Teaching First Trimester Uterine Sizing

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The importance of accurate dating by the obstetrician is underscored by the influence a small difference in estimated gestational age may exert in management decisions. Differences of one or two weeks in estimated gestational age may influence decisions about steroid administration, tocolytic therapy, and postdates evaluation. Among the tools available for clinical dating during the first trimester, estimation of uterine size by bimanual pelvic examination is among the most important. Information in the literature to aid in learning or teaching this skill is sparse, however. It has been felt by some to be unteachable except by experience. Nevertheless, a reasonable didactic framework might assist physicians in training to master this skill. Ideally, this didactic framework would be compatible with both ultrasound data and clinical experience. Systems relating uterine size at varying gestational ages to objects of known size may fulfill these criteria. Ultrasonically derived uterine measurements may aid in refining such systems.

Illustrative Systems for Uterine Measurement

Table 1 lists ultrasonically derived uterine measurements of varying gestations along with an illustrative "fruit system" and "ball system" that may aid in teaching uterine sizing. Ultrasonically derived uterine length measurements are presented from the series reported by Kohorn and Kaufman[1] (derived from 58 sonograms) and from the series of Hellman et al[2] (derived from 120 sonograms) to underscore differences among reports.

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Discussion

At any particular gestational age, there is variability in uterine length as determined by independent ultrasonographers. At least this same degree of variation would be anticipated in clinical sizing because of the subjectivity inherent in bimanual examinations. Hence it would be unreasonable to expect all clinicians to accept one set of uterine sizes or one specific teaching model.

In correlating the systems illustrated in Table 1 to ultrasonic measurements, it seems that uterine length, rather than width or volume, most accurately reflects what is felt clinically. For example, a softball has a diameter that approximates the length of a uterus at eight to ten weeks' gestation, but has a volume more than twice that of a uterus at ten weeks' gestation. Uterine width at eight to ten weeks' gestation is less than the diameter of a hardball, inconsistent with clinical feel to most clinicians. Perhaps the shape of the pelvis and the nature of the examination provides to some extent an illusion, with length as the dominant measurement.

With regard to the specific teaching systems illustrated, balls have the advantage of lending themselves to easy storage and frequent reference. However, finding universally recognized balls that correspond closely to first trimester uterine sizes is difficult. Sizes of commonly recognized fruit, on the other hand, correspond quite well to ultrasonic uterine length measurements. Fruit, being more irregular, may help to emphasize that uterine sizing has an appreciable degree of variability rather than being consistent and absolute, although this variability in fruit size may leave some teachers and students uncomfortable.

Other models that circumvent these disadvantages are available, but have potential problems of their own. Commercial uterine models are available, but their use in residency programs seems limited, presumably due to expense. This expense could be minimized by homemade clay models.

Table 1. Comparison of Ultrasonic Uterine Measurements to Teaching System Measurements

Measurement	Weeks Since Last Menstrual Period				
	6 Weeks	8 Weeks	10 Weeks	12 Weeks	14 Weeks
Uterus					
Length (cm)					
Kohorn and Kaufman[1]	7.3	8.8	10.2	11.7	13.2
Hellman et al[2]	9.1	10.8	12.5	14.2	15.9
Width (cm)	3.9	5.0	6.1	7.1	8.2
Fruit					
Model	Small orange	Large orange	Grapefruit	Cantaloupe	
Diameter (cm)	7.8	9.0	10.2	13.7	
Balls					
Model	Hardball	Softball			
Diameter (cm)	7.6	9.8			

Commercial or clay models have the advantage of being able to reproduce the aspherical nature of uterus and duplicate measurements determined by ultrasound; therefore, the difficulty encountered in finding common objects whose measurements correspond to uterine sizes would not be a problem. Since these models are not derived from familiar objects, however, easily recallable images may be more difficult to incorporate. Hence, in the examination room, students taught with familiar objects might be able to recall an accurate mental image more easily than those trained solely with clay or commercial models. Another disadvantage of measurement-based models may be that "clinical feel" differs from measured size because of the nature of the pelvic examination, muscle tone, interposed tissue, and uterine softening. Systems of comparison based on "feel" can help compensate for these variables.

Another system for uterine sizing correlates an "8-cm uterus" to eight weeks' gestation, 10 cm to ten weeks' gestation, and so on. If uterine length is indeed the dominant measurement in "clinical feel," this system would seem very plausible based on Kohorn and Kaufman's data.[1] Data of Hellman et al[2] correlate a little less well with this method, however.

The presumption in all the systems to teach first trimester uterine dating is that uterine size correlates with gestational age in a reasonably predictable fashion. This assumption has been verified by ultrasound, and, in fact, independent investigators have found uterine length and width growth to be well approximated by linear equation from six to 14 weeks.[1-3] Studies have also shown that while the fundus is globular (anterior-posterior diameter approximating width), the uterine length exceeds the width (length averaging 1.9 times the width).[4,5] Differences in sizes of multiparous and nulliparous uteri have not been found ultrasonically, eliminating this potential variable.[3] Also, a uterus of six weeks' gestation has not been found to differ in dimensions from nongravid uterus on ultrasound, although a gestational sac is visible.

References

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