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Review Article

**THE VALUE OF ULTRASOUND FOR THE DIAGNOSIS OF
RETAINED PRODUCTS OF CONCEPTION-A SYSTEMATIC
REVIEW**

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(URSMIT), University of Lahore**Article Received:** October 2020**Accepted:** November 2020**Published:** December 2020**Abstract:**

Retained products of conception (RPOC) refer to the persistence of placental and/or fetal tissue in the uterus following delivery, termination of pregnancy or a miscarriage. Ultrasound is the most effective method for diagnosis of RPOCs. The present study was conducted to investigate the role of ultrasound for diagnosis of RPOC.

Purpose: *The goal of this systematic review is to evaluate the value of grey & color Doppler ultrasound for detection of retained products of conception (RPOCs).*

Method: *During October 2020 we searched PubMed, google scholar & Medline using the following Mesh Terms: Color Doppler, endometrial thickness, ultrasound findings, postpartum, retained placenta, retained products. We did not limit the search in time but we narrowed it down to English articles.*

Results: *Using the search criteria, 12 researches were examined based on the title & abstract. All the 12 studies were considered in their full versions. Of these works, including literature review or meta analysis report, it was concluded that ultrasound grey scale & doppler studies a positive relationship with RPOCs.*

Conclusion: *Color Doppler evaluation of the endometrium is helpful in determining the presence of RPOC. Endometrial vascularity is highly correlated with RPOC, whereas the lack of vascularity can be seen in both intrauterine clots and avascular RPOC.*

Key word: *Color Doppler, endometrial thickness, ultrasound findings, postpartum, retained placenta, retained products*

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INTRODUCTION:

The term retained products of conception (RPOC) refers to intrauterine tissue that develops after conception and persists after medical and surgical pregnancy termination, miscarriage, and vaginal or cesarean delivery. This intrauterine tissue is often of placental origin [1]. RPOC is one of the most common causes of postpartum bleeding, but the clinical presentation can be also characterized by pain or fever. The incidence of RPOC seems to be related on the gestational age of the pregnancy, most frequently after second- trimester delivery or termination of pregnancy. RPOC are estimated approximately 1% of term pregnancies [2]. The main risk factors are failure to progress during delivery, placenta accreta, and instrument delivery. The diagnosis presents a major clinical challenge. The association between clinical features and ultrasonographic characteristic is essential for diagnosis; however color Doppler US increases the positive predictive value for the diagnosis of RPOC. Serum beta human chorionic gonadotropin (B-hCG) levels also may be checked, but they may not be helpful because they can be elevated in the

postpartum period [2]. The histological diagnosis is based on the presence of chorionic villi, which indicates persistent placental or trophoblastic tissue, can invade uterine endometrium [1].

METHODS & MATERIAL:

A review of scientific literature concerning the role of ultrasound in retained product of conception was done. During October 2020 we searched PubMed, google scholar & Medline using the following Mesh Terms: Color Doppler, endometrial thickness, ultrasound findings, postpartum, retained placenta, retained products.. We did not limit the search in time but we narrowed it down to English articles..

Next, we screened the articles for relevance based on their title and abstract and we excluded 25 articles, which left us with 25 articles to be included in our literature study. We then evaluated these articles with a self-drawn up checklist based on the evaluation and excluded 13 more. Eventually, 12 articles remained useful for our literature review. Figure 1 shows a flow chart of the study selection.

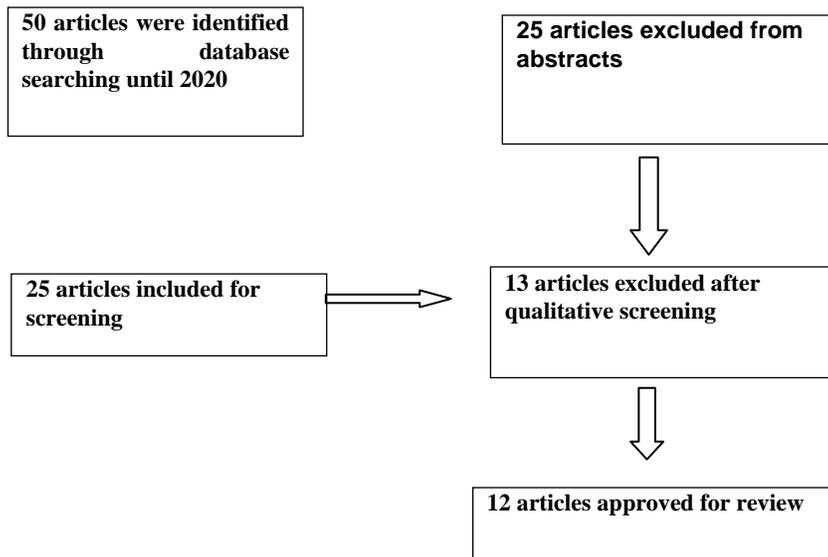


Fig -1 flow chart of study selection

Systematic Review:

Total 12 articles were reviewed which addressed the role of ultrasound in RPOCs. In 2005 Sara M. Durfee performed a study on “The sonographic and color Doppler features of retained products of conception”.

Cases of clinically suspected RPOCs referred for pelvic sonography between September 1994 and July 2001 were identified. Patient age, indication, gestational age at delivery, and days postpartum were recorded and sonographic findings were reviewed. Outcomes were determined from medical records and pathology reports. & conclude an endometrial mass is the most sensitive finding for RPOCs. If no mass or endometrial fluid is seen and the endometrial thickness is less than 10 mm, RPOCs are extremely unlikely. The absence of blood flow does not exclude the diagnosis of RPOCs.[3]

In a retrospective study conducted by Emin Ustunyurt in 2007 included 116 patients who underwent uterine re-evacuation with a diagnosis of retained products of conception based on clinical and sonographic findings. Pathologic reports of samples obtained during re-evacuation were reviewed for the presence of gestational tissue. Endometrial thickness determined by transvaginal sonography and certain clinical features (gestational age and interval between initial curettage and re-evacuation, which may affect presence or absence of gestational tissue, parity, indication for initial curettage) were noted. The sensitivity and specificity of sonographic measurement of endometrial thickness for detecting retained products of conception were assessed. An endometrial thickness of 13 mm or more, detected by transvaginal sonography, has the best diagnostic efficiency for detection of retained products of conception following first trimester spontaneous abortion or elective pregnancy termination [4]

Study conducted by S Abbasi in 2008 was a retrospective study, including 91 patients admitted for suspected RPOC after spontaneous first-trimester miscarriage who were evacuated surgically, and for whom histopathological reports were available. All the women underwent transvaginal sonography after their miscarriage. The decision to evacuate the uterus was based on vaginal bleeding, lower abdominal pain and/or sonographic findings of hyperechoic material or endometrial thickness more than 8 mm. Maternal age, gestational age, clinical signs and symptoms and sonographic findings were recorded. Clinical and sonographic findings were compared with the histopathological reports and the sensitivity and specificity of vaginal bleeding, abdominal pain and sonographic appearance of the endometrium for

detecting the products of conception were assessed. The ultrasound finding of hyperechoic material is the best predictor for diagnosing RPOC. In the absence of hyperechoic material and vaginal bleeding, RPOC are extremely unlikely.

Aya Kamaya (2009) did a retrospective study on the Retained products of conception: spectrum of color Doppler findings. Clinically suspected cases of RPOC between January 2005 and February 2008 were reviewed. Patient data and relevant color Doppler and gray scale features were recorded & concluded that color doppler evaluation of the endometrium is helpful in determining the presence of RPOC. Endometrial vascularity is highly correlated with RPOC, whereas the lack of vascularity can be seen in both intrauterine clots and avascular RPOC. [6]

Maryam Karimpour in 2010 performed retrospective study on accuracy of transvaginal sonography in detecting retained products of conception in correlation with pathologic findings and clinical examination, 109 patients whom suspected to have retained products of conception based on clinical and transvaginal sonographic were studied and finally clinical and sonographic finding were compared to post evacuation histopathological reports. Based on our current experience, it seems, that combination of clinical data and ultrasonographic findings are more reliable for detection of RPOC and thus lowering the rate of unnecessary invasive procedures. According to this study an endometrial thickness of 12 mm or more by transvaginal sonography, has the best diagnostic accuracy for detection of RPOC. [7]

A retrospective study conducted M Atri in 2011 included 91 consecutive patients who underwent transvaginal sonography (TVS) with color Doppler to evaluate for the presence of RPOC. The images of TVS studies were reviewed by two radiologists in consensus blinded to the final outcome. Data on a number of variables including endometrial measurable mass and focal increased color vascularity were collected as predictors of RPOC. The patients' ages ranged from 17 to 48 years (mean, 31.8 ± 6.8) and gestational age from 5 to 24 weeks (mean, 9.2 ± 3.8). Thirty-six were confirmed as RPOC by dilatation and curettage (D&C) and pathology. Fifty-five were considered negative, 9 based on D&C results and 46 on clinical grounds.[8]

Study conducted by Hanaa Abd Elhamaid Elebeissy in 2012 on Detection of Retained product of conception (color Doppler study), 60 women were included who were clinically diagnosed as having incomplete first trimester spontaneous abortion at

AL-Zahraa University Hospital. Inclusion criteria were: positive pregnancy test, gestational age less than 14 weeks, products of conception have partially passed from the uterine cavity, protruding from the external os, or in the vagina with persistent bleeding and cramping or history of heavy vaginal bleeding. TVCD of cases of incomplete abortion which classified according to vascularity in 4 groups: Type 0: no vascularity, Type 1: low Vascularity, Type 2: moderate vascularity, Type 3: high vascularity. The presence of a colour Doppler signal and the amount of endometrial vascularity were assessed as none, minimal, moderate, or marked. Quantification of blood flow was done using, resistance index (RI). From this small series we concluded that, colour Doppler studying posses high sensitivity and specificity that make each of them clinically more useful, helpful and applicable as a single screening tool in predicting retained product of conception in incomplete abortion instead of invasive methods such as D&C. [9]

In 2015 Aya Kamaya conducted study on Variable color Doppler sonographic appearances of retained products of conception, radiologic-pathologic correlation, After institutional review board approval, sonographic images and pathologic specimens were retrospectively reviewed in 26 patients with pathologically proven RPOC. Ultrasound (US) images were scored 0–3 for the degree of vascularity by two radiologists blinded to the diagnosis. Corresponding pathologic specimens were evaluated for vascularization of chorionic villi, degree of inflammation, morphology of maternal arteries, chorionic villous preservation, and percentage of clot, membranes, chorionic villi, and decidua/myometrium. Statistical analysis, including multiple linear regression, was performed. Histologic vascularity of villi appears to contribute to the observed variation in sonographic vascularity. This finding may underlie known differences in clinical outcomes between sonographic vascularity groups. [10]

Yusuf Aytac Tohma conducted a retrospective study in 2016. Total of 466 patients with a gestational age < 10 weeks were followed up at the 7th day after MVA of unwanted pregnancies. The patients who had intense or moderate bleeding and other symptoms related to RPOC had a re-evacuation and all the patients were followed up until the next menstruation. Ultrasonographic evaluation was repeated weekly in asymptomatic patients with abnormal ultrasonographic findings (increased endometrial thickness, presence of hyperechogenic, mixed and hypoechogenic material) until a normal

endometrial cavity was visualized & concluded that abnormal ultrasonographic findings return to normal over time in asymptomatic patients, the diagnosis of RPOC should not be based on ultrasonographic findings. [11]

In 2018, Noam Smorgick conducted a retrospective study on postpartum Retained Products of Conception, A Novel Approach to Follow-Up and Early Diagnosis, Parturients at risk for RPOC underwent an ultrasound exam on the second postpartum day. Based on the ultrasound findings, women were either: (1) discharged to routine postpartum care in cases of normal scans, (2) invited for follow-up in cases of abnormal scans. We retrospectively analyzed the rates of women requiring uterine evacuation due to persistent abnormal scans. Postpartum ultrasound evaluation may allow for early diagnosis of RPOC in women considered at risk for this condition. [12].

Naoya Akiba in 2019 conducted a study on Ultrasonographic vascularity assessment for predicting future severe hemorrhage in retained products of conception after second-trimester abortion. This is a retrospective cohort study on all cases after second-trimester abortion managed at our institute between January 2014 and December 2016. We assessed the associations between the occurrence of SPPH requiring invasive treatment and clinical factors including ultrasonographic findings (size and the vascularity status of RPOC classified as follows: type 1: vascularity confined to endometrium, type 2: vascularity reaching <1/2 myometrium, and type 3: vascularity reaching $\geq 1/2$ myometrium) in vascularized RPOC cases. Our findings suggest that the ultrasonographic assessment of RPOC focused on the depth of vascularity in combination with the measurement of its size appears to be essential in determining women with RPOC who are at high risk for SPPH. [13].

2020 S. KAVTHALE Ultrasound sonocharecterisation of retained products of conception (POC) in Post MTP bleeding PV. In our study, patients with 3 days history of bleeding PV after Medical termination of pregnancy were evaluated with transvaginal ultrasound. All cases in whom echocharacterisation showed suspicious / confirmatory features of POCs were subjected for removal followed by histopathological analysis. The range of findings in our study was thickened endo cavity to complex mixed echogenic pseudo mass pattern. As the complexity and mixed features in uterine cavity goes on increasing the probability of products of conception rises. In all cases where cavity measuring 12 mm or more and echogenic material

intermixed with fluid spaces is seen, intervention is advisable (oral medication or instrumentation or Both).

Study Selection: Multiple articles were reviewed. Prospective studies & case reports were excluded from data. Retrospective studies included in this review article.

RESULTS:

Using the search criteria, 12 researches were examined based on the title & abstract. All the 12 studies were considered in their full versions. Of these works, including literature review or meta analysis report, it was concluded that ultrasound grey scale & doppler studies has a positive relationship with RPOCs.

DISCUSSION:

Retained products of conception (RPOC) are the persistency of intrauterine tissue, developed during pregnancy, after delivery. It is a serious condition and patients most frequently present with abdominal pain, fever and postpartum hemorrhage. However, a diagnosis is not easy to make and ultrasound images are often used. To differentiate a normal postpartum uterus and an abnormal one, it is important to understand how a normal one is identified on ultrasound. So, from this systematic review we concluded that a thickened endometrial stripe and echogenic material in the cavity indicate a possible chances of RPOCs [15].

In our study there is significant correlation between irregularity of endometrial myometrial interface, hypo or hyperechoic uterine contents, endometrial mass and the presence of RPOC. Although in other studies, findings such as hyperechoic material in uterine cavity or the presence of echogenic mass in uterine cavity has mentioned as the most specific sonographic findings of RPOC. [16]

CONCLUSION:

Our result suggests that application of sonography is important in differential diagnosis of RPOCs. On gray scale ultrasound, one must be focus on a thickened endometrial echo (>10 mm), intracavity mass & fluid in endometrial canal. If these features are not visible, RPOC is rare. However, these findings are neither specific nor conclusive for RPOC and can even be seen in a normal postpartum uterus. On a colour Doppler ultrasound Detection of hypervascularity in a thickened EEC or intracavitary mass with color Doppler ultrasound is very sensitive for RPOC An endometrial mass is the most sensitive finding for RPOCs. If no mass or

endometrial fluid is seen and the endometrial thickness is less than 10 mm, RPOCs are extremely unlikely. The absence of blood flow does not exclude the diagnosis of RPOCs.

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