

## Functional aspects of ultrasound screening during first trimester of pregnancy: emphasis on preventing bleeding and abortion

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### Abstract

Ultrasound is the sensitive method for evaluation in early pregnancy. Ultrasounds may be done to confirm pregnancy as well abnormality associated with the pregnancy. More sophisticated and advanced ultrasound procedures are available and gynaecologist can use differently as per the need and aim of the test. Ultrasound is a useful tool in the diversity of causes of first trimester vaginal bleeding. Ultrasound is helpful in the decision-making tool for the safe continuation of the pregnancy, timely intervention for abnormal pregnancy. Prudent utilization of ultrasonography and a close liaison with the sonologist is necessary. However, it should be remembered that ultrasound is an extension of the pelvic examination and cannot replace obstetric history and clinical examination. This review will present brief knowledge about the role of this sensitive technique in evaluation of vaginal bleeding associated with first trimester of pregnancy and its usefulness in avoiding a spontaneous abortion.

**Key words:** Priest, Obesity, Hypertension, level of physical activity, Ujjain.

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### Introduction

Sensitive method for evaluation in early pregnancy is ultrasound. The advancement in the ultrasound has made an unquestionable impact on evaluation of clinical condition in the first trimester[1]. Ultrasound examination during pregnancy was introduced in Sweden in 1973. An ultrasound can be used for a variety of reasons during pregnancy starting from the confirmation of pregnancy to detection of a problem, when simple blood test unable to confirm it. Ultrasounds may also be done for nonmedical reasons, such as to produce images for the parents or to determine the sex of the baby. While ultrasound technology is safe for both mother and child, healthcare practitioners discourage the use of ultrasounds when there is no medical reason or benefit. The ultrasound can be used during pregnancy to show images of the baby, amniotic sac, placenta, and ovaries.

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Major anatomical abnormalities or birth defects may be visible on an ultrasound. Providing too detailed lists of fetal anomaly detection would cause unnecessary anxiety and worry, and is therefore not desired for by pregnant women. has shown to reduce maternal and perinatal morbidity and mortality by allowing elective termination of malformed fetus. The scan is important to pregnant women as it results in feelings of satisfaction, comfort and joy when findings are normal. Being non-invasive, safe and without hazards of radiation, it has gained wide acceptability, as an integral part of basic investigative procedures[2].

### Uses of Ultrasound in pregnancy

An ultrasound scan is a medical imaging diagnostic test used in obstetrics for over 20 years. With technological improvements, increased image quality and Doppler techniques, the capabilities and limitations can now be more clearly defined and cost effectiveness taken into consideration. Throughout the pregnancy this method can be used. The 18-20 weeks scan which provides the most information and, in many patients, will be the only scan required. Obstetric scanning has added significantly to the development of fetal medicine. This

involves the antenatal detection of a condition, that may require treatment or alter management of the pregnant patient. Ultrasounds may be done to confirm pregnancy, determine the gestational age of the baby and estimate a due date, check for multiple pregnancies, examine the placenta, uterus, ovaries, and cervix, check the fetal heartbeat, diagnose an ectopic pregnancy or miscarriage and look for any abnormal growth in the fetus.

### **Pregnancy ultrasounds: Types**

More sophisticated and advanced ultrasound procedures may be used when a more comprehensive image is essential. Based on the ultrasound images doctor gets an information necessary to make a diagnosis if they detected problems during your traditional ultrasound.

### **Transvaginal ultrasound**

A transvaginal ultrasound usually produces a clearer image. This ultrasound is further likely to be used during the early stages of pregnancy, when capturing a clear image may be more difficult. A small ultrasound probe that rests against the back of your vagina captures images.

### **3-D ultrasound**

Unlike a conventional 2-D ultrasound, a 3-D ultrasound permits gynaecologist the height, width and depth of the fetus, uterus and cervix. This 3-D ultrasound helps especially in diagnosing any suspected complications during the pregnancy. A 3-D ultrasound ensues the same procedure as that of the standard ultrasound. However, it uses a special probe and software to create the 3-D image and requires special training for the technician[3].

### **4-D ultrasound**

A dynamic 3-D ultrasound is called as a 4-D ultrasound. Unlike other ultrasounds, a 4-D ultrasound creates a moving video of the fetus. It generates a better image of the baby's face and movements and captures highlights and shadows better. This ultrasound is performed similarly to other ultrasounds, but with special equipment.

### **Fetal echocardiography**

A fetal echocardiography is performed if your doctor suspects your baby may have congenital heart defects. This test may be done similarly to a traditional pregnancy ultrasound, but it might take longer to complete. It captures an in-depth image of the fetus' heart one that shows the heart's size, shape, and structure. This ultrasound also gives your doctor a look

at how your baby's heart is functioning, which can be helpful in diagnosing heart problems[4].

### **Is Prenatal Ultrasound Safe: Pros and Cons**

All medical practices have risk if not used properly, however, a prenatal ultrasound does not harm mother or her unborn child as ultrasound does not use radiation, as other procedures, such as X-rays. It should be performed by a physician or a sonographer (trained technician). This technique doesn't use radiation. It is recommended for assessment of threatened abortion to document fetal viability or for incomplete abortion to identify retained products of conception (II-2B). Prior to pregnancy termination this ultrasound is helpful. It is helpful in diagnostic or therapeutic procedures requiring visual guidance. It can detect the suspected multiple gestation or to detect suspected ectopic pregnancy, molar pregnancy, and suspected pelvic masses. It can further assess the anatomic development in situations of increased risk for major fetal congenital malformations. But other reasons for doing an ultrasound in the first trimester include determining the gestational age of the pregnancy or evaluating a patient who has bleeding or pain. American College of Obstetricians and Gynecologists (ACOG) indicates that ultrasounds in the first trimester should not be standard as it is tricky to see the parts of the baby to determine its normal development is not recommended to diagnose pregnancy, to date pregnancy when last normal menstrual period and physical examination are concordant, or to investigate an inevitable abortion, while it is indicated when last menstrual period date is uncertain[5].

### **Role of Ultrasound in pregnancy related bleeding**

Vaginal bleeding through pregnancy is discharge of blood from the vagina. This may occur at any time in the pregnancy period, from conception to the delivery. First trimester vaginal bleeding is prevalent in 16% of pregnancies. Vaginal bleeding during their first 20 weeks of pregnancy is considered as harmful as it may lead to miscarriage and immediate measure is essential, though clinical approaches are limited. The primary causes of first trimester bleeding are spontaneous abortion, ectopic pregnancy, and gestational trophoblastic disease; however, the most common cause of bleeding is spotting caused by implantation of the conceptus into the endometrium. A complete assessment of the first trimester pregnancy requires correlation of serum human chorionic gonadotropin (hCG) levels with the appearance of the gestational sac (GS) using

sonography. Sonography shows crucial role to omit other causes of bleeding such as molar pregnancy, ectopic pregnancy, and risk of miscarriages which are related with heavy bleeding during first trimester of pregnancy. Ultrasonography is an exceptional device to assess the prediction of the pregnancy like whether the safe continuation of pregnancy is possible or not, particularly in subjects who present with a poor obstetric history, vaginal bleeding or abdominal cramps in early pregnancy. These are also present a diagnostic

challenge to the clinicians and sonographers. Clinical history and pelvic examination are insufficient in assessing the reason of bleeding and the prognosis. Ultrasound plays an important function in the evaluation of the causes of the first trimester bleeding, prognosis and predict the status of abnormal pregnancy. Ultrasonography is a non-invasive modality which is extremely useful to arrive at an accurate diagnosis and management of cases appropriately[6]. Table 1 showed the different methods of ultrasound and its applicability.

**Table 1: Ultrasound appropriateness as per American College of Radiology**

Methods of ultrasound	Rating	Remarks
Ultrasound pelvis transvaginal	9	Findings are correlated with b-hCG and clinical scenario, M-mode for fetal heart rate
Ultrasound pelvis transabdominal	8	Findings are correlated with b-hCG and clinical scenario, It always Should be performed with transvaginal ultrasound to have correct diagnosis.
Ultrasound duplex Doppler pelvis	7	Pulsed Doppler of the embryo should be avoided.

Radiology plays an important role in identifying and diagnosing early pregnancy complications such as bleeding, and ultrasound is the primary imaging equipment. Nearly all instances of first trimester bleeding can be adequately evaluated with a combination of clinical assessment, serum  $\beta$ -hCG assay and endo-vaginal ultrasound. There is essentially no role for CT and limited role of MRI in evaluating first trimester bleeding. Ultrasonography has provided novel dimensions in early pregnancy difficulties so that specific treatment, medical or surgical, can be instantaneously approached. Precise diagnosis of the nature of the pregnancy (viable or non-viable) can avoid unwarranted hormonal treatment and prolonged hospitalisation. Ultrasonographic examination should be done at the earliest possible period to confirm the clinical findings. As shown in our study, the clinical findings were confirmed by ultrasonography in only 51% of cases, while in 41 % cases, it played the diagnostic role. The sonographic landmarks of the first trimester pregnancy have been well recognised and they include identification of the gestational sac, fetal pole, fetal cardiac activity, movements, yolk sac and the amnion. The invaluable role of these landmarks, the gestational sac and fetal biometry in diagnosing pathological pregnancies and predicting the pregnancy outcome has been clearly documented by Decherney et al. Ultrasound images can be taken via endovaginal or transabdominal or approaches. Endovaginal ultrasound commonly required for a more detailed evaluation of

the uterus and ovaries and it utilize a higher frequency yielding increased resolution at the expense of less tissue penetration. Transabdominal scanning is usually obtained first that provides a large field of view, optimal to demonstrate large or widespread processes. Because accurate measurements of early gestational processes are crucial, endovaginal imaging should be utilized whenever possible[7].

### Conclusion

Ultrasound can quickly distinguish the most widespread reasons of vaginal bleeding in early pregnancy and shows an essential role in patient management. Familiarity with the ultrasound appearance as well as new guidelines is essential to avoid causing potential harm to the mother or developing fetus.

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