



Detection of the Small-for-Gestational Age Twin Fetus by a Two-Stage Ultrasound Examination Schedule

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Serial ultrasonic measurement of the biparietal diameter is an unsatisfactory means of detecting the small-for-gestational age (SGA) fetus in twin pregnancies. A new two-stage ultrasound examination schedule, highly effective in detecting the SGA singleton fetus, has been evaluated prospectively in 31 twin pregnancies. The schedule comprises ultrasonic assessment of gestational age in early pregnancy, followed by measurement of the product of the crown-rump length and trunk area of both fetuses at 34-36 weeks. All Nineteen SGA twin fetuses were detected using this schedule; the technique offers several other advantages over serial biparietal cephalometry.

Key words: Twin pregnancy, Intrauterine growth retardation, Ultrasound, Fetal measurement, Screening

INTRODUCTION

Intrauterine growth retardation is an important cause of perinatal mortality and morbidity in twin pregnancies [15, 16]; unfortunately, special problems arise in attempting to detect the small-for-gestational age (SGA) twin fetus. Assessment of fetal size by abdominal palpation, a method which allows detection of only 30-40% of singleton SGA fetuses [1], is more difficult because of the other twin and polyhydramnios, when present. Biochemical monitoring is unsatisfactory [7, 8], because both fetal-placental units are assessed together. Diagnostic ultrasound, which allows investigation of each fetus individually, could be expected to be of greater value.

Until recently, serial measurement of the fetal biparietal diameter (BPD) has been the main method of assessing fetal growth with ultrasound. There are, however, problems in its use in twin pregnancy, including mechanical difficulties in directing the ultrasound transducer at the (crucially) correct angle for accurate measurement, as well as difficulties in interpreting results, that is, deciding which BPD values relate to which twin on repeated measurements.

Relatively little has been published on the value of serial cephalometry in detecting the SGA fetus in twin pregnancies. Reports have tended to be anecdotal [6, 25], or have compared BPD values of co-twins in individual pregnancies [11, 12, 13], a process which is illogical when one considers that one or both twin fetuses may be growth retarded. Divers and Hemsell [5] found a false-negative rate of over 50% in the detection of SGA twin fetuses when using a singleton BPD chart for reference. Neilson [17], in a retrospective study of 66 twin pregnancies in which serial BPD measurements had been carried out, plotted results on the chart of Campbell and Newman [4] which was compiled from singleton data. In all 66 cases in which gestational age seemed certain, at least two ultrasound examinations had been done (mean 4.9), the last examination being within three (usually two) weeks of delivery. Of the 43 SGA fetuses, only 24 (56%) were shown to have had abnormal BPD growth. Moreover, only 51% of fetuses with abnormal BPD curves were in fact SGA at delivery, while almost 10% of curves could not be interpreted. Granted there are significant false-negative rates in the detection of SGA fetuses in single pregnancies [3], mainly due to brain-sparing [10], the efficacy of serial cephalometry is clearly worse in twin pregnancies.

A new two-stage ultrasound examination was developed as a means of screening for the SGA fetus. The first stage provides an accurate assessment of gestational age in early pregnancy by ultrasonic measurement of crown-rump length (CRL) [22] or BPD [2]. With these data as a reference point the second examination is performed between 34 and 36 weeks, and consists of an assessment of fetal size by calculation of the product of CRL and trunk area (TA) ($CRL \times TA$). In a prior study [18] of 474 singleton pregnancies, 34 out of 36 (94%) SGA fetuses were detected using this schedule. Early results of its use in twin pregnancies also have been reported [17]. The purpose of this work is to describe an expanded series of 31 twin pregnancies in which the two-stage examination was used to screen for intrauterine growth retardation.

MATERIAL AND METHODS

Thirty-one patients with twin pregnancies were studied prospectively. All underwent ultrasound examinations before 20 weeks to establish gestational age, and once again between 34 and 36 weeks to measure the $CRL \times TA$ of both fetuses. The technique of measurement of $CRL \times TA$ has been described elsewhere [17, 18, 20, 26]; a semiautomated area and perimeter measuring device [9] was used in conjunction with a conventional static scanner (Diasonograph 4102). The $CRL \times TA$ of each fetus was calculated and plotted on our singleton chart [18]. Babies with birth weights less than the fifth percentile [24] were classified as SGA. Two babies were stillborn, both deaths being attributed to uteroplacental insufficiency. There were no other perinatal deaths and no malformed infants in this series. In analyzing the results, it was assumed that the greater $CRL \times TA$ value related to the twin of greater birth weight.

RESULTS

Nineteen of the 62 babies were SGA at delivery; all (including both stillborn SGA fetuses) had $CRL \times TA$ results below the 10th percentile line (Fig. 1). Of the 43 babies of normal birth weight, 32 had results above this line.

Since the assumption that the greater $CRL \times TA$ value related to the heavier twin at birth may not always be valid, the predictive value of pairs of $CRL \times TA$ values was assessed (Table 1). Of the 12 pregnancies in which both $CRL \times TA$ values were below the 10th percentile, 11 produced infants of which one (five cases) or both (six cases) were SGA. When both $CRL \times TA$ values were above the 10th percentile line (13 cases), all babies were of normal birth weight.

TABLE 1. Product of Crown-Rump Length and Trunk Area (CRL × TA) and Prediction of Outcome by Paired Values

CRL × TA	N	Both SGA	SGA + normal	Both normal
Both <10%	12	6	5	1
<10%/>10%	6	0	2	4
Both >10%	13	0	0	13

SGA: small-for-gestational age.

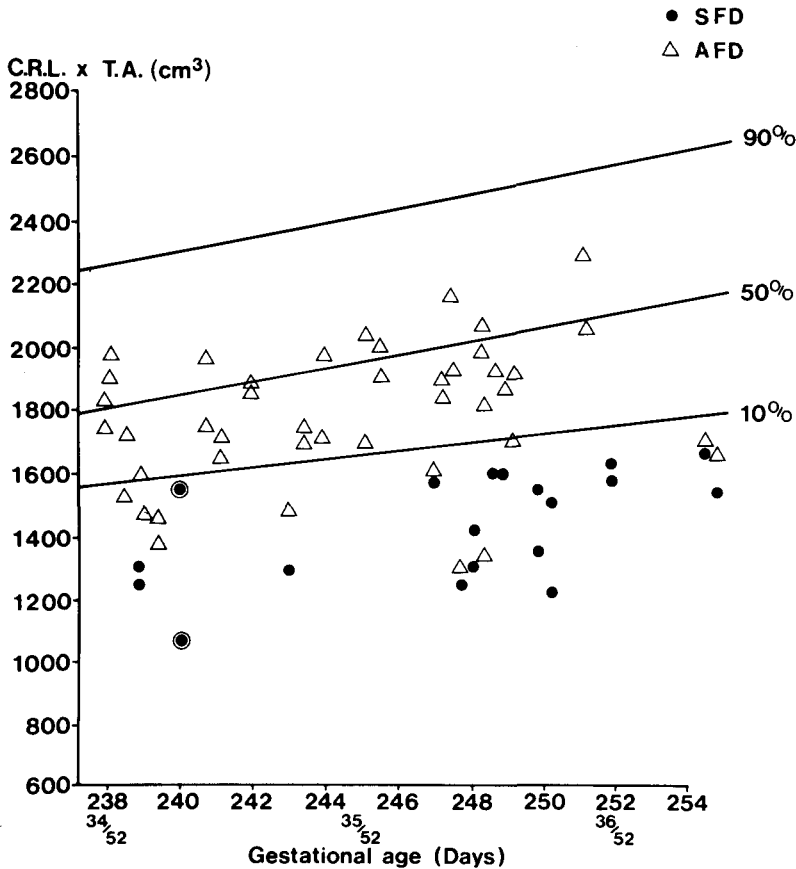


Fig. 1. Values of product of crown-rump length and trunk area (CRL × TA) plotted against gestational age at the time of measurement. The 10th percentile line on the chart is used as the demarcation line. Values obtained from SGA fetuses are depicted as circles; those from fetuses of normal birth weight as triangles. The encircled circles represent the values from the stillborn fetuses.

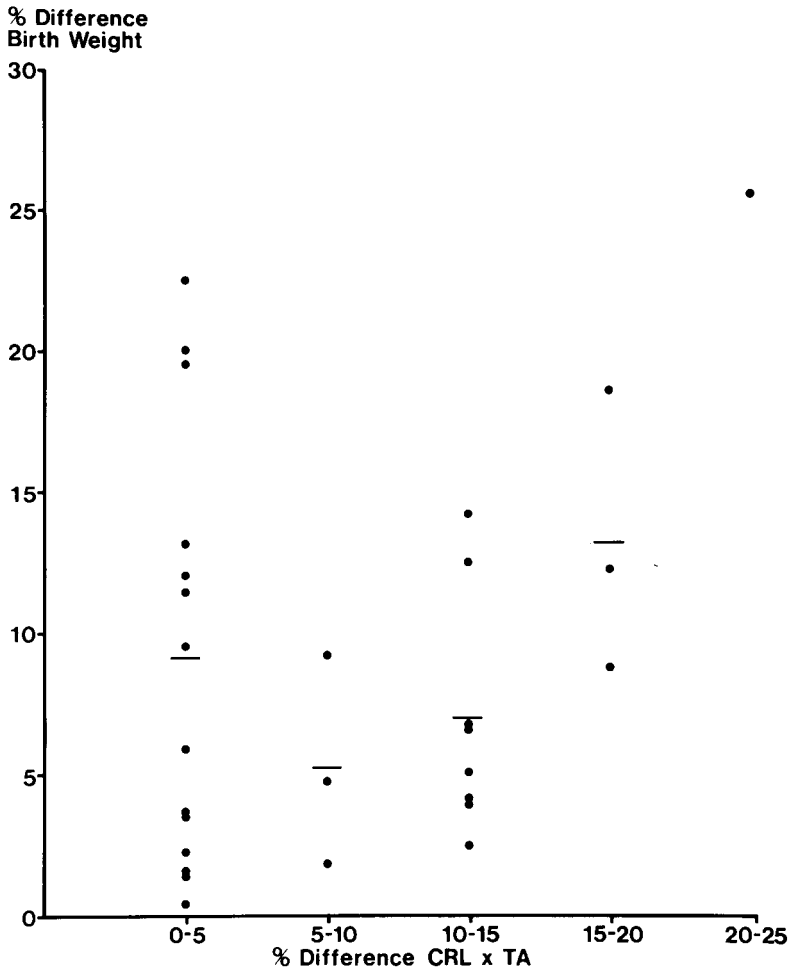


Fig. 2. Comparison between percentage difference CRL x TA values of co-twins (horizontal axis) and their percentage difference birth weight (vertical axis). Results from the stillborn co-twins were not included.

Comparison between percentage difference in CRL x TA values in co-twins and percentage difference in birth weight is shown in Figure 2.

DISCUSSION

Despite arguments to the contrary [14, 23], it is logical to apply singleton standards in defining abnormal growth and size of twin fetuses. This controversy has been discussed elsewhere [17].

The first-stage examination to assess gestational age is incorporated in our routine hospital policy, which provides ultrasound examination for all patients at their first clinic visit. This policy offers several advantages [19] including the early detection of all twin pregnancies. It has been suggested that such intervention per se may help lower the high perinatal mortality rate associated with twinning [21].

The second-stage measurement of fetal CRL \times TA values is highly effective in detecting the SGA twin fetus. This is true whether or not assumptions are made as to which value relates to which twin and despite the relatively long interval between measurement and delivery. Such measurements do not, however, generally prove useful in predicting weight difference between co-twins at delivery (Fig. 2). In the one case, in which there was a greater than 25% birth weight difference, there was, however, a CRL \times TA difference of more than 20%.

Comparison with serial biparietal cephalometry in twin pregnancies indicates several advantages for CRL \times TA measurement: (1) it is measured on only a single occasion; (2) it apparently can be measured in all cases; (3) it is easier to interpret results; and (4) it combines much more effective detection of the SGA fetus with a lower false-positive rate.

CONCLUSIONS

The two-stage ultrasound examination schedule described here is highly effective in detecting the SGA twin fetus. The simplicity of the schedule makes it suitable as a screening procedure.

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