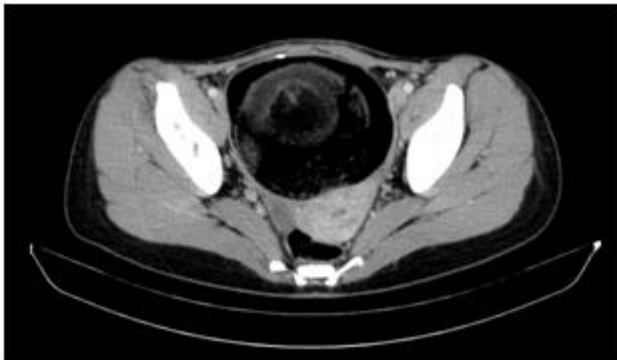
(b)

Figure 3: a,b - AX T2 FAT SAT, here the right ovary is easily evaluated with an appearance correlating to the one seen on ultrasound.

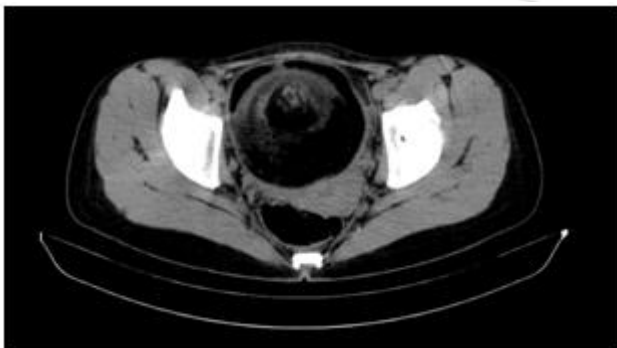


(c)

Figure 3: c - COR T1 FAT SAT, the mass is suppressed on T1 and T2 with fat saturation with the Rokitsky nodule lying in the base of the tumour which is with lack of signal intensity, because of its solid nature.



On Fig. 4a is a non-contrast CT of another patient used as a demonstration for the appearance of a similar looking teratoma of the left ovary. A mass arising from the left ovary is seen with fine margins and contours. The formation is made up of dominating low density regions correlating with fat. There are soft tissue inclusions in the mass which represent tissues from ecto- and mesodermal origin.



On Fig. 4b arterial phase CT

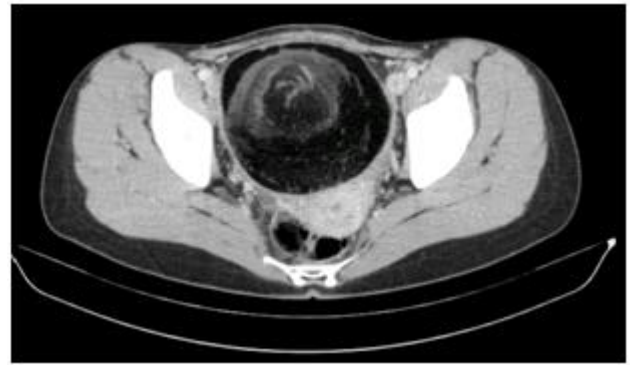


Fig. 4c venous phase CT we can appreciate uptake of contrast material on the venous phase in the soft tissue compartments and the cyst wall.

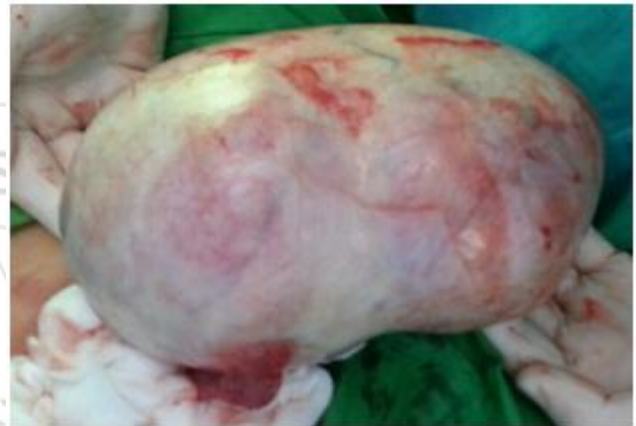


Fig 5. of the postoperative macroscopic appearance of the mature dermoid cyst diagnosed via ultrasound and MRI

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