

Title:

Late Ultrasound (Greater Than 20 weeks) vs. Last Menstrual Period to Date Pregnancy in Hispanic Women

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Session Title:

Global Strategies in Perinatal Health

Slot:

I 18: Monday, 30 October 2017: 3:45 PM-4:30 PM

Scheduled Time:

4:05 PM

Keywords:

Hispanic, pregnancy and ultrasound

References:

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Abstract Summary:

This presentation will include a review of the current evidence on the use of ultrasound measurements in pregnancy dating. Then, new research on pregnancy dating in Hispanic women will be presented. Finally, recommendations for future research will be discussed.

Learning Activity:

LEARNING OBJECTIVES	EXPANDED CONTENT OUTLINE
The learner will be able to define gestational age, last menstrual period and estimated date of delivery.	Definitions of gestational age, last menstrual period and estimated date of delivery will be discussed.
The learner will be able to identify current methods of pregnancy dating, including last menstrual period and ultrasound evaluation.	Current methods of pregnancy dating, and the current literature regarding ultrasound use in pregnancy dating, will be presented.
The learner will be able to identify variations in ultrasound measurements in the second half of pregnancy that may affect dating validity.	Variations in ultrasound measurements in the second half of pregnancy and their relationship to pregnancy dating will be discussed.
The learner will be able to identify areas for improvement in clinical practice as relates to pregnancy dating criteria and need for further research activity.	Recommendations for future research on ultrasound use in pregnancy dating will be discussed, including a time of receiving recommendations from the participants.

Abstract Text:

Pregnancy dating is a critical component of pregnancy management, including timing of antenatal testing and management of preterm and post-term pregnancies. Maternal, fetal, and neonatal well-being are affected by the accuracy of dating methods, including last menstrual period (LMP) and ultrasound determinations of gestational age (GA). This review was conducted to determine the relationship of estimated date of delivery (EDD) based on LMP and late ultrasound (>20 weeks) and GA at spontaneous onset of labor (SOOL).

According to the American Congress of Obstetricians and Gynecologists (ACOG; 2012, 2013, 2014, & 2015), the first trimester of pregnancy lasts until 13 weeks from the LMP. The second trimester is 13 to 26 weeks, and the third trimester is 27 weeks and up (ACOG). The ICD-10-CM code set defines the first trimester as less than 14 weeks 0 days, the second trimester as 14 weeks 0 days to 27 weeks 6 days, and the third trimester as 28 weeks 0 days to delivery (AAPC, 2014). This variation is important when comparing data based on billing codes versus data based on clinical guidelines.

Spontaneous abortion is classified as pregnancy loss before 20 weeks GA. Preterm birth occurs between 20 weeks 0 days and 36 weeks 6 days. Full-term birth occurs between 37 weeks 0 days and 41 weeks 6 days. Post term birth occurs at or after 42 weeks 0 days (ACOG).

Current Practice

Initially, EDD is calculated as 280 days from the LMP. This assumes ovulation on day 14 of a cycle and accurate recall of the LMP by the patient. In reality, most cycles do not fit the “normal” pattern monthly, if at all, which leads to discrepancy when using the LMP for pregnancy dating. Because of recall bias, the LMP may be more inaccurate the later a patient presents for prenatal care.

Formulae based on US measurements have been used for several decades for pregnancy dating. Crown-rump length is measured in the first trimester and used as the basis for calculating GA by several formulae. After 13 to 14 weeks GA, the fetus begins to curve; thereafter, head circumference or biparietal diameter with or without the femur length is used. It is generally agreed that first trimester ultrasounds are more accurate at determining GA when compared to later ultrasounds.

Literature Review

A literature review reveals that ultrasounds early in pregnancy are the most accurate measurements of GA, although accuracy will depend on the formula used. An international standard for pregnancy dating in the first trimester has been developed to minimize variations in GA assessment by US (Papageorghiou, Kennedy, Salomon, Ohuma, Cheikh Ismail, Barros, et al., 2014).

There are several formulae used for calculating GA by US. Some of the formulae include Persson & Weldner, Hadlock, Mul, Altman & Chitty, and Selbing & Kjessler (Saltvedt, Almstrom, Kublickas, Reilly, Valentin & Grunewald, 2004; Simic, Amer-Wahlin, Marsal & Kallen, 2012). Formulae are designed to be used during certain GA ranges to improve accuracy. Saltvedt and colleagues (2004) found that formulae designed for use in early second trimester dating were not as accurate in the first trimester. The same held true for first trimester formulae-- these formulae were not as accurate for dating second trimester pregnancies. The literature also demonstrates that after the first trimester, there is greater variation in fetal growth, which can lead to greater discrepancies in dating by US, making it more difficult to interpret growth patterns after 20 weeks GA.

Lazariu, Davis, & McNutt (2012) found that Hispanic women have a higher rate of discordant GA classifications at delivery compared with non-Hispanic women. And Hoffman, Messer, Mendola, Savitz, Herring, et al. (2008) found that Hispanic women were more likely to have an older GA based on LMP compared to US measurements in first trimester.

Okland, Nakling, Gjessings, Grottum, & Eik-Nes (2012) state that a range of 2-5 days on prediction bias is relevant when dating pregnancies based on LMP or US; their study demonstrated a median bias of +/- 1 day when US measurements in second trimester were used (biparietal diameter and femur length measurements).

Methods

The study presented here is a retrospective chart review of Hispanic women who initiated prenatal care with two providers in a single practice in 2014-2015. Approval from the Institutional Review Committee of Baptist Health was received. There was no risk of harm to the patients as no intervention was being performed.

In the community of interest, Hispanic women frequently presented for care after the midpoint of pregnancy; therefore, initial ultrasounds were anticipated to be less accurate for dating purposes when compared to other populations who received care earlier in pregnancy. The charts reviewed included the antenatal record from the clinic and the delivery and discharge summaries from the affiliated hospital. The electronic medical records system used in the clinic is programmed to select the final EDD based on US if the GA varies from the LMP by 5 or 10 days in the first or second trimester, respectively. These can be overridden by the provider if clinical judgement dictates. Statistical analysis was completed by the author. US measurements performed at the initial appointment were obtained by trained sonographers using standards based on the Hadlock scale.

Results

Of the original 162 charts examined, 70 women were included in the final sample. Inclusion criteria were initial US at >20 weeks GA, spontaneous onset of labor (SOOL), recorded last menstrual period (LMP), EDD discrepancy between LMP and US dates, and birth records available. Exclusion criteria were induction of labor, intrauterine fetal demise, cesarean section without spontaneous onset of labor, and unknown or unrecorded LMP and birth data.

The final sample was divided into 2 groups: final EDD based on LMP (LMP group) and final EDD based on US (US group). The LMP group included 31 women; mean age at delivery was 25.97 years (mode 29 years) and mean gravida was 3.45 pregnancies (mode 3 pregnancies). The US group included 39 women; mean age at delivery was 27.79 years (mode 25, 26, and 28 years) and mean gravida was 3.64 pregnancies (mode 3 pregnancies). The ages of the LMP group ranged 13-41 years, including 1 "young" gravida and 3 "elderly" gravidas. The ages of the US group were more closely clustered and ranged 20-42 years, including 6 "elderly" gravidas and no "young" gravidas. In the LMP group, 2 of the 31 women reported a history of preterm births (6.4%); in the US group, 4 of the 39 women reported a history of 1 preterm birth each (10.2%). Overall, the US group was older and had a higher rate of previous preterm birth.

The LMP group presented for prenatal care at a mean GA of 26.6 weeks and had a mean GA at SOOL of 38.6 weeks. If the opposite EDD (based on US) had been used for these women, it would have changed their mean GA at SOOL to 38.5 weeks.

The US group presented for prenatal care at a mean GA of 28.3 weeks, which was 11 days later in pregnancy compared to the LMP group. The US group had a mean GA at SOOL of 38.3 weeks, which was 3 days earlier than the LMP group. If the opposite EDD (based on LMP) had been used for these women, it would have changed their mean GA at SOOL to 37.4 weeks, which is 6 days earlier than their actual GA at SOOL and 9 days earlier than the actual GA at SOOL of the LMP group.

In the LMP group, 2 of the 31 pregnancies in the study ended in preterm birth (6.4%). In the US group, 5 of the 39 pregnancies in the study ended in preterm birth (12.8%). These rates of preterm birth are comparable within the groups to the reported rates of preterm birth that occurred before the pregnancies being studied. Only 1 of the preterm births in the study would have been reclassified as full-term had the opposite EDD been used (36.5 weeks based on US and 40.3 weeks based on LMP). The remaining preterm births were classified as preterm based on both LMP and US.

Conclusion

The results of this study support the findings of Hoffman, et al. (2008), who found that the pregnancies of Hispanic women were dated older when using LMP dates than when using US dates obtained in the first trimester. This suggests that fetuses of Hispanic women measure “smaller” throughout pregnancy than the fetuses on which the currently used standards are based. The findings also suggest, though, that late ultrasound (>20 weeks GA) is an appropriate measure of gestational age when the gestational age calculated by the last known menstrual period is >10 days different. There may be some slight variation in outcomes for individual pregnancies, but the sample shows a comparable outcome between groups. These variations may be attributed to several factors and it is recommended that further studies be performed to guide the development of population-specific formulae for the establishment of GA and EDD in the second half of pregnancy.