

# Use of Ultrasonography vs Clinical Factors to Estimate Date of Confinement

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Controversy exists regarding the use of routine ultrasound for dating of intrauterine pregnancy. This retrospective study was designed to determine the frequency of ultrasonography use and its correlation with an easily obtainable clinical date. Two hundred sixteen patients from the St. Joseph Hospital family practice residency model office over the last four years were selected for retrospective study. Criteria included (1) single intrauterine pregnancy, (2) birth weight of 2,500 g or greater, and (3) spontaneous onset of labor.

Data reviewed included timing, reasons, and number of ultrasonograms; reliable last menstrual periods; and compilation of clinical factors that included fundus at umbilicus, serial fundal heights, and last menstrual period.

Comparison of these various clinical criteria with ultrasonogram dating showed a high correlation of last menstrual periods, clinical scores, and ultrasonograms. Many of the ultrasound studies seem to be redundant and may not have been required.

A major objective of antenatal obstetrical care is the determination of the estimated date of confinement. Most of the therapeutic and diagnostic

interventions during pregnancy require an accurate estimated date of confinement. Studies have demonstrated its usefulness in determining dates of repeat cesarean sections, delivery of babies of diabetic mothers, and management of premature labor.<sup>1-3</sup> Further studies have discussed the benefits of clinical vs technologic methods of determining estimated date of confinement and the indications for each.<sup>4,5</sup> The controversy regarding the use of ultrasonography and the resolution of its

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indications has yet to be resolved. This debate centers mostly on the low-risk, routine obstetrical population.

The purpose of this study was to examine the use of ultrasonograms in comparison with the traditional clinical factors in a family practice residency setting.

## Methods

Obstetrical charts on patients seen in the Family Health Center, St. Joseph Hospital, from 1981 through 1984 were selected for review. The Family Health Center is a model family practice office staffed by resident physicians in Flint, Michigan. The criteria for inclusion in the study were (1) spontaneous onset of labor, and (2) delivery of a single infant weighing more than 2,500 g.

Each chart was reviewed for the date of the last menstrual period, which was listed as reliable or unreliable as determined by the examining resident physician's history. The fundus at umbilicus was recorded as 20 weeks gestation. Fundal heights of 1 cm above or below the umbilicus were assigned corresponding one-week deviations.

Fundal heights were determined between 18 and 32 weeks, with a minimum of three values plotted to determine an estimated date of confinement. These values were measured on a centimeter equal to gestation age basis, that is, a 22-cm fundal height was equivalent to 22 weeks gestational age.

A combination score was calculated by averaging the last menstrual period, fundus at umbilicus, and fundal heights. Finally, the assigned estimated date of confinement as calculated by ultrasonic determination of biparietal diameters was recorded. Also recorded were the reasons for the ultrasonogram and the gestational age at which time the ultrasonogram was performed.

All the above values were computed to the actual date of delivery, and a plus or minus days deviation of the calculated estimated date of confinement from the actual date of delivery was recorded. The differences between the actual date of birth and the estimated date of confinement were

compared for each of the above categories.

## Results

Two hundred eighty-three patient records from 1981 through 1984 were reviewed. Of these, 216 met the criteria for inclusion in the study. Of those not included in the study, the majority were excluded because of repeat cesarean, and others were excluded for either prematurity or induction of labor.

Those charts that met the criteria were reviewed for the data described in the methods section. Table 1 summarizes the deviation of the estimated date of confinement for each category from the actual delivery date and the percentage of estimated date of confinements within certain time periods.

It should be noted that of the 216 charts accepted into the study, 157 had reliable last menstrual periods, 176 had ultrasonograms, and 149 had sufficient data to form a combined clinical score. These populations, therefore, were different. Table 2 displays data for those patients who had all three, ie, a reliable last menstrual period, an ultrasonogram, and sufficient data to calculate a combined clinical score.

Timing of the ultrasonogram has been shown to correlate with its accuracy. Table 3 displays the timing and accuracy of the 176 ultrasonograms obtained.

Finally, approximately 85 percent of the ultrasonograms were obtained for dates alone. Another 7 percent were ordered for question of dates or twins. The remaining 8 percent were ordered for such reasons as intrauterine growth retardation or bleeding.

## Discussion

The study sought to examine the use of ultrasonograms in calculating the estimated date of confinement and to compare its accuracy with that of the last menstrual periods and other clinical fac-

	<b>Number of Patients</b>	<b>Average Days (+/-) From Actual Delivery</b>	<b>Percentage Predicted Within (+/-) 14 Days</b>	<b>Percentage Predicted Within (+/-) 21 Days</b>
Ultrasonogram	176	9.38	78.4	93.2
Reliable last menstrual period	157	9.35	76.4	93.0
Combined clinical score	149	9.67	75.0	89.0

	<b>Number of Patients</b>	<b>Average Days (+/-) From Delivery Date</b>	<b>Percentage Predicted Within (+/-) 14 Days</b>	<b>Percentage Predicted Within (+/-) 21 Days</b>
Ultrasonogram	118	9.1	80.5	94.5
Reliable last menstrual period	118	9.5	74.5	92.4
Combined clinical score	118	10.1	73.7	88.4

<b>Weeks Gestation</b>	<b>Number</b>	<b>Average +/- Days</b>	<b>Percentage Within (+/-) 21 Days</b>
0-18	41	8.2	97.5
18-26	79	9.38	92.4
26-40	56	10.3	91.1

tors. Data were obtained from a routine population of obstetrical patients followed in the Family Health Center during the period from 1981 to 1984. These patients' charts were reviewed for reliable last menstrual periods, fundal heights, ultrasonograms, birth weights, and actual delivery dates.

Out of the 216 patients who fit the admission criteria, only 157 had a reliable last menstrual period. Many women were on oral contraceptives up until one month before conception, or even during conception, and their estimates of last menstrual periods could not be considered reliable. A larger number simply had no idea when their last menstrual period was.

Of note were the large number of ultrasonograms performed. This number was a result of the large number of unreliable last menstrual periods and that the study reviewed patients cared for in a teaching institution. One can only speculate what the number of ultrasonograms would be in the private physician's office.

Literature data indicate that any single indicator of estimated date of confinement, such as a reliable last menstrual period, can predict only 90 percent of the delivery dates within three weeks. The importance of this prediction relates to the certainty with which one can induce a pregnancy dated at 43 weeks gestation and expect to deliver an infant greater than 38 weeks gestational age.<sup>2</sup> The data from this study confirm these previous findings and found no statistical difference between last menstrual period and ultrasonograms

in this regard. It is of note that early ultrasonograms, those done before 18 weeks gestation, had a very high (97.5 percent) predictability in the study. Larger numbers of early sonograms would be helpful to further evaluate the reliability of this finding.

The overall data suggest that there was no difference between the use of a reliable last menstrual period and an ultrasonogram in determining the estimated date of confinement. Similarly, the addition of fundal heights did not seem to add to the accuracy of the reliable last menstrual period.

When one considers cost effectiveness, the obtaining of a reliable last menstrual period may aid in better selection of patients who will benefit from ultrasonography. In a hospital setting total costs for an obstetrical ultrasonogram average \$80 per study. Based on the findings in this study, over \$8,000 were spent on ultrasonograms during the period in question on patients who had reliable last menstrual periods. Certainly those patients with uncertain dates are candidates for ultrasonograms, but the almost routine use of ultrasonograms did not appear to aid in the determination of the estimated date of confinement. Efforts to elicit an accurate last menstrual period in clinic patients and keeping careful clinical records may obviate the need for the majority of ultrasonograms in routine obstetrical patients. In addition, instruction of all (female gynecological) patients of child-bearing age on the importance of keeping a menstrual calendar would aid in this endeavor.<sup>3</sup>

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