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WOMEN'S HEALTH CARE PHYSICIANS



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Committee on Obstetric Practice
American Institute of Ultrasound in Medicine
Society for Maternal-Fetal Medicine

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Method for Estimating Due Date

ABSTRACT: Accurate dating of pregnancy is important to improve outcomes and is a research and public health imperative. As soon as data from the last menstrual period, the first accurate ultrasound examination, or both are obtained, the gestational age and the estimated due date should be determined, discussed with the patient, and documented clearly in the medical record. Subsequent changes to the estimated due date should be reserved for rare circumstances, discussed with the patient, and documented clearly in the medical record. When determined from the methods outlined in this document for estimating the due date, gestational age at delivery represents the best obstetric estimate for the purpose of clinical care and should be recorded on the birth certificate. For the purposes of research and surveillance, the best obstetric estimate, rather than estimates based on the last menstrual period alone, should be used as the measure for gestational age.

Recommendations

The American College of Obstetricians and Gynecologists, the American Institute of Ultrasound in Medicine, and the Society for Maternal-Fetal Medicine make the following recommendations regarding the method for estimating gestational age and due date:

- Ultrasound measurement of the embryo or fetus in the first trimester (up to and including 13 6/7 weeks of gestation) is the most accurate method to establish or confirm gestational age.
- If pregnancy resulted from assisted reproductive technology (ART), the ART-derived gestational age should be used to assign the estimated due date (EDD). For instance, the EDD for a pregnancy resulting from in vitro fertilization should be established using the age of the embryo and the date of transfer.
- As soon as data from the last menstrual period (LMP), the first accurate ultrasound examination, or both are obtained, the gestational age and the EDD should be determined, discussed with the patient, and documented clearly in the medical record. Subsequent changes to the EDD should be reserved for rare circumstances, discussed with the patient, and documented clearly in the medical record.

- When determined from the methods outlined in this document for estimating the due date, gestational age at delivery represents the best obstetric estimate for the purpose of clinical care and should be recorded on the birth certificate. For the purposes of research and surveillance, the best obstetric estimate, rather than estimates based on the LMP alone, should be used as the measure for gestational age.

Purpose

An accurately assigned EDD is among the most important results of evaluation and history taking early in prenatal care. This information is vital for timing of appropriate obstetric care, scheduling and interpretation of certain antepartum tests, determining the appropriateness of fetal growth, and designing interventions to prevent preterm births, postterm births, and related morbidities. Appropriately performed obstetric ultrasound has been shown to determine fetal gestational age accurately (1). A consistent and exacting approach to accurate dating is also a research and public health imperative because of the influence of dating on investigational protocols and vital statistics. This Committee Opinion outlines a standardized approach for estimating gestational age and the anticipated due date. It is understood that within the ranges

suggested by different studies, no perfect evidence exists to establish a single-point cut-off in difference between clinical and ultrasonographic EDD to prompt changing a pregnancy's due date. However, there is great utility in using a single, uniform standard within and between institutions that have access to high-quality ultrasonography (as most, if not all, U.S. obstetric facilities do). Accordingly, in creating recommendations and the associated summary table, single-point cut-offs were chosen based on expert review.

Background

Determining the first day of the LMP traditionally is the first step in establishing the EDD. By convention, the EDD is 280 days after the first day of the LMP. Because this practice assumes a regular menstrual cycle of 28 days, with ovulation occurring on the 14th day after the beginning of the menstrual cycle, this practice does not account for inaccurate recall of the LMP, irregularities in cycle length, or variability in the timing of ovulation. It has been reported that approximately one half of women accurately recall their LMP (2–4). In one study, 40% of the women randomized to receive first-trimester ultrasonography had their EDDs adjusted because of a discrepancy of more than 5 days between ultrasound dating and LMP dating (5). Estimated due dates were adjusted in only 10% of the women in the control group who had second-trimester ultrasonography, suggesting that first-trimester ultrasound examination can improve the accuracy of the EDD, even when the first day of the LMP is known.

Accurate determination of gestational age can positively affect pregnancy outcomes. For instance, one study found a reduction in the need for postterm inductions in a group of women randomized to receive routine first-trimester ultrasonography compared with women who received only second-trimester ultrasonography (5). A Cochrane review concluded that ultrasonography can reduce the need for postterm induction and lead to earlier detection of multiple gestations (6). Because decisions to change the EDD significantly affect pregnancy management, their implications should be discussed with patients and recorded in the medical record.

Clinical Considerations in the First Trimester

Ultrasound measurement of the embryo or fetus in the first trimester (up to and including 13 6/7 weeks of gestation) is the most accurate method to establish or confirm gestational age (3, 4, 7–10). Up to and including 13 6/7 weeks of gestation, gestational age assessment based on measurement of the crown–rump length (CRL) has an accuracy of \pm 5–7 days (11–14). Measurements of the CRL are more accurate the earlier in the first trimester that ultrasonography is performed (11, 15–18). The measurement used for dating should be the mean of three discrete CRL measurements when

possible and should be obtained in a true midsagittal plane, with the genital tubercle and fetal spine longitudinally in view and the maximum length from cranium to caudal rump measured as a straight line (8, 11). Mean sac diameter measurements are not recommended for estimating the due date. Beyond measurements of 84 mm (corresponding to approximately 14 0/7 weeks of gestation), the accuracy of the CRL to estimate gestational age decreases, and in these cases, other second-trimester biometric parameters (discussed in the following section) should be used for dating. If ultrasound dating before 14 0/7 weeks of gestation differs by more than 7 days from LMP dating, the EDD should be changed to correspond with the ultrasound dating. Dating changes for smaller discrepancies are appropriate based on how early in the first trimester the ultrasound examination was performed and clinical assessment of the reliability of the LMP date (Table 1). For instance, before 9 0/7 weeks of gestation, a discrepancy of more than 5 days is an appropriate reason for changing the EDD. If the patient is unsure of her LMP, dating should be based on ultrasound estimates, ideally those obtained before or at 13 6/7 weeks of gestation, with the earliest ultrasound with a CRL measurement prioritized as the most reliable.

If pregnancy resulted from ART, the ART-derived gestational age should be used to assign the EDD. For instance, the EDD for pregnancy resulting from in vitro fertilization should be assigned using the age of the

Table 1. Guidelines for Redating Based on Ultrasonography

Gestational Age Range*	Method of Measurement	Discrepancy Between Ultrasound Dating and LMP Dating That Supports Redating
≤ 13 6/7 wk	CRL	
• ≤ 8 6/7 wk		More than 5 d
• 9 0/7 wk to 13 6/7 wk		More than 7 d
14 0/7 wk to 15 6/7 wk	BPD, HC, AC, FL	More than 7 d
16 0/7 wk to 21 6/7 wk	BPD, HC, AC, FL	More than 10 d
22 0/7 wk to 27 6/7 wk	BPD, HC, AC, FL	More than 14 d
†28 0/7 wk and beyond	BPD, HC, AC, FL	More than 21 d

Abbreviations: AC, abdominal circumference; BPD, biparietal diameter; CRL, crown–rump length; FL, femur length; HC, head circumference; LMP, last menstrual period.

*Based on LMP

†Because of the risk of redating a small fetus that may be growth restricted, management decisions based on third-trimester ultrasonography alone are especially problematic and need to be guided by careful consideration of the entire clinical picture and close surveillance.

embryo and the date of transfer. For example, for a day-5 embryo, the EDD would be 261 days from the embryo replacement date. Likewise, the EDD for a day-3 embryo would be 263 days from the embryo replacement date.

Clinical Considerations in the Second Trimester

Using a single ultrasound examination in the second trimester to assist in determination of gestational age enables simultaneous fetal anatomic evaluation. However, the range of second-trimester gestational ages (14 0/7 weeks to 27 6/7 weeks) introduces greater variability and complexity, which can affect revision of LMP dating and assignment of a final EDD. With rare exception, if a first-trimester ultrasound examination was performed, especially one consistent with LMP dating, gestational age should not be adjusted based on a second-trimester ultrasound examination. Ultrasound dating in the second trimester typically is based on regression formulas that incorporate variables such as

- the biparietal diameter and head circumference (measured in transverse section of the head at the level of the thalami and cavum septi pellucidi; the cerebellar hemispheres should not be visible in this scanning plane);
- the femur length (measured with full length of the bone perpendicular to the ultrasound beam, excluding the distal femoral epiphysis); and
- the abdominal circumference (measured in symmetrical, transverse round section at the skin line, with visualization of the vertebrae and in a plane with visualization of the stomach, umbilical vein, and portal sinus) (8).

Other biometric variables, such as additional long bones and the transverse cerebellar diameter, also can play a role.

Gestational age assessment by ultrasonography in the first part of the second trimester (between 14 0/7 weeks and 21 6/7 weeks of gestation, inclusive) is based on a composite of fetal biometric measurements and has an accuracy of ± 7 –10 days (19–22). If dating by ultrasonography performed between 14 0/7 weeks and 15 6/7 weeks of gestation, inclusive, varies from LMP dating by more than 7 days, or if ultrasound dating between 16 0/7 weeks and 21 6/7 weeks of gestation varies by more than 10 days, the EDD should be changed to correspond with the ultrasound dating (Table 1). Between 22 0/7 weeks and 27 6/7 weeks of gestation, ultrasound dating has an accuracy of ± 10 –14 days (19). If ultrasound dating between 22 0/7 weeks and 27 6/7 weeks of gestation, inclusive, varies by more than 14 days from LMP dating, the EDD should be changed to correspond with the ultrasound dating (Table 1). Date changes for smaller discrepancies (10–14 days) are appropriate based on how early in this second-trimester range the ultrasound examination was performed and on clinician assessment of LMP reliability.

Clinical Considerations in the Third Trimester

Gestational age assessment by ultrasonography in the third trimester (28 0/7 weeks of gestation and beyond) is the least reliable method, with an accuracy of ± 21 –30 days (19, 20, 23). Because of the risk of redating a small fetus that may be growth restricted, management decisions based on third-trimester ultrasonography alone are especially problematic; they need to be guided by careful consideration of the entire clinical picture and may require closer surveillance, including repeat ultrasonography to ensure appropriate interval growth. The best available data support adjusting the EDD of a pregnancy if the first ultrasonography in the pregnancy is performed in the third trimester and suggests a discrepancy in gestational dating of more than 21 days.

Conclusion

Accurate dating of pregnancy is important to improve outcomes and is a research and public health imperative. As soon as data from the LMP, the first accurate ultrasound examination, or both are obtained, the gestational age and the EDD should be determined, discussed with the patient, and documented clearly in the medical record. Subsequent changes to the EDD should be reserved for rare circumstances, discussed with the patient, and documented clearly in the medical record. When determined from the methods outlined in this document for estimating the due date, gestational age at delivery represents the best obstetric estimate for the purpose of clinical care and should be recorded on the birth certificate. For the purposes of research and surveillance, the best obstetric estimate, rather than estimates based on the LMP alone, should be used as the measure for gestational age.

Table 1 provides guidelines for estimating the due date based on ultrasonography and the LMP in pregnancy. The American College of Obstetricians and Gynecologists, the American Institute of Ultrasound in Medicine, and the Society for Maternal-Fetal Medicine recognize the advantages of a single dating paradigm being used within and between institutions that provide obstetric care. Therefore, Table 1 provides single-point cut-offs and ranges based on available evidence and expert opinion.

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