

Effectiveness of ultrasonography in determining gestational age and expected date of delivery

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Abstract

Background: The accurate knowledge of gestational age (GA) is perhaps the most important piece of information in pregnancy management. It is indispensable when considering therapy during pregnancy, for interpreting diagnostic tests or for management of labour.

Aim: To find out the effectiveness of ultrasonography (USG) in estimation of gestational age and expected date of delivery (EDD).

Methods: The study consisted of 145 women drawn from different socioeconomic groups belonging to different communities who came for antenatal check to HSK Hospital. In all the women EDD was calculated from last menstrual period (LMP) by Naegele's rule. After taking detailed history, thorough clinical examination was done. USG was done by Radiologist before 20 weeks of gestation. Data collected was tabulated, evaluated and analysed.

Results: Of the 102 patients finally selected for the study their age ranged from 18 to 35 years. Maximum cases belonged to 21-25 years age group. There was significantly high incidence of teen age pregnancy. 30 out of 102 patients were under 20 years, 8 patients were above the age of 30 years. There was no influence of age over the time of delivery. The study has shown that the percentage of deliveries after 42 weeks has reduced from 8.8 to 4.9%, 8.8% when only clinical method (LMP) was used compared to USG date.

Conclusion: Accurate estimation of Gestational age is very important for obstetric management. Present study reveals that USG EDD is more superior to clinical EDD. Hence USG can safely be used for calculation of Gestational age whenever LMP is not known.

Keywords: Gestational Age; Ultrasound; Last Menstrual Period; post maturity

Introduction

The accurate knowledge of GA is perhaps the most important piece of information in pregnancy management. Clinically, knowledge of Gestational duration is important because the correct interpretation of many observations is only possible if the duration of gestation at the time of measurement is known.^[1] It is indispensable when considering therapy during pregnancy, for interpreting diagnostic tests or for management of labour. Uncertain GA is important cause of iatrogenic prematurity which is an important cause of perinatal mortality. Accurate dating helps to avoid post dated pregnancy and its associated complications. It also helps to detect IUGR or Macrosomia.

Traditionally GA is calculated from first day of LMP.

But LMP is uncertain in 20-30% of gravidas due to lack of illiteracy and lack of awareness in developing countries. The most effective way to date pregnancy is by USG. When ultrasound is performed with quality and precision, there is evidence to suggest that dating a pregnancy using ultrasound measurements is clinically superior to using menstrual dating with or without ultrasound, and this has been advocated and adopted in other jurisdictions.^[2]

Objectives of the study:

1. Comparison of LMP EDD with USG EDD.
2. To find out the effectiveness of USG in estimation of Gestational age.

Methods

The study consisted of 145 women drawn from

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different socio economic groups belonging to different communities who came for antenatal check up to HSK Hospital.

Inclusion criteria

- Age from 18 years to 35 years
- Gravida from 1 to 6, belonged to different period of gestation
- Women with regular menstrual cycles of 3-4/28-30 days and remembered their LMP accurately.

Exclusion criteria

- History of first trimester bleeding
- History of taking contraceptive pills before the present pregnancy
- Women who later developed pregnancy complications like – Pre-eclampsia, Gestational diabetes and Antepartum haemorrhage.

In all the women EDD was calculated from LMP by Naegele's rule. After taking detailed history, thorough clinical examination was done. USG was done by Radiologist before 20 weeks of gestation. Data collected was tabulated, evaluated and analysed.

Results

The present study included 145 women selected irrespective of age, parity, socio-economic status and religion, Of the 145 patients, 26 patients were excluded from the study due to prematurity, 10 due to PIH and 7 due to antepartum haemorrhage and gestational diabetes. Remaining 102 patients were followed till the time of delivery.

Of the 102 patients finally selected for the study their age ranged from 18 to 35 years. Maximum cases belonged to 21-25 years age group. There was significantly high incidence of teen age pregnancy. 30 out of 102 patients were under 20 years, 8 patients were above the age of 30 years. There was no influence of age over the time of delivery represented in (Table 1).

Table 1: Distribution of patients according to age

Age group (years)	Number of patients	Percentage of cases (%)
18-19	16	15.6
20-24	44	43.1
25-29	27	26.6
30-34	15	14.7

The gravidas ranged from G1 to G6 with maximum cases in G1 followed by G2. There were 2 cases of G5 and one case of G6 (Table 2).

Table 2: Distribution of Patients according to gravida

Gravida	Number of cases	Percentage of cases (%)
G1	38	37.2
G2	34	33.3
G3	19	18.6
G4	8	7.8
G5	2	1.9
G6	1	0.9

The number of deliveries at different gestational weeks, according to LMP EDD, is described in Table 3. The study showed that 8.8% of cases were delivered after 42 weeks i.e., postdated but none of babies showed any evidence of post maturity.

Table 3: Distribution of patients according to LMP EDD

Gestational weeks	No of cases	Percentage of cases (%)
37-38	3	2.9
38-39	12	11.7
39-40	37	36.2
40-41	42	41.1
42+	9	8.8

The number of deliveries at different gestational weeks, according to USG EDD, is as follows (Table 4)-

Table 4: Distribution of patients according to USG EDD

Gestational weeks	No of cases	Percentage of cases (%)
37-38	13	12.7
38-39	31	30.4
39-40	38	37.2
40-41	15	14.7
42+	5	4.9

The study has shown that the percentage of deliveries after 42 weeks has reduced from 8.8 to 4.9%, 8.8% when only clinical method (LMP) was used compared to USG date. The 4% of cases would have been induced unnecessarily for post maturity. Even in babies who delivered after 42 weeks according to USG EDD none of them showed signs of post maturity.

The above chart has shown that gestational age is approximately 1 week longer in cases of clinical EDD compared to USG EDD. 41% of patients delivered after 40 weeks according to LMP EDD while only 14.7% delivered after 40 weeks according to USG EDD.

This shows that LMP EDD may underestimate the gestational age by nearly a week.

Discussion

The accurate determination of fetal age is of prime importance in obstetric practice but because of uncertain dates, the length of gestation cannot be reliably estimated in 80 % of pregnant women. The co-existence of inaccurately dated pregnancies with obstetric complications like PIH, Hypertension, Diabetes, Rh incompatibility, Placenta praevia and repeat cesarean section poses perplexing difficulties in the clinical decision of the most optimal time for delivery.

Afroza Ghani et al in 2014 concluded that USG dating during estimated GA range of 12 -14 weeks gave a more accurate prediction of delivery date than the estimate based on LMP EDD.^[3]

A hospital based study from Oklahoma reached a conflicting conclusion^[4]. They suggested that gestational age based on good menstrual records supported by a pelvic examination in the first trimester may be more reliable than even the best USG method for dating. They also concluded that if the woman is very sure about her LMP the EDD by Naegle's rule should not be changed unless the discrepancy between LMP and USG EDD is 14 days or more.

A study from a London hospital accepting many tertiary referrals from district general hospital obstetric units and serving a multiracial local population showed that biparietal diameter measurements performed at between 12 and 18 weeks' gestation were significantly more accurate predictors of the actual date of delivery than last menstrual period for all 4527 women examined, including those who were sure of the date of their last menstrual period.^[5]

The British Medical Ultrasound Society's view is that if the scan estimated date of delivery differs from the clinical, including last menstrual period, assessment by more than one week, then the ultrasonic assessment should be the working gestational age and the clinical assessment should be discarded^[6].

With the widespread availability of USG and with the development of standard fetal measurement, most women now have two independently derived estimates which may differ: a calculation based on last menstrual period (L.M.P.+280 days) and a prediction based on the measurement by USG ^[7,8].

Conclusion

Accurate estimation of Gestational age is very

important for obstetric management. Present study reveals that USG EDD is more superior to clinical EDD. Hence USG can safely be used for calculation of Gestational age whenever LMP is not known.

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