Section: Radiology

Original Research Article

STUDY OF ULTRASONOGRAPHY IN FIRST TRIMESTER PREGNANCY RETROSPECTIVE STUDY

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Abstract

Background: Ultrasound is the imaging technique to detect congenital anomalies, intrauterine growth retardation and also to predicts possible morbidity and mortality risk of both fetus and mother in early pregnancy itself. **Materials and Methods:** 250 women within 12 weeks of gestation were studied. Patients were subjected to TAS or TVS as per the need; gestational age, nuchal translucency, and scan findings were noted. A comparison of gestation age with CRL and diameter of the yolk sac was studied. **Result:** Gestation age in weeks, 23 (9.2%); nuchal translucency ranged from 0.1 to 1.0 mm. In 42 (16.8%) ranged from 1.1 mm to 2.0. Out of 250, 198 (79.2%) had normal pregnancies, 3 (1.2%) had brightened ovum, 6 (2.4%) had embryonic demise, 37 (14.8%) had wrong dates, 3 (1.2%) had uterine mass (fibroid), and 3 (1.2%) had ectopic pregnancies. In comparison, GA and CRL were 36.43 (± 13.68) mm. In comparison of GA with diameter of Yolk Sac. In 250 women, the mean yolk sac diameter was 3.32 (± 1.33) mm. **Conclusion:** The USG study is an ideal and gold standard method to find out normalcy and/or abnormal (anomalies) in early pregnancies.

INTRODUCTION

Ultrasound is the imaging study of choice for detection and full characterization of early pregnancies based on its accuracy, low cost, safety profile, and abundant availability.[1]

USG study is quite useful in the first trimester to detect intrauterine growth, measure gestational sac, gestational age (GA), and evaluate miscarriage, uterine anomalies. Adnexal diseases and cervical length can all be accurately diagnosed in the first trimester of pregnancy.[2] All the trimester problems can be detected before they become apparent.[3] By allowing for the elective termination of malformed fetuses, antenatal identification of fetal abnormalities has been demonstrated to improve maternal and perinatal morbidity and mortality.[4] The usage of ultrasound assessment of fetal nuchal translucency. The study of ultrasonography is carried out to predict the complications to avoid morbidity and mortality of the fetus and mother as well in early pregnancy.

MATERIALS AND METHODS

250 women within 12 weeks of gestation regularly visited the Vedanta Institute of Medical Sciences and the hospital in Dahanu, Maharashtra 401606 were studied.

Inclusion Criteria

Pregnant women with a history of amenorrhea <12 weeks of gestation. The patients who gave their consent in writing for the study were selected.

Exclusion Criteria

Patients with a history of abdominal pain and bleeding per vagina, hypertension, type II DM, and a history of cardiac disease were excluded from the study.

Method: A history and clinical examination of every patient were carried out. Every routine investigation was done. After describing the technique to the patients. Every patient was subjected to transabdominal sonography (TAS) or transvaginal sonography (TVS), depending upon the patient's condition.

The parameters of the study were gestation sac location, presence of yolk sac, and presence of fetal pole. Fetal heart rate, crown-rump length (CRL) measurements, uterine anomalies and tumors, pelvic or adnexal mass, cervical length, internal OS condition, and study of nuchal translucency (NT) were studied.

The duration of the study was May 2023 to Sep 2024. Statistical analysis: gestation age by weeks, nuchal translucency, scan findings, comparison of gestational age with CRL, and diameter of yolk sac was carried out. The findings were classified with The statistical analysis was carried out in SPSS

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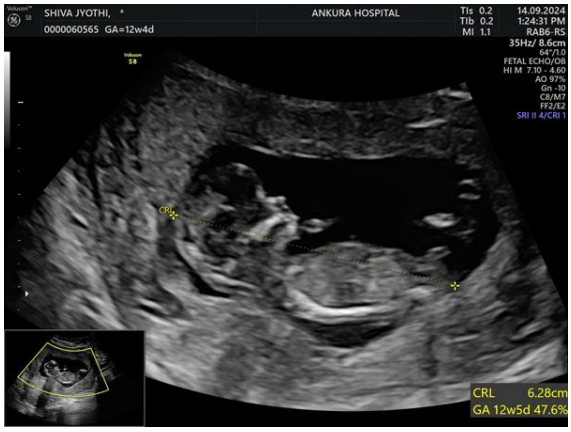
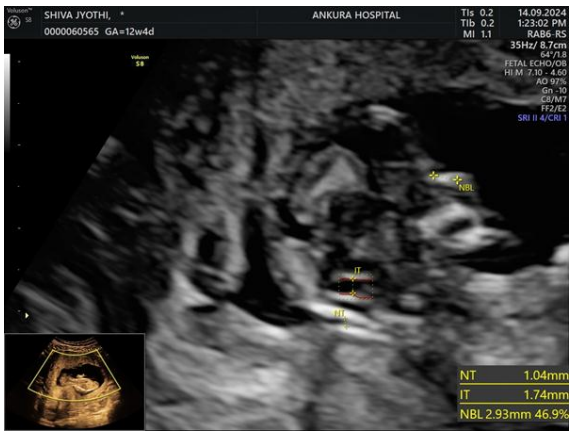
software; mean values of findings were also studied. The statistical analysis was carried out in SPSS software.





RESULTS

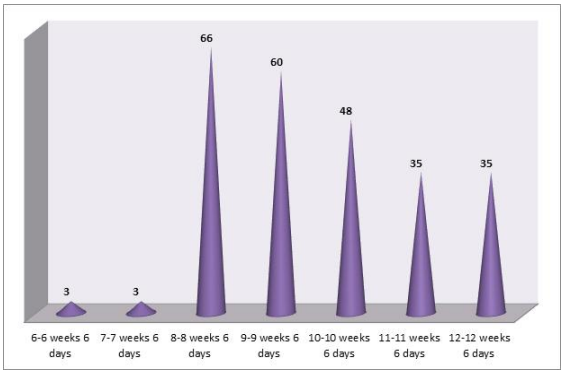


Figure 1: Distribution of women by gestational age by Last Menstrual period (LMP)

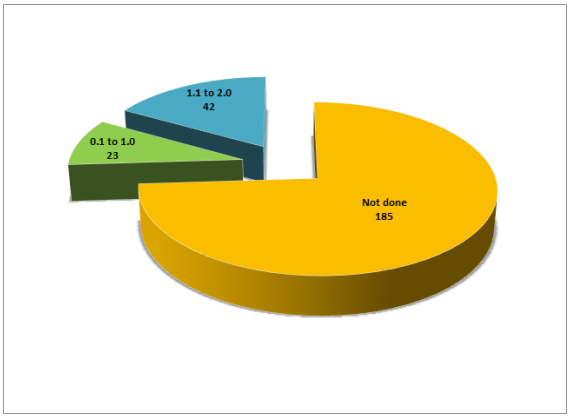


Figure 2: Study of Nuchal translucency findings

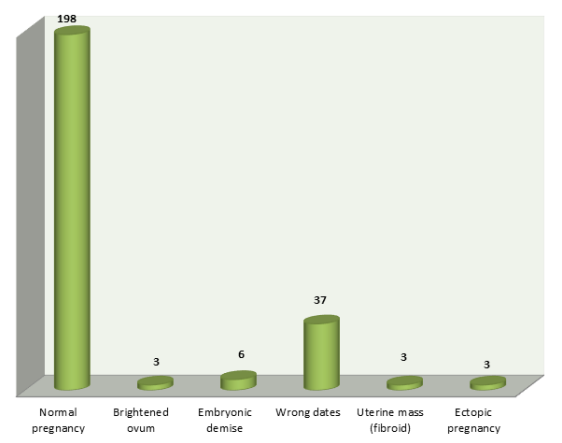


Figure 3: Findings of ultrasonography

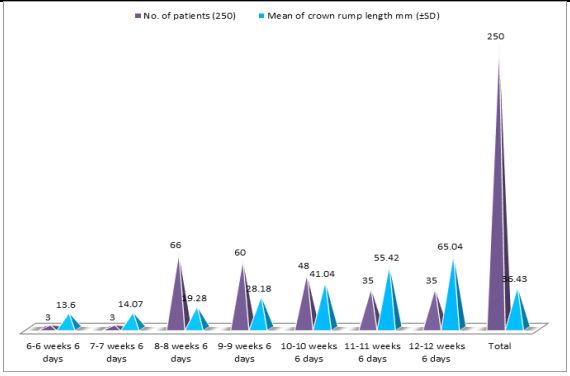


Figure 4: Comparative of Gestational age and CRL by USG

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[Table 1] Study of distribution of women by gestational age by last menstrual period (LMP) 3 women had 6-6 weeks of 6 days, 3 women had 7-7 weeks of 6 days, 66 women had 8-8 weeks of 6 days, 60 women had 9-9 weeks of 6 days, 48 women had 10-10 weeks of 6 days, 35 women had 11-11 weeks of 6 days, and 35 women had 12-12 weeks of 6 days.
[Table 2] Study of Nuchal Translucency Findings 185 (74%) not done, 23 (9.2%) had 0.1 to 1.0 mm, and 42 (16.8%) had 1.1 to 2.0 mm.
[Table 3] Findings of ultrasonography: 198 (79.2%) had normal, 3 (1.02%) had brightened pregnancy, 6 (2.4%) had embryonic demise, 37 (14.8%) had wrong dates, and 3 (1.2%) had uterine mass (fibroid). 3 (1.2%) had ectopic pregnancy.
[Table 4] Comparison of gestational age and CRL by USG 3 patients of 6-6 weeks of 6 days had 13.6 (± 0) mean CR Length, 3 women of 7-7 weeks of 6 days had 14.07 (±0), CR Length, 66 women of 8-8 weeks of 6 days had 19.28 (± 2.60) mean CR Length, 60 women of 9-9 weeks of 6 days had 28.18 (± 3.95) CR Length, 48 women of 10-10 weeks of 6 days had 41.04 (± 3.34) mean CR Length, 35 women of 11-11 weeks had 55.42 (± 6.56) mean CR Length, 35 women of 12-12 weeks of 6 days had 65.04 (± 4.78) CR Length.
[Table 5] Comparative study of mean yolk sac with gestational age: 3 women of 6–6 weeks and 6 days had 2.12 (± 0) mean yolk sac diameters; 3 women of 7–7 weeks of 6 days had 2.33 (± 0) mean yolk sac diameters; and 66 women of 8–8 weeks of 6 days had 3.44 (± 1.95) mean yolk sac diameters. 60 women of 9-9 weeks of 6 days had 4.18 (± 2.13) 48 women of 10-10 weeks 6 days had 4.65 (± 1.53) 35 women of 11-11 weeks 6 days had 3.40 (± 1.96) 35 women of 12-12 weeks 6 days had 2.96 (± 1.75) mean yolk sac diameter; 250 women of the present study had 3.32 (± 1.33) mean yolk sac diameter.

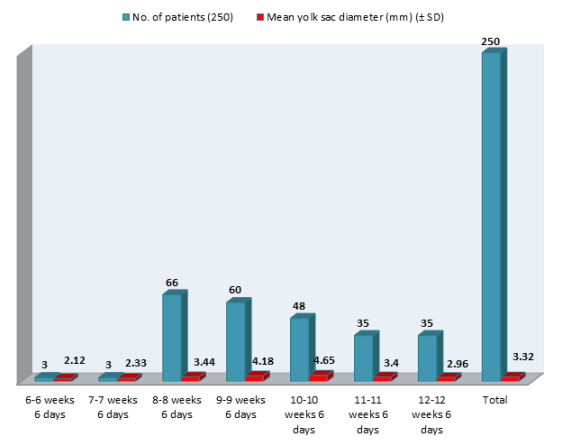

Figure 5: Comparative of Mean Yolk sac diameter according to gestational age

Table 1: Distribution of women by gestational age by Last Menstrual period (LMP).

Gestational age by dates (weeks)	Number (250)
6-6 weeks 6 days	3
7-7 weeks 6 days	3
8-8 weeks 6 days	66
9-9 weeks 6 days	60
10-10 weeks 6 days	48
11-11 weeks 6 days	35
12-12 weeks 6 days	35

Table 2: Study of Nuchal translucency findings

Nuchal translucency	No. of patients (250)	Percentage (%)
Not done	185	74
0.1 to 1.0	23	9.2
1.1 to 2.0	42	16.8

Table 3: Findings of ultrasonography

Scan findings	Number (250)	Percentage (%)
Normal pregnancy	198	79.2
Brightened ovum	3	1.2
Embryonic demise	6	2.4
Wrong dates	37	14.8
Uterine mass (fibroid)	3	1.2
Ectopic pregnancy	3	1.2

Table 4: Comparative of Gestational age and CRL by USG

Gestational ages (weeks)	No. of patients (250)	Mean of crown rump length mm (±SD)
6-6 weeks 6 days	3	13.6 (± 0) 0
7-7 weeks 6 days	3	14.07 (± 0) 0
8-8 weeks 6 days	66	19.28 (± 2.60)
9-9 weeks 6 days	60	28.18 (± 3.95)
10-10 weeks 6 days	48	41.04 (± 3.34)
11-11 weeks 6 days	35	55.42 (±6.56)
12-12 weeks 6 days	35	65.04 (± 4.78)
Total	250	36.43 (± 13.68)

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Table 5: Comparative of Mean Yolk sac diameter according to gestational age

Gestational age weeks	No. of patients (250)	Mean yolk sac diameter (mm) (± SD)
6-6 weeks 6 days	3	2.12 (± 0)
7-7 weeks 6 days	3	2.33 (± 0)
8-8 weeks 6 days	66	3.44 (± 1.95)
9-9 weeks 6 days	60	4.18 (± 2.13)
10-10 weeks 6 days	48	4.65 (± 1.53)
11-11 weeks 6 days	35	3.40 (± 1.96)
12-12 weeks 6 days	35	2.96 (± 1.75)
Total	250	3.32 (± 1.33)

DISCUSSION

Present study of ultrasonography in first trimester pregnancy complications. Gestation age by dates (weeks) was studied [Table 1]. In the study, nuchal translucency findings showed that 23 (9.2%) had 0.1 to 1.0 mm, and 42 (± 16.8%) had 1.1 to 2.0 mm [Table 2]. In the USG study, out of 250 women, 198 (79.2%) had normal pregnancies, 3 (1.2%) had brightened ovum, 6 (2.4%) had embryonic demise, 37 (14.8%) had wrong dates, 3 (1.2%) had uterine mass (fibroid), and 3 (1.2%) had ectopic pregnancy [Table 3]. In a competitive study of gestation age with CRL, the mean value was 36.43 (± 13.68) [Table 4]. In comparison, GA (weeks) with a diameter of the yolk sac was 3.32 (± 1.33) (Table 5) (Figures 1, 2, 3, and 4). These findings are more or less in agreement with previous studies.[5-7]

USG is one of the most important tools for antenatal care, which is the preventive arm of obstetric medicine. USG is a crucial component of both high-risk and low-risk pregnancies during first trimester pregnancies. E.g., first trimester vaginal bleeding, detection of fetal anomalies. USG plays a vital role in the detection of early gestation. The earliest sign of intrauterine gestation is an echogenic area within the thickened decidua, and it can be seen as early as 25 days of menstrual age.[8] Pregnant women exposed to radiation, smoking and alcohol usage of certain drugs lead to defects in the neural tube, which can be seen in the first trimester of pregnancy. Spontaneous preterm labor accounts for around 60.70% of all pattern deliveries and thus makes a significant contribution to prenatal morbidity and mortality, mainly predicted in the first trimester study. Moreover, gestational diabetes in the first trimester of pregnancy includes sex hormone-binding globulin (SHBG), a highly sensitive C-reactive protein, and adiponectin, which may retard the growth of the fetus in a later stage of pregnancy.[9] Growth-restricted infants are overrepresented in perinatal morbidity and mortality statistics and have an increased lifetime risk of cardiovascular and metabolic disease; hence, first trimester CR length has clinical significance in growth retardation predictability.[10]

In the first trimester of pregnancy, biomarkers are fetal nuchal translucency, uterine artery pulsation, and placental growth factors, which are the best predictors for later pregnancy complications.

In the normal USG study, the following criteria were observed: presence of a yolk sac within the gestational uterine pregnancy. An embryo should be visualized when MSD (mean sac diameter) is at least 25 mm; otherwise, it is considered an embryonic pregnancy. Gestational age by CRL is within 5 days of GA calculated by the LMP method. Presence of fetal heart rate Nuchal translucency value less than 4 mm viewed from the 11th week absence of the yolk or adnexal pathology.[11] These findings, including the diameter of the yolk sac and CR length, can predict the clinical outcomes of morbidity and mortalities.

CONCLUSION

USG is a noninvasive, non-radioactive, effective, easily accessible, and cost-effective tool to find out normalcy or abnormalities in fetal growth, location and position of placenta viability, and movements of the fetus. USG is mandatory during pregnancy for prediction of low-risk or high-risk for both fetus and mother.

Limitation of study: Owing to the tertiary location of the research center, the small number of patients, and the lack of the latest techniques, we have limited findings and results.

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