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REVIEW ARTICLE

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Uterine arteriovenous malformations: a rare but serious cause of vaginal bleeding

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Abstract Arteriovenous malformations (AVMs) of the uterus are rare. They may either be congenital or acquired. They can cause life-threatening haemorrhage and should therefore be considered in all premenopausal women presenting with severe vaginal bleeding, especially those with a previous history of uterine curettage. We report on six women aged between 20 and 26 years of age, all of whom presented with heavy vaginal bleeding 1 week to 12 months postuterine curettage. All of our patients had undergone surgical termination of pregnancy within the preceding 12 months. Grey-scale transvaginal ultrasound and colour Doppler are diagnostic. The latter shows characteristic patterns of turbulent high systolic velocity flows with low resistance indices. Pelvic angiograms and magnetic resonance imaging are also useful diagnostic tools. Until recently, hysterectomy was the only treatment available. Currently the preferred choice appears to be uterine artery embolisation, which allows fertility to be retained. Embolisation was successfully used in three of our patients. Two were managed conservatively, and one of our patients has had a hysterectomy following failed embolisation. Curettage can provoke catastrophic bleeding and must be avoided. In conclusion, the AVMs are a potential cause of catastrophic vaginal bleeding in premenopausal women. Early diagnosis is based on a high index of suspicion and is confirmed by characteristic colour Doppler imaging findings. Typically, there is a history of previous uterine curettage.

Keywords Arteriovenous malformations · Vaginal bleeding · Uterine artery embolisation

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Introduction

Uterine arteriovenous malformations (AVMs) are rare. The first description of these lesions was by Dubreil and Loubat [1]. They are also known by a variety of names, including arteriovenous fistulae and cirsoid aneurysms. They can cause catastrophic bleeding in women in their prime of life, but their precise aetiology is poorly understood. Some are thought to be congenital in origin, resulting from disordered vascular development in embryonic life. The acquired variety is believed to be traumatic in origin, as illustrated by our series of patients. In AVMs, the normal vascular pattern in which arteries and veins have intervening capillary networks is absent. Instead, there are direct communications between the arteries and veins. These result in turbulent blood flow patterns. Heavy, unpredictable vaginal bleeding may be the first presenting symptom. Traditionally, such life-threatening bleeding would have been treated by an emergency hysterectomy. There is now ample evidence in the literature that interventional radiology should be the first line of management [2, 3].

Diagnosis

A high index of suspicion is necessary to ensure that the diagnosis is not missed. All six of our patients were in the reproductive age group. They all presented with significant vaginal bleeding that was potentially life-threatening. Many women with AVMs have undergone uterine surgical procedures such as termination of pregnancy; this was the case in all of our patients.

Transvaginal ultrasonography is very helpful [4]. The grey-scale image (Fig. 1b) typically shows multiple hypoechoic or anechoic spaces within the myometrium. Colour Doppler (Fig. 1a) shows evidence of hypervascularity with colour aliasing and apparent flow reversals. Colour aliasing is the result of high peak systolic velocities leading to separation of red and blue colours

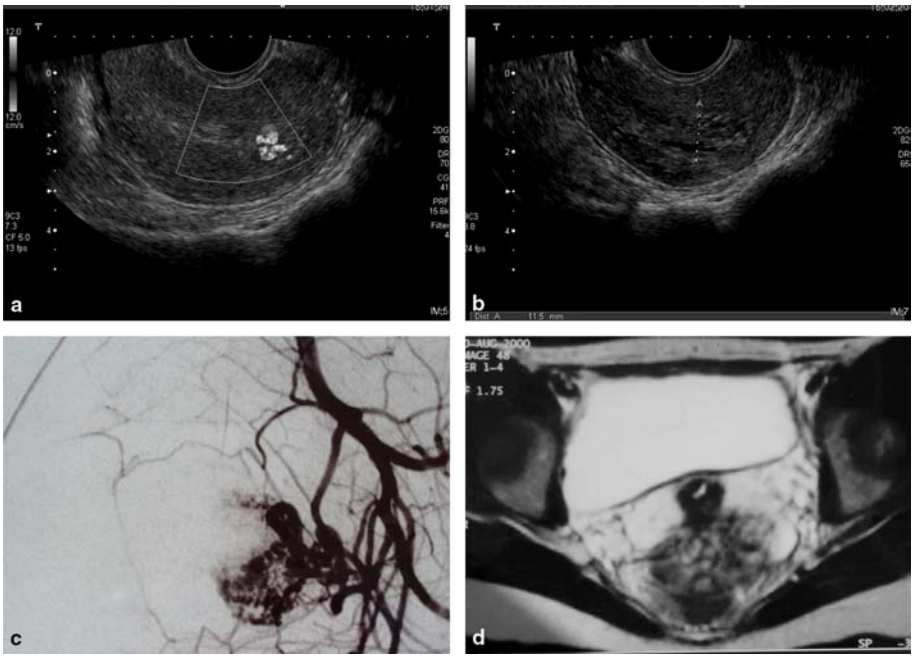

Fig. 1 **a** Colour Doppler showing hypervascularity and colour aliasing. **b** Transvaginal scan grey-scale image showing hypoechoic spaces in myometrium. **c** Pelvic angiogram showing extensive tangling of vessels and early venous drainage during the arterial phase. **d** T2-weighted magnetic resonance image showing multiple serpentine signal voids in uterine fundus

by yellow and white components. This appearance is so striking that it has been likened to the lighting up of a Christmas tree! All six of our patients had these characteristic ultrasound features. On spectral Doppler, there are low-resistance indices and high flow velocities in venous waveforms. Magnetic resonance imaging is also useful in confirming the extent of the malformation.

Fig. 1c is a pelvic angiogram from one of our patients, a 20-year-old parous woman who presented with heavy vaginal bleeding 1 month after suction termination of pregnancy.

Treatment

Traditionally, AVMs have been treated with hysterectomy. This method of management, although lifesaving for many women with catastrophic bleeding, may be inappropriate if fertility is desirable. With the advent of interventional radiology as a speciality, uterine artery embolisation (UAE) is being increasingly used as the first line of management. There are reports in the literature of successful pregnancies following embolisation [5]. UAE was successfully used in treating some of our patients with AVMs. The principle relies on the injection of particulate material into the nidus of the feeding vessels; polyvinyl alcohol, steel coils, and histoacryl have all been used. The procedure is performed under a local anaesthetic block. To achieve 100% success, a repeat procedure is sometimes required. Some authors suggest [6] that UAE may have only a short-term benefit because of the excellent collateral blood supply in the pelvis.

Conservative management also has a place. This was the case in two of our patients. In our most recent patient, an AVM was diagnosed on transvaginal scanning and spectral Doppler studies in November 2003. The patient was managed conservatively. She is now pregnant and has no evidence of AVM on transvaginal scanning. The main concern with conservative treatment is the difficulty in predicting the risk of torrential haemorrhage in such patients. A recent study [4] concluded that the peak systolic values assessed by spectral Doppler may help in predicting which patients have a high risk of bleeding.

Conclusion

AVMs are a rare but potentially serious cause of life-threatening vaginal bleeding in premenopausal women. A high index of suspicion is needed so that a prompt diagnosis can be made. We have seen several cases in our unit recently, which has led to an increased awareness among clinicians of this otherwise rare condition. It appears that interventional radiology is becoming the mainstay of treatment because this allows fertility to be preserved while ensuring effective therapy.

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