Original Research Article

Retained products of conception: Solving the diagnostic puzzle

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Abstract

Retained products of conception (RPOC) is a partial retention of placental tissue after dilatation and curettage (D & C) procedures or vaginal deliveries. Pelvic sonography plays an important role in determining the source of abnormal bleeding and is the first-line imaging modality in the evaluation for RPOC. Though there are various gray scale ultrasound findings suggestive of RPOC, determination of presence of increased endometrial/ sub-endometrial vascularity in the context of RPOC is of paramount importance. The aim of this article is to discuss the diagnostic pitfalls of retained products of conception (RPOC) with increased vascularity. It is very important to make the obstetrician aware about this aspect as mistaking the marked vascularity of Arterio-venous malformation for hyper vascular RPOC may land up in serious intra-operative haemorrhage even with a simple procedure like dilatation and curettage and endanger the life of the patient. This makes the evaluation of vascularity in all cases of RPOC very essential as it guides the clinical management and may prevent unnecessary and some life-threatening complications associated.

Key Word: Retained products of conception, increased vascularity, Doppler study, ultrasound, arteriovenous malformation

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INTRODUCTION

Retained products of conception complicate ~1-5% of all pregnancies. According to one prospective study, RPOC was present 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. In the subacute postpartum setting, abnormal bleeding related to uterine atony can be difficult to differentiate from retained products of conception (RPOC). Pelvic sonography plays an important role in determining the source of abnormal bleeding and is the first-line imaging modality in evaluation for RPOC. The diagnosis should be made promptly because retention of placental remnants and decidua can act as a source of prolonged bleeding or as a nidus for infection. 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

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in RPOC's also includes implantation of the embryo in the lower part of the uterus and a history of multiple DandC'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. It is theorized that a retained placenta maintains its vascular connection to the uterus and when prolonged (>6 weeks) may be associated with hypertrophied peritrophoblastic vessels that communicate via areas of necrosis in the retained placenta[5]. In the last few years, several case reports of RPOC mimicking arteriovenous malformations (AVMs) have also been published, raising the suspicion that RPOC can have variable color doppler appearances, including a highly vascularized appearance[6].

Diagnosis: Common clinical symptoms include vaginal bleeding and abdominal or pelvic pain, similar to patients with gestational trophoblastic disease. Some patients may have fever[7]. Differentiation of these two 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. Clinical evaluation for RPOCs is inaccurate because symptoms of retained products are nonspecific and may be similar to those following a normal delivery. To improve on clinical evaluation and to avoid unnecessary surgery, radiology comes to the rescue. Ultrasound is typically the first-line investigation in suspected retained products of conception. Different gray scale sonographic features of RPOC, includes the presence of an intrauterine mass[8], endometrial thickness[9], and echogenicity[10]. 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. However, 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)[11].Despite the fact that the finding of an echogenic mass in the uterus or thickened endometrium is the most common sonographic feature, the appearance of retained products on sonography is variable[12,13]. The presence of calcified and uncalcified placental tissue, blood clots, and necrotic decidua in varying amounts leads to overlap of findings in patients with and without retained products. In some cases, the appearance of a mass likely represents a blood clot or normal involution of the endometrium postpartum. Besides, a vascular thickened endometrium may also have RPOC, which may not appear as a distinct mass on gray scale sonography. 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 endometrium or endometrial mass is likely to represent RPOC. Presence of vascularity within the echogenic material supports the diagnosis 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[14]. In these cases, the myometrium not immediately adjacent to the vascular area of the endometrium but in the same plane of imaging should be used as a comparison because the adjacent myometrium can be considered part of the same vascular process affecting a highly vascular endometrium. Vascular grading of RPOC on ultrasound and colour doppler aids in proper triage of patients for further management. An avascular color Doppler appearance is defined as undetectable vascularity in the endometrium (type 0). Minimal vascularity is defined as some detectable color Doppler flow in the endometrium but less than in the myometrium in the same image section (type 1). Moderate vascularity is defined as vascularity equal to or near equal to that in the myometrium in the same image section (type 2). Marked vascularity is defined as marked endometrial vascularity greater than that in the myometrium in the same image section (type 3). The presence of any vascularity in the endometrium (types 1–3) has a high likelihood of representing RPOC (FIG 1**)**. Because blood clots and debris can mimic RPOC on gray scale imaging, detection of intrinsic vascularity is helpful in distinguishing simple clots and decidua from RPOC. Vascularity may be confirmed with spectral tracings, which will separate clear arterial or venous flow from artefacts related to uterine contractions and other nonvascular causes of motion[14]

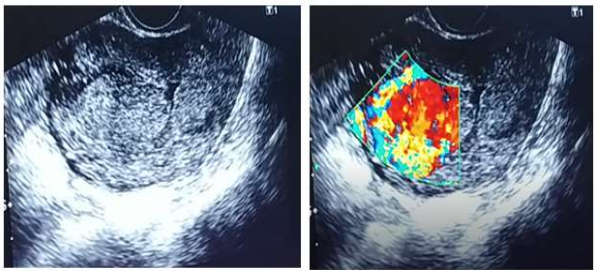

Figure 1: Transvaginal sonography showing grey scale and doppler image of hyper vascular RPOC.

Type 0 vascularity does not completely exclude the presence of RPOC[8]. The finding of avascularity should be counterbalanced by other less specific imaging findings such as the presence of an echogenic mass, endometrial thickness, and, most importantly, the degree of clinical suspicion for RPOC. Although the latter findings are not necessarily sensitive nor specific in isolation, a combination of many of these findings may in fact still be regarded as "suspicious" for RPOC. 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[15] Role of CT in imaging RPOC is limited, however, it can delineate the angioarchitecture of the vascular lesions[16]. The biggest pitfall in diagnosis is mistaking the marked vascularity of RPOC for an AVM[17,18]. Uterine AVMs can be divided into congenital and acquired subtypes[19]. Acquired uterine AVMs are usually traumatic and may be related to dilatation and curettage (DandC), therapeutic abortion, uterine surgery, or direct uterine trauma[20,21]. Although rare, it is important to recognize uterine AVMs because treatment with DandC could potentially cause serious bleeding. However, there is also a recognized potential to over diagnose uterine AVMs in the postpartum and postabortion periods[22].Many so-called uterine AVMs diagnosed in the early postpartum or postabortion 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 DandC with angiographic backup available if there is a high clinical suspicion for RPOC in a patient with a vascular uterine mass. Angiography used to be the gold standard for the diagnosis of AVM[23].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[24]. 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[25].A true uterine AVM is exceedingly rare and should persist after RPOC have been excluded. Interestingly, RPOC can have very high velocities, which may contribute to the erroneous diagnosis of an AVM. In RPOC with type 3 vascularity, the obstetrician should be made aware of the highly vascular nature, which in turn may alter management. On magnetic resonance (MR) imaging, uterine AVMs are manifested as a bulky uterus, a focal uterine mass, disruption of the junctional zones, serpiginous flow-related signal voids, and prominent parametrial vessels[26]. Spectral analysis of the vessels within the lesion shows low-impedance, high-velocity flow, with resistance index values ranging from 0.25 to 0.55 and peak velocity values ranging from 40 cm/s to 96 cm/s in previously reported cases[27]. Doppler and MR imaging features of uterine AVMs may overlap with other causes of arteriovenous shunting, including trophoblastic disease and abnormal placentation 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[28].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[29]. 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[30]. 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.

CONCLUSION

Determining the etiology of postpartum and post abortion bleeding can be challenging from both a clinical and radiologic perspective. Retained products of conception (RPOC) are common complications of spontaneous miscarriage or postpartum following delivery which can potentially be life threatening. Clinical manifestations of RPOC are not specific and clinical diagnosis is difficult. There are different modalities for management of RPOC which consists of surgical intervention, medical treatment, 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 uterine artery embolisation to preserve the uterus. An accurate and early diagnosis is therefore essential. Transvaginal ultrasonography has been introduced as a helpful technique to assess RPOC. Doppler sonography combined with grayscale ultrasound can

improve the accuracy of diagnosing retained products. 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. Vascular grading of RPOC on ultrasound and colour doppler aids in proper triage of patients. 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 in order to avoid the complications of massive hemorrhage and hysterectomy and decide upon the accurate mode of management .

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