

Ultrasound of ovarian dermoids – sonographic findings of a dermoid cyst in a 41-year-old woman with an elevated serum hCG

Abstract

Ovarian dermoid cysts are made up of solid, cystic and fat tissue. These components give rise to characteristic sonographic features such as a fat-fluid level, dermoid mesh and tip of the iceberg sign. The presence of two or more of these typical features can be used to confidently diagnose a dermoid cyst on ultrasound. This 41-year-old woman with a known cystic lesion on her right ovary which, on ultrasound, demonstrated two of these features, had the diagnosis of a dermoid cyst later confirmed on histopathology. She concurrently had an elevated serum human chorionic gonadotrophin (hCG), an unusual, but not unknown, finding in the presence of a dermoid cyst. The hCG resolved after removal of the ovarian cyst.

Keywords: Dermoid, human chorionic gonadotrophin, mature teratoma, ovarian cyst, transvaginal ultrasound

Lauren Kite
MBBS

Talat Uppal
MBBS, FRANZCOG

Women's, Children &
Family Health
Northern Beaches Health
Service
Manly NSW Australia

Correspondence to author
via Email
laurenkite@hotmail.com

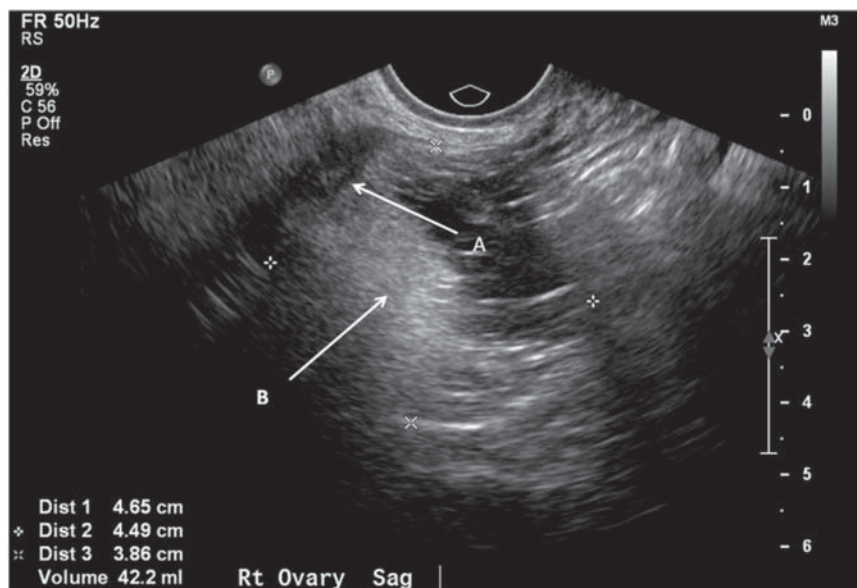


Figure 1: Sono-graphic image demonstrating fat fluid level (A) and tip of the iceberg sign (B).

Case

A 41-year-old woman was initially referred for a pelvic ultrasound by her general practitioner for investigation of heavy periods. The scan revealed an endometrial thickness of 14.0 mm and identified an incidental unilocular cystic lesion on her right ovary. This unilocular cystic lesion contained hyperechoic material consistent with a dermoid cyst. She was referred to our Gynaecology Clinic for further investigation and management.

The woman was an otherwise well, multiparous woman who, apart from one instance some ten weeks prior to initial presentation, had

not been sexually active for a number of years. She had had no pelvic pain and a pelvic mass was not palpable on examination. She complained of heavy periods but otherwise had no significant gynaecological history.

Transvaginal ultrasound demonstrated a unilocular cystic lesion on the right ovary with dermoid mesh, the tip-of-the-iceberg sign and a dermoid plug (Figs. 1, 2). The endometrium measured 15 mm.

Blood tests performed prior to surgery interestingly returned a serum hCG of 254 IU/L, Carcinoembryonic antigen (CEA) was mildly elevated at 3.4 µg/L. Serum CA-125 was normal

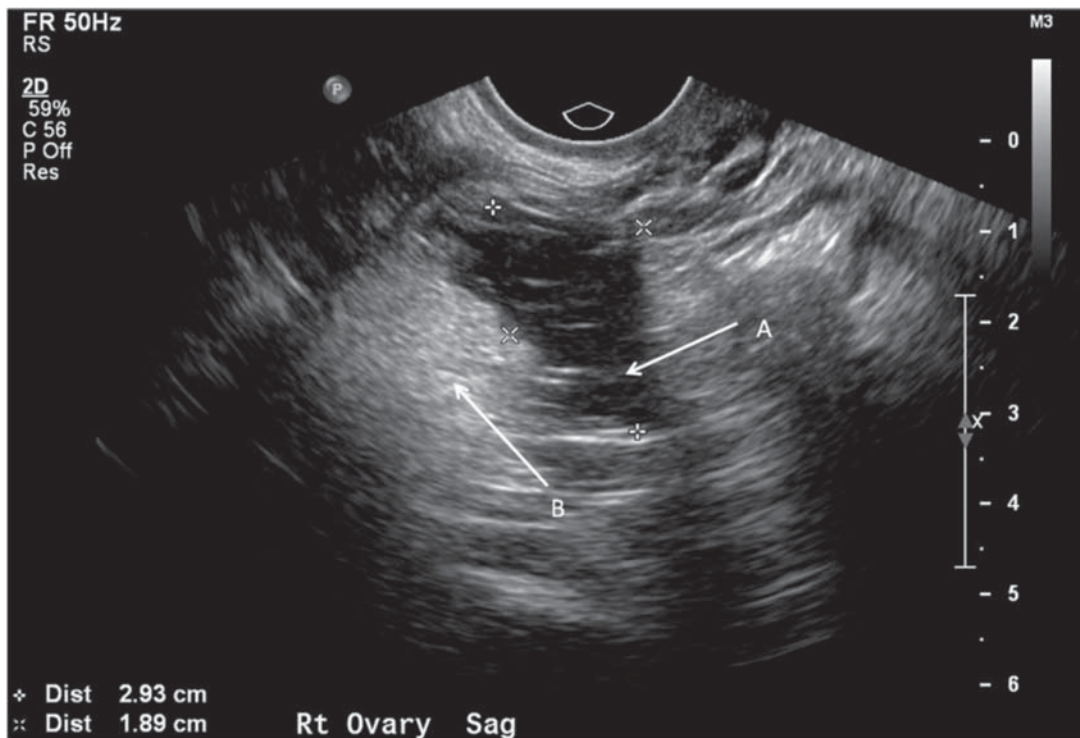


Figure 2: Dermoid mesh (A) and dermoid plug (B).

with value of 13.1 U/mL as was the alphafetoprotein (1.7 IU/mL). The elevated serum hCG raised the possibility of pregnancy. She had had two transvaginal ultrasound scans in the ten weeks prior to her surgery, neither of which showed any evidence of an intra- or extra-uterine gestation.

The woman underwent a hysteroscopy which revealed a normal endometrium with no evidence of an intra-uterine gestation. A dilatation and curettage of the uterus was performed and histological analysis demonstrated no endometrial tissue.

At the same time she underwent laparoscopic right salpingo-oophorectomy. A clearly defined right ovarian cyst was indentified on the right ovary and histopathology demonstrated 30% solid and 70% cystic tissue. On microscopy, a mature cystic teratoma containing elements from all three germ cell layers was confirmed. Cartilage, mucinous glands, respiratory-type epithelium, smooth muscle, colonic type mucosa, mature adipose tissue and focal calcification were all identified. The adjacent ovary was normal in appearance as was the fallopian tube.

The woman was followed up in the clinic 2 weeks later by which time her serum hCG had returned to a normal level (<1 IU/L).

Discussion

Dermoid cysts, or cystic mature teratomas, are a common benign ovarian pathology making up 15–25% of ovarian neoplasms. They occur primarily in pre-menopausal women between the ages of 10 and 30 years. Ultrasound has become a frequently used and highly effective modality through which the diagnosis of a dermoid cyst can be made.

A dermoid cyst generally contains fluid, fat and solid tissue. It is this make up that gives rise to the stereotypical sonographic features. With the presence of two or more of these features a

diagnosis of dermoid cyst can confidently be made¹. A recent study found that 90% of cysts later identified by histopathology as being dermoid were accurately diagnosed at ultrasound². Additionally, the stereotypical sonographic features are uncommonly seen in malignant neoplastic ovarian lesions giving a high positive predictive value and reassurance to the assessor that should such features be identified the lesion is highly unlikely to be malignant.

Dermoid plug; this is the most common sonographic feature of a dermoid cyst. It appears as an echogenic mass within the cyst made up of hair, teeth or fat³.

Dermoid mesh; as the name implies, the appearance on ultrasound is of multiple small hyperechoic lines and dots within the cyst forming a “mesh-like” picture. These echogenic foci are small hairs floating in the cystic fluid.

Tip of the iceberg sign; the appearance of a hyperechoic area, the base of which cannot be visualised. This is the result of a mass made up of matted hair and sebum casting an echogenic shadow.

Fat-fluid level; also known as a “hair-fluid level” or “fluid-fluid” level is believed to be the result of layering of serous fluid and sebum.

Quantitative serum hCG and Dermoid cysts

It is uncommon to find an elevated serum hCG related to a dermoid cyst. If an elevated serum hCG is found in the presence of an ovarian mass and there is no obvious intra-uterine gestational sac, and an ectopic pregnancy has been excluded, one must consider hCG-secreting tumours including dysgerminomas, polyembryoma, placental site trophoblastic tumours or choriocarcinoma. Cases have been reported of a mixed polyembryoma and immature teratoma resulting in elevated serum hCG and alphafetoprotein⁴ or that of a torted dermoid cyst mimicking a ruptured ectopic pregnancy⁵. In

this case, the rapid decline in the serum hCG post unilateral oophorectomy strongly supports the conclusion that the mature teratoma was the cause of the raised serum hCG.

CT and MRI

Alternative methods of diagnosis of dermoid cysts include CT and MRI both of which are more sensitive to fat than ultrasound. At CT a diagnosis of dermoid cyst can be made when attenuation of fat is imaged⁶. At MRI a dermoid cyst can be reliably differentiated from a haemorrhagic lesion or endometrioma again due to the intensity of the fatty contents on imaging⁶. Bekiesinska-Figatowska, *et al.* described 83% accuracy in diagnosing ovarian lesions on MRI and also highlight the advantage of this non-invasive and non-radiating form of imaging in younger populations of women with suspected pelvic lesions⁷. However, transvaginal sonographic evaluation using pattern recognition by experienced operators is the optimal approach to the diagnosis of dermoid cysts⁸. In fact, pattern recognition as a rule by experienced sonographers or sonologists is the best way to distinguish benign and malignant adnexal masses⁸.

References

- 1 Patel MD, Feldstein VA, Lipson SD, Chen DC, Filly RA. Cystic teratomas of the ovary: diagnostic value of sonography. *Am J Roentol* 1998; 171: 1061–65.
- 2 Tan PL, Willatt JM, Lindsell D The ability of ultrasound to detect gynaecological neoplasms and their ultrasound morphological features. *Australas Radiol* 2007; 51: 260–66.
- 3 Hertzberg BS, Kliewer. Sonography of benign cystic teratoma of the ovary: pitfalls in diagnosis. *AJR* 1996; 167: 1127–33.
- 4 Takemori M, Nishimura R, Yamasaki M, Kawabe Y, Hasegawa K. Case report; ovarian mixed germ cell tumor composed of polyembryoma and immature teratoma. *Gynaecol Oncol* 1998; 69: 260–63.
- 5 Pothula V, Matseoane S, Godfrey H. Gonadotropin-producing benign cystic teratoma simulating a ruptured ectopic pregnancy. *J Natl Med Assoc* 1994; 86: 221–22.
- 6 Outwater EK, Siegelman ES, Hunt JL. Ovarian teratomas: tumor types and imaging characteristics. *RSNA* 2001; 21 (2): 475–90
- 7 Bekiesinska-Figatowska M, Jurkiewicz E, Iwanowska B, Uliasz M, Romaniuk-Doroszevska A, Bragoszevska H, Ceran A, Olszewski A. Magnetic resonance imaging as a diagnostic tool for ovarian masses in girls and young women. *Medical Science Monitor* 2007; 13 (1): 116–20.
- 8 Van Holsbeke C, Daemen A, Yazbek J, Holland TK, Bourne T, Mesens T, Lannoo L, Boes AS, Joos A, Van De Vijver A, Roggen N, de Moor B, de Jonge E, Testa AC, Valentin L, Jurkovic D, Timmerman D. Ultrasound experience substantially impacts on diagnostic performance and confidence when adnexal masses are classified using pattern recognition. *Gynecol Obstet Invest* 2010; 69 (3): 160-8. Epub 2009 Dec 11.