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Review Article

Hypervascular retained products of conception: dilemma of diagnosis and management

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ABSTRACT

Retained products of conception (RPOC) are a partial retention of placental tissue after dilation and curettage (D&C) procedures or vaginal deliveries. Ultrasound scan reports sometimes mention the presence of increased endometrial / sub-endometrial vascularity in the context of retained products of conception. This raises the possibility of serious intra-operative haemorrhage because of the possibility of arterio-venous malformation. The aim of this article is to discuss the diagnosis and management options of retained products of conception (RPOC) with increased vascularity where simple dilatation and curettage may lead to life threatening haemorrhage and endanger the life of the patient and to enlighten the importance of evaluation of vascularity in all cases of RPOC prior to dilatation and curettage in order to avoid the dreaded complication of massive haemorrhage.

Keywords: Diagnosis, Dilatation and curettage, Doppler study, Increased vascularity, Retained products of conception, Ultrasound

INTRODUCTION

Retained products of conception complicate ~1-5% of all pregnancies. According to one prospective study, RPOC was present in after a third-trimester delivery in around 2.7% of women, whereas it was diagnosed in pregnancies ending during the second and first trimesters in 40% and 17%, respectively.[1] It occurs with greater frequency with: medical termination of pregnancy (MTP), second-trimester miscarriage and placenta accreta. Various causes of increased vascularity of RPOC's include arteriovenous malformations, placental polyp and excessive myometrial invasion by the trophoblasts. Due to excessive trophoblastic invasion of myometrium, the physiological myometrial arteriovenous shunting in the placental bed persists, leading to prominent vascularity.

Another school of thought is that the presence of endometrial vascularity in the retained products of conception may be due to delay in involution of the placental implantation site vessels. The implantation site may remain vascular during the time of the involution causing vascularity of the endometrium on ultrasound scan.[2]

The risk factor of developing excessive vascularity in RPOC's also includes implantation of the embryo in the lower part of the uterus and a history of multiple D and C's.[3,4] Since the endometrium is thin and decidual formation tends to be insufficient in the lower part of the uterus, embryo implantation in this part leads to excessive trophoblastic invasion thereby causing increased vascularity.

Diagnosis

Clinical presentation

Common symptoms include vaginal bleeding and abdominal or pelvic pain, similar to patients with gestational trophoblastic disease. Some patients may have fever.[5]

Differentiation of these entities is important because retained products of conception are treated conservatively or with curettage, while gestational trophoblastic disease may require chemotherapy. ß-human chorionic gonadotropin (beta-hCG) remains elevated in patients with gestational trophoblastic disease but falls to an undetectable level over 2-3 weeks, in cases of retained products. When RPOC manifests as secondary PPH, it may need to be distinguished from endometritis, uterine dehiscence or perforation, and, rarely, subinvolution of the placental implantation site.

Radiographic features

Ultrasound is typically the first-line investigation in suspected retained products of conception. A variable amount of echogenic or heterogeneous material may be seen within the endometrial cavity in some instances which may present like an endometrial or intrauterine mass. The most sensitive finding of RPOC at gray-scale US is a thickened endometrial echo complex (EEC). RPOC can be suspected on ultrasound if the endometrial thickness is >10 mm following dilatation and curettage or spontaneous abortion (80% sensitive).[6] Calcification may also sometimes be present.

Color Doppler US further enhances diagnostic confidence in identifying RPOC. For example, blood clots will appear avascular at color Doppler US, whereas the detection of vascularity in a thickened EEC or endometrial mass is likely to represent RPOC. Presence of vascularity within the echogenic material supports the diagnosis (Figure 1) but the absence of color Doppler flow has a low negative predictive value because retained products of conception may be avascular . Vascularity should always be seen extending from the myometrium into the endometrium. If vascularity is isolated to the myometrium, other diagnoses besides RPOC should be considered.[7] Vascular grading of RPOC on ultrasound and colour doppler aids in proper triage of patients for further management (Figure 2).[1]

Retained products of conception can appear on MR imaging as an intracavitary uterine soft-tissue mass with variable amounts of enhancing tissue and variable degrees of myometrial thinning and obliteration of the junctional zone. Signal characteristics include: T1: variable heterogeneous signal, T2: variable heterogeneous signal, T1 C+ (Gd): can show variable enhancement.[8]

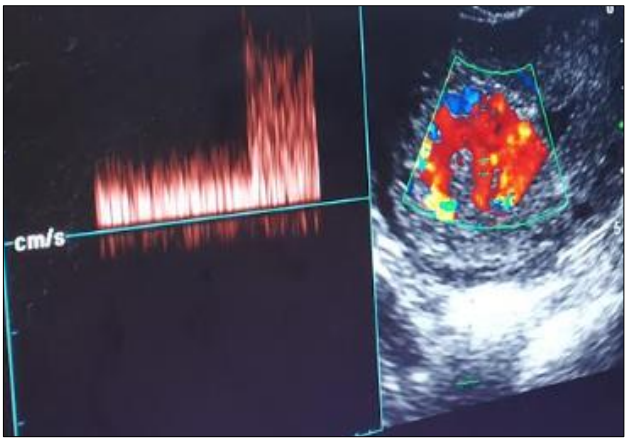

Figure 1: Transvaginal sonography and doppler image of hypervascular RPOC.

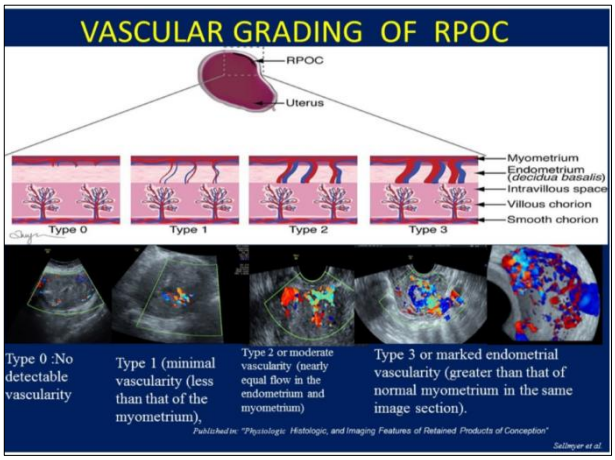

Figure 2: Vascular grading of retained products of conception on ultrasound and colour Doppler.[1]

Role of CT in imaging RPOC is limited, however, it can delineate the angioarchitecture of the vascular lesions.[9]

The biggest pitfall in diagnosis is mistaking the marked vascularity of RPOC for an AVM.[10,11] Angiography used to be the gold standard for the diagnosis of AVM.[12] The standard for AVM diagnosis is angiographic identification of an early draining vein although color-power Doppler US is increasingly being relied on as a surrogate.[13] Spectral analysis of the colour Doppler insonated area of the endometrium, in patients with AVMs, shows high flow velocities and systolic velocity peaks, similar to an arterial pattern, which suggests arteriovenous shunting.[14] However very high velocities have also been documented with retained products without AVM.

Hysteroscopy

Imaging feature of RPOC can closely imitate those of an AVM or GTN; so, hysteroscopy is one of the best non-invasive procedures which may be helpful in diagnosis

and selecting appropriate treatment especially in young patients who desire to preserve their fertility.

Histopathology

The key to the microscopic diagnosis of RPOC is the presence of chorionic villi, which indicates the persistence of placental tissue

Besides AVM, another potential mimic of RPOC is an underlying endometrial abnormality, such as an endometrial polyp or submucosal fibroid. Subinvolution of the placental implantation site is an exceptionally rare postpartum condition in which the uterine vessels fail to involute following delivery which is also a differential diagnosis.[15] Invasive moles and RPOC may have some overlap of imaging findings, but the clinical picture usually allows differentiation; the presence of a prior molar pregnancy with persistently elevated and increasing hCG levels is vital in making the diagnosis.[16]

Given the risks associated with surgical interventions, including perforation, infection, Asherman syndrome, and development of scar tissue, any of which can have a long-term negative impact on future pregnancies, accurate diagnosis is vital.[17]

Early diagnosis is critical for directing clinical management of bleeding and for preventing associated immediate complications such as perforation or infection, as well as future obstetric complications.

Managment

The management for RPOC consists of surgical intervention, medical treatment, and expectant management. Although the choice of the management depends on the patient's condition including the severity of bleeding or intrauterine infection, there is no definitive method for RPOC.

In all the cases, informed consent should be taken regarding conversion to a laparotomy or hysterectomy if uncontrollable bleeding occurred during the procedure.

Various medical and surgical methods have been employed in the treatment of retained products of conception (RPOC). Amongst the surgical methods the universally accepted technique is simple dilatation and curettage. However, it is estimated that nearly 20% of RPOC's have increased vascularity and in such cases simple dilatation and curettage (D&C) may lead to massive haemorrhage.[18]

Increased vascularity may indicate AVM which puts the patient at increased risk of life threatening intra-operative haemorrhage. A congenital AVM is extremely rare, but can grow as pregnancy progresses whereas an acquired AVM is uncommon and results from uterine damage as a result of previous uterine surgery, pelvic trauma, normal and molar pregnancy, endometriosis and endometrial cancer.[19,20] Surgical curettage can result into heavy and life threatening haemorrhage as a result of the damage to the endothelial lining of the AVM.

Vascularity can be reduced with uterine artery embolization followed by D and C. Simple D and C in cases of hypervascular RPOC should be deferred until its vascularity is sufficiently reduced.

UAE is a noninvasive radiologic modality that was first reported by Ravina et al, in 1995 where it was used as an effective pre-hysterectomy treatment. This technique results in significant clinical improvement and averted many hysterectomies as reported by various studies.[21] The procedure is of short duration performed usually under conscious sedation where the branches of uterine artery are occluded using a variety of embolization substances. The most common embolization substances used for the management of post-partum haemorrhage or vaginal bleeding include gelfoam particles, coils or glue like n-butyl-cyanoacrylate.[22] However, persistent symptoms after UAE occur in approximately 20% of patients who may require other procedures such as repeat embolization, myomectomy or hysterectomy.[23]

Hysteroscopic resection can also be tried for RPOC after the vascularity has been minimized by procedures like uterine artery embolization, iliac artery ligation or intra-arterial balloon occlusion. In a study laparoscopic temporal ligation of uterine aftery has also been attempted for removal of RPOC. Considering that blood flow is blocked for only a short time (<120 minutes) during the procedure, the procedure may have fewer effects on fertility and obstetric outcomes than UAE, and it might lead to a better prognosis.[24]

Amongst a variety of treatment options available now days for refractory cases, conservative line of management helps to preserve future fertility in younger women. Methotrexate has emerged with promising results to treat persistent retained placental tissue. Its action on the dividing trophoblastic cells of the placental tissue reduces the neovascularisation; resorption of retained placental tissue occurs over course of time.[21] Conservative management can be followed up with serial beta hcg monitoring. The failure of the serum beta-HCG level to become undetectable in retained products of conception is presumably due to a small amount of viable trophoblastic tissue and may correlate with the presence of endomyometrial mass and high vascularity.

Unprepared intrauterine manipulation in the presence of RPOCs with rich blood flow might lead to uncontrollable massive bleeding, potentially requiring an undesired hysterectomy or UAE to preserve the uterus. In view of the patient's age, completed family and assumed risk of excessive bleeding, elective hysterectomy can also be done.

DISCUSSION

Retained products of conception (RPOC) are common complications of spontaneous miscarriage or postpartum following delivery which can potentially be life threatening. Determining the etiology of postpartum and post abortion bleeding can be challenging from both a clinical and radiologic perspective. Clinical manifestations of RPOC are not specific and radiologically there are various differentials that mimic RPOC. Transvaginal ultrasonography has been introduced as a helpful technique to assess RPOC.[25] Doppler sonography combined with grayscale ultrasound can improve the accuracy of diagnosing retained products. Vascular grading of RPOC on ultrasound and colour doppler aids in proper triage of patients.

There are different modalities for management of RPOC which consists of surgical intervention, medical and expectant management depending on the patient's condition. Hyper vascular RPOC's present a clinical challenge as unprepared intrauterine manipulation in the presence of RPOCs with rich blood flow might lead to uncontrollable massive bleeding, potentially requiring an undesired hysterectomy or UAE to preserve the uterus. An accurate diagnosis is therefore essential and in all the cases, informed consent should be taken regarding conversion to a laparotomy or hysterectomy. The biggest pitfall in diagnosis is mistaking the marked vascularity of RPOC for an AVM. Although rare, it is important to recognize uterine AVMs because treatment with D and C could potentially cause serious bleeding. However, there is also a recognized potential to over diagnose uterine AVMs in the postpartum and post abortion periods. Many so-called uterine AVMs diagnosed in the early postpartum or post abortion period spontaneously resolve on follow-up imaging. This issue has clinical importance because if curettage is not performed for fear of heavy bleeding related to a possible uterine AVM, the patient may undergo preventable blood loss due to the presence of RPOC. It may be reasonable to consider proceeding with D and C with angiographic backup available if there is a high clinical suspicion for RPOC in a patient with a vascular uterine mass.

CONCLUSION

Determining the etiology of postpartum and post abortion bleeding can be challenging from both a clinical and radiologic perspective. Early and accurate diagnosis is critical for directing clinical management of bleeding and for preventing associated immediate complications as well as future obstetric complications. Thus, from this article we conclude that in all cases of RPOC's, vascularity should be evaluated with colour doppler prior to attempting dilatation and curettage to decide upon the accurate mode of management and avoid the complications of massive haemorrhage and hysterectomy. Future studies should aim to define criteria to distinguish retained products of conception from its various differentials.

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