Evidence-Based Reporting of Suspected Retained Products of Conception Following Miscarriage or Termination of Pregnancy

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Purpose

Retained products of conception (RPOC) can be a troublesome complication following first trimester miscarriage or termination of pregnancy (TOP). Symptoms include uterine bleeding and endometrial infection, which in turn can lead to intrauterine adhesions with negative effects on fertility and future pregnancies. Dilatation and curettage (D&C) is often performed as a treatment for RPOC, however this also carries risks such as uterine perforation and cervical laceration. In addition, this procedure can cause Asherman's syndrome (intrauterine adhesions secondary to instrumentation).\(^{(1,2)}\)

By supplementing clinical assessment with transvaginal ultrasound, patients with suspected RPOC can be allocated to either conservative or surgical management. Nonetheless, there is little consensus in the literature on the most appropriate sonographic features to use in clinical decision making, with institutions placing different amounts of emphasis on different findings.

Varying endometrial thickness cut-off values have been adopted in some institutions, with a wide range of reported sensitivities and specificities. A high rate of false positive results has been reported in this setting with patients potentially being subjected to unnecessary procedures. It seems that reliance on endometrial thickness alone is likely to be inaccurate.\(^{(1,3)}\)

Other studies have suggested that the presence of an intracavity mass has a high association with RPOC on histology. Colour Doppler, in addition to 2D ultrasound, has also had a role in distinguishing a mass lesion from otherwise normal endometrial tissue.\(^{(4,5,6)}\) One recognised pitfall in using Doppler however, is the potential for confusion of hypervascular myometrium with an arterovenous malformation. Much anxiety surrounds such a finding, as the potential for extensive bleeding following dilatation and curettage has been documented. In the vast majority of cases, the vascularity disappears as the RPOC eventually organizes and the remnants can be surgically removed. A true AVM is actually exceedingly rare.\(^{(7)}\)

In addition to the above biomarkers, the status of the cervix can indicate whether or not the patient is unstable and requires more urgent intervention.\(^{(8,9)}\)

Our aim is to provide a simple, structured approach to reporting ultrasound findings, with a focus on providing clinically relevant information in patients with suspected RPOC.
Methods and Materials

A retrospective audit was performed of women who presented to the Royal Brisbane and Women's Hospital emergency department between 1st November 2011 and 15th February 2012 with suspected RPOC following first-trimester miscarriage or TOP. Post partum investigation of RPOC was not included in this study as sonographic findings can be non-specific and the normal post-partum appearances of the uterus can be confused with pathology.\(^\text{10}\)

The time-to-presentation (time from miscarriage or TOP to presentation) varied between two to ten days with a mean time-to-presentation of four days. Two separate observers analysed the ultrasound images recorded. Inter-observer reliability was calculated using Cohen’s kappa.

Patient inclusion criteria:

- Previously confirmed pregnancy with a quantitative human chorionic gonadotropin (beta-hcg)
- Reported symptoms of vaginal bleeding, passage of products of conception, abdominal pain or fever

Exclusion criteria:

- Second or third trimester
- No pelvic ultrasound performed or available for review

All subjects underwent an ultrasound study performed by an experienced sonographer. A transabdominal and transvaginal technique was used on every patient and colour doppler was performed on any identified endometrial abnormality. The following biomarkers were assessed:

1. Endometrial uniformity (Figures 1,2)
   - Both layers of the endometrium were visualised to assess uniformity.
   - Absence of RPOC was defined as a regular endometrium with a distinct interface between the endometrium and myometrium

2. Intracavitary mass (Figure 3)
   - Defined as a focal area of increased tissue thickness, typically with different echogenicity and echotexture to the remainder of the endometrium.
3. Vascularity associated with a mass (Figure 4)
   • This was assessed using a colour Doppler.

+/‐ Cervical dilatation (Figure 5)
   • The cervix was determined to be either open or closed based on the presence or absence of blood, fluid or debris in the endocervical canal.

Due to the disparity between the findings of different studies and the reported differences in clinical decision-making algorithms between institutions, it was determined that the best approach to interpreting ultrasound biomarkers (in the correct clinical setting) was to provide a simple risk‐stratification of the likelihood of having RPOC. We determined the risk as being either unlikely, likely or highly likely based on a score derived from the biomarkers described.

   • Unlikely (0 or 1 of 3 biomarkers present)
   • Likely (2 of 3 biomarkers present)
   • Highly likely (3 of 3 biomarkers present + presence of an open cervical os)

Images for this section:
**Fig. 1:** Greyscale ultrasound image of uniform endometrium

![Greyscale ultrasound image of uniform endometrium](image)

**Fig. 2:** Greyscale ultrasound image of non-uniform endometrium

![Greyscale ultrasound image of non-uniform endometrium](image)
Fig. 3: Greyscale transvaginal ultrasound image of an intracavitary mass, measured at 0.7cm
Fig. 4: Vascularity associated with intracavitary mass on Doppler
Fig. 5: Open Cervix
Results

Thirty-four women met the criteria for inclusion.

Biomarkers of RPOC

<table>
<thead>
<tr>
<th>Biomarker</th>
<th>Observer 1</th>
<th>Observer 2</th>
<th>Kappa Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Uniform Endometrium</td>
<td>28/34 (82%)</td>
<td>27/34 (80%)</td>
<td>0.673</td>
</tr>
<tr>
<td>Intracavitary Mass</td>
<td>15/34 (45%)</td>
<td>18/34 (52%)</td>
<td>0.579</td>
</tr>
<tr>
<td>Vascularity of Mass</td>
<td>8/34 (24%)</td>
<td>9 (26%)</td>
<td>0.924</td>
</tr>
<tr>
<td>Cervix Open</td>
<td>8/34 (24%)</td>
<td>8/34 (24%)</td>
<td>0.835</td>
</tr>
</tbody>
</table>

Inter-observer Reliability

Overall, the inter-observer reliability in determining the presence or absence of the biomarkers was adequate. Specifically:

- Substantial agreement (91% raw agreement) when identifying endometrial non-uniformity (kappa value of 0.673)
- Moderate agreement (78% raw agreement) was found in the presence of an echogenic mass (kappa score of 0.579)
- Excellent agreement (kappa=0.924) for the presence of vascularity of a mass
- Excellent agreement (kappa=0.835) for the presence or absence of an open cervical os

Risk Stratification Based on Findings

<table>
<thead>
<tr>
<th>Likelihood of RPOC</th>
<th>Observer 1</th>
<th>Observer 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlikely RPOC</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Likely RPOC</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Highly Likely RPOC</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>34</td>
</tr>
</tbody>
</table>

Both Observer 1 and 2 had similar classification of patients according to their likelihood of having RPOC.
Conclusion

Discussion and Conclusion:

Although ultrasound is regularly used in the diagnosis of RPOC, the available literature on the subject reports varied degrees of accuracy of individual biomarkers when correlated to histological findings. This is likely to be due to a number of factors including relatively small sample sizes, inconsistent definitions of positive biomarker features and variation in study design. In addition, the presence of RPOC histologically should not necessarily govern clinical decision-making, as even when women are initially treated conservatively they may require further surgical intervention to remove RPOC that have not passed naturally.\(^{(11,12)}\)

Given these circumstances and the variation in treatment algorithms between institutions, the most logical way to report ultrasound findings is to simply describe the findings. The hallmark of clinically-relevant radiology reporting, however, is in providing an interpretation. With this in mind, we would also advocate the inclusion of a simple risk-stratification of the likelihood of RPOC. This is based on our reading of the available literature that correlates RPOC on ultrasound and histology.

The biomarkers used in this small audit are likely to be sufficient to risk-stratify patients for this purpose. This in turn allows appropriate information to be relayed to emergency physicians and gynaecologists in order to assist in patient management.

Personal Information

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References


