



Uterine Growth in Twin Pregnancy by Measurement of Total Intrauterine Volume

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Total intrauterine volume (TIUV) was determined serially in 27 twin pregnancies from which a nomogram was constructed. At the beginning of the second trimester, TIUV was similar to that in singleton pregnancy; by the 18th week it had become twice as large, and remained so until late in pregnancy. Labor was preceded more frequently by a slowing than by an acceleration of uterine growth.

Key words: Twins, Uterine growth, Ultrasound

INTRODUCTION

Uterine growth in twin pregnancy is subject to wide variation. Although in some cases the excessive uterine enlargement is obvious from an early stage, about half of twin pregnancies cannot be detected by abdominal palpation before labor begins [2]. Formal measurement of fundal height or abdominal girth can improve discrimination, but estimation of uterine size by clinical methods remains imprecise. A recently described ultrasonographic technique for measuring total intrauterine volume (TIUV) [1] enables uterine size to be measured more accurately.

A major clinical problem in twin pregnancy is the high rate of preterm labor. Although the exact reasons for this are unclear, uterine overdistention is believed to be a significant contributory factor. Serial TIUV measurements facilitate the determination of the absolute volume of the uterus and its rate of growth prior to the onset of labor.

MATERIALS AND METHODS

TIUV was measured by the method of Gohari et al [1]. Using a static gray scale ultrasound unit, maximum uterine length in the sagittal plane (L) and maximum anteroposterior diameter (AP) at right angles to this were measured from a longitudinal scan. A transverse scan at right angles to the first scan was then performed at the level of the maximum AP diameter, and the maximum transverse diameter (T) was measured. TIUV was calculated using the formula for a prolate ellipse:

$$TIUV = 0.5233 \times L \times AP \times T$$

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TIUV was measured serially in twin pregnancies at approximately three-week intervals from the time of diagnosis, or from the 12th week of pregnancy in cases diagnosed in the first trimester. Eighty-five observations in 27 pregnancies were used to create a nomogram of TIUV from 12 to 36 weeks of twin pregnancy (Fig. 1). Individual nomograms (Fig. 2) also were generated for each of the three linear measurements (uterine length, anteroposterior diameter, and transverse diameter).

RESULTS

At the beginning of the second trimester, TIUV is similar in singleton and twin pregnancies. By about the 18th week of gestation, however, the mean TIUV of a twin pregnancy becomes twice that of a singleton pregnancy, and remains so until late pregnancy (Fig. 1). By the 25th week the mean twin TIUV is equal to that of a term singleton

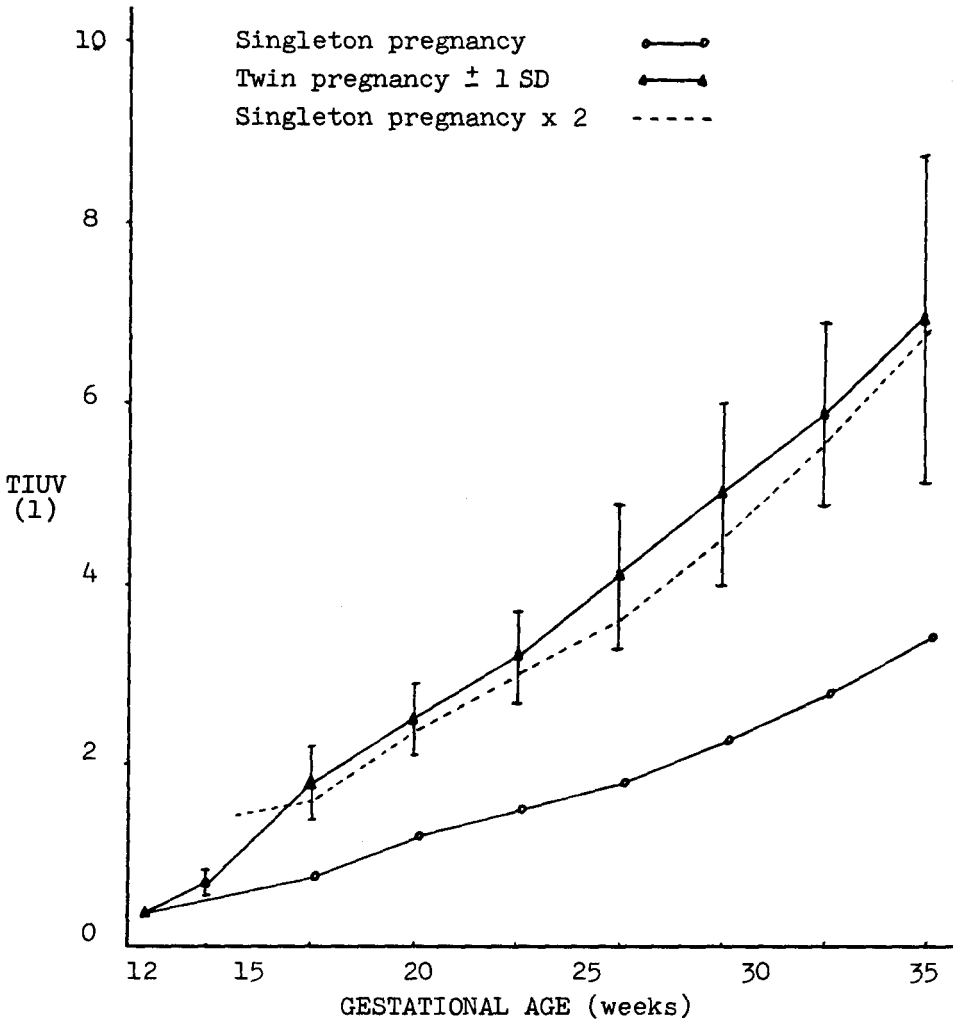


Fig. 1. Total intrauterine volume in singleton and twin pregnancy.

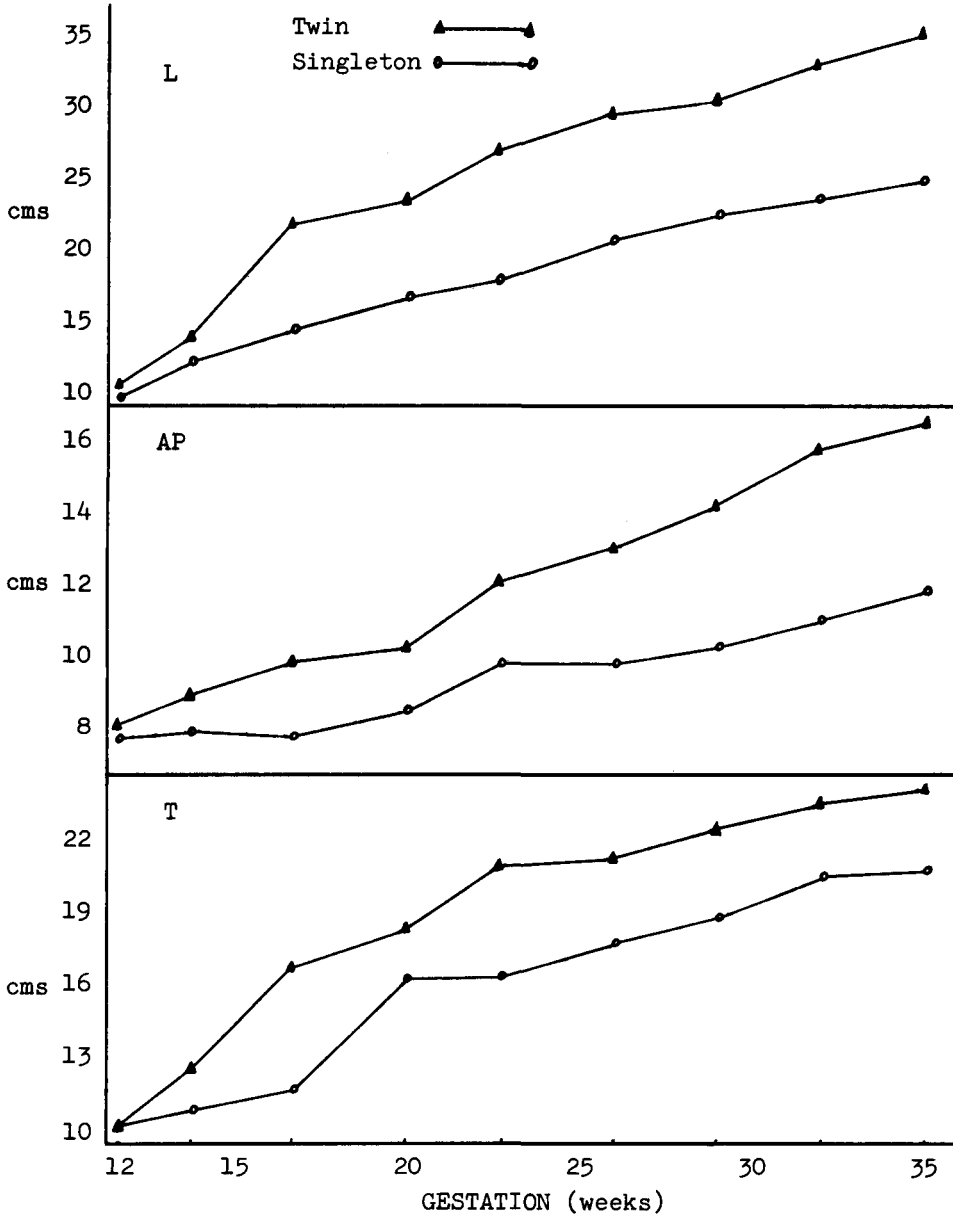


Fig. 2. Uterine length (L), anteroposterior diameter (AP) and transverse diameter (T) vs. gestational age in singleton and twin pregnancy.

uterus. At 34–36 weeks the mean twin TIUV is 6.9 L, and the largest single measurement among the cases studied is a volume of 9.4 L at 37 weeks.

Curves for the individual dimensions (Fig. 2) generally follow the same pattern as seen in singleton pregnancy. Uterine length and transverse diameter increase rapidly in the second trimester. Growth of the transverse diameter almost ceases in the last trimester, while the anteroposterior diameter is undergoing its most rapid growth.

Analysis of individual growth curves reveals no consistent pattern in relation to the onset of labor. In particular, an increase in the rate of growth immediately prior to delivery was observed only in two of the first 12 patients who delivered. A slowing or cessation of uterine growth occurred in six of these patients, five of whom had abnormal pregnancies. Two developed hypertension and proteinuria, and three gave birth to growth-retarded infants, one of which was stillborn. Six of the 12 patients delivered before 37 completed weeks, but extreme preterm delivery occurred only once, at 30 weeks. This patient previously had delivered a singleton infant at a similar gestational age, and neither acceleration nor slowing of uterine growth occurred prior to labor in her case.

DISCUSSION

These preliminary findings lend no support to the theory that overdilatation or a rapid increase in uterine size initiates labor in twin pregnancy. However, as the measurements of TIUV were made at three-week intervals, rapid changes in size occurring over hours or days would not have been detected. The method of measuring TIUV is not entirely suitable for very frequent observations because the estimated mean error of 6% represents about one week's growth during the third trimester. In addition, it is possible that different mechanisms underlie term- and preterm labor. Although half of the deliveries in this group occurred before 37 completed weeks, only one occurred before 34 weeks. In this case the patient previously had delivered very prematurely also, suggesting that other factors may have been operating as well. The observation of impaired uterine growth preceding labor, particularly in abnormal pregnancies, is more in keeping with the concept of fetal initiation of labor, perhaps in response to a hostile intrauterine environment [4]. It seems unlikely, however, that this mechanism should be responsible for an increased incidence of twin delivery before 30 weeks, as it is only at this stage that fetal growth impairment becomes obvious in twins [3]. A far larger group of twin pregnancies would need to be studied before sufficient deliveries at this early stage could be collected to address this question.

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