Original Article

Ultrasonography in 1st Trimester of Pregnancy

Determination of Accuracy of Ultrasonography in 1st Trimester of Pregnancy in Detection of Date of Delivery

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ABSTRACT

Objective: To determine the accuracy of ultrasonography in 1st trimester of pregnancy in detection of date of delivery.

Study Design: Descriptive / cross sectional study.

Place and Duration of Study: This study was conducted at the Department of Obstetrics & Gynecology, Sandeman Provincial Hospital, Quetta from 1st July 2016 to 31st December 2016.

Materials and Methods: Total 100 primigravida with 1st trimester of pregnancy having age 18-45 years were recruited for the present study. Women with Multiple gestation, nonviable pregnancy and fetal malformation were excluded from the study.

Results: In this study accuracy rate of USG for date of delivery was 84 (84%) in first trimester. In age group18-30 years, accuracy rate was 71 (93.42%) and 13 (54.17%) in age group 31-45 years. Accuracy of USG for date of delivery was noted in 57 (90.48%) patients and 27 (72.97%) patients in both gestational age groups respectively (9-10 weeks vs 11-12 weeks).

Conclusion: Findings of this study revealed that accuracy of USG based EDD estimation is found better in first trimesters in detection of date of delivery. A higher rate of accuracy of Ultrasound based EDD estimation was noted in early age group as compared to middle age group. It is also observed that accuracy was significantly associated with gestational age.

Key Words: Last menstrual period, Accuracy, Ultrasound, Gestational age, Expected date of delivery

Citation of article: Kakar F, Hamza S. Determination of Accuracy of Ultrasonography in 1st Trimester of Pregnancy in Detection of Date of Delivery. Med Forum 2017;28(2):19-22.

INTRODUCTION

The estimated date of delivery EDD has profound social, medical and personal implications for the pregnant woman and is a vital yardstick for the clinician who is responsible for safe delivery of their patient. In obstetric care, proper evaluation of gestational age is paramount.[1] To make the proper management, decisions need correct estimation of age of gestation. Accurate date of pregnancy may assist doctors in appropriately counselling women who are at the risk of a pre-term delivery (delivery of fetus before 37 weeks) about likely neonatal outcomes and is also essential in the evaluation of growth of fetal and the detection of intrauterine growth restriction.[1,2] Almost 70% of women in USA have ultrasound testing done in pregnancy to determine delivery date.[3]

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Received: November 5, 2016; Accepted: December 29, 2016

That's why the correct information about gestational age is essential for monitoring the growth of the fetus throughout pregnancy and to provide optimal management of the fetus in connection with date of delivery.[4]

Knowledge about the date of delivery is an essential for taking care of fetus and for the classification of a delivery as preterm, term or post-term (after 42 weeks). Its accuracy is therefore of paramount importance.[5] Women now have estimate which is the prediction based on the measurement by ultrasound scanning of well-recognized fetal parameters.[6] For the pregnant woman, the deliveries have various implications on pregnancy. The Ultrasound assessment is limited because it introduces bias as it is based on fetal growth, and thus could systematically result in the assignment of incorrect lower gestational age estimates for small fetus and incidence of the infants born as preterm is 7.9%, and 1.1% as post term.[2]

In low-resource settings such as Pakistan where limited information or education is routinely unavailable, mothers often determine gestational age of fetus by relying on USG .The estimation of the magnitude of accuracy of USG in 1st trimester of pregnancy in assessing the delivery date is very important**.** If its accuracy is higher, then it can be used for the assessment of date of delivery in future and to improve the quality of obstetri1cal care to patient and newborn.

MATERIALS AND METHODS

This descriptive cross-sectional research was conducted at Obstetrics & Gynecology, Sandeman Provincial Hospital, Quetta from 1st July 2016 to 31st December 2016. Total 100 primigravida with 1st trimester of pregnancy having age 18-45 years were recruited for the present study. Women with Multiple gestation, nonviable pregnancy and fetal malformation were excluded from the study. First trimester of pregnancy defined as time period extending up to12th weeks of gestation. An approval was taken from institutional review committee and written informed consent was taken from every patient. Demographic profile of all the patients was entered in predesigned proforma. Ultrasound was done of all the selected patients and expected date of delivery on USG was noted on predesigned proforma. Accuracy of USG was labeled as positive if delivery occurs on the date estimated by USG in 1st trimester of pregnancy. Term was defined as if the delivery occurs at or between 37 completed weeks and 41 weeks +6 days. At the time of delivery if 1st trimester USG date was match with the date of delivery, then accuracy was labelled as positive.All the collected data was entered in SPSS version 17 analyzed. Mean and SD was calculated for age gestational age. Frequency was calculated for accuracy (Yes/No). Stratification of age and gestational was done. Post stratification chi-square was applied to see the effect on these variables on outcome i.e. accuracy. The level of significance ≤ 0.05 was significant.

RESULTS

Total 100 patients with 1st trimester of pregnancy were selected for this study. Mean age of the patients was 28.58±4.65 years and mean gestational age of the fetus was 11.30±0.90 weeks. Accuracy of USG for date of delivery was 84 [16%] (Fig. 1). Patients were divided in to age group i.e. age group 18-30 years and age group 31-45 years. Out of 76 (76%) patients of age group 18-30 years, accuracy of USG for delivery was noted in 71 (93.42%) patients. Among the 24 (24%) patients of age group 31-45 years, accuracy was noted in 13 (54.17%) patients. Statistically significant (P = 0.000) association of accuracy with age of the patients was noted (Table 1).

Table No.1: Relation of accuracy with age

Age (years)	Accuracy		P value
	Yes	No	
18 – 30	71 (93.42)	5 (6.58%)	0.000
31 – 45	13 (54.17%)	11 (145.83)	
Total	84 (84%)	16 (16%)	

Patients were divided into two gestational age group i.e. 9-10 weeks and 11-12 weeks. Total 63 (63%) patients belonged to 9-10 weeks of gestational age and 37 (37%) patients belonged to 11-12 weeks of gestational age and accuracy of USG for date of delivery was noted in 57 (90.48%) patients and 27 (72.97%) patients in both gestational age groups respectively (Table 2).

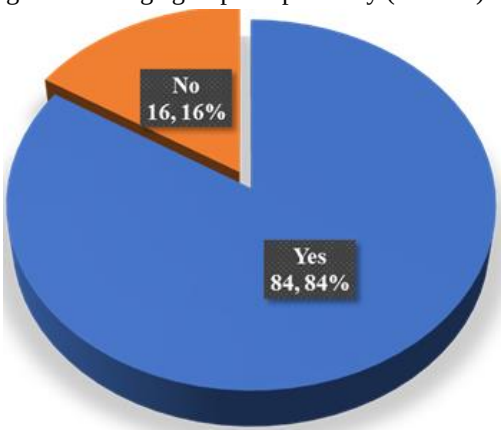

Figure No. 1: Accuracy of USG in 1st trimester

Table No.2: Relation of accuracy with gestational age

Gestational age (weeks)	Accuracy		P value
	Yes	No	
9-10	57 (90.48%)	6 (69.52%)	0.023
11-12	27 (72.97%)	10 (27.03%)	
Total	84 (84%)	16 (16%)	

DISCUSSION

The aim of present study was to determine the accuracy of Ultrasonography in 1st trimester of pregnancy in detection of date of delivery which was 84% in our study. These findings comparable with the study by Dietz et al[2], they reported accuracy rate of EDD on ultrasound in trimester of pregnancy as 91%. Once first trimester USG estimation was reserved for those ladies having unknown LMP dates.[7] But it became very popular in USA with the passage of time. But it is not beneficial in routine use in low risk populations. In USA, clinician often revise women due date when ultrasound and LMP estimation differ by 7 days or more up to 20 weeks gestation.[7-9] In 20-30 weeks gestation, if the difference is 14 days and at 30 week gestation if the difference is 21 days or more.[10]

The basis of gestational age estimation by USG, various measurement of fetus is taken by obstetrician on the basis of reported LMP date.[11] Crown rump length is used in the estimation of gestational age with rapid growth and linear relation with the gestational age at that time.[12] Crown rump length mark is visible at the 8th

weeks gestation approximately. In the last two trimesters combination of biparietal diameter of head circumference and femur length are used after that standard formula is applied.[13]

In our study, significantly (P = 0.000) high accuracy rate was observed in women having age 18-30 years as compared to women having 31-45 years (93.42% vs 54.17%). In our study, it was also revealed that rate of accuracy of USG for date of delivery was significantly (P=0.023) high in 9-10 weeks of gestation group as compared to 11-12 weeks gestation [90.48% vs 72.97%] (Table 2). As it is well known and documented in the literature that EDD estimation by ultrasonically has better results in early trimester than later trimesters even found much better in early weeks than late weeks of first trimester. [14]

In literature, several studies comparing the LMP with USG dating techniques used fetal head measurements (i.e. biparietal diameter) to estimate the gestational age.[15] These studies were done in 2nd or 3rd trimester of gestation according the LMPs. There were remain limitations as some of the women were found unreliable. So the ultrasound base dating techniques were found superior to dating based on LMP. Particularly with regarding to predicting the actual date of delivery.[16]

Mongelli et al[17] concluded that among the all the EDDS for singleton pregnancies with reliable menstrual date according to 5 methods: Last menstrual period (LMP) only, USG only, and 3 separate combinations of LMP and USG, the EDD by USG independently was found more accurate. Deliveries occurred within the ten days of estimated date in 64.1% of the women when LMP alone were used, and in 70.3% of the women when USG alone was used. However, it should be stressed that delivery occurred on the predicted date in 3.6% women when the expected date of delivery was based on LMP and in only 4.3% of women when the date was based on USG.

CONCLUSION

Findings of this study revealed that accuracy of USG based EDD estimation is found better in first trimesters in detection of date of delivery. A higher rate of accuracy of Ultrasound based EDD estimation was noted in early age group as compared to middle age group. It is also observed that accuracy was significantly associated with gestational age.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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