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Case Report

Role of Dynamic Contrast-Enhanced MRI in Diagnosing Vascularized Retained Products of Conception: A Case Study

Paruchuri Vineetha[1], Jensy Jaison[2], R Rajeswaran[3]

[1]Junior Resident, Department of Radiology and Imaging Sciences, Sri Ramachandra Medical College and Research Institute, Chennai, Tamil Nadu, India, [2]Assistant Professor, Department of Radiology and Imaging Sciences, Sri Ramachandra Medical College and Research Institute, Chennai, Tamil Nadu, India, [3]Head of Department and Professor, Department of Radiology and Imaging Sciences, Sri Ramachandra Medical College and Research Institute, Chennai, Tamil Nadu, India

Abstract

Background: The term retained products of conception (RPOC) indicates the persistence of fetal and/or placental tissue in the uterus following miscarriage, termination of pregnancy, or delivery. It is one of the differential diagnoses to consider in patients presenting with bleeding per vagina after termination of pregnancy or delivery.

Case Report: A 34-year-old female who was 2-month postpartum presented with complaints of vaginal bleeding, fever, and abdominal pain. Transvaginal ultrasound revealed vascularity in the anterior myometrium, extending to the anterior cervix. Then, she was referred to magnetic resonance imaging (MRI) for further evaluation, which narrowed the differential and allowed a definitive diagnosis of vascularized retained products of conception, following which the patient underwent bilateral uterine artery embolization in the interventional radiology department.

Conclusion: RPOC is an important differential to consider in postpartum patients with vaginal bleeding. Based on the clinical history and imaging features, MRI can provide an accurate diagnosis of this disease process, leading to more focused patient evaluation and management.

Key words: Dynamic contrast-enhanced magnetic resonance imaging, Postpartum vaginal bleeding, Retained products of conception, Uterine artery embolization, Uterine arteriovenous malformation, Vascularized retained products of conception

INTRODUCTION

Postpartum bleeding is the typical physiological process that follows childbirth or miscarriage. Bleeding usually stops in the 1st postpartum week. When bleeding is very severe and uterine atony is ruled out, the next most prevalent cause is the retained products of conception (RPOC). If a postpartum patient manifests symptoms of endometritis or hemorrhage, such as fever, pelvic discomfort, and vaginal discharge or bleeding, RPOC should be suspected.[1] The placenta typically makes up the majority of RPOC and acts as a conduit for ongoing bleeding due to its highly vascular relationship to the uterus. Another close differential is gestational trophoblastic disease (GTD).

It is crucial to differentiate between these two diseases, as RPOC can be managed conservatively or with curettage.[2] On the other hand, GTD may require chemotherapy. In the postpartum period, the serum level of beta-human chorionic gonadotropin (β-HCG) helps differentiate between these two. In patients with GTD, β-HCG stays elevated, whereas it falls to an undetectable level over 2–3 weeks in patients with RPOC.[3] Ultrasound is the first modality used for the evaluation of patients with retained products of conception.[4,5]

Computed tomography (CT) and magnetic resonance imaging (MRI) offer a limited role in the evaluation of postpartum hemorrhage; however, their applicability improves with time after delivery or pregnancy termination

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Corresponding Author: Dr. Paruchuri Vineetha, Junior Resident, Department of Radiology and Imaging Sciences, Sri Ramachandra Medical College and Research Institute, Chennai, Tamil Nadu, India.

and with the clinical complexity of the case. In regular or typical cases of RPOC, ultrasound is usually sufficient; nevertheless, the distinctive appearance of RPOC at CT and MRI can be useful in case of inconclusive ultrasound imaging. If an enhancing soft-tissue mass is seen inside the endometrial canal, a solid diagnosis of RPOC can be obtained using one of these modalities.[6] The assessment of enhancement can be greatly aided by post-contrast MRI. However, the amount of tissue necrosis and hemorrhage can affect the signal characteristics of RPOC on pre-contrast T1 and T2-weighted images (T1WI and T2WI). The clinical scenario is very important since the imaging findings of RPOC on MRI can completely overlap with those of GTD.

CASE DETAILS AND RESULTS

A 34-year-old female presented to the obstetric and gynecology department with a 2-month history of excessive vaginal bleeding associated with abdominal pain following a spontaneous abortion. She had an intermittent fever and reported heavy menstrual bleeding with the passage of clots, changing 6–7 pads/day.

The patient was apparently asymptomatic 2 months ago, after which she started developing complaints, and a urine pregnancy test was done then, which was weakly positive. She denied any other symptoms. Her past medical history remains otherwise unremarkable. She had no prior history of any blood transfusions. She had a history of two prior abortions (one medical termination of pregnancy given social reasons at 10 weeks and one spontaneous miscarriage at 7 weeks), with no previous complications post-abortions. Her last childbirth was 4 years ago through a lower-segment cesarean section.

She was admitted with the above-mentioned complaints for further management. The patient had a negative urine pregnancy test and β-HCG levels of 19.4. Initial vital signs were stable (blood pressure - 100/80 mmHg, pulse - 74 bpm, respiration - 18/min, temperature - 98.6F, and pulse ox - 99%). Upon physical examination, the patient appeared pale with a soft, tender abdomen on palpation over the suprapubic area. The uterus was not palpable, and there were blood clots noted on local examination.

Diagnostic Evaluation

Laboratory findings

All baseline investigations were done. Hemoglobin (Hb) was revealed to be 7.7 g/dL, total counts were 7330, platelet count was 1.84, and HbA1c was 5.2. Renal functional tests were within normal limits. Urine analysis showed erythrocytes 5+, leukocytes 2+, pus cells 10, and bacteria 1+. Blood group O is positive. She was diagnosed as having severe anemia.

Imaging studies

A transvaginal ultrasound done in the obstetrics and gynecology department showed an anteverted uterus with an endometrial thickness of 7 mm. The anterior myometrium demonstrated vascularity extending into the anterior aspect of the cervix, and a left ovarian cyst was incidentally found.

She was referred to the radiology department with the differential diagnosis of (1) enhanced myometrial vascularity, (2) arteriovenous malformation (AVM), and (3) gestational trophoblastic neoplasia.

Dynamic contrast-enhanced MRI pelvis and abdomen [Figures 1 and 2] was done, which revealed a bulky and anteverted uterus measuring 10.4 × 6.1 × 7.8 cm (AP × TR × CC), as seen in Figure 1. Serpiginous signal intensity, which was heterogeneously hypointense on T2WI and mildly hyperintense on T1WI, showing blooming on gradient-echo, was noted within the endometrial cavity, extending to the internal cervical OS. The junctional zone could not be clearly made out. There was no significant diffusion restriction on diffusion-weighted imaging.

Furthermore, multiple prominent flow voids were noted in the uterine myometrium (anterior > posterior), traversing from the parametrium to the endometrial cavity lesion, thereby suggesting the presence of vascularity as seen in Figure 2.

On dynamic contrast-enhanced images [Figure 3], multiple prominent tortuous arterial feeders are noted from the bilateral uterine and ovarian arteries. Furthermore, a note of numerous dilated and tortuous engorged veins was made in the soft tissues of the pelvis adjoining the uterus and cervix.

A biloculated cyst [Figure 1] with a thin internal septation measuring 4.2 × 3.2 × 4.2 cm is seen in the left ovary (ovarian-adnexal reporting and data system-2). The right ovary and the rest of the pelvis appear unremarkable, and there was no significant intraperitoneal free fluid.

These findings supported a diagnosis of hypervascular RPOC (type 3) rather than AVM or gestational trophoblastic neoplasia. Due to the hypervascular nature of the lesion, digital subtraction angiography was suggested with angioembolization before definitive management.

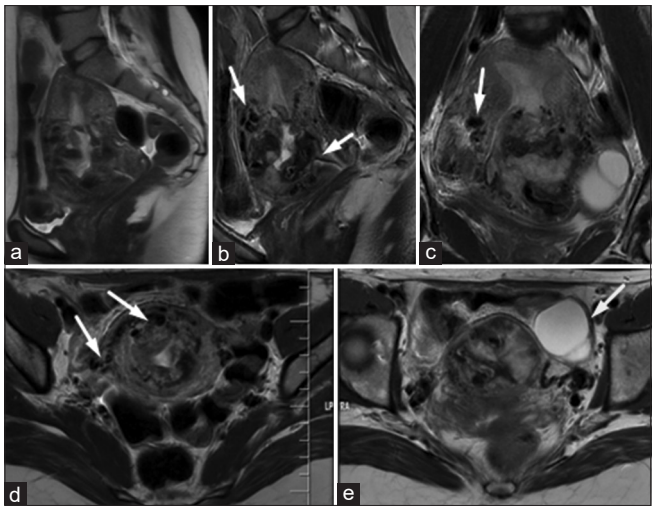

Figure 1: Magnetic resonance imaging pelvis: Sagittal, coronal, and axial views (a: Sag SSFE, b: Sag T2, c: Cor T2, d and e: Ax T2) at the level of the pelvis showing bulky and anteverted uterus. Heterogeneously T2 hypointense serpiginous signal intensity is seen in an endometrial cavity in the lower uterine segment. Multiple prominent flow voids are seen predominantly in the anterior myometrium than posterior myometrium traversing from the parametrium to the endometrial cavity lesion (white arrows). The bottom two images show an incidentally detected left ovarian biloculated cyst (ovarian-adnexal reporting and data system-2) (yellow arrow)

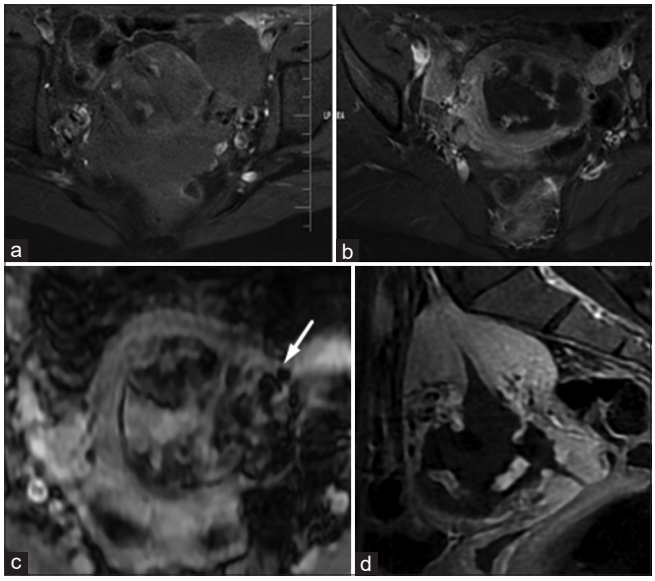

Figure 2: Magnetic resonance imaging pelvis pre- and post-contrast images (a: Ax T1 FS, b: Ax T1 FS + C, c: GRE, d: Sag T1 FS + C) showing enhancing serpiginous contents within the distended endometrial cavity (blue arrow) showing blooming on GRE sequence (white arrow). The anterior myometrium appears thinned out in the lower uterine body (white star) GRE: Gradient-echo

Management approach

Uterine artery embolization (UAE) [Figure 4]: After obtaining anesthesia consent, UAE was initiated to reduce blood flow to the hypervascular lesion, aiming to stabilize the patient's condition and prepare for definitive treatment.

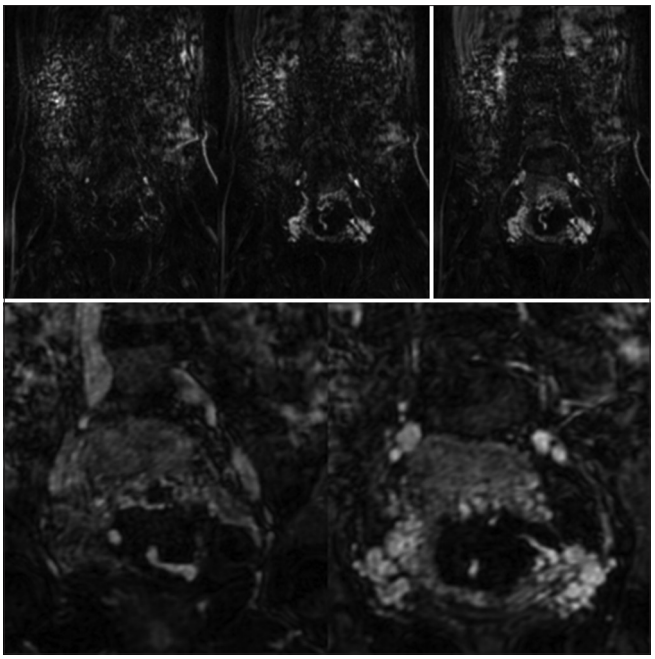

Figure 3: Dynamic contrast enhanced-magnetic resonance imaging (COR TRICKS sequence) at the level of the pelvis showing multiple prominent tortuous arterial feeders. Arterial supply is seen from bilateral uterine and ovarian arteries. Numerous dilated and engorged veins are seen within the soft tissues of the pelvis adjoining the uterus and cervix

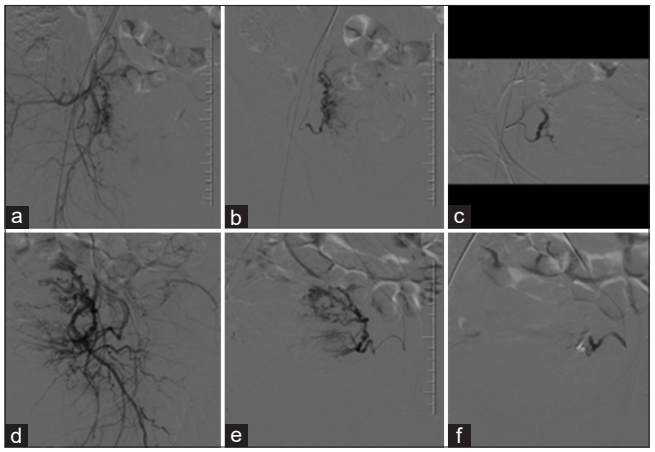

Figure 4: Bilateral uterine artery embolization for vascularized retained products of conception (RPOC) using polyvinyl alcohol (PVA) articles and gel foam slurry: (a-c: right, d-f: left). Angiogram revealed hypertrophied, tortuous bilateral uterine arteries with vascular blush suggestive of RPOC. Post-procedure angiogram revealed a complete absence of abnormal blush on either side

The suction evacuation followed embolization to remove the retained products of conception, and the specimen was sent for histopathological evaluation.

Outcome and Follow-Up

Post-operative course

The patient showed clinical improvement with the resolution of symptoms, including cessation of bleeding

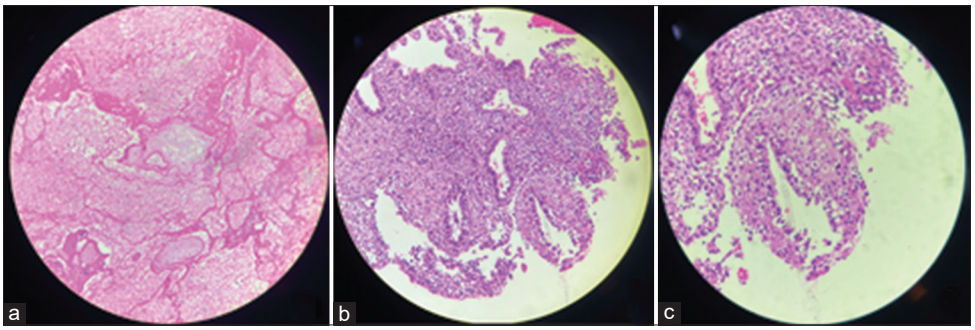

Figure 5: Histopathological examination: Specimen site: Retained product of conception endometrium. (a) Sections show completely infarcted chorionic villi with extensive areas of hemorrhage and endometrial glands showing Arias Stella's reaction. (b) No evidence of infection/molar changes. (c) High power microscopy showing endometrial tissue with stroma showing decidualization and glands showing arias Stella reaction

and improvement in hemoglobin levels (8.4 g/dL), and the repeat serum HCG level returned to normal. She was discharged the following day.

Long-term monitoring

Follow-up will include monitoring for the recurrence of symptoms and complications related to the embolization procedure.

Histopathology

Examination of the tissue specimen showed multiple gray–white to gray–brown soft-tissue fragments with spongy areas [Figure 5]. Microscopically, infarcted chorionic villi with extensive areas of hemorrhage and Arias-Stella reaction within endometrial glands were observed. Importantly, no signs of infection or molar changes were noted, confirming the diagnosis of retained products of conception, hence confirming the MRI findings.

DISCUSSION

The case presented involves a 34-year-old female who presented with excessive vaginal bleeding and abdominal pain for 2 months after a spontaneous abortion. Despite a negative urine pregnancy test and low β-HCG levels, she exhibited symptoms suggestive of RPOC. Initial evaluation with transvaginal ultrasound and subsequent MRI revealed findings consistent with RPOC, characterized by a heterogeneously hypointense signal within the endometrial cavity on T2WI and prominent vascularity involving uterine arteries.

RPOC is a medical term used to describe any tissue from a pregnancy that remains in the uterus after a miscarriage, abortion, or delivery. This tissue can include parts of the placenta, membranes, or fetal tissue. After a pregnancy loss or termination, the uterus usually expels all the pregnancy tissues naturally. However, sometimes, some tissue may remain inside the uterus, which can lead to complications such as bleeding, infection, or discomfort.

RPOC is a known but rare complication post-abortion or miscarriage, leading to severe anemia and abnormal uterine bleeding. In this case, the patient's prolonged symptoms and imaging findings pointed toward a hypervascular lesion, necessitating a multidisciplinary approach for diagnosis and management. UAE followed by surgical evacuation effectively managed the patient's condition, with histopathology confirming the diagnosis.

The differential diagnosis for vascular endometrial mass on imaging includes GTD and uterine AVM. These may have similar postpartum or post-abortion complaints. GTD can be excluded if the serum level of β-hCG is markedly elevated. Hypervascular RPOC (type 3) and uterine AVM can have overlapping clinical appearances and can sometimes coexist, but strict differentiation may be difficult.[7]

A dynamic contrast-enhanced MRI scan can be useful in evaluating RPOC and differentiating it from other conditions.

MRI can provide detailed images of the uterus and surrounding structures, allowing health-care providers to identify and locate any retained products of conception. This can include parts of the placenta, fetal tissue, or membranes that may not have been completely expelled after a miscarriage, abortion, or delivery.

MRI can also assess for complications associated with retained products of conception, such as infection or abnormal uterine anatomy.

The detailed images provided by MRI can assist health-care providers in planning the appropriate treatment. The degree of vaginal bleeding, the level of vascularity, and

the size of the endometrial component all influence how RPOC is managed and treated. Medical treatment and attentive monitoring may be sufficient if the patient reports sporadic vaginal bleeding and the endometrial component is hypovascular (type 0, 1). Dilatation and curettage are suggested if the endometrial component is large and hypovascular or has moderate vascularity (type 2). Either surgical excision of the residual tissue under ultrasound guidance or UAE may be advised if the endometrial component exhibits hypervascularity (type 3).[8,9]

Furthermore, in cases where treatment has been performed to remove retained products of conception, MRI can be used to confirm the completeness of the removal and ensure that there are no residual issues.

CONCLUSION

The clinical presentation, imaging findings on MRI, and subsequent histopathological evaluation confirmed the diagnosis of RPOC in this patient. This case underscores the importance of a systematic approach to diagnosing and managing vascularized RPOC following spontaneous abortion. Utilization of advanced imaging techniques like dynamic contrast enhanced-MRI was pivotal in delineating the extent of uterine pathology and the management of postpartum complications such as retained products of conception, which can present similarly to other conditions, such as uterine AVMs or trophoblastic neoplasia. Multidisciplinary collaboration among obstetricians, radiologists, and pathologists ensured comprehensive care and optimal patient outcomes.

Distinguishing between RPOC and uterine AVM on MRI can be crucial for accurate diagnosis and appropriate management. Here are some key points to differentiate between the two:

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Any errors or omissions are the responsibility of the authors.

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