

# Can Ultrasound Predict the Presence of Retained Products of Conception Following First-Trimester Spontaneous Abortion?

Z Zare<sup>1\*</sup>, M Shadman Zijerdi<sup>1</sup>

<sup>1</sup>Department of Radiology, Shiraz University of Medical Sciences, Shiraz, Iran

## Abstract

**Background:** The incidence of retained products of conception (RPOC) has been reported as 1-3% and ultrasound has an important role in their diagnosis and selection of patients for surgical management. The aim of this study is to identify that ultrasound is a predictor of the presence of retained product of conception (RPOC) within the uterine cavity in women with the clinical diagnosis of incomplete first trimester abortion.

**Methods:** One hundred patients with a diagnosis of incomplete abortion and RPOC based on clinical and sonographic findings were enrolled. The gold standard test was pathologic reports of samples obtained during dilatation and curettage. Endometrial thickness and homogeneity of the endometrium were determined by sonography. The sensitivity and specificity of the measurements for detecting RPOC were assessed.

**Results:** Histopathological reports confirmed the diagnosis of RPOC in 71 patients (71%). Mean endometrial thickness with RPOC was 16.3 mm versus 12.1 mm without RPOC. Heterogenic endometrium was seen in 56 out of 71 patients (78 %). The sensitivity and specificity of the endometrial thickness greater than 11.25mm for detecting RPOC were 81% and 45%, respectively. Regarding the endometrial thickness and heterogenic endometrium, 13.5 mm had the best performance criteria with 60% and 63% sensitivity and specificity, respectively.

**Conclusion:** An endometrial thickness of 11.25 mm or more detected by sonography had the best diagnostic efficacy, considering the heterogeneity with the thickness of the endometrium, 13.5 mm had the best performance criteria for detection of RPOC following first trimester spontaneous abortion.

**Keywords:** Ultrasonography; Retained products of conception; Incomplete abortion

## Introduction

Spontaneous abortion is one of the most common admission causes in gynecologic wards.<sup>1</sup> Surgical curettage accounts for 3/4 of emergency gynecological operations to evacuate the possible retained gestational tissue in the uterine cavity for prevention of any complication such as perforation, hemorrhage, trauma to the cervix, intrauterine adhesion, infertility, and postoperative endometritis. The complication rate of varies between 4 to 10%.<sup>1</sup> The economical costs and anesthesia complications are important in this procedure. The incidence of retained products of con-

ception (RPOC) has been reported as 1-3%,<sup>2</sup> and its diagnosis is based on clinical presentations, bimanual examination, sonographic findings and a histopathological confirmation. B-HCG level has an insignificant role in the diagnosis in cases who are within 3 weeks after abortion but ultrasound has an important role in the diagnosis of the RPOC and selection of patients for surgical management. If the presence of RPOC cannot be ruled out by sonographic findings, the physician has to resort to curettage that is a procedure with some possible complications.<sup>3</sup> So, accurate diagnosis as much as possible is mandatory to avoid unnecessary curettage. Sonography is a simple and safe technique to detect the RPOC, but unfortunately there is no consensus in the literature regarding the optimal sonographic criteria to rule out the retained products of conception. Many sonographic

\*Correspondence: Zahra Zare, MD, Assistant Professor of Radiology, Shiraz University of Medical Sciences, Shiraz, Iran. Tel: +98-917-710-2628, Fax: +98-711-647-3233, e-mail: [zzare@sums.ac.ir](mailto:zzare@sums.ac.ir)  
Received: January 20, 2009 Accepted: May 17, 2009

features are mentioned in the literature for determining the presence of RPOC such as endometrial mass, thick endometrium, irregular endometrial interface, complex endometrial fluid or echogenic focus without apparent endometrial mass.<sup>4</sup> However, there is no agreement on the appropriate cut-off level of endometrial thickness for diagnosis of incomplete abortion. The aim of this study was to find an optimum cut-off level of endometrial thickness or presence of homogeneity or heterogeneity of the postabortion endometrium or combination of them, using pelvic or transvaginal ultrasonography to detect RPOC in patients with first trimester abortion.

## Materials and Methods

From June 2005 to September 2007, 100 women referred to Zainabieh Hospital affiliated to Shiraz University of Medical Sciences in Shiraz, southern Iran with clinical and sonographic findings suggestive of a first trimester spontaneous incomplete abortion or RPOC before having completed 12 weeks of gestation were enrolled. The gestational age was determined based on the date of last menstrual period (LMP). The women who had a gestational age more than 12 weeks or had unknown LMP were excluded. The women were first examined by a gynecologist and selected for operation based on clinical data like a positive pregnancy test result, a history of tissue and blood passage and an open cervical os. Then, they were referred to the Radiology Department and a pelvic or transvaginal sonography (according to the physicians' request) was performed, using a 5-7.5 MHZ probe (Schimadzo 2000 Japan). In accordance with the sonographic findings, the patients were divided into several groups of normal uterine cavity, pure endometrial fluid collection, irregular empty or non-empty gestational sac, evidence of ectopic pregnancy and intracavity mixed echopattern of fluid and solid compartments. The first two groups were considered not to have RPOC whereas the 3rd one certainly had RPOC and was also excluded from this study. The 4th one was also excluded and the last one was suspected of having residual RPOC and so the endometrial thickness was measured in the longitudinal view. The measurement was always performed in such a way as to include the maximum anteroposterior diameter of the uterine cavity at the site of the suspected RPOC. The homogeneity or heterogeneity of the endometrium was also mentioned. Indi-

cations for surgical removal of RPOC were vaginal bleeding and clinical examinations. The time interval between the onset of bleeding and ultrasound examination was recorded in all cases. The final diagnosis of incomplete miscarriage was based on the histopathologic evidence of chorionic villi in tissue samples obtained following D&C. T and Chi-Square tests were used for statistical analysis.

## Results

Histopathologic reports confirmed the presence of villi in 71 (71%) patients. The mean age was  $28.1 \pm 7.1$  years. The median parity was 2 with a range of 1-7. The mean interval between initial bleeding and sonographic examination was  $6.6 \pm 8.7$  days. Endometrial thickness was significantly higher in patients with RPOC (16.3 versus 12.7 mm;  $p < 0.001$ ). Fifty six (78%) patients with residual material versus 16 (55%) having negative histopathology had significant heterogeneous endometrium ( $p = 0.040$ ).

The diagnosis of RPOC could be made with a sensitivity of 81% and specificity of 45% when endometrial thickness of 11.25 mm was chosen as a cut-off level. This cut-off level had the best diagnostic performance, using ROC curve with 0.7 of area under the curve. The diagnosis of retained gestational material could be made with a sensitivity of 81% and specificity of 45% when endometrial thickness of 11.25 mm was chosen as the cut-off point. In this study, homogeneity of the endometrium was also considered and among the patients with residual material, 56 out of 71 (78.8%) had heterogeneous endometrium whereas 16 out of 29 (55%) patients without retained material had heterogeneous endometrium ( $p = 0.040$ ).

When both of these parameters, endometrial thickness and heterogeneous endometrium were considered together, 13.5 mm was chosen as the cut-off level with a sensitivity of 60%, specificity of 63% and positive and negative predictive values of 85% and 31%, respectively.

## Discussion

Management of post-abortion patients with suspected retained material is problematic because neither accepted diagnostic criteria nor treatment protocols exist. Sonography is widely used to evaluate the endometrial cavity to detect RPOC following first trimes-

ter abortions.<sup>4</sup> According to our data, endometrial thickness greater than 11.25 mm has the best diagnostic performance to detect RPOC in our patients. The sensitivity and specificity for 11.25 mm are 81% and 45%, respectively.

Several studies have reported the various cut-off levels for ruling out RPOC. In one study, 8 mm has been suggested as the cut-off level with a sensitivity and specificity of 100% and 80%, respectively.<sup>4</sup> In another study, the researchers reported 13 mm as the cut-off level with a sensitivity of 85% and a specificity of 64%.<sup>5</sup> Our results were inconsistent with 8 mm, since we had obtained lower sensitivity (28%) with this thickness. We also mentioned heterogeneous endometrium as another parameter; when we used both of them, 13.5 mm had the best performance criteria with 60% and 63% sensitivity and specificity, respectively. This is in agreement with Maslovitz *et al.* who have stated that morphological character of the endometrium can be helpful in the diagnosis of RPOC. In our study, the minimum endometrial thickness with residual material was 6 mm. These findings are compatible with Sawyer *et al.*<sup>3</sup> and Kurtz *et al.*'s<sup>6</sup> findings that have mentioned a percentage of women with endometrial thickness below 10 mm on preoperative ultrasound showing residual gestational material.

So, novelty in our research as compared to other studies is assessing morphological features of the

endometrium in combination with measurement of the endometrial thickness to predict the RPOC. In our exam, gynecologists at first selected the patients according to the clinical findings and exams. So it is necessary to consider the combination of clinical and sonographic findings, as stated by Leung *et al.* in 2004.<sup>7</sup> In our research, there was no relevance between the time interval of the onset of bleeding and sonographic performance with having or not having RPOC. This is in agreement with Sawyer *et al.*'s findings in 2007.<sup>3</sup>

Regarding merely the endometrial thickness, 11.25 mm had the optimal efficacy to detect RPOC but when morphological feature of the endometrium is also included, 13.5 mm has the best diagnostic performance. Conservative management below the above-mentioned cut-off levels in accordance with the clinical findings may be appropriate and might avoid unnecessary surgical intervention until a better diagnostic approach is introduced with case control studies.

### Acknowledgement

The authors wish to thank Shiraz Medical Imaging Center for financial support.

**Conflict of interest:** None declared.

### References

- Moodliar S, Bagratee JS, Moodley J. Medical vs. surgical evacuation of first-trimester spontaneous abortion. *Int J Gynaecol Obstet* 2005;**91**:21-6. [16051242] [doi:10.1016/j.ijgo.2005.06.009]
- Debby A, Malinger G, Harow E, Golan A, Glezerman M. Transvaginal ultrasound after first-trimester uterine evacuation reduces the incidence of retained products of conception. *Ultrasound Obstet Gynecol* 2006;**27**:61-4. [16374763] [doi:10.1002/uog.2654]
- Sawyer E, Ofuasia E, Ofili-Yebovi D, Helmy S, Gonzalez J, Jurkovic D. The value of measuring endometrial thickness and volume on transvaginal ultrasound scan for the diagnosis of incomplete miscarriage. *Ultrasound Obstet Gynecol* 2007;**29**:205-9. [17201018] [doi:10.1002/uog.3914]
- Wong SF, Lam MH, Ho LC. Transvaginal sonography in the detection of retained products of conception after first-trimester spontaneous abortion. *J Clin Ultrasound* 2002;**30**:428-32. [12210461] [doi:10.1002/jcu.10086]
- Ustunyurt E, Kaymak O, Iskender C, Ustunyurt OB, Celik C, Danisman N. Role of transvaginal sonography in the diagnosis of retained products of conception. *Arch Gynecol Obstet* 2008;**277**:151-4. [17710427] [doi:10.1007/s00404-007-0436-z]
- Kurtz AB, Shlansky-Goldberg RD, Choi HY, Needleman L, Wapner RJ, Goldberg BB. Detection of retained products of conception following spontaneous abortion in the first trimester. *J Ultrasound Med* 1991;**10**:387-95. [1870183]
- Leung SW, Pang MW, Chung TK. Retained products of gestation in miscarriage: an evaluation of transvaginal ultrasound criteria for diagnosing an "empty uterus". *Am J Obstet Gynecol* 2004;**191**:1133-7. [15507932] [doi:10.1016/j.ajog.2004.04.024]