



Using Ultrasound for Diagnosing Remnants of Pregnancy after Second-Trimester Abortion: Is it Practical?

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ABSTRACT

The purpose of this study was to determine the sonographic characteristics of retained products of conception after second-trimester abortion. 187 women clinically suspected for retained products of conception referred for abdominal and if needed transvaginal ultrasound between 2015 and 2016. If remnants of pregnancy were suspected due to prolonged symptoms, and some specific sonographic findings (echogenous or heterogeneous mass, upper or lower segment maximal anterior-posterior endometrial thickness of more than 15 millimeter) dilation and curettage was performed and the specimen was sent for pathological confirmation. Information regarding age, gestational age, and number of previous pregnancies, as well as sonographic findings were recorded. 55 patients (29.4%) were found to have retained products of conception. Every patient with retained products of conception had at least one positive sonographic finding. A lower segment endometrial thickness of more than 15 mm was the most specific characteristic of retained products of conception (97.7%) with the highest PPV (83.3%), followed by endometrial mass with 94% specificity and 65% PPV. Lower segment endometrial thickness of more than 15mm is the most specific sonographic finding for remnants of pregnancy; while, upper segment thickness of more than 10mm is the most sensitive one.

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Introduction

Despite the fact that the majority of abortions take place in the first trimester, second trimester abortions comprise about 15% of all induced abortions. These abortions are responsible for nearly 70% of all major abortion-related complications [1].

Presence of retained products of conception, although fairly uncommon, may lead to additional surgical evacuation [2]. This intervention is associated with complications such as perforation of the uterus, cervical injury, infection, hemorrhage, intrauterine adhesion formation and subsequent infertility [3]. Therefore, accurate selection of patients who require this procedure is fundamental [3,4]. As retained products of conception have nonspecific clinical symptoms and varied sonographic features, establishing a precise criteria regarding retained tissue is vital in order to reduce unnecessary interventions [3,5].

Therefore, we have conducted this study to assess the accuracy of different sonographic parameters in diagnosing retained products of conception after second-trimester induced abortions.

Materials and Methods:

This study was performed at Yas hospital affiliated to Tehran University of medical sciences. The study was approved by ethical committee of the medical faculty of Tehran university of medical sciences. Informed consent was obtained from all patients.

Our study population consisted of 187 pregnant women in their second-trimester (14 to 28 weeks of gestation) undergoing medical abortion with misoprostol between 2015 and 2016.

Information including maternal age, gestational age, and number of previous pregnancies was recorded.

Transabdominal (3.5 to 5 MHz) and if needed transvaginal ultrasonography (5 to 7 MHz transducer) was performed by two attending perinatologists 48 hours post-abortion.

Persistent symptoms alone or in combination with some specific ultrasound findings led to dilation and curettage (D&C). These findings include: echogenous or heterogeneous mass, and upper or lower segment maximal anterior-posterior endometrial thickness (ET) (in the longitudinal plane) of more than 15 millimeter. Presence of chorionic villi and membranes on histopathology confirmed the diagnosis of retained products of conception. The data was analyzed using the Statistical Package for the Social Sciences (SPSS, version 18 for windows, Chicago, Illinois, USA). Sensitivity, specificity, positive and negative predictive values were calculated to assess the diagnostic value of each ultrasound finding.

Results:

There were 187 patients enrolled in our study, with a mean age of 28.7 ± 5.8 years, mean gestational age of 18.28 ± 3.65 weeks, and mean previous pregnancy number of 2.09 ± 1.3 . 71 patients (37%) underwent surgical intervention

Table 1. Sonographic findings.

	Remnants of pregnancy Pathologically proved 55 (29.4%)	No remnants of pregnancy 132 (70.5%)	
		Pathologically proved (4.8%)	Not proved by pathology (65.7%)
Upper segment endometrial thickness ≥ 10 mm	11 (22.4%)	3 (6.1%)	35 (71.4%)
Upper segment endometrial thickness ≥ 15 mm	15 (83.3%)	3 (16.7%)	0 (0%)
Lower segment endometrial thickness ≥ 15 mm	13 (65%)	6 (30%)	1 (5%)
Heterogeneous mass	38 (45.8%)	6 (7.2%)	39 (47%)

Table 2. sensitivity, specificity, PPV, and NPV of sonographic findings.

	Mass	Upper segment ET ≥ 10 mm	Upper segment ET ≥ 15 mm	Lower segment ET ≥ 15 mm
Sensitivity	23.6%	79.6%	69%	27.27%
Specificity	94.6%	28.5%	68.9%	97.7%
PPV	65%	31.1%	45.7%	83.3%
NPV	74.8%	77.5%	83.6%	76.3%

due to persistent symptoms or specific ultrasound findings, 16 of whom appeared to have no retained products of conception on pathological examination; this means 22% unnecessary intervention. Among those, who underwent unnecessary D&C, 2 had both upper and lower segment endometrial thickness of more than 15mm and 5 had both endometrial mass and high upper segment endometrial thickness. Overall, retained products were found in 29.4% (55 of 187) of all study patients and 77.4% (55 of 71) of patients who had surgical intervention. The sonographic findings are listed in table 1. For each sonographic finding sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated and this data is illustrated in table 2. Noteworthy is that each patient with retained products of conception had at least one positive sonographic finding suggestive of pregnancy remnants. A lower segment endometrial thickness of more than 15 mm on ultrasonography was the most specific characteristic of retained products of conception (97.7%) with the highest PPV (83.3%), followed by endometrial mass with 94% specificity and 65% PPV, in the second place. 7 patients underwent D&C due to persistent symptoms alone (bleeding, pelvic pain, or both); among them just 2 patients had retained products of conception on pathology specimen.

Discussion:

Despite the importance of recognizing retained products of conception after delivery in the second trimester, a widely accepted sonographic criteria has not yet been introduced (2). Malvern et al is one of the first researchers who used pelvic ultrasound to evaluate retained products of conception. In his study, although a high false positive rate was reported, it was observed that unnecessary curettage could be avoided in 74% of the patients considering the sonographic findings (6). A high false positive rate was also reported in other studies ranging from 17% to 51% (5,6,7). Uterine echogenous mass and increased endometrial thickness are among the most common features used on the ultrasound for diagnosing retained products of conception (3,8). In a study on 163 patients, Durfee et al, reported endometrial mass as the most sensitive finding, although not specific (8). Abbasid et al, conducted a retrospective study on 91 patients with suspected retained products of conception after first trimester miscarriage. They reported sensitivity of 78% and specificity of 100% for hyperechoic material on ultrasound (4). Abbasi et al's (4) findings are in complete agreement with the results of Creinin at al's study (9).

They claimed that a relationship between ET and incomplete abortion is very unlikely and it is due to this fact that efforts for finding a cut-off point have been unsuccessful (4,9). In Creinin at al's study none of the patients with ET ≥ 15 mm needed evacuation (9). This is in accordance with the study of Reeves MF et al, who considers endometrial thickness of any measure, not a useful indicator for further D&C need (10). Also, Cowett et al observed the ET after administering a single dose of misoprostol and mifepristone and claimed that although ET was higher in those who failed having a successful abortion, it cannot be relied on for indicating surgical procedures (11). Conversely, according to our findings the most sensitive sonographic measure for retained products of conception is upper segment ET ≥ 10 mm (79.6%), yet it has the least specificity (28.5%) and relying on it, alone, can result in many unnecessary interventions. Meanwhile, an upper segment ET ≥ 15 mm has been shown to be fairly sensitive and specific, 69% and 65.9%, respectively.

But, it has the highest negative predictive value (83.6%) among other findings. Thus, the likelihood of retained products of conception sinks drastically when the upper ET is reported less than 15mm. Similarly, El-Baradie SM reported a sensitivity of 88.5% and a specificity of 73.3% for ET ≥ 12 mm, which in combination with beta-human chorionic gonadotropin levels and clinical assessment can be used as a predictor of retained products of conception (12). A study conducted by Ori Shen et al shows that when transabdominal or transvaginal ultrasound reveals a mass larger than 10mm thick, uterine exploration is needed to rule out retained products of conception (7). Also Maged et al, who had conducted a study to determine the role of transvaginal ultrasound in detection of retained products of conception, considered an ET of more than 15mm and focal heterogeneous contents as markers for retained products of conceptions (3).

The lower segment ET had also been measured in our study, and to our surprise, it had revealed the highest specificity (97.7%) and a positive predictive value of 83.3%. Whereas acting on it may spare many unnecessary D&Cs, it cannot be used as a screening means since it is as less sensitive as 27.27%. The second highest specific test, according to our findings, is endometrial mass (94.6%). But, that is, too, not sensitive enough to be used as screening measure.

Karimpour found the endometrial thickness of greater than 12 mm the best diagnostic value with a sensitivity of 66.2% and specificity of 97.6% and reported no correlation between irregularity in the myometrium and endometrial mass with retained products of conceptions (13).

There is a study in which 8mm has been suggested as the cut-off point for ET with sensitivity and specificity of 100% and 80%, respectively (14). Another researcher had considered 13mm the cut-off value and reported 85% of sensitivity and 64% of specificity (15).

Despite all these studies, there are still authors like Sadan et al, who believe that sonographic diagnosis, due to its high false- positive rates, could not be relied on, as it imposes many unnecessary procedures on the patients (5).

In another study of us, the overall curettage rate was 35.4%, when 15mm was considered as ET cut-off point (16). Similarly, 34.3% curettage (46 of 134) is reported in another research in our center (17). In our study 37 % (71 out of 187 cases) underwent D&C from which 12.3% (9 of 71) were unnecessary and pathological report indicated decidua.

There are also studies in which gray-scale and color doppler transvaginal sonographic examination were performed to determine the most useful predictors of retained products of conception. M.Atri et al reported a sensitivity of 81%, a specificity of 71%, and a negative predictive value of 85% and an accuracy of 75% to detect retained products of conception when an endometrial mass is present. For focal color vascularity, these values were as follows: 94%, 67% ($p > 0.05$), 95% and 78% ($p > 0.05$) respectively. Consequently, these authors concluded that increased focal vascularity with or without a mass can be used as the best predictor of diagnosing retained products of conception (18).

Sellmyer et al considered gray-scale ultrasound findings, alone, insufficient and stated that detecting vascularity in a thickened endometrium or an endometrial mass raises the positive predictive value of diagnosing remnants of pregnancy. They have found thickened endometrium the most sensitive finding of retained products of conception at gray-scale ultrasound. They used 10 mm as the cut-off value. Another finding they reported, was the presence of an endometrial mass with a sensitivity of only 29% but a positive predictive value (PPV) of 80%. Yet, they believe that doppler ultrasound enhances the confidence of diagnosis, since by presence of vascularity in a thickened endometrial focus or mass, the PPV rockets to 96% (19). A limitation of our study was the scant number of cases. Therefore, we propose that this study be done in greater scales using other measures such as doppler ultrasound.

Disclosure:

There are no conflicts of interest between authors of this study. No author has received funding or research grants. All procedures performed in this study were in accordance with the ethical standards of the institutional and national research committee. Informed consent was obtained from all individual participants included in the study.

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