A Case of Uterine Arteriovenous Malformation: Ultrasound Appearances

Rebecca Chambers BSc(Hons), PgDip, MSc, Advanced Practitioner Sonographer, Manchester Fertility

Introduction

Uterine arteriovenous malformation (UAVM) is a rare gynaecological condition which can be life threatening when presenting with severe vaginal bleeding. Arteriovenous malformations are abnormal communications between arteries and veins in a tissue without the presence of an intervening capillary network. They are classified as congenital or acquired. Congenital type UAVM is very rare, and it results from developmental abnormalities of uterine vessels. Acquired type is more common, and may develop after: multiple pregnancies, miscarriage, previous surgery, dilation and curettage (D&C), termination of pregnancy and caesarean section. Management of UAVM depends on clinical presentation. Most of the time UAVMs will resolve spontaneously; however, they may require treatment such as uterine artery embolization hysterectomy (Yoon et al., 2016).

Case Report

A 29-year-old female presented to the clinic following recent termination of pregnancy at 15 weeks gestation for foetal abnormalities. The patient was experiencing painless prolonged vaginal bleeding eight weeks post surgical evacuation. A negative beta-human chorionic gonadotropin (beta-hCG) test was performed. Pre-treatment scans prior to the pregnancy were unremarkable (figure 1).

On transvaginal (TV) ultrasound examination the scan revealed marked enlargement of the anterior myometrial wall with dilated vessels (figure 2, left). Increased vascularity was demonstrated on colour Doppler examination (figure 2, middle and right). The endometrium was visualised separately measuring 6.5 mm but was distorted posteriorly. UAVM was suspected and a hospital referral was made.

A repeat pelvic ultrasound was performed at the hospital that suggested the presence of retained products of conception (RPOC) rather than UAVM. The patient underwent hysteroscopy and D&C. The procedure resulted in a complication of excessive blood loss requiring blood transfusion. The histology sample was negative for RPOC. The patient's symptoms subsided and conservative management was recommended. Two follow up TV ultrasound scans were performed at the clinic to check for resolution. The first scan was performed four weeks after the initial diagnosis of UAVM. The ultrasound revealed partial resolution with a reduction in the myometrial thickness and heterogenicity (figure 3, left). Pulsed Doppler revealed high-velocity, low-resistance flow within the remnant UAVM, resistance index of 0.32 (figure 3, right). A 3D glass body reconstruction identified the remnant UAVM vessels (figure 4, left). 3D tomographic imaging using colour Doppler imaging revealed vascularization of the myometrium without affecting the endometrium (figure 4, right). The second scan, eight weeks post diagnosis, demonstrated a full resolution with no evidence of the UAVM on greyscale, Doppler or 3D imaging.

Figure 1: Normal uterus in longitudinal (LS) [left], transverse (TS) [middle] and 3D coronal section [right].

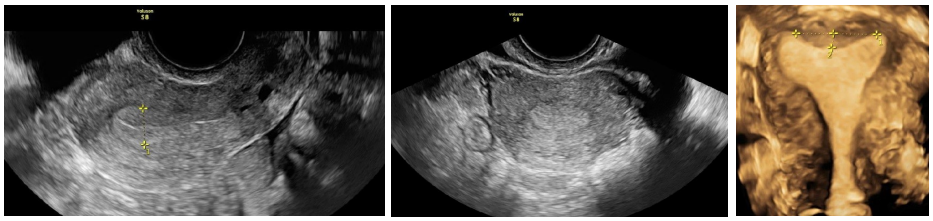


Figure 2: LS uterus shows irregular anechoic tubular structures within the enlarged anterior myometrium [left]. Colour Doppler examination in LS [middle] and TS [right] demonstrate increased vascularity.

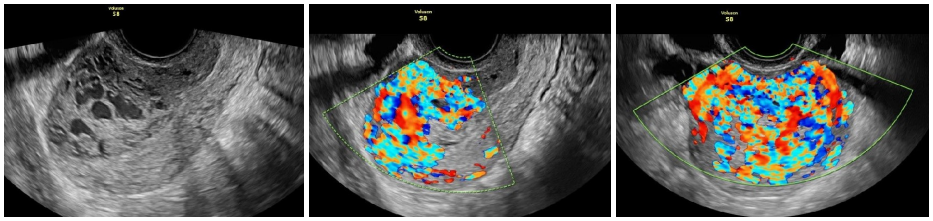


Figure 3: LS uterus shows mild heterogenicity of the anterior myometrium [left].

Colour and pulsed Doppler identified remnant dilated vessels with a RI of 0.32 [right].

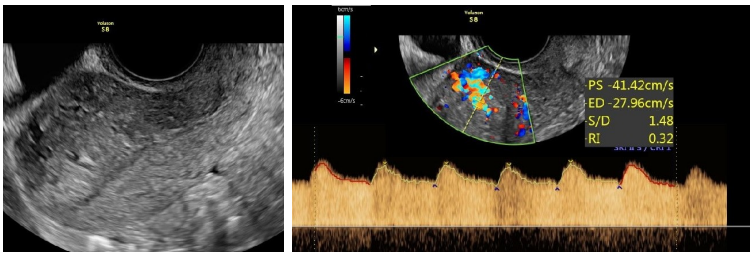
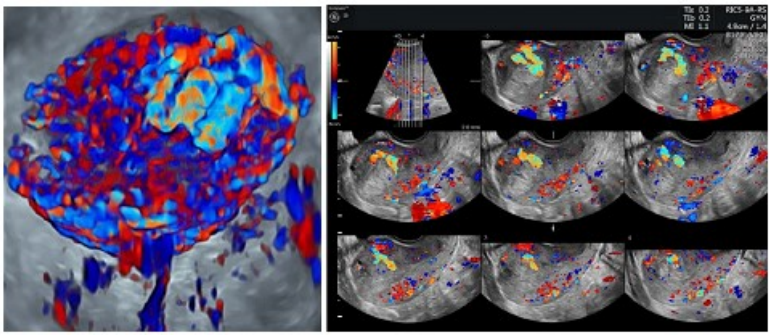


Figure 4: Glass body reconstruction demonstrating remnant dilated vessels [left]

3D tomographic technique demonstrating multiple slices through the uterus in LS [right].



Diagnosis

The diagnosis of UAVM is challenging not only given the rarity of the condition but because they may present similarly to, or in conjunction with, other pregnancy related pathologies, such as RPOC, postpartum endometritis, as well as gestational trophoblastic disease (GTD). Accurate differentiation from other uterine pathology is critical as procedures such as hysteroscopy or dilatation and curettage should be avoided in cases of UAVM as there is a risk of causing profuse bleeding and even death. On ultrasound examination, UAVM appears as irregular, anechoic, tortuous, tubular structures within the myometrium that show evidence of increased vascularity on Doppler examination. Pulsed Doppler characteristically depicts a low-resistance, high-velocity arterial flow (RI range 0.25 to 0.55) consistent with arteriovenous shunting (Lalitha et al., 2016). RPOC is usually confined to the endometrial cavity and is seen as a focal echogenic mass. If there is a vascular component seen in RPOC, it will be located in the endometrium, whereas the vascular component in AVM is primarily situated in the myometrium. GTD presents with very similar appearances to UAVM with multiple anechoic spaces within myometrium. In cases of suspected UAVM at ultrasound, beta-hCG is recommended to exclude GTD.

The adjunct of using 3D ultrasound imaging may also provide useful information to determine the presence of UAVM. 3D tomographic and glass body imaging enables us to study and understand the vascular anatomy immediately and without radiation exposure to the patient.

References:

Yoon, D.J. et al., 2016. 'A Systematic Review of Acquired Uterine Arteriovenous Malformations: Pathophysiology, Diagnosis, and Transcatheter Treatment'. American Journal of Perinatology. 6(1), pp. 6-14.

Lalitha, N. et al., 2016. 'Uterine Arteriovenous Malformation: Case Series and Literature Review'. The Journal of Obstetrics and Gynecology of India. 66(2), pp. 282-286.