

**Original Article****Sonographic comparison of transvaginal and transabdominal techniques in first trimester**

Mohamed Yousef\*, Abdelmoneim Sulieman, Safaa Mohamed

College of Medical Radiologic Science, Sudan University of Science and Technology, Khartoum, Sudan

E-mail mohnajwan@yahoo.com

Accepted: January 12  
© National College**ABSTRACT**

Hundred women with a positive pregnancy test and during first trimester pregnancy had transvaginal and abdominal ultrasound in order to compare the value of the two techniques for the detection of gestational abnormalities. An Ultrasound machine from (MEDISON) SONOACE Model 8000 SE was used in this study (trans-vaginal (7.5 MHz) and trans-abdominal (3.5 MHz) probes). Informed consent was obtained from all ladies in the study. The study conducted from May to October 2009 in Al-Turkey Hospital, Khartoum. Patient age was ranged between 15 years to 45 years. Transvaginal technique was found significant superior to trans-abdominal in detection of gestational sac Pearson Chi-Square=32.727, P=.000, embryonic pole Pearson Chi-Square=26.667, P=.000 presence of retained product of concepts Pearson Chi-Square=16.471, P=.000, and uterine abnormalities Pearson Chi-Square= 10.370, P =0.001. Equivocal result found in detection of number of embryos, fetal heart motion, ectopic and molar pregnancy. This finding goes with the majority of the previous studies finding. In conclusion trans-vaginal technique is superior to trans-abdominal in first trimester assessment. Transvaginal technique should be used in all clinics assessing of the first trimester pregnancy and to inform the Sudanese ladies of the safety of this technique.

*SMM 2012; 7 (3): 185-1 89***Keywords:** ultrasound , pregnancies, Transvaginal ,Transabdominal, First trimester**INTRODUCTION**

Women with first-trimester pregnancies frequently present to the emergency department complaining of abdominal or pelvic pain, cramps, vaginal bleeding, or all of the above. 50-60% of these pregnancies will develop normally, 10% will turn out to be ectopic pregnancies, and up to 40% will go on to miscarry<sup>1</sup>. Clinical exam, however, is neither sensitive nor specific for differentiating between normal intrauterine pregnancy, abnormal intrauterine pregnancy, and ectopic pregnancy<sup>2, 3</sup>. Thus, up to 50% of patients with ectopic pregnancies are misdiagnosed during their initial evaluation<sup>4</sup>. Since ectopic pregnancy is the leading cause of maternal death in the first trimester<sup>3</sup>, ultrasound

evaluation of women with symptomatic first-trimester pregnancy has become standard of care<sup>5, 6</sup>. The clear identification of a normal intrauterine pregnancy by ultrasonography is vital as these pregnancies have a good prognosis<sup>7</sup>. Modern ultrasound technology, especially transvaginal, has improved the assessment of early pregnancy development<sup>8</sup>. The use of diagnostic ultrasound during pregnancy is considered to be safe for both mother and fetus. Even in critical periods of development and using high-frequency transvaginal transducers, no adverse bioeffects have been demonstrated<sup>9</sup>. Ultrasound provides reassurance, charts normal development, and identifies women with abnormal or high risk pregnancies<sup>10</sup>.

International studies was done comparing transvaginal ultrasound versus trans-abdominal in early pregnancy, Pennell R G, et al found in 1987, no endovaginal study yielded less information than its trans-abdominal counterpart. Endovaginal sonography is likely to be diagnostic when trans-abdominal images fail to yield a definitive diagnosis in early pregnancies<sup>11</sup>. In 1989 Jain KA, et al found that endovaginal sonography is more sensitive than trans-abdominal sonography in the detection of early pregnancy and its complications<sup>12</sup>.

In the majority of ultrasound clinics the sonographers use the trans-abdominal technique for first trimester pregnancy although the previous studies superioris the transvaginal technique, and no one study done in Sudan to enquerige use of this technique in Sudanese pregnant ladies.

This Study aimed to evaluate use of transvaginal ultrasound in first trimester pregnancy in Sudanese ladies, to compare between the use of

transvaginal ultrasound and transabdominal ultrasound in first trimester pregnancy, to detect the best method to use in first trimester scanning in Sudanese pregnant ladies and to evaluate the results with the literature.

## MATERIALS AND METHODS

This is a descriptive analytical study deals with the pregnant ladies in their first trimester for sonographic comparison between the transvaginal and transabdominal techniques in Elturky hospital-Ultrasound Clinicin the period from May 2009 up to October 2009.

The study population consisted of all pregnant ladies who were attending ultrasound clinic in first trimester and sure about their gestational dates. Forty patients examined trans-abdominal and trans-vaginal.

There were 100 patients which presented for ultrasound clinic for assessing their first trimester pregnancy, either symptomatic or not.

### Ultrasound machine:

Machine	Company	Model	Probe
SONOACE	MEDISON	8000 SE	Trans-abdominal probe (frequency 3.5MHz) Transvaginal probe (frequency 7.5 MHz)

### Technique

First trimester scanning performed using an abdominal approach then a vaginal approach. Abdominal scanning is performed with a full maternal bladder, provides a wider field of view, and provides the greatest depth of view. Vaginal scanning is performed with the bladder empty, gives a much greater resolution with greater crispness of fine detail.

### RESULTS

The age of the study population ranged from 15 to 45 years. Most of the study population were in the age group 15-20 years (30%), while (15%) in age group 30-35 years. The rest of populations (20%) were from 20-25 years and from 25-30 years old most of the study population (50%) were overweight and no one found underweight. Gestational Age ,about three quarters of the study population were in 6,7, 8,11and12 gestational age and every gestational age had (15%).The least gestational age were 5,9and 13 weeks and each had (5%),the clinical indication

status ,the percentages were equal between symptomatic and asymptomatic(50%).

There was significant relation between transvaginal ultrasound which shows non empty uterus and trans-abdominal ultrasound which shows empty uterus(p=.001).

There was significant relation between the presence of gestational sac in transvaginal and absence of gestational sac in trans-abdominal (p=.000),there was significant link between presence of embryonic pole in transvaginal ultrasound and absence of embryonic pole in trans-abdominal (p=.000), there were<sup>5</sup> cases had irregular gestational shape seen by trans-abdominal and no one by transvaginal. There were equal results in the detection of number of embryos between the transvaginal ultrasound and the trans-abdominal one, there was no difference in fetal heart motion detection between transvaginal ultrasound and trans-abdominal ultrasound, there were significant relation between presence of Retaind product of concepts in the transvaginal ultrasound and absence of it in the trans-abdominal (p=.000), there was no case of ectopic

pregnancy detected by either transvaginal or trans-abdominal ultrasound ,there was no case of molar pregnancy detected by transvaginal ultrasound or tranabdominal one.  
there were relation between presence of uterine abnormalities in the transvaginal ultrasound and

trans-abdominal ultrasound (p=.005) and there was no case of adenexeal abnormality detected by either transvaginal ultrasound or trans-abdominal one.

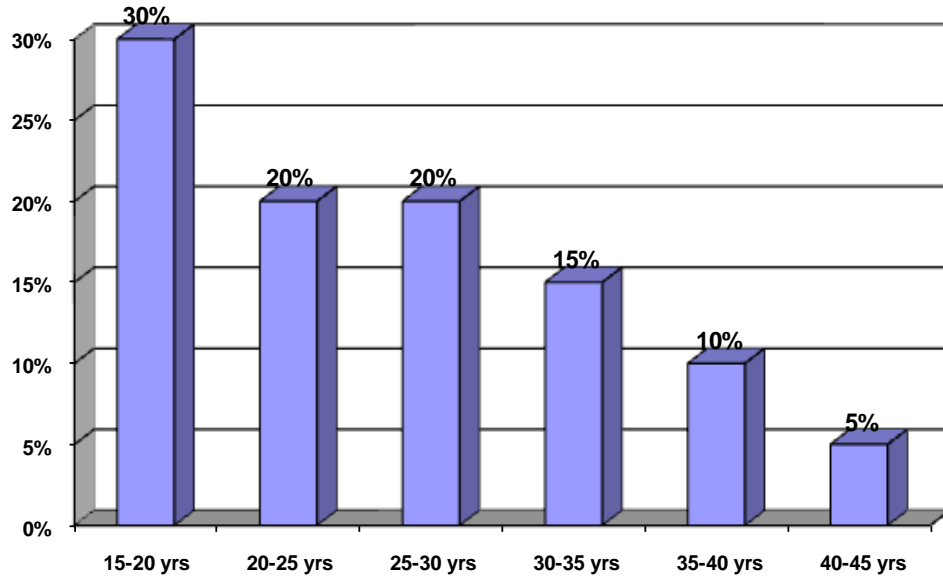


Figure 1: Show Age distribution.

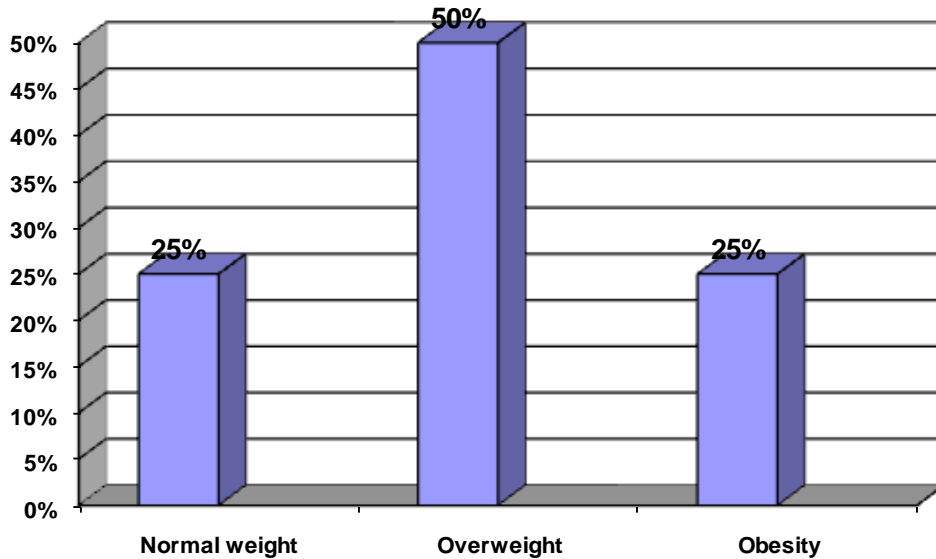


Figure: 2 Body Mass Index.

## DISCUSSION

Considerable number of patients presenting to ultrasound clinic in first trimester of pregnancy have complaints of amenorrhea with vaginal bleeding and lower abdominal pain and others for routine scanning, all of them had urine for HCG positive. The first aim of the clinician is to determine whether the patient had normal pregnancy or not.

Ultrasound is an effective tool to identify the gestational sac and fetal cardiac activity and to determine the normal pregnancy and pregnancy complications. In our case series, we concentrated on trans-abdominal and transvaginal ultrasound and correlation. Trans-abdominal and transvaginal ultrasound provided single unequivocal diagnosis in 20 cases. First trimester pregnancy complications are serious and have high mortality and morbidity. The management of early pregnancy complications needs emergency intervention.

In this study out of forty patients who were referred for ultrasound examination for assessment of their pregnancies.

Patients' age range between 15-45 years .The commonest age group was (15-20) years, while the rest of the study population were in the range of age 20-30 years old.

Out of forty patients, twenty (half of patients) patients had a history of symptoms of early pregnancy failure, and the others had no history.

This can be attributed to overweight (75% of the sample).

In comparing between transvaginal ultrasound and trans-abdominal one in the empty uterus or not, we found it significant that the transvaginal ultrasound could detect presence of something in the uterus when trans-abdominal couldn't .

Also found that transvaginal ultrasound could detect presence of gestational sac in two cases when trans-abdominal couldn't . Recognition of an intrauterine gestational sac by transvaginal technique when not detected by trans-abdominal exclude the possibility of presence of ectopic pregnancy, this also benefit of transvaginal technique.

In detection of the embryonic pole, it found significant that transvaginal ultrasound was superior to trans-abdominal .Pennell RG et al<sup>13</sup>, extract the same results in their study.

Both techniques show equivocal finding in the detection number of embryos .

Yolk sac in the gestational sac could be detected normal with transvaginal ultrasound in two cases when it was absent in the transabdominal, this increase the sensitivity in the diagnosis of the threatened miscarriages. Ferrazzi E<sup>14</sup> results were agonist our result when he found no significant different between the two techniques in the detection of yolk sac and embryonic pole.

Both methods could detect fetal heart motion in cases of normal and threatened miscarriage .

No cases of ectopic or molar pregnancies found in the study population .

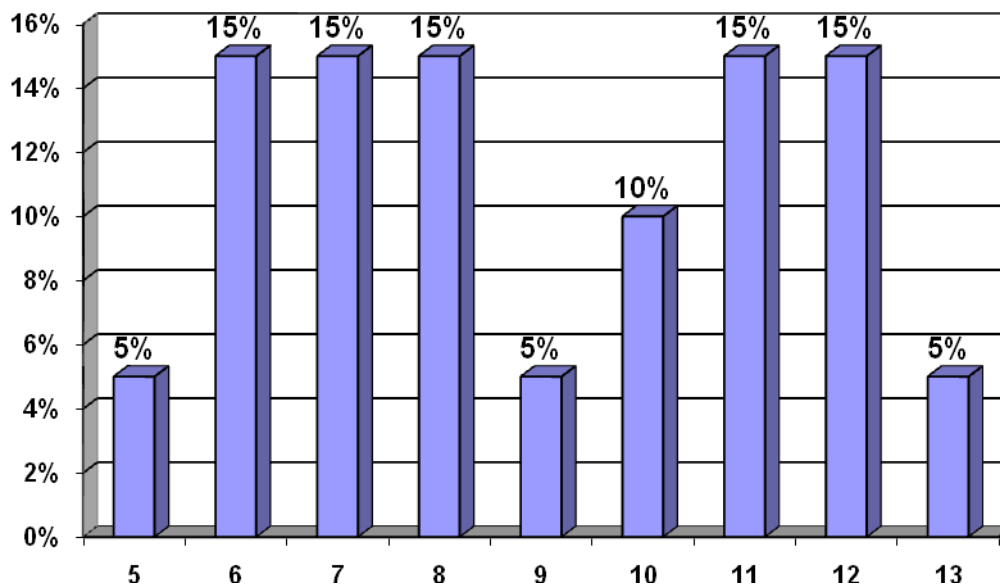


Figure 3: Gestational Age distribution.

Transvaginal ultrasound could detect presence of uterine abnormalities superior than the trans-abdominal one express by its significance .

Adenexal abnormalities detected by transvaginal ultrasound in four cases when not detected by trans-abdominal one . This was supported by the study done by Coleman BG<sup>15</sup> when he detect ovarian masses with transvaginal technique superior to trans-abdominal one.

Our findings show that endovaginal sonography is more sensitive than trans-abdominal sonography in the detection of early pregnancy and its complications.

## CONCLUSION

The transvaginal ultrasound is more efficient in assessing the first trimester pregnancy and its complications than the trans-abdominal technique. Despite of this fact, knowledge of the finding on trans-abdominal technique made it easier to interpret the transvaginal findings. The transvaginal have limitations; to locate lesions outside the pelvis. Transvaginal technique needs further counseling and education.

Trans-vaginal ultrasound should be used for the assessment of the first trimester pregnancy and it's complications. Sudanese ladies should be encouraged to accept the transvaginal ultrasound.

Continuous education and training of transvaginal ultrasound to sonographers is highly required in ultrasound clinics.

All machines should equipped with transvaginal probe in both ultrasound and emergency clinics. Further studies are required using transvaginal ultrasound in the evaluation of the cases suspected to have ectopic pregnancy to avoid unnecessary interventions

## REFERENCES

1. Kaplan B, Dart R, Moskos M, et al. Ectopic pregnancy: prospective study with improved diagnostic accuracy. *Ann Emerg Med* 1996; 28:10-17.
2. Stovall T, Kellerman A, Ling F, et al. Emergency department diagnosis of ectopic pregnancy. *Ann Emerg Med* 1990; 19:1098-1113.
3. Abbott J, Emmans LS, Lowenstein SR. Ectopic pregnancy: ten common pitfalls in diagnosis. *Am J Emerg Med* 1990; 8:515-522.
4. Carson SA, Buster JE. Ectopic pregnancy. *N Engl J Med* 1993; 329:1174-1181.
5. Stabile I, Campbell S, Grudzinkkas JG. Ultrasound assessment of complications during first trimester of pregnancy. *Lancet* 1987; 2:1237-1240.
6. Timor-Tritsch I, Greenidge S, Admon D, et al. Emergency room use of transvaginal ultrasonography by obstetrics and gynecology residents. *Am J Obstet Gynecol* 1992; 166:866-872.
7. Jouppila P, Huhtaniemi I, Tapanainen J. Early pregnancy failure: study by ultrasonic and hormonal methods. *Obstet Gynecol* 1980; 55:42-47.
8. Jurkovic D, et al. Ultrasound features of normal early pregnancy development. *Curr Opin Obstet Gynecol* 1995; 7:493-504.
9. Kossof G. Contentious issues in safety of diagnostic ultrasound: editorial. *Ultrasound Obstet Gynecol* 1997; 10:151-5.
10. Sawyer E, Jurkovic D. Ultrasonography in the diagnosis and management of abnormal early pregnancy. *Clin Obstet Gynecol* 2007; 50:31-54.
11. Pennell R G, et al. Complicated first-trimester pregnancies: evaluation with endovaginal US versus trans-abdominal technique. *Pubmed* 1987 Oct; 165(1):79-83.
12. Jain KA, Hamper UM, Sanders RC. Comparison of transvaginal and trans-abdominal sonography in the detection of early pregnancy and its complications. *AJR Am J Roentgenol.* 1989 May; 152(5):1132.
13. Pennell RG, Merritt, CR. "Ultrasound safety: what are the issues?". *Radiology* .November 1989; 173 (2): 304-306. Retrieved on 2008 Jan22.
14. Ferrazzi E, Garbo S, Sulpizio P, Ghisoni L, Levi Setti P, Buscaglia M. Miscarriage diagnosis and gestational age estimation in the early first trimester of pregnancy: trans-abdominal versus transvaginal sonography. *Ultrasound Obstet Gynecol.* 1993 Jan 1;3(1):36-41
15. Coleman BG, Arger PH, Grumbach K, Menard MK, Mintz MC, Allen KS, Arenson RL, Lamon KA. Transvaginal and trans-abdominal sonography: prospective comparison. *Radiology.* 1988 Sep; 168(3):639-43.