TAUS versus TVUS in detection early pregnancy complication.

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الملخص

استخدام الفحص بالامواج الفوق الصوتية بواسطة المسبار البطني تكون رويا اعضاء الحوض محددة وذلك بسبب تضعيف هذة الامواج بواسطة الجدار الامامي للبطن وشحوم الحوض في حين استخدام المسبار المهبلي ذو التردد العالي 5-7 ميكا هيرتز يعتبر الان ثورة مهمة في تشخيص الحمل المبكر ومعرفة مضاعفاتة وذتك لانة يسهل وضوح اكثر للاعضاء الحوض مثل الرحم والمبايض.هدف الدراسة هو تقييم دور الفص بالامواج الفوق الصوتية باستخدام المسبار المهبلي في تشخيص الحمل المبكر ومضاعفاتة ومقارنتة مع الفحص بالامواج الفوق الصوتية باستخدام المسبار البطنيتضمنت الدراسة اربع وستين مريضة كل المريضات كان لديهم فحص حمل موجب مع علامات ومضاعفات الحمل المبكر و جميع المرضى تم فحصهم بواسطة المسبار البطني وبعدها بالمسبار المهبلي وقبل الفحص تم توضيح طريقه الفحص للمرضى.النتائج هي25مريضا لديهم حالة حمل طبيعي وكلهم شخصوا عن طريق الفحص بالمسبار الداخلي بينما 12منهم شخصوا بالمسبار البطني .5 مرضى لديهم حمل غير جنيني وكلهم شخصوا بالمسبار المهبلي وفقط اثنان منهم شخصوا بواسطة المسبار البطني ست مرضى كان لديهم نزف حول كيس الحمل اربعة منهم شخصوا باستخدام المسبار البطني وكلهم شخصوا باستخدام المسبار المهبلي.ثلاثه حالات لديهم حمل خارج الرحم وفقط حاله واحدة شخصت بواسطة المسبار البطني ،اجهاض غير كامل شخص في 8حالات بواسطه المهبلي وفقط 3منهم شخص عن طريق المسبار البطني 14مريضة كانت لديهم حاله موت الجنين داخل الرحم وفقط 8 حالات شخصت عن طريق المسبار البطني. الفحص بالامواج فوق الصوتيه باستخدام المسبار المهبلي هو اكثر حساسيه واكثر دقه في تشخيص الحمل المبكر ومعرفه مضاعفاته ويجب ان يكون هناك توضيح جيدلطريقة الفحص للمريضه قبل إجراء الفحص.

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Abstract

Background: Using TVUS(transvaginal ultrasound) visualization of pelvic organ is limited due to attenuation of ultrasound beam by intervening anterior abdominal wall and pelvic fat while TVUS (high frequency transducers 5-7MHz) now day regard important revolution in diagnosis of early pregnancy and their complications ,because it facilitate high resolution image of target organ uterus , adenaxa and cul de sac.

Aim of study: To evaluate TVUS in detection of early pregnancy complication and compare transvaginal approach with TAUS .

Patient and Methods : Sixty four patients were included in this study all of them have positive pregnancy test with signs and symptoms of early pregnancy complication .All of those patient examine by TAUS than by TVUS .with good explanation of the procedure to the patients .

Results: From sixty four patients a twenty five patients has normal intrauterine pregnancy all of them are diagnosed by TVUS while only

12 diagnosed by TAUS.Five patients have blighted ova all of them are diagnosed by TVUS and only 2 diagnosed by TAUS. All of 6 patient with subchronic hematoma are diagnosed by TVUS only 4 diagnosed by TAUS .

Three cases were diagnosed as ectopic pregnancy and all of them are diagnosed by TVUS only 1 diagnosed by TAUS . Two patient that diagnosed only by TVUS had intact gestational sac in the adenaxa with positive heart pulsation in fetal pole.Incomplete abortion diagnosed in 8 patient all of them diagnosed by TVUS , only 3 diagnosed by TAUS Fourteen patients has missed abortion only 8 of them are diagnosed by TAUS .

Conclusion and Recommendation:TVUS is more sensitive and more accurate in diagnoses of normal early pregnancy and in detection of early pregnancy complication.Many patient refused TVUS. So good explanation of the procedure to the patient is important.

Key words: TAUS, TVUS, early pregnancy complications.

Introduction

With all US application, its standard practice to use the highest possible transducers frequency which is allowed visualization of the target organ. Using TAUS, visualization of the pelvic organ is limited by body habits owing to sonic attenuation of intervening anterior abdominal wall, subcutaneous and proportional fat and fat in the mesentery and omentem.As a result of this attenuation , its not possible to use high frequency transducer in TAUS[1and2].

High frequency(5-7MHz) and high resolution transducer describe in 1984 and now it's the Methods of choice for monitoring infertility disorders, first trimester pregnancy and its complication and the diagnosis of ectopic pregnancy[3] .

Major advantage of TVUS

1-The ability to use a higher frequency transducers near to the organ of interest which is facilitate higher resolution image of the uterus , ovaries , adenaxa and cul de sac.

2-Avoidenace attenuation of US beam by anterior andomenal wall and other pelvic organ .

3-Scaning can be perform with an empty maternal UB, the latter fact leading many women to prefer this technique to TAUS which is perform through [3] .

Limitation of TVUS

1-Reduce beam of penetration (field of view).As the highest the frequency produce by the transducers cause the less penetration of the beam (roughly penetration=40/frequency)while TAUS provide wider field of view .

2-TVUS is more invasive technique and many patient with early pregnancy refuse this approach . [3and4]

Adverse effect of TVUS

1.Spread of infectious diseases and to prevent this is by a latex condom should be cover the probe .

2.Chemical irritation of the vagina if the patient has latex allergy and to prevent this irritation an alternative cover should be used,Which is available from probe manifacture .

3.Deleterous affect of the lubricant on the sperm motility , so it recommended that a water or saline be used as a lubricant [1]

4. In pregnant women TVUS may expose the fetus to high intensities than TAUS and as there is no restriction on the use of US in pregnancy, care should be taken to avoid unnecessary prolong exposure to US beam .[5]

First trimester of pregnancy:First trimester of pregnancy have dramatic events which is make it the most critical and tenuous period of human development.The life span of first trimester of pregnancy is conclude 12 weeks started from the first day of last normal menstrual period [6]

First trimester complication:Because of complex sequences and events that accompany first trimester development .Its not unusual for complication to occur. Early pregnancy complication may present with vaginal bleeding or and abdominal pain. Differential diagnosis of first trimester complication include:

1-Intact intrauterine pregnancy.
2-Blighted ova.
3-Incomplete abortion.
4-Hydatiform mole.
5 -Missed abortion.
6-Complete abortion.
7-Ectopic pregnancy.
8 -Subchrionic hematoma[7.8and9].

In women who present with sign and symptom of first trimester complication US is often the first and frequently the only study required to sort out the many differential clinical consideration.

At present days TVUS change the clinical approach for evaluation of first trimester complication and it became the optimal way to image a patient during the first trimester of pregnancy and its play a pivotal role in diagnosis its disorders[6].

Indication of TVUS in the first trimester includes

1) To identify the location and number of gestational sacs .
2) To date the age of the pregnancy .
3) To determine whether an early pregnancy had normal sonographic appearance or there is sonographic feature of pregnancy failure.
4) To asses maternal symptom such as pain or bleeding [6and10].

The Aim of the study

To evaluate TVUS in detection of early pregnancy complication and compare TV approach with TAUS.

Patients and Methods

Sixty four patient were included in this study and they were referred from obstetric department in AL-Diwanyia Maternity and children teaching hospital for US examination from the first of February 2008 to the first of February 2009.

This study include interobsever and intraobserver examination and the reliability (patient correlation coefficient) =0.9.

The criteria of selected patient included :Patients women how have positive pregnancy test with sign and symptom of fist trimester complication these patients should agree with TVUS.All patients who refused TVUS were excluded from this study.

The US machine used

1. Siemens Versa Pro with (3.5MHz) for TAUS.
2. Philips with 7 MHz for TVUS.

TAUS was the first line in the examination follow by TVUS:

Patient preparation in TVUS:Good explanation of the procedure to the patients and the patient should void before the examination so that the urinary bladder is empty or nearly empty before the examination, the patient place in a supine position covered with sheet with the knee bent and the foot flat on the table .

Probe preparation in TVUS:A disposable cover (condom) , placed over the probe and small amount of transducers coupled gel is placed inside the tip of the condom , the condom is pulled over the shaft of the probe than we inserted the probe.

Once the probe is inserted into the vagina, it rotated from 0-90 degree about its axis to obtain coronal and sagital plans.

Results

This study was conducted on (64) patients who have early pregnancy (positive pregnancy test) with sign and symptom of early pregnancy complication such as vaginal bleeding with or with out uterine cramping. Either a normal delivery occurred or surgical intervention and some time end with curettage. The data of study analyzed by used frequency and percentage with sensitivity of TAUS compare with that of TVUS in detection of early pregnancy complication.

Table- 1: shows the findings of TVUS and TAUS in early pregnancy complication .

Causes of Early pregnancy complication	Finding of TVUS		Finding of TAUS		Sensitivity of TAUS compare with TVUS
	Frequency	Percentage	Frequency	Percentage	
Normal intrauterine pregnancy	25	39%	12	18.7%	48%
Blighted ova	5	7.8%	2	3%	40%
Subchorionic hematoma	6	9.4%	4	6.2%	66.6%
Ectopic pregnancy	3	4.7%	1	1.56%	33.3%
Incomplete abortion	8	12.5%	3	4.68%	37.5%
Complete abortion	3	4.7%	1	1.5%	33.3%
Missed abortion	14	21,9%	8	12.5%	57%
Total	64	100	31	48%	

In all sixty four patients the causes of early pregnancy complication are only in 31(48%) patients the causes of early pregnancy complication are detected in TAUS.Twenty five (39%) of cases have normal intrauterine pregnancy and all of them are diagnosed by TVUS while only 12%(18.7) are diagnosed by TAUS .

So 13 of cases not diagnosed by TAUS from these 13 patient five patients have R/V uterus with small gestational sac (very early pregnancy) , three patients have A/V uterus with small gestational sac (mean sac diameter (2-5mm)) .Other 5 patient have very small fetal pole (4-5mm) with positive heart beat.As result TVUS better than TAUS in detection of early normal pregnancy with small gestational sac especially in patient with R/V uterus and its better than TAUS in diagnoses normal small pulsatile fetal pole.Five(7.8%) patients of all of 64 patient have blighted ova . Only 2(3%) of them diagnosed by TAUS when mean sac diameter =35mm, 30mm with no yolk sac, no fetal pole.

Three cases that diagnosed only by TVUS have smaller gestational sac, means sac diameter =(15-20mm) with no fetal pole , no yolk sac .Six patients (9.4%) with subchrionic hematoma and only four (6.2%) of them are diagnosed by TAUS , two cases that not diagnosed by TVUS have very small amount of subchrionic hematoma . Ectopic pregnancy diagnosed in three patient (4.7%) from those 64 patient only one(1.56%) of them diagnosed by TAUS after rupture of the extrauterine gestational sac. Other two patient that diagnosed by TVUS as adenaxal mass before rupture of gestational sac , one of them have small pulsatile fetal pole in the extrauterine gestational sac.Only three patients (4.68%) from all eight patients (12.5%) of incomplete abortion are diagnosed by TAUS small retained pieces difficult to diagnosed by TAUS and easy to diagnosed by TVUS.Complete expelletion of conception content with out retained pieces are found in 1 patient (1.5%) in TAUS out of three patients (4.7%)fourteen patients are diagnosed to have missed abortion all of them are diagnosed by TVUS , only 8 (12.5%)cases are diagnosed by TAUS , other 6 patient does not diagnosed by TAUS have small , no viable fetus ...

From table 1 we found that higher sensitivity of TAUS is detection of subchorionic hematoma which is less than 70% and lower sensitivity in detection of ectopic 33% and complete abortion 33%.

Discussion

Normal intrauterine pregnancy : From all 64 patient normal intrauterine pregnancy was the commonest finding reported in this study 25patient (39%)which is consistent with finding reported by KA Jain et al [11] andwith R.Chisholm[3]. Only 12 of patients (18.7%) are diagnosed in TAUS.The first sonographic evidence of pregnancy is the gestational sac as a small an echoic fluid collection surrounding by an echogenic ring[12and13]. We found in this study that TVUS are very useful in detection this feature of early normal pregnancy.

Also Timor et al[14]who studied early embryonic development with the high frequency TVUS found that its possible to identify this small gestational sac by four week and three day when mean sac diameter =2-3mm.

Blighted ova :We found that TVUS can diagnosed blighted ova earlier than TAUS and as the possibility of incorrect date should always be considers [15and16] we confirm the diagnosis of blighted ova by repeated US after interval.So TVUS was better than TAUS in detection of blighted ova and this flinging is inconsistent with finding of Nyberg et al [17] and with Levi GS et al [18] as shown in table 3 .who reported that in TVUS blighted ova is certain when the mean gestational sac diameter exceed 8mm , with no yolk sac , or when gestational sac diameter exceed 16mm without embryoWhile in TAUS blighted ova is

diagnosed when means sac diameter exceed 20mm with out yolk sac or when mean gestational sac exceed 25 with out embryo [17,18].

Table -3:The early diagnosis of non-viable pregnancy (blighted ova) correlation of gestational sac diameter with detection of yolk sac and embryo[17,18].

	Mean sac diameter (mm) in TVUS	Mean sac diameter (mm)in TAUS
Yolk sac not detected	More than 8	More than 20
Embryo not detected	16	More than 25mm

Levi et al and Nyberg et al reported that in TVUS blighted ova is certain when the mean gestational sac diameter exceed 8mm , with no yolk sac , or when gestational sac diameter exceed 16mm without embryo .While in TAUS blighted ova is diagnosed when means sac diameter exceed 20mm with out yolk sac or when mean gestational sac exceed 25 mmwith out embryo [17,18].

Subchorionic hematoma :Spontaneous loss rate in the presence a intrauterine subchrionic hematoma occur in 9% of patients [19] and this risk increase in women older than 35 years old and in pregnancy less than 8 weeks [20].So early diagnosis of subchrionic hematoma is important while in this study two cases not diagnosed by TAUS .

Ectopic pregnancy :The sonographic feature of pregnancy is varied and early diagnosis of ectopic pregnancy very effective in decrease risk on maternal life [20]

In this study we found that TVUS better than TAUS in early detection of ectopic pregnancy which is goes with findings of Arthur C[21] and with KA Jain et al [11] .

Incomplete and complete abortion:

All patients with incomplete abortion are diagnosed by TVUS incorrect diagnosis occur in 5 patients from 8 patients by TAUS

From these five patients two woman have a continues bleeding even after curettage .Only one patient (1.5%) from 3(4.7%) documented in TAUS as complete abortion .

Missed abortion:US have important role in establishing whether there is heart motion of embryo /fetus and TVUS is accurate in determine heart motion in early pregnancy[22].Incorrect diagnosis or inappropriate reassurance about viability of the embryo seen in 6 patients and need TVUS to documented diagnosis from this we found that TVUS very important to take decision about fetal viability, that goes with Brown et al [23] who study the diagnosis of early embryonic demis by endovaginal sonography and concluded that diagnosis of embryonic demis can be made when there is no cardiac activity in an embryo greater than 5mm by TVUS or greater than 9mm in abdominal US .

Conclusions

In some cases the causes of early pregnancy complication can not explain successfully by TAUS , TVUS is more sensitive than routine TAUS in diagnosis normal early pregnancy and detect first trimester complication and so that maternal mortality and morbidity can be reduce with earlier diagnosis of first trimester complications, so TVUS have important role in diagnosis early pregnancy complications

Recommendations

1-Adequate explanation of the procedure (TVUS) to the patient is essential and its important to explain that the examination is essential painless and only part of the probe will be inserted .
2-Give the possibility of incorrect date should consider. a repeated TVUS should arrange after an interval of at least one week if there is any suspicion.
TVUS (transvaginal ultrasound)
TAUS (transabdomenal ultrasound)
MHZ (mega hertz)

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