The American College of Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

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Society for Maternal•Fetal Medicine
High-risk pregnancy experts

COMMITTEE OPINION

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Committee on Obstetric Practice
American Institute of Ultrasound in Medicine
Society for Maternal-Fetal Medicine
This Committee Opinion was developed by the American College of Obstetricians and Gynecologists' Committee on Obstetric Practice, in collaboration with members Christian M. Pettker, MD; James D. Goldberg, MD; and Yasser Y. El-Sayed, MD; the American Institute of Ultrasound in Medicine's liaison member Joshua A. Copel, MD; and the Society for Maternal-Fetal Medicine.

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PDF Format

Methods for Estimating the 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 (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. A pregnancy without an ultrasound examination that confirms or revises the EDD before 22 0/7 weeks of gestational age should be considered suboptimally dated. 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 that resulted from in vitro fertilization should be assigned 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.
- A pregnancy without an ultrasound examination that confirms or revises the EDD before 22 0/7 weeks of gestational age should be considered suboptimally dated.

Introduction

An accurately assigned EDD early in prenatal care is among the most important results of evaluation and history taking. 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 ultrasonography has been shown to accurately determine fetal gestational age (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 to estimate 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 cutoff in the difference between clinical and ultrasonographic EDD to prompt changing a pregnancy's due date. However, there is great usefulness in having 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 cutoffs were chosen based on expert review.

Background

Traditionally, determining the first day of the LMP 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 EDD 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 ultrasonography in the second trimester, which suggests 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 ±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 examination estimates (ideally obtained before or at 13 6/7 weeks of gestation), with the earliest ultrasound examination of 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 a pregnancy that resulted from in vitro fertilization should be assigned using the age of the 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 determining the gestational age enables simultaneous fetal anatomic evaluation. However, the range of second-trimester gestational ages

(14 0/7 weeks to 27 6/7 weeks of gestation) 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. Ultrasonography 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)
- 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 ultrasonography 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 ultrasonography dating (Table 1). Between 22 0/7 weeks and 27 6/7 weeks of gestation, ultrasonography dating has an accuracy of ± 10–14 days (19). If ultrasonography 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 ultrasonography 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. Of note, pregnancies without an ultrasound examination that confirms or revises the EDD before 22 0/7 weeks of gestational age should be considered suboptimally dated (see also Committee Opinion 688, *Management of Suboptimally Dated Pregnancies* [23]).

Clinical Considerations in the Third Trimester

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.

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, 24). 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; therefore, decisions need to be guided by careful consideration of the entire clinical picture and may require close 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. A pregnancy without an ultrasound examination that confirms or revises the EDD before 22 0/7 weeks of gestational age should be considered suboptimally dated.

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. Table 1 provides guidelines for estimating the due date based on ultrasonography and the LMP in pregnancy, and provides single-point cutoffs and ranges based on available evidence and expert opinion.

References

1. Reddy UM, Abuhamad AZ, Levine D, Saade GR. Fetal imaging: executive summary of a joint *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, Society for Maternal-Fetal Medicine, American Institute of Ultrasound in Medicine, American College of Obstetricians and Gynecologists, American College of Radiology, Society for Pediatric Radiology, and Society of Radiologists in Ultrasound Fetal Imaging workshop. Fetal Imaging Workshop Invited Participants. Obstet Gynecol 2014;123:1070–82. [PubMed] [*Obstetrics & Gynecology*] ⇦
2. Wegienka G, Baird DD. A comparison of recalled date of last menstrual period with prospectively recorded dates. J Womens Health (Larchmt) 2005;14:248–52. [PubMed] [Full Text] ⇦
3. Savitz DA, Terry JW Jr, Dole N, Thorp JM Jr, Siega-Riz AM, Herring AH. Comparison of pregnancy dating by last menstrual period, ultrasound scanning, and their combination. Am J Obstet Gynecol 2002;187:1660–6. [PubMed] [Full Text] ⇦
4. Barr WB, Pecci CC. Last menstrual period versus ultrasound for pregnancy dating. Int J Gynaecol Obstet 2004;87:38–9. [PubMed] ⇦
5. Bennett KA, Crane JM, O'Shea P, Lacelle J, Hutchens D, Copel JA. First trimester ultrasound screening is effective in reducing postterm labor induction rates: a randomized controlled trial. Am J Obstet Gynecol 2004;190:1077–81. [PubMed] [Full Text] ⇦
6. Whitworth M, Bricker L, Mullan C. Ultrasound for fetal assessment in early pregnancy. Cochrane Database of Systematic Reviews 2015, Issue 7. Art. No.: CD007058. [PubMed] [Full Text] ⇦
7. Taipale P, Hiilesmaa V. Predicting delivery date by ultrasound and last menstrual period in early gestation. Obstet Gynecol 2001;97:189–94. [PubMed] [*Obstetrics & Gynecology*] ⇦
8. Verburg BO, Steegers EA, De Ridder M, Snijders RJ, Smith E, Hofman A, et al. New charts for ultrasound dating of pregnancy and assessment of fetal growth: longitudinal data from a population-based cohort study. Ultrasound Obstet Gynecol 2008;31:388–96. [PubMed] [Full Text] ⇦
9. Kalish RB, Thaler HT, Chasen ST, Gupta M, Berman SJ, Rosenwaks Z, et al. First- and second-trimester ultrasound assessment of gestational age. Am J Obstet Gynecol 2004;191:975–8. [PubMed] [Full Text] ⇦
10. Caughey AB, Nicholson JM, Washington AE. First- vs second-trimester ultrasound: the effect on pregnancy dating and perinatal outcomes. Am J Obstet Gynecol 2008;198:703.e1–5; discussion 703.e5–6. [PubMed] [Full Text] ⇦
11. Robinson HP, Fleming JE. A critical evaluation of sonar "crown-rump length" measurements. Br J Obstet Gynaecol 1975;82:702–10. [PubMed] ⇦
12. Hadlock FP, Shah YP, Kanon DJ, Lindsey JV. Fetal crown-rump length: reevaluation of relation to menstrual age (5–18 weeks) with high-resolution real-time US. Radiology 1992;182:501–5. [PubMed] ⇦
13. Tunon K, Eik-Nes SH, Grottum P, Von During V, Kahn JA. Gestational age in pregnancies conceived after in vitro fertilization: a comparison between age assessed from oocyte retrieval, crown-rump length and biparietal diameter. Ultrasound Obstet Gynecol 2000;15:41–6. [PubMed] [Full Text] ⇦
14. Sladkevicius P, Saltvedt S, Almstrom H, Kublickas M, Grunewald C, Valentin L. Ultrasound dating at 12–14 weeks of gestation. A prospective cross-validation of established dating formulae in in-vitro fertilized pregnancies. Ultrasound Obstet Gynecol 2005;26:504–11. [PubMed] [Full Text] ⇦
15. Daya S. Accuracy of gestational age estimation by means of fetal crown-rump length measurement. Am J Obstet Gynecol 1993;168:903–8. [PubMed] ⇦

16. Wisser J, Dirschedl P, Krone S. Estimation of gestational age by transvaginal sonographic measurement of greatest embryonic length in dated human embryos. Ultrasound Obstet Gynecol 1994;4:457–62. [PubMed] [Full Text] ⇦
17. MacGregor SN, Tamura RK, Sabbagha RE, Minogue JP, Gibson ME, Hoffman DI. Underestimation of gestational age by conventional crown–rump length dating curves. Obstet Gynecol 1987;70:344–8. [PubMed] [Full Text] ⇦
18. Pexsters A, Daemen A, Bottomley C, Van Schoubroeck D, De Catte L, De Moor B, et al. New crown–rump length curve based on over 3500 pregnancies. Ultrasound Obstet Gynecol 2010;35:650–5. [PubMed] [Full Text] ⇦
19. Sabbagha RE, Hughey M. Standardization of sonar cephalometry and gestational age. Obstet Gynecol 1978;52:402–6. [PubMed] [*Obstetrics & Gynecology*] ⇦
20. Benson CB, Doubilet PM. Sonographic prediction of gestational age: accuracy of second- and third-trimester fetal measurements. AJR Am J Roentgenol 1991;157:1275–7. [PubMed] [Full Text] ⇦
21. Rossavik IK, Fishburne JI. Conceptional age, menstrual age, and ultrasound age: a second-trimester comparison of pregnancies of known conception date with pregnancies dated from the last menstrual period. Obstet Gynecol 1989;73:243–9. [PubMed] [*Obstetrics & Gynecology*] ⇦
22. Hadlock FP, Deter RL, Harrist RB, Park SK. Estimating fetal age: computer-assisted analysis of multiple fetal growth parameters. Radiology 1984;152:497–501. [PubMed] ⇦
23. Management of suboptimally dated pregnancies. Commit-tee Opinion No. 688. American College of Obstetricians and Gynecologists. Obstet Gynecol 2017;129:e29–32. [PubMed] [*Obstetrics & Gynecology*] ⇦
24. Hadlock FP, Deter RL, Harrist RB, Park SK. Computer assisted analysis of fetal age in the third trimester using multiple fetal growth parameters. J Clin Ultrasound 1983;11:313–6. [PubMed] ⇦