Original Research

Devising New Management Protocol Based on Sonographic Sensitivity for the Detection of Retained Products of Conception

ABDUS S Q.,[1] SABAHAT S.,[2]

Address for Correspondence: *Dr. Abdus Sami Qazi Department of Radiology, Postgraduate Medical Institute / Lahore General Hospital, Lahore*

Objective: To assess the accuracy of ultrasonography for the detection of retained products of conception in post partum and post abortal patients with Trans abdominal sonography using conventional medium frequency probes.

Material and methods: Out of 289 patients referred by the Gynaecology Department with strong clinical suspicion of RPOC on clinical examination, 179 patients had D&C after sonographic evidence favouring RPOC. Sonographic criteria used for RPOC were echogenic, echopenic or mixed echogenecity uterine cavity mass with anteroposterior dimension equal to or exceeding 10 mm. We did not take into account the D&C carried out on clinical suspicion as this study was not designed for that and we wanted to know the sensitivity of Ultrasonography alone for detection of RPOC. For statistical analysis patients were divided into three groups depending on the antero posterior measurement of endometrial mass. Group I, endometrial mass thickness 10-12 mm, Group II, endometrial mass measurement 13-15 mm, Group III, anteroposterior endometrial mass thickness of 16-20 mm and Group IV with endometrial mass thickness of 21 mm onwards. Extracted material was sent for histopathology. Record of sonographic findings was matched with retrieved histopathology reports and sensitivity of sonography for the detection of RPOC was calculated.

Results: 134 patients were found to have RPOC. This constituted 75% overall accuracy. Remaining 45 patients, wrongly labeled as having RPOC on sonographic evaluation, were mostly within first week of delivery or induced abortion. Blood clots and necrotic material closely mimicked RPOC in these patients but could not be differentiated from residual trophoblastic tissue, chorionic villi or fetal parts even by experienced radiologist. Sensitivity of sonography was noted to be alarmingly low in Group I and II patients (31% aggregate) whereas in Group III and IV it approached 81% and 95% respectively.

Conclusion: 75% sensitivity for detection of RPOC led to 25% patients undergoing unnecessary D&C. Considering the possibility of complications, both minor as well as major, following this interventional procedure, it is recommended that clinical impression as well as sonographic findings should be combined before proceeding on to uterine evacuation and if findings are equivocal on any of these, a waiting period of 24 to 48 hours may be observed and patient reviewed before operative procedure. This protocol should be given very serious consideration in patient with endometrial mass thickness of 15 mm or less.

Introduction

Secondary Postpartum Hemorrhage (PPH), either alone or associated with pain, fever or both is a common clinical symptom of retained products of conception (RPOC).[1] Reported incidence is around 1% of all deliveries and it is considered to be the most common reason for hospital readmission in the post partum period.[2] The diagnosis of RPOC presents a major clinical challenge which relies on different clinical symptoms and signs as well as sonographic assessment. The introduction of sonographic examination into the gynaecological practice has contributed greatly to the identification of remnants of a recent pregnancy. Ultrasonography has been used extensively, in addition to clinical evaluation, for the diagnosis of RPOC. However sonographically detected intrauterine findings following termination of pregnancy or delivery are quite variable and residual trophoblastic tissue or blood clots can appear alike. Many of the recent reports describe relatively high false positive cases if the diagnosis is based on ultrasonography alone.[3] A false diagnosis of RPOC inevitably leads to curettage with possibility of attendant complications. Such unjustified interventional uterine exploration needs to be reduced to the minimum and confined to only those cases which are strongly suspected to be having RPOC. With this view in mind, the authors have attempted to determine accuracy of transabdominal ultrasonography in the Emergency Hospital settings using commercially available medium frequency curved array probe and have tried to evolve a new approach to the management of the patients suspected of having RPOC.

Materials and Methods

This prospective study was carried out from October 2007 to February 2009 in the Emergency Radiology Department of Lahore General Hospital, Lahore, a very busy Metropolitan Tertiary Care Teaching Hospital in the periphery of Lahore (more than 900 patients attending Emergency Department daily since its inauguration in 2007). The hospital caters to the needs of a large population belonging to the middle and lower socioeconomic classes. In this zone of Lahore, a significant number of deliveries as well abortions

are known to be carried out by the non-qualified health facilitators therefore post partum/post abortion complication rate is quite high. This research was conducted in collaboration with the Gyneacology Department of the same institute.

During this time period of 17 months, 1120 patients attended the Emergency Gynaecology Wing for PPH. Initial symptoms and clinical examination leading to suspicion of RPOC included pain, post partum hemorrhage, fever or combination of any of these. All women in the study group underwent bimanual gynaecological examination by an experienced gynaecologist (S.S) who referred 229 of these 1120 patients to Emergency Radiology Department upon strong suspicion of harbouring RPOC. Based on sonographic evaluation, 179 consecutive women were included in the study. The only inclusion criterion in the study group was sonographic suspicion of RPOC. 146 out of 179 patients (82%) had undergone D&C for abortion. Of these only 21 (14%) had the D&C performed in our hospital for various medical reasons whereas the remaining 125 (86%) patients attended this hospital after having had D&C either in a local private setup or from centres outside Lahore. The remaining thirty three women (18%) had delivered normally either in our hospital (8 patients) or elsewhere (25 patients). An experienced Radiologist (Q.A.S) performed transabdominal sonography utilizing either Famio 5 (Toshiba Medical Systems, Japan) or Logic Pro 200 (GE Medical Systems, Milwaukee, USA) ultrasound equipment using convex probes with frequencies ranging from 2.75 to 6.0 MHz. On ultrasonography, the diagnosis of RPOC was entertained when an echogenic, hypoechoic or mixed echogenecity irregular mass measuring 10 mm or more was appreciated within endometrial cavity. This measurement included both layers of endometrium at the mediosagittal plane.

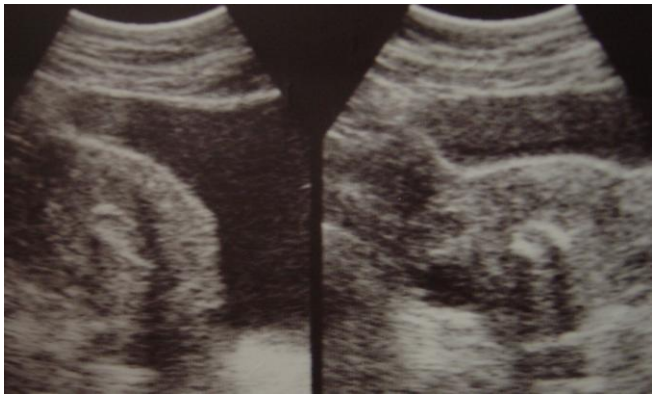

Fig. 1: *Densely echogenic intra uterine mass measuring 10 mm in thickness with posterior shadowing came out to be foetal bones on D&C.*

The patients were divided into four groups depending on antero posterior measurement of endometrial mass. Group I Endometrial mass measurement 10-12 mm (Fig. 1, 2), Group II Endometrial mass measurement 13-15 mm (Fig. 3), Group III Endometrial mass measurement 16-20 mm (Fig. 4) and Group IV (Fig. 5, 6, 7, 8) Endometrial mass measurement of more than 20 mm.

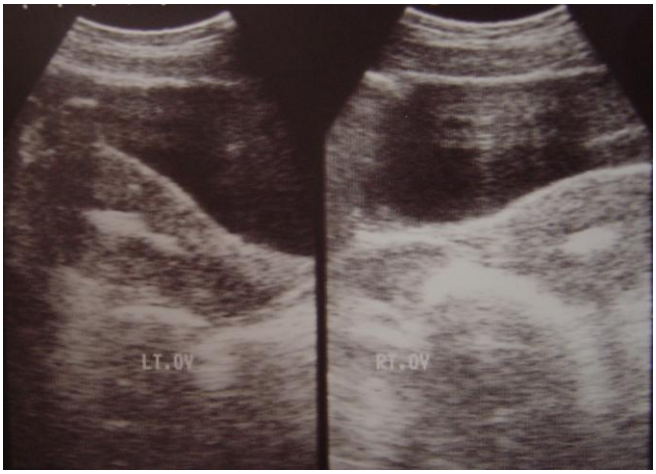

Fig. 2: *Echogenic endometrial contents measuring 12 mm in antero posterior dimension. Histopathology confirmed it to be a blood clot and not RPOC.*

Except for one patient who expelled RPOC spontaneously, all patients underwent D&C or suction and curettage for evacuation of uterine cavity and extracted material was sent for histopathology for confirming the radiological impression of RPOC. The final diagnosis of RPOC was made only if confirmed by histopathological examination based on demonstration of chorionic villi, trophoblastic tissue or fetal parts in the submitted tissue. Applying statistical analysis, sensitivity of sonography for detecting the products of conception was assessed.

Results

The mean age of the patients in this study was 23.8 years (Range 17-39 years) and the mean elapsed time after delivery or abortion was 6.6 days (range 4-24 days). Histopathologic examination demonstrated gestational tissue in 134 of 179 cases (75%). Histopathologic analysis confirmed the presence of choronic villi in 80 (60%) patients, decidua in 48 patients (36%) and fetal parts in the remaining 6 (4%) patients. It was noted that PPH was the most common presentation in patients with RPOC whereas lower abdominal pain, though a recognized symptom of this condition, was more frequently observed in infected cases or in cases proved later to be suffering from endometritis.

As is evident from the Table 1, 20 patients fell into group I and we could positively document RPOC in 5 (25%) patients only. Out of 25 patients falling in Group II, true positive diagnosis was made in 9 patients representing 36% sensitivity. Group III included 52 patients and in this group we made correct sonographic diagnosis in 42 patients denoting sensitivity to be 81%. Largest group (Group IV) comprised of 82 patients and 78 out of these 82 (95%) patients had correct sonographic impression. It was appreciated that

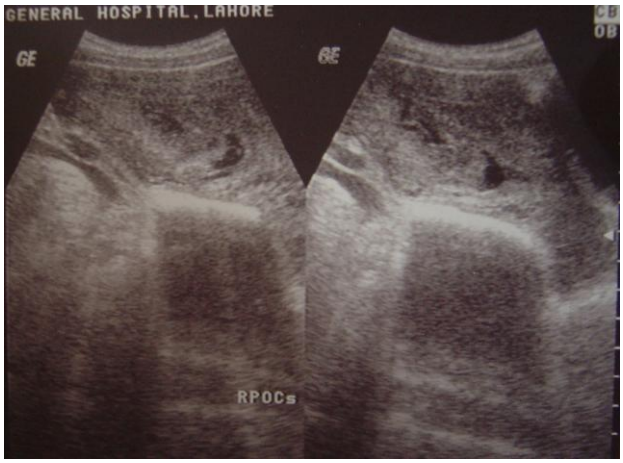

Fig. 3: *Ultrasongram from Group II patient (post abortal) showing endometrial mass to be 15 mm in thickness. It failed to show any RPOC on histopathology.*

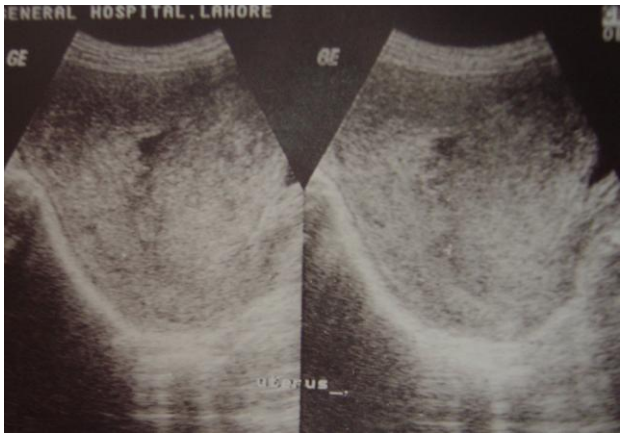

Fig. 4: *Endometrial mass thickness of 18 mm proved to be RPOC on histopathology.*

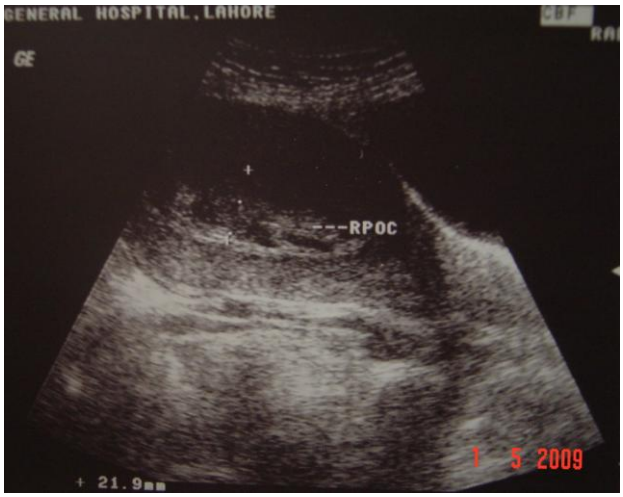

Fig. 5: *Sonography showing 22 mm endometrial mass rightly confirmed to be RPOC on histopathological evaluation.*

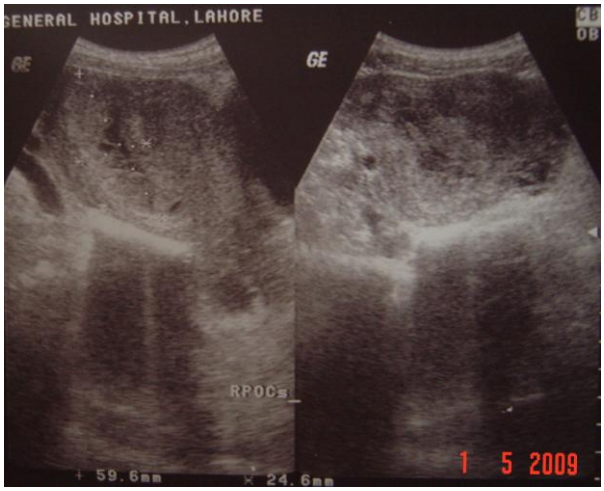

Fig. 6: *Endometrial cavity contents measuring 25 mm antero-posteriorly confirmed to be RPOC on Histopathologic assessment.*

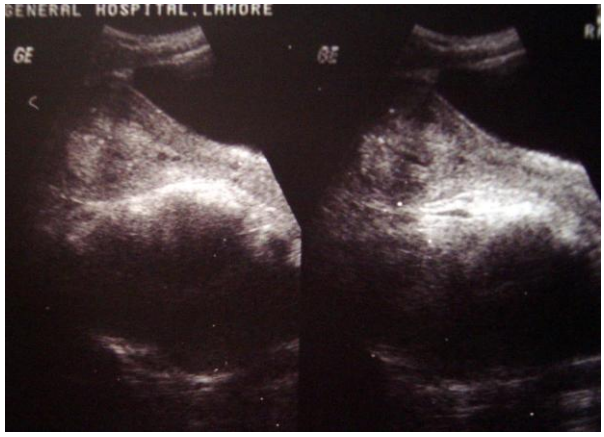

Fig. 7: *Endometrial thickness of 37 mm appreciated on sonography was confirmed as RPOC on histopathology.*

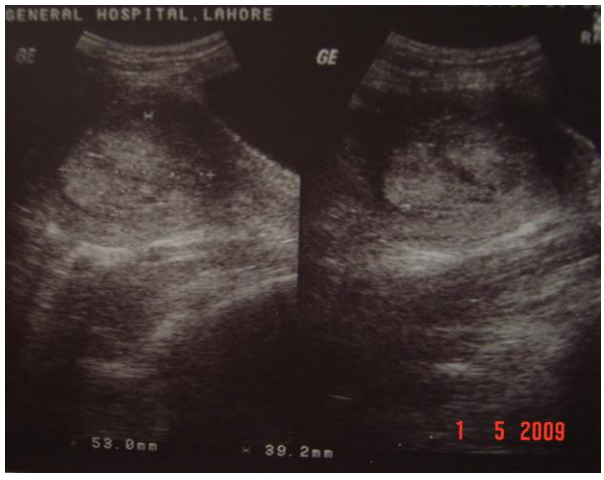

Fig. 8: *Considerable amount of RPOC is seen as echogenic intra uterine mass measuring 39 mm anteroposteriorly.*

as the endometrial mass anteroposterior measurement increased, false positive cases dropped proportionately thus leading to a conclusion that in experienced hands, sensitivity significantly increases for the detection of RPOC as the endometrial mass size increases. Conversely, decreasing size of endometrial mass makes it difficult to give consistently high sensitivity as it was calculated to decrease significantly from 95% in Group IV patients to merely 25% in Group I patients. This leads to an inference that a radiologist is more apt to make false positive diagnosis of RPOC with decreasing mass size and hence should be careful enough in Group I and II cases before labeling the case to be harbouring RPOC. As suggested in many earlier studies, combining clinical parameters, Colour Doppler evaluation and Trans Vaginal Sonography (TVS) may be helpful in these groups by demonstrating early and fine infiltration of endometrium by retained trophoblastic tissue. However Group III and IV patients can quite confidently be labeled as cases of RPOC on gray scale ultrasonography using commercially available convex probes (with frequency ranging from 2.75 to 6.0 MHz) with possibility of false positive diagnoses in 19% and 5% respectively. This false positive ratio may further be reduced by the addition of clinical criteria. Probably in the emergency settings like ours where we don't possess Colour Doppler Ultrasound equipment, uterine evacuation can be safely carried out in these groups based on results of ultrasonography and clinical impression. Therefore group III and IV patients i.e. patients with endometrial mass anteroposterior dimension exceeding 15 mm, need not be referred to other institutions for additional Doppler studies. This approach can't be recommended for Group I and II patients.

Table 1: *Ultrasonographic sensitivity for detection of RPOC based on antero posterior measurement of Endometrial Mass.*

Group	Antero posterior measurement	Total patients	True positive Cases	False positive cases	Sensitivity
I	10-12 mm	20	5	15	25%
II	13-15 mm	25	9	16	36%
III	16-20 mm	52	42	10	81%
IV	21mm onwards	82	78	4	95%
Total		179	134	45	75%

14 of the 45 patients (31%) falsely diagnosed to be having RPOC had attended the hospital within 4 days after delivery or abortion and we diagnosed them on the finding of hyperechoic material in the uterine cavity. It was realized that this is a common pitfall arising out of close resemblance of intrauterine normal contents following delivery or abortion to RPOC within the first week after uterine spontaneous or induced evacuation and one should be very careful while declaring RPOC in immediate post partum period. Sonographic finding of hyperechoic or mixed echogenecity intrauterine mass had an overall sensitivity of 75% whereas we made false positive diagnoses in 25% of cases which is not an insignificant ratio.

Discussion

The decision whether to perform uterine curettage for post abortal or post parturition bleeding depends on the ability to demonstrate placental remnants as well as fetal parts in the uterine cavity.[4] Secondary PPH either alone or associated with pain, fever or both is a common clinical symptom of RPOC and the reported incidence in the literature is about 1% of all deliveries. This also represents one of the most common reasons for hospital referral and readmission in the post partum period. The diagnosis of RPOC relies on clinical signs and symptoms as well as sonographic assessment. Uterine evacuation is considered relatively simple and safe procedure but various authors have reported 8.5% incidence of major morbidity due to this procedure.[5] Therefore it is extremely important to carefully evaluate patients with symptoms and signs of RPOC, both clinically as well as sonographically, to reduce the number of unnecessary interventional procedures hence avoiding their undesirable consequences.

Since early days, clinical presentation and bimanual examination of the cervix have been the mainstay for making a diagnosis of RPOC and final diagnosis in all these cases has always rested on histopathological report on the material submitted following D&C. This has always been considered a reliable way of diagnosing this condition but false positive diagnoses have been high enough necessitating the clinicians to seek help from other diagnostic modalities. The introduction of ultrasonographic examination into the field of gynaecology has contributed greatly to the identification of remnants of a recent pregnancy. Sonographically detected intrauterine findings following termination of pregnancy or delivery usually result from either residual trophoblastic tissue or blood clots.[6-8]

Sonographically defined criteria used for the diagnosis of RPOC are generally uniform and well defined. The ultrasound finding of hyperechoic or mixed echogenecity material within endometrial cavity is an excellent predictor of diagnosing RPOC. If no mass is seen and the endometrial thickness is less than 10mm, RPOC are extremely unlikely. We did not take 8 mm endometrial thickness as cut off point because sensitivity for the detection of RPOC is known to decrease if this parameter is not combined with clinical findings.[9] Early fine infiltration of the endometrium by trophoblastic tissue has also been documented in some researches

utilizing transvaginal probes but this was not possible in the Emergency Department setting where we do not possess this probe.[10] It is pertinent to note that normal sonographic findings might obviate the need for exploration of the uterine cavity while a questionable sonographic finding might lead to unnecessary curettage. Sonography, in comparison with dilatation of the cervical canal, has almost 30% higher sensitivity rate regarding the prediction of RPOC but the specificity is almost the same (33.3% versus 30.7%). The highest diagnostic accuracy regarding the prediction of RPOC results from a combination of sonography and colour Doppler assessment of the uterus. Even sonography alone has highest sensitivity and positive predictive value but the specificity and negative predictive values are low.

However the reliability of ultrasonography for the diagnosis of RPOC has been quite variable. Carlan and colleagues, using their sonographic description of RPOC reported sensitivity, specificity, positive and negative predictive values of ultrasound in detecting retained products as 44%, 92%, 58% and 87% respectively. They also noted that RPOC were histopathologically documented in up to 37% of the patients showing normal endometrial cavity on ultrasound. They also noted that nearly 100% of the cases with an echogenic mass were associated with RPOC.[11] Durfee et al. in 2005 evaluated the sonographic and Colour Doppler features of RPOC in 163 patients and found that an endometrial mass was the most sensitive (79%) and specific (89%) sonographic feature for RPOC. They also concluded that infected or necrotic material, in addition to blood clots, could also appear as a heterogeneous mass in endometrial cavity. The sonographic features of RPOC are often non specific especially the fact that blood clots can closely resemble sonographic appearance of RPOC.[12]

Within the week after first trimester abortion the uterine cavity is seldom empty and thick heterogeneous material is an expected finding on sonographic examination. By being familiar with this normal range of appearances, clinicians can avoid unnecessary repeated invasive evacuation procedures. A follow up sonogram during the follicular phase of the next menstrual cycle is recommended to confirm the presence of RPOC.[13]

Our approach towards managing the patients suspected to be having RPOC has been modified after this study. We believe that only those women should undergo D&C in whom there is combined clinical as well as sonographic evidence favouring RPOC. Conversely, women in whom there is only either clinical or radiological suspicion of RPOC can be observed from 24 to 48 hours, if their medical condition permits, to see the effect of uterotonics and antibiotics. A follow up clinical and sonographic reevaluation should be done after that time. This is because neither clinical examination nor ultrasonography are sensitive enough to make a confident diagnosis of RPOC when used alone as both have documented sensitivity and accuracy in the range of 70-80% leaving behind as much as 20% of cases which may undergo unnecessary evacuation and hence are potentially subjected to complications of surgery which vary from as trivial as endometritis to as severe as uterine perforation or adhesion formation (Ashermann syndrome) leading to permanent infertility in a few of operated cases. I hope this working protocol is likely to reduce unnecessary uterine interventions. Care should also be exercised while performing D&C in the patients who are suspected to be having RPOC but are within first week of delivery or abortion, as like other studies, we also encountered a good number of false positive cases in this period by wrongly confusing normally present post abortal material with RPOC.

Cautious approach towards managing patients with endometrial mass thickness of less than 16 mm is also stressed because in our study, only 14 out of 45 (31%) patients were correctly diagnosed to be having RPOC in these groups of patients (Group I and II) and the remaining 31 of 45 patients (69%) had unnecessary D&C which could have been averted if we could have observed these cases for 24-48 hours before carrying out uterine evacuation. It is therefore important to assess patients with symptoms and clinico-radiological signs of RPOC very carefully to reduce the number of unnecessary procedures with all of their consequences.

Conclusion

The best way to be sure of presence of RPOC is to combine clinical examination findings with sonographic assessment. False positive cases are likely to be reduced to minimum using this approach. Ultrasonography alone is quite sensitive and absence of an endometrial mass nearly always rules out RPOC. However care should be taken while evaluating patients within first week of abortion or delivery when post abortal intrauterine residual material can closely mimic RPOC. Every effort should be made to avoid uterine interventional procedures and this can be accomplished by observing the patient with endometrial mass thickness of less than 16 mm for 24-48 hours before resorting to surgery.

References

1. Hoveyda F, MacKenzie IS. Secondary postpartum haemorrhage: incidence, morbidity and current management. BJOG 2001; 108: 927–930.
2. Matijevic R, Knezevic M, Grgic O, Zlodi-Hrsak L. Diagnostic Accuracy of Sonographic and Clinical Parameters in the Prediction of Retained Products of Conception J. Ultrasound Med 2009; 28: 295-299.
3. Sadan O, Golan A, Girtler O, et al. Role of sonography in the diagnosis of retained products of conception. J ultrasound Med 2004; 23:371–374.
4. Tal J, Timor TI, Degani S. Accurate diagnosis of post-abortal placental remnant by sonohysterography and color Doppler sonographic studies. Gynecol Obstet Invest 1997; 43:131–134
5. Pather S, Ford M, Reid R, Sykes P. Postpartum curettage: an audit of 200 cases. Aust NZ J Obstet Gynaecol 2005; 45: 368–371.

6. Ben-Ami I, Schneider D, Maymon R, Vankin Z, Herman A, Halperin R. Sonographic versus clinical evaluation as predictors of residual trophoblastic tissue. Hum Reprod 2005; 20: 1107–1111.
7. Shen O, Rabinowitz R, Eisenberg VH, Samueloff A. Transabdominal sonography before uterine exploration as a predictor of retained placental fragments. J Ultrasound Med 2003; 22: 561–564.
8. Rufener SL, Adusumilli S, Weadock WJ, Caoili E. Sonography of Uterine Abnormalities in Postpartum and Postabortion Patients: A Potential Pitfall of Interpretation J. Ultrasound Med 2008; 27: 343-348.
9. Sawyer E, Ofuasia E, Ofili YD, 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 in obstetrics & gynecology 2007; 29: 205-209.
10. 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: 428–432
11. Carlan SJ, Scott WT, Pollack R, Harris K. Appearance of the uterus by ultrasound immediately after placental delivery with pathologic correlation. J Clin Ultrasound 1997; 25: 301–308.
12. Durfee SM, Frates MC, Luong A, Benson CB. The Sonographic and Color Doppler Features of Retained Products of Conception J. Ultrasound Med 2005; 24: 1181-1186.
13. Bar-Hava I, Ashkenazi S, Orvieto R et al. Spectrum of normal intrauterine cavity sonographic findings after first trimester abortion. J Ultrasound Med 2001; 20: 1277–1281.