Ultrasound In Diagnosing a Dermoid Cyst – A Case Study

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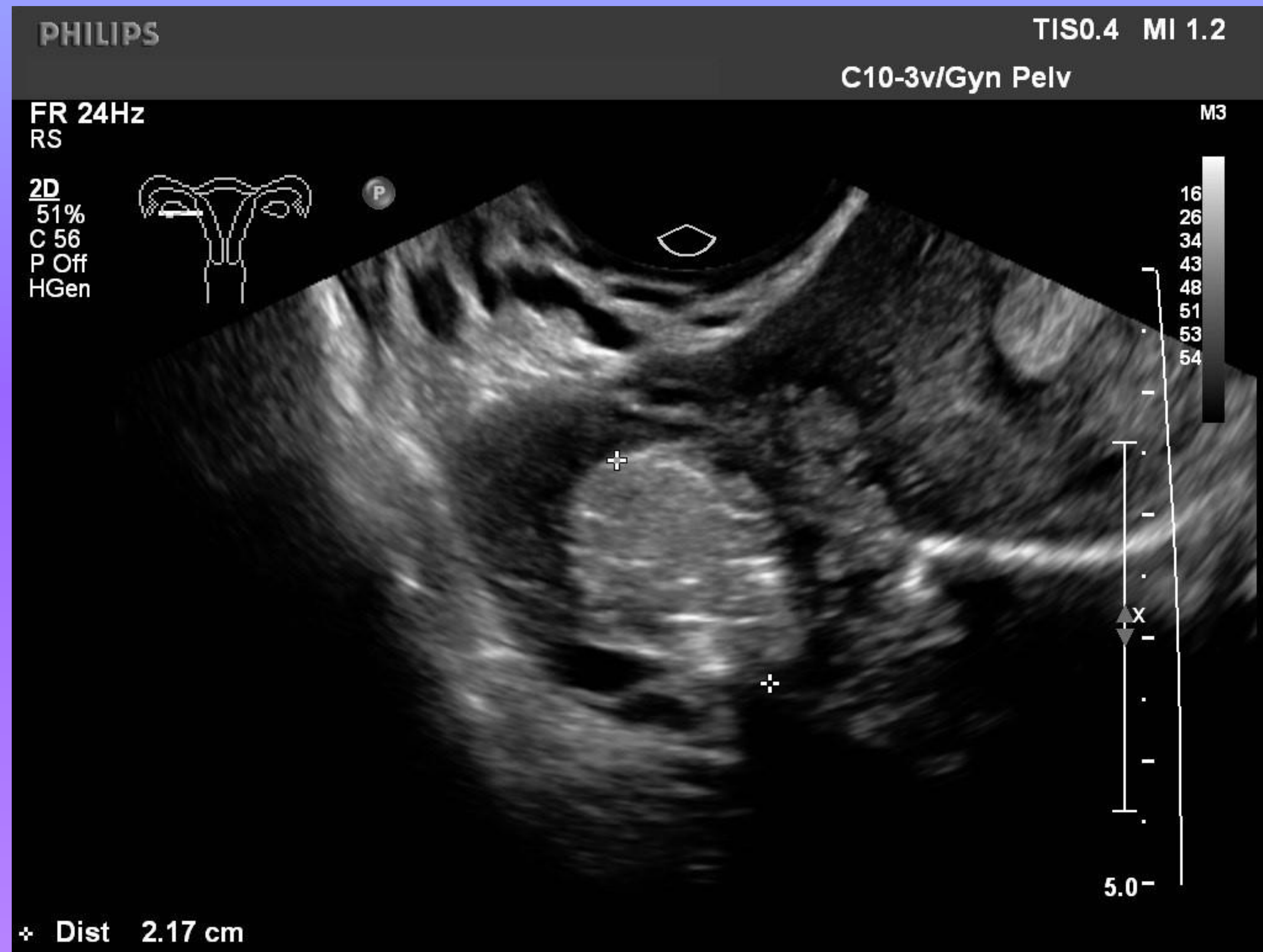UNIVERSITY OF LEEDS

Number: 46

Case

A 21 year old, premenopausal, nulliparous, female attended the ultrasound department for a pelvic ultrasound examination as requested by her General Practitioner (GP). The request read: "*Lower abdominal pain, very tender. History of ovarian cysts in home country of Albania*". The patient was a victim of human trafficking and this was her first medical imaging investigation at this trust. There was no previous history or biochemical tests.

In the right ovary was a complex, unilocular mass of mixed echogenicity measuring 22mm. The mass demonstrated multiple, hyperechoic, echogenic striations (image 1) which may represent hair and posterior acoustic shadowing (image 1) likely caused by calcified components. Ovarian tissue is seen around the mass.

In view of the ultrasound features, the mass was reported as a dermoid cyst with a recommended routine gynaecology referral.
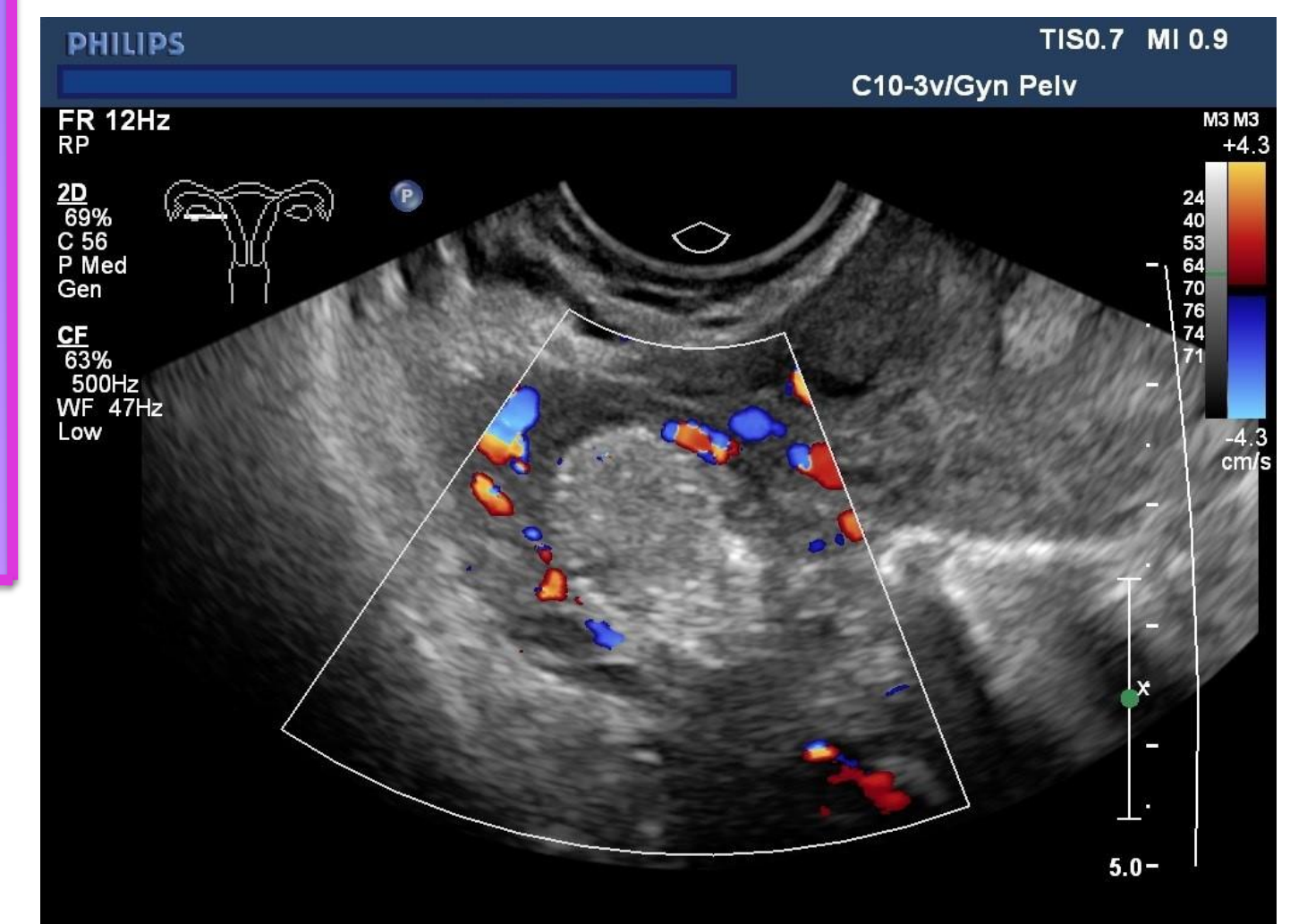
Discussion

Ovarian dermoid cysts, also known as mature cystic teratomas (MCTs), are a common benign germ-cell tumour frequently found incidentally due to most patients being asymptomatic (Bates, 2006; Hoo et al, 2010; Kite and Uppal, 2011, Williams and Orr, 2011). MCTs contain all three germ germ cell layers, therefore containing mature tissue consisting of skin, bone, muscle, fat, teeth and hair (Williams et al. 2011).

MCTs have a high positive predictive value as the stereotypical sonographic appearances, characterised by sebaceous material and calcification, are uncommonly seen in malignancy and other adnexal lesions, allowing the sonographer to be confident of the diagnosis (Hoo et al. 2010; Kite and Uppal, 2011; Williams et al. 2011).

Typical ultrasound appearances can include:

| A dense mesh like appearance (Bates, 2006) |
| Multiple, thin, echogenic bands which depict hair within the cyst (image 1, 2) (Outwater et al. 2001) |
| Posterior acoustic shadowing caused by calcium components (bone and teeth), hair or fat (image 1, 2) (Saba et al. 2009) |
| "tip of the iceberg" appearance. (Williams et al. 2011). |

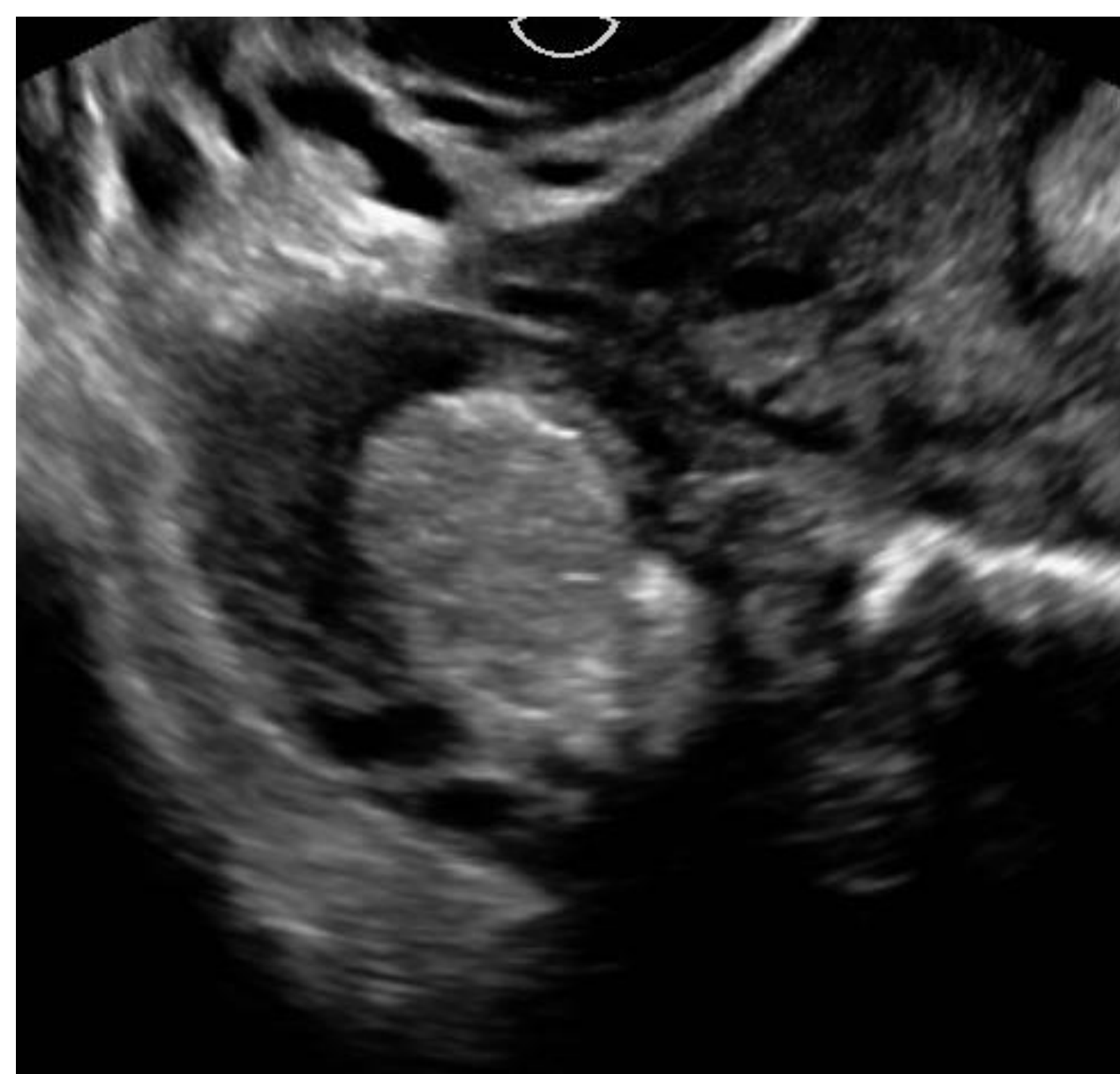Image 1 – Transvaginal scan. Transverse view of the right ovary demonstrating the mixed echo mass and ovarian tissue.

Image 2 – Transvaginal scan. Transverse view of the right ovary demonstrating posterior acoustic shadowing

The International Ovarian Tumor Analysis (IOTA) (Timmerman et al. 2000, p500) defined an adnexal lesion as '*the part of an ovary or an adnexal mass that is judged from an assessment of ultrasound images to be inconsistent with normal physiologic function*'. In 2008 IOTA created simple ultrasound rules (Table 1) that can be used to differentiate between malignant and benign adnexal masses (Timmerman et al. 2008). Using these rules prospectively, Timmerman et al. (2008) correctly classified 87% of MCTs using ultrasound and in a phase 2 prospective, multicentre study 100% of MCTs were correctly classified using ultrasound (Timmerman et al. 2010).

In this case, colour Doppler demonstrated no internal vascularity (image 3), B5 of the B-rules. The mass was unilocular (B1) and formed posterior acoustic shadowing. (image 1), B3 of the B-rules. Using transabdominal ultrasound it was seen that there was no pelvic ascites. Therefore, the mass can be confidently identified as benign.

Image 3– Transvaginal scan. Transverse view of the right ovary. Colour Doppler used to assess vascular flow.

Table 1 - IOTA simple rules to discriminate between malignant and benign masses on ultrasound

M-rules		B-rules	
M1	Irregular solid tumour	B1	Unilocular cyst
M2	Ascites	B2	Presence of solid components for which the largest solid component is <7 mm in largest diameter
M3	At least four papillary structures	B3	Acoustic shadowing
M4	Irregular multilocular solid tumour with a largest diameter of at least 100 mm	B4	Smooth multilocular tumour
M5	High colour flow using Doppler	B5	No Doppler flow

The patient opted for an expectant management approach. Increased confidence in the diagnosis of MCTs using ultrasound eliminates the fear of malignancy as a primary reason for surgery. Therefore in asymptomatic women with a reliable diagnosis, the possible benefits of surgical intervention are hard to justify (Hoo et al. 2010).

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