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Case Report

Mature cystic ovarian teratoma without intracystic fat: Case report with the “fat within the wall” sign

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ABSTRACT

Mature cystic teratoma is the most common ovarian neoplasm among young females. Diagnosed through radiological imaging as it exhibits typical radiological features; typically, fat. However, complete cystic teratoma without visible fat is a very rare and challenging diagnosis. It is difficult to distinguish it from malignant neoplasm, due to the presence of enhancing components, for example, Rokitansky nodule and the presence of diffusion restriction from keratinized products. We present a case of an incidental mature cystic teratoma without visible intracystic fat, where the correct diagnosis based on imaging was failed. Mature cystic teratoma was then confirmed upon histologic examination.

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Background

Mature cystic teratoma is a benign mass that accounts for 20% of ovarian neoplasm in adults and 50% of ovarian neoplasm among pediatrics [1].

Mature cystic teratoma includes mature, immature, and mono dermal; such as struma ovarii and carcinoid [2].

Clinical presentation of mature ovarian teratoma can range between asymptomatic course and pelvic discomfort to more serious complications such as ovarian torsion 16%, malignant transformation 1%-2%, infection 1% and rarely autoimmune hemolytic anemia [2,3].

Radiologically, mature cystic teratomas are easily diagnosed on sonographic scan where it typically shows hypoechoic cystic mass with posterior acoustic enhancement and the presence of an echogenic nodule known as the Rokitan-

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sky nodule. More typically is the presence of an echogenic lobule representing fat. The presence of tooth or hair in form of shadowing calcifications or linear echogeincities respectively can also be seen [4,5].

Using computed tomography (CT) and magnetic resonance imaging (MRI) scanning, diagnosis is made based on the presence of fat which is the typical distinguishing component. It can be identified easily on CT scan by its negative hounsfield unit (HU) range, the presence of associated calcifications, and proteinaceous/sebaceous material [6,7].

Mature cystic teratoma is also diagnosed using MRI, through identifying fat component which is detected on the fat saturated spin echo sequences, and the T1 wighted image (T1WI) in-phase and out-of-phase sequence. Detecting the signal drop on T1WI-out-of phase in case of microscopic fat or the loss of T1WI hyper-intense signal on the fat saturated spin echo sequences. Proteinaceous or sebaceous material can vary between expressing T1WI hyperintensity to being hypointense. They can show diffusion restriction as well [7,8].

However, minimal fat that is invisible radiologically, or complete lack of fat component is a rare presentation. In the following case report, we present a case of mature cystic teratoma that was lacking intracystic fat component, and was not labeled the correct diagnosis based on imaging. Moreover, minimal fat within the cystic wall was then retrospectively seen after histopathologic examination. Searching the literature showed few reported cases of mature ovarian teratomas without intracystic fat but interestingly, fat within the wall, as the only finding in some cases [9].

Case report

A 19-year-old healthy female with 3 years history of primary infertility due to male factor was referred due to an incidental finding of a left adnexal complex cystic mass.

The patient was then assessed by gadolinium-enhanced MRI study. The MRI showed a well-defined cystic lesion measuring 5.9 × 6 × 3.6 cm and composing of an internal enhancing nodule and septations. It showed a central cystic component that expressed clear cystic signal characteristics using MRI, being homogeneously hyperintense on T2 weighted



Fig. 1 – A 19-year-old female with a left ovarian incidental lesion. Coronal T2WI sequence shows the left ovarian cystic lesion with central fluid signal intensity and peripheral moderately hyperintense component corresponding to hair-filled sac.

image (T2WI) and hypointense on T1WI, with no diffusion restriction (Fig. 1). In contrast to the peripheral component which was moderately hyperintense on T2WI and moderately hyperintense on T1WI with diffusion restriction (Figs. 2A and B). Enhancing septations were seen within the peripheral component with no intracystic areas of drop in signal intensity on the out-of-phase sequences, nor the fat-saturated spin echo sequences to suggest fat component. There was a questionable area of signal cancellation within the wall of the cystic teratoma, where in retrospect, found to represent fat when the wall as confirmed on histologic finding (Figs. 3A and B).

The patient underwent laparoscopic surgical cystectomy, where the cystic mass showed great amount of hair and

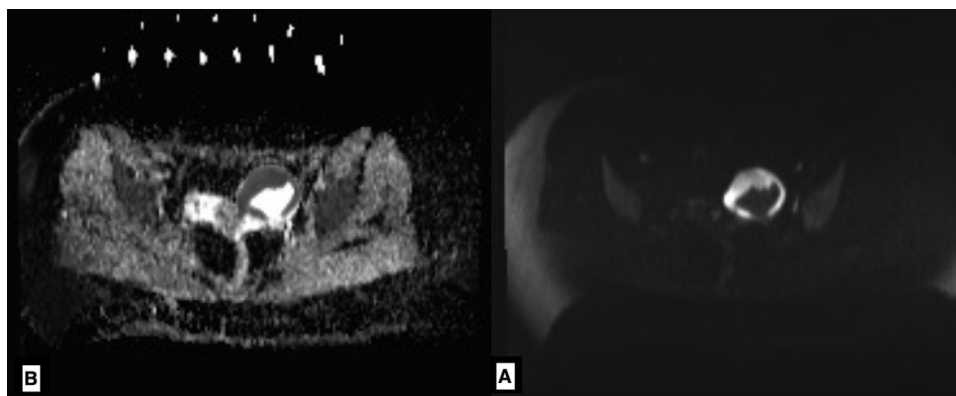


Fig. 2 – (A) Diffusion weighted image (DWI) and (B) Apparent diffusion coefficient (ADC) map show a high signal intensity of the peripheral component of the left ovarian cystic lesion with low ADC values suggesting diffusion restriction within the hair containing sac.

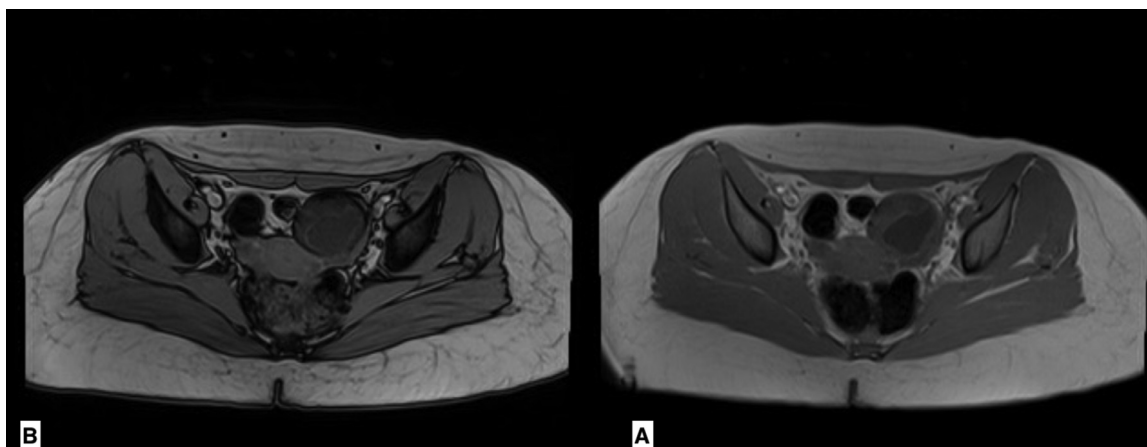


Fig. 3 – (A) T1 weighted image (T1WI) in-phase and (B) T1WI out-of-phase show lack of intracystic signal cancellation to suggest intracystic microscopic fat. Note the small area of signal drop noted only within the cystic wall superiorly.

sebaceous material representing mature teratoma containing mainly skin appendages. The right ovary and both fallopian tubes were normal (Fig. 4).

Histopathologic examination showed an ovarian cyst measuring 5.0 cm in the greatest dimension. The interior component contained hair shafts. Microscopically, the wall of the cyst was lined by keratinizing squamous epithelium with pilosebaceous unit including hair shafts. Additionally, mature neuroglial tissue was observed. There were no immature elements.

Discussion

Presence of fat within an ovarian cystic mass is the most specific indicative of a mature cystic teratoma and is seen in up to

93% of cases [6,10]. Fat component can range between a completely fatty, fat fluid level, balls of floating fat (marble sign) and rarely, fat can only be appreciated within the cystic wall or within the Rokitansky nodule [11].

A study of 12 cases of mature cystic teratomas that was lacking fat within the cavity, done by Yamashita et al. found that 7 cases out of 12 showed the fat component to be within the wall and was evident by signal cancellation on the T1WI out-of-phase sequence with the smallest area to be measuring 4 mm [9]. In our case, pathologic examination showed small areas of fat within the wall, where in retrospect, confined signal cancellation within the wall of the cystic teratoma was seen without evidence of intracystic fat component.

Typical mature cystic teratoma contains keratinized material such as hair and skin as well as sebaceous and mucinous material in which all can show diffusion restriction due to dense cellularity and increased viscosity, respectively, rather

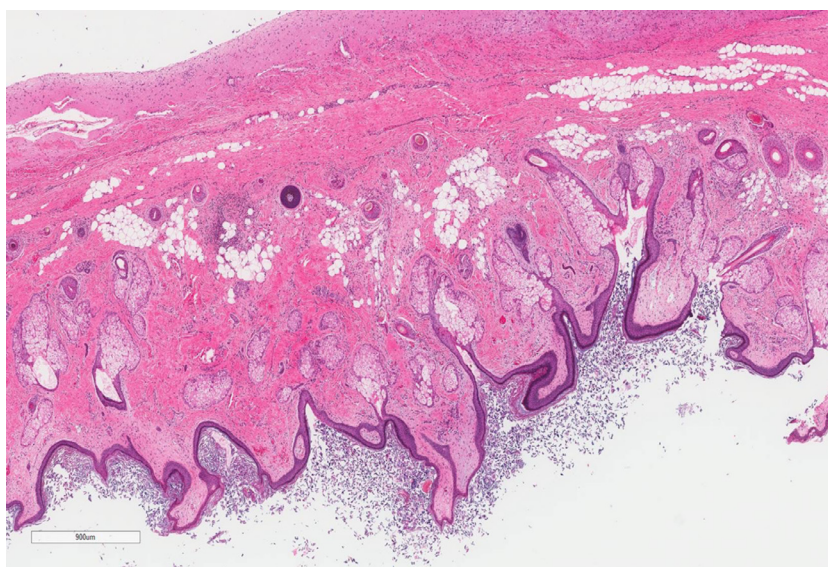


Fig. 4 – Photomicrograph (original magnification, 40; hematoxylin-eosin [H-E] stain) of the cyst wall shows keratinized squamous epithelium lining with pilosebaceous unit including hair shafts. The mesenchymal component contains fibrous and fatty tissue. Deeply, mature neuroglial tissue is observed. There were no immature elements.

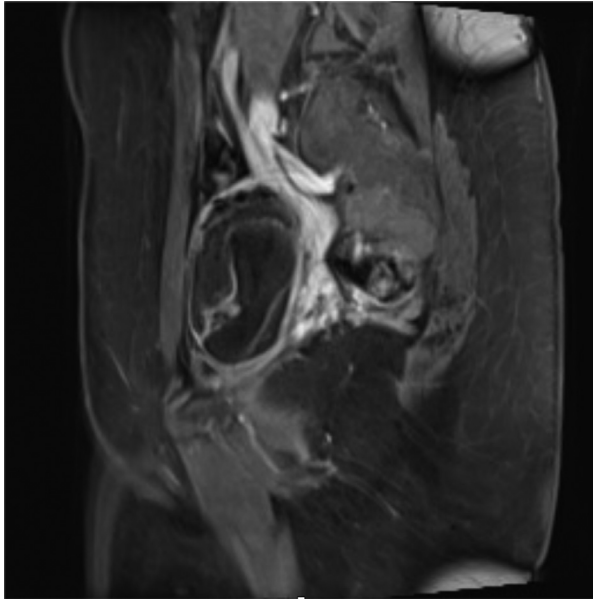


Fig. 5 – Sagittal T1 weighted image (T1WI) postcontrast sequence shows an enhancing nodule that is tethering few separations suggesting a Rokitansky nodule.

than due to malignant component [12]. In our case, the peripheral area that was showing diffusion restriction was attributed to the presence of hair and sebaceous material rather than malignancy.

The presence of calcifications is another typical component of mature cystic teratoma. However, this is a nonspecific feature and can be seen in other ovarian masses such as epithelial ovarian neoplasms, germ cell tumors and more rarely, collision tumors [13]. Lack of CT scan in our study was a limiting factor for detection of calcification.

Rokitansky nodule is an additional typical feature of mature cystic teratoma [2]. However, this is a nonspecific finding as the presence of an enhancing component within a mass that lacks other features of mature cystic teratoma cannot be easily named a Rokitansky nodule. In this case report, Rokitansky nodule is thought to be present as an enhancing nodule tethering few enhancing septations (Fig. 5).

Mature cystic teratomas can be associated with complications such as ovarian torsion which is the most common cause of ovarian torsion among pediatrics and young adults, malignant degeneration, rupture and peritonitis as well as infection. Other rare complications are autoimmune hemolytic anemia and anti-N-methyl-D-aspartate-receptor encephalitis [14,15]. None of these complications were present in our case.

Conclusion

Mature cystic teratomas are typically diagnosed radiologically. However, atypical features such as lacking fat component or

atypical areas of fat within the mass “such as in our case only within the wall” should be well known by radiologists as teratomas, which are the most common ovarian masses in adults. Emphasis on the variable presentation of this entity is important as they should be always sought before excluding teratomas from the differential diagnosis.

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