Case report

Recurrence of a mature cystic teratoma: masquerading as a malignant neoplasm

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Abstract

We report a case of a mature cystic teratoma (MCT) of the ovary in a 44-year-old woman, characterized by both solid and cystic components derived from all three germ layers: ectoderm, endoderm, and mesoderm. This patient presented with non-specific abdominal discomfort and abdominal bloating for a couple of years. A pelvic ultrasound scan (USS) showed a large complex ovarian tumour with a CA 125 level of 74U/ml.

Due to the high calculated Risk of Malignancy Index (RMI), a diagnostic dilemma arose. Consequently, a total abdominal hysterectomy, salpingo-oophorectomy, and partial omentectomy were performed, given the suspicion of a malignant ovarian tumour. Macroscopically left ovary was enlarged with a nodular cystic mass. The cut surface showed a multilocular cyst filled with mucoid fluid. Some loculi contained hair and sebaceous material. Microscopically the solid areas of the cyst wall were largely composed of thyroid tissue (10%), the rest of the cyst wall contained mature skin adnexal structures including hair, salivary glands, adipose tissue, bone, lymphoid tissue and smooth muscle.

Introduction

Ovarian teratomas are histologically classified into three types: mature cystic teratomas (MCT), immature teratomas, and monodermal teratomas. Among germ cell tumours of the ovary, MCT, commonly referred to as “dermoid cyst,” is the most prevalent type, accounting for approximately 20% of all ovarian tumours. MCT is typically benign, with a slow growth rate of 1.8 mm per year. However, in rare instances (≤1%), it can undergo malignant transformation.[1] These tumours are usually unilateral, with bilateral occurrence observed in about 10% of cases.

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While the ovaries and testes are the most common sites for teratomas, they can occasionally arise in less typical locations such as the anterior mediastinum, sacrococcygeal region, or neck.[1] MCTs are composed of mature tissues derived from one or more germ layers – ectoderm, mesoderm, or endoderm. Ectodermal tissue is consistently present, mesodermal tissue is frequently found, and endodermal tissue is less common.[2]

A rare subtype, *struma ovarii*, occurs when thyroid tissue makes up more than 50% of the tumour, and it is associated with hyperthyroidism in 5-20% of affected women.[3]

Case

This 44-year-old woman had felt her abdomen was bloated and abdominal discomfort for a couple of years but did not seek medical advice until recently. Her menstrual cycles were regular and she had no pain during menstruation or heavy menstrual flow. She had no change in her bowel habits and she did not have any hyperthyroid features.

At the age of 28, she had a cystectomy for a MCT of the right ovary with no immature elements or malignancy detected microscopically. At the age of 30, she gave birth to her only child. She also had undergone hemi thyroidectomy in 2012, for multinodular goitre; histology confirmed microfollicular proliferation of the gland. At the time of presentation, she was clinically euthyroid and her thyroid stimulating hormone (TSH) levels were within normal limits.

On examination, her BMI was 23 kg/m^2. Her abdomen was grossly enlarged, with a palpable pelvic mass corresponding in size to a 20-week gravid uterus. The mass was non-tender, firm in consistency, had an irregular surface, well-defined margins, and limited mobility.

An ultrasound scan of the abdomen revealed a multiloculated, complex lesion with solid and cystic components in the pelvic region, measuring 15 cm × 13.5 cm × 10 cm, suggestive of an ovarian tumour. Free fluid was noted in the pelvis and abdomen, but no pleural effusion was observed. The uterus appeared normal, and the liver, gallbladder, pancreas, and kidneys were ultrasonically normal. The tumor marker CA 125 was elevated at 74 U/mL.

The calculated Risk of Malignancy Index (RMI) was 222. The RMI is a validated clinical tool used to stratify the risk of malignancy in ovarian tumours and guide further management.[4] It is calculated using the formula: RMI = U × M × CA-125 where U represents the ultrasound features of the lesion, M denotes the patient's menopausal status, and CA-125 is the serum tumour marker level. An RMI score exceeding 200 indicates a high risk of ovarian malignancy. In such cases, further evaluation with computed tomography (CT) imaging is recommended to obtain a more comprehensive assessment of the lesion and guide appropriate management.[4]

Findings of contrast-enhanced CT of abdomen and pelvis: there is a multi-loculated complex cystic mass adjacent to the bladder, connected to the left adenexa. There is contrast enhancing intra-cystic solid components and thin septations, no surrounding soft tissue infiltrations, free fluid, lymph node enlargements or pleural effusions. No evidence of distant solid organ metastasis.

Following a multidisciplinary team discussion, it was decided that the patient would undergo a staging laparotomy, total abdominal hysterectomy, bilateral salpingo-oophorectomy, and partial omentectomy.

Laparotomy was performed and a large multilocular cyst of the left ovary was found measuring 16cm × 14cm × 10cm (Figure 1). Free fluid noted a sample of 20 cc taken for cytology. The uterus was normal in size. The right ovary had a small functional cyst, histology confirmed a haemorrhagic corpus luteum. There was no evidence of tumour metastases or pelvic lymphadenopathy. Partial omentectomy was done for staging purposes. Post-operative recovery was unremarkable.

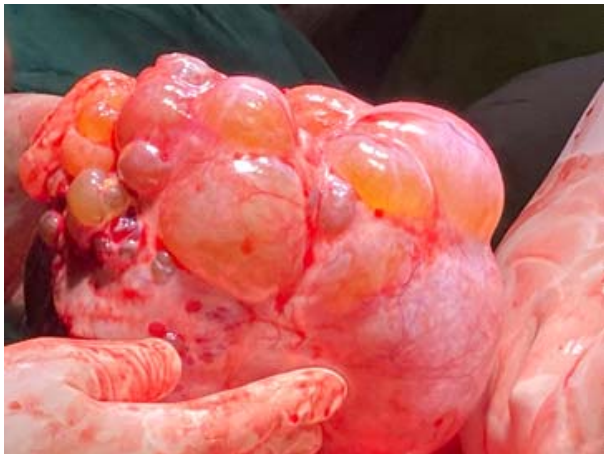

Figure 1. Picture taken at the time of surgery of the left ovarian MCT.

Histopathology reporting: The macroscopic specimen consists of a nodular cystic ovarian mass measuring 155 × 130 × 100mm. The attached part of the fallopian tube with the fimbrial end measures 60 × 8mm. The cut surface shows a multilocular cyst filled with mucoid fluid. Some loculi contain hair and sebaceous material. Solid areas are identified (10%). Normal ovarian tissue is seen at the

periphery. Macroscopic appearances are consistent with a MCT of the left ovary. The right ovary measures 40 × 26 × 8mm, cut surface shows cystic areas filled with blood. A mass of omental tissue measuring 280 × 130 × 5mm. No macroscopic tumour deposits were identified.

Microscopic sections of the left ovarian mass show a multilocular cyst lined in part by a mature squamous and in part by a mature respiratory epithelium. The solid areas of the cyst wall are largely composed of thyroid tissue containing a proliferation of micro and macro acini filled with colloids. The rest of the cyst wall contains mature skin adnexal structures including hair, salivary glands, adipose tissue, bone, lymphoid tissue and smooth muscle. No immature elements or malignancy is seen. Normal ovarian tissue is seen at the periphery.

The uterus contains a secretory phase endometrium. The myometrium, cervix, bilateral parametrial tissue and omental tissue appear unremarkable.

The right ovary contains a haemorrhagic corpus luteum. Both fallopian tubes appear unremarkable. Appearances are consistent with a MCT of the left ovary with prominent thyroid tissue.

Discussion

The imaging (ultra-sound and CECT) and the RMI were not accurate in predicting this ovarian tumour as a MCT. The ultrasonic features such as multilocularity, cystic and solid areas which are suggestive of malignant ovarian tumours are seen in MCT too. Therefore, RMI may be deceiving for mature cystic teratomas which are almost always benign in women in their 4th decade of life. However, ultrasound features like Rokitansky nodule (Figure 2) or multiple thin and echogenic bands (Figure 3) are suggestive of a MCT. A Rokitansky nodule is a solid protuberance observed as a densely echogenic nodule with posterior acoustic shadowing, projecting from an ovarian cyst. This nodule often contains calcific, dental, adipose, hair, and/or sebaceous components.[5] Magnetic resonance imaging (MRI) is the preferred modality for evaluating Rokitansky nodules due to its superior ability to characterize these features.

Multiple thin and echogenic bands represent the hair arising from the cyst wall.

Thyroid tissue, derived from endodermal cells, can be identified histologically in up to 20% of cases of mature cystic teratoma (MCT).[6] However, it is typically not detectable through macroscopic examination or imaging. Hyperthyroid features in women occur when more than 50% of the tumour is composed of thyroid tissue.[6] In this case, only 10% of the tumour was composed of thyroid tissue. Despite this, the tumour exhibited components from all three germ layers, making it a rare presentation.

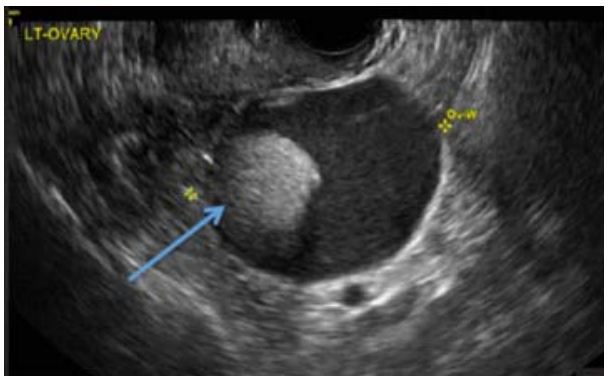

Figure 2. Rokitansky nodule (blue arrow).

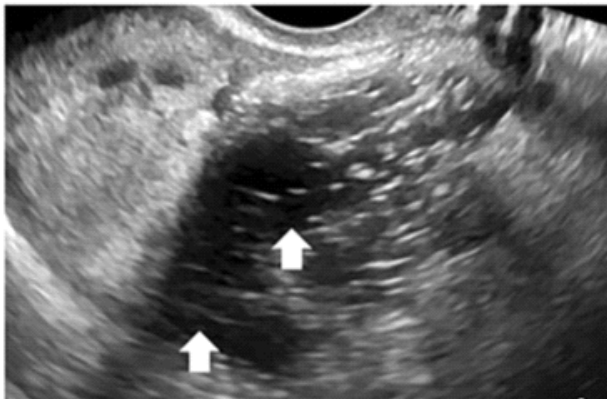

Figure 3. Multiple thin and echogenic bands (white arrows).

Conclusion

Mature cystic teratomas (MCT) account for approximately 20% of all ovarian neoplasms in women under 45 years of age.[7] These tumours are typically well-characterized on ultrasound, CT, and MRI. However, due to their variable composition, MCTs can present with atypical clinical and imaging features, leading to misdiagnosis as malignant ovarian tumours.

In this case, diagnostic uncertainty resulted in a more extensive surgical procedure. If a more accurate pre-operative diagnosis had been achieved through advanced imaging, the management could have been limited to a left oophorectomy, which is sufficient for treating a benign MCT while preserving fertility and reducing surgical morbidity.

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