



Systematic labeling of twin pregnancies on ultrasound

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ABSTRACT

Objective Correct labeling of twin fetuses is needed for consistency in assigning and interpreting longitudinal scan and prenatal screening/diagnostic results. The aim of this study was to describe a standard method of twin labeling in the first trimester of pregnancy and to assess the robustness of such a technique in predicting the presenting twin in subsequent scans and at delivery.

Methods This was a retrospective first-trimester study of all twin pregnancies assessed by ultrasonography at our center between 2000 and 2010. The fetus contained in the gestational sac closer to the maternal cervix was designated as Twin 1 and the relative orientation of the fetuses to each other was then defined as either lateral (left/right) or vertical (top/bottom). In discordant-sex twins, their sex and presenting order on the final scan prior to delivery were documented and compared with the sex and birth order at delivery.

Results A total of 416 twin pregnancies were seen during the study period. At the 11–14-week scan 90.9% of twins were in lateral orientation while the remainder were oriented vertically. None of the vertically oriented twin pairs but 32 (8.5%) of the laterally oriented twin pairs changed their presenting order between the first and the last ultrasound scan prior to delivery. There were 108 discordant-sex twins scanned in the third trimester, of which the birth order changed in 20.3% that were delivered by Cesarean section and in 5.9% of those delivered vaginally.

Conclusion The study demonstrates that antenatal labeling of twins according to laterality or vertical orientation is reliable. The technique ensures continuity of biometric assessment from serial scans at each visit, and as such should be adopted as the preferred method of twin labeling. Furthermore, the use of orientation for antenatal labeling of twins rather than assignment of a number

based on proximity to the cervix, precludes any misconception regarding which twin will be born first and ensures that parents and pediatricians are aware of the significant likelihood of a peripartum switch. Copyright © 2011 ISUOG. Published by John Wiley & Sons, Ltd.

INTRODUCTION

Twin pregnancies comprise approximately 1–2% of all conceptions and are continuing to increase in frequency because of assisted reproductive technologies and advancing maternal age^{1,2}. Multiple pregnancies are scanned frequently because of the increased risk for discordant anomalies, aneuploidy and growth restriction compared to singleton pregnancy^{3–5}. Accurate labeling of the twins is needed to ensure that ultrasound measurements are correctly allocated to each fetus throughout the pregnancy. Standardized and reliable labeling is also mandatory at first-trimester Down syndrome risk assessment in case invasive prenatal diagnosis is subsequently required⁶. In spite of the importance and volume of ultrasound work related to managing twin pregnancies, there are no published reports or accepted standards for labeling or cataloging twins by ultrasound.

The aim of this study was to describe a standard method of twin labeling in the first trimester of pregnancy and to assess the reliability of this technique in predicting the presenting twin in subsequent scans and birth order at delivery.

METHODS

This was a retrospective study performed on all twin pregnancies booking for antenatal care at 11–14 weeks' gestation at our center over the time period 2000 to 2010. All ultrasound examinations were carried out by qualified sonographers and the data entered into a dedicated obstetric ultrasound database. Pregnancy outcome data

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were retrieved from the computerized delivery suite database.

At the 11–14-week ultrasound assessment, the fetus contained in the gestational sac closer to the maternal cervix was designated as Twin 1⁷. The uterine cervix was identified in the transabdominal longitudinal view by placing the probe in the midline, with its lower end just above the symphysis. The cervical canal was identified directly posterior to the bladder, typically at about 45° to the horizontal. The relative orientation of the fetuses to each other (Figure 1) was then defined as either lateral (left/right) or vertical (top/bottom). Lateral fetal orientation was associated with an intertwin membrane running vertically along the longitudinal axis of the uterus and vertical fetal orientation was associated with an intertwin membrane running horizontally across the longitudinal axis of the uterus (Figure 1).

The gestational sac and twin designations were documented in the computerized records and were visible at all subsequent visits. At each subsequent ultrasound examination the sonographer documented which twin (left or right, top or bottom) was the presenting twin. In all discordant-sex twins, the sex and presenting order of the twins on the final scan prior to delivery was documented and compared with the sex and birth order at vaginal delivery or Cesarean section.

RESULTS

A total of 416 twin pregnancies seen at 11–14 weeks' gestation with serial scan data and delivery details were identified during the study period. The maternal age, proportion of dichorionic pregnancies and gestational age at ultrasound and delivery are shown in Table 1.

At the 11–14-week scan, 378 (90.9%) twins were judged to have a predominantly lateral orientation while the remaining 38 (9.1%) were oriented vertically. Thirty-two (8.5% (95% CI, 5.9–11.8%)) of the laterally oriented twin pairs but none of the vertically oriented twin pairs

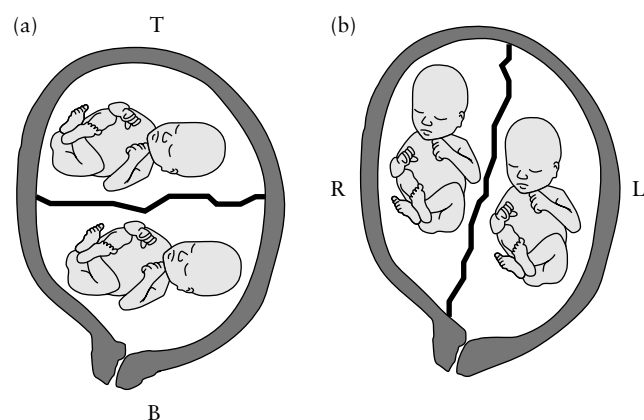


Figure 1 Diagrammatic representation of twin orientation relative to the longitudinal axis of the uterus. The twins may have a top/bottom (T/B) (vertical) (a) or right/left (R/L) (lateral) (b) orientation.

Table 1 Patient characteristics of the twin pregnancies studied ($n = 416$)

Characteristic	Value
Maternal age (years)	33 (17–48)
Dichorionic pregnancy	322 (77.4)
Gestational age (weeks) at:	
First scan	12.5 (11.0–14.0)
Last scan	34.2 (23.6–39.6)
Delivery	36.7 (23.7–40.1)

Data are given as mean (range) or n (%).

Table 2 Change in twin presenting order between last scan and delivery as determined by discordant fetal sex on scan and after delivery ($n = 108$)

Mode of delivery	n	Change in twin order (n (%; 95% CI))
Vaginal	34	2 (5.9; 0.7–19.7)
Cesarean	74	15 (20.3; 14.0–34.2)
Total	108	17 (15.7; 10.4–24.8)

changed their presenting order between the first scan and last scan prior to delivery.

There were 108 discordant-sex twins for which ultrasound data were available in the third trimester. Of these, a total of 17 (15.7%) changed presentation when the scan orientation was compared to the birth order (Table 2). The change in twin order was significantly higher ($P = 0.0319$) for twins delivered by Cesarean section (15/74, 20.3%) vs. those delivered vaginally (2/34, 5.9%).

DISCUSSION

A reproducible method for antenatal labeling of twins is important in the management of all twin pregnancies to ensure that biometric measurements from longitudinal growth scans are consistently allocated to the same twin at each visit. Failure to do so may result in 'yo-yoing' of fetal growth data as smaller and larger twin sizes are swapped repeatedly during the course of the pregnancy. Additionally, when screening for aneuploidy is undertaken, there must be a reliable and accurate system in place to ensure that invasive prenatal diagnosis or selective fetal reduction is carried out on the at-risk or affected twin, respectively⁶. Clear labeling around the time of birth is also important when communicating with the neonatal team in cases of twins with discordant anomalies that may not be obvious externally; it is also important when trying to correlate antenatal growth rates with postnatal growth patterns. Identifying each fetus by the position of its placenta is of limited value as not only does placental position change with advancing gestation, but this technique cannot be used with twin pregnancies where the placenta is either monochorionic or fused dichorionic^{8,9}. Furthermore, ultrasound determination of

fetal sex as a discriminator is limited by unreliable fetal sexing in early pregnancy and is of no value in same-sex twin pregnancies¹⁰.

The position of the gestational sacs in relation to the maternal cervix is often used to determine which twin is presenting in early pregnancy. This is because the gestational sac's position relative to the cervix remains constant throughout the pregnancy, while the position of either fetus relative to the cervix can change considerably, especially in early pregnancy (Figure 2). Hence, although the laterality of the gestational sacs is preserved antenatally because the base of the intertwin membrane is immobile, the fetuses are free to move independently of each other, resulting in varying presentation. The intertwin membrane is positioned in such a way as to divide the uterine cavity in a left/right or top/bottom orientation, probably because the uterine cross-section is ellipsoid with a small anteroposterior dimension. The data of the current study demonstrate that at 11–14 weeks' gestation approximately 90% of twins have a left/right orientation and the remainder are positioned in a top/bottom manner. By the time of the last ultrasound scan at 34 weeks, approximately 10% of the left/right oriented twins have changed presentation, such that the fetus in the sac further away from the cervix is deemed to be the presenting twin. None of the top/bottom twins changed their order of presentation during the course of the pregnancy.

Pediatric convention dictates that the first-born twin, irrespective of mode of delivery, is labeled 'Twin 1' and the second baby as 'Twin 2'. Analyzing twins of discordant sex demonstrated that a significant number of twins switch label or nomenclature at the time of birth, and that this was influenced by the mode of delivery. Fetuses designated as Twin 2 at the 34-week ultrasound scan were born first in approximately 25% of cases delivered by Cesarean section. This is understandable, as a lower-segment uterine incision may afford access to the fetus designated as Twin 2 in preference to Twin 1. More importantly, the same

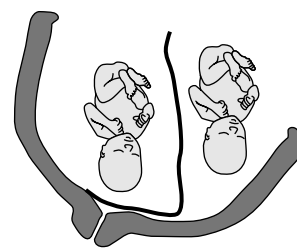


Figure 3 A perinatal switch in vaginal birth order may occur if Twin 2 delivers through a fold of the intertwin membrane.

finding occurred in about 5% of twin pregnancies delivered vaginally. The latter may be explained by a switch of the presenting twin in the 2-week interval between ultrasound assessment and delivery (Figure 2), resulting in the delivery of Twin 2 'through', as it were, a fold in the intertwin membrane, as depicted in Figure 3. In the majority of normal twin pregnancies, this perinatal switch in twin labeling will be of no significant medical consequence. However, when this happens, it is difficult for most parents to understand why the relative sex or size of the twins changed at the time of delivery. This is often perceived by parents and pediatricians alike as an apparent 'error' and undermines their trust in the abilities of the obstetrician and sonographer who were involved in their antenatal care. The perinatal 'switch' is of vital importance to both obstetricians and pediatricians when dealing with fetal discordance – such as a cardiac defect, congenital diaphragmatic hernia or other internal abnormality – that may not be immediately evident at birth. When dealing with such high-risk pregnancies, standard clinical operating procedures must include immediate postnatal verification of the affected twin requiring further management.

Clinical implications

Accepted clinical practice dictates that twin labeling is defined differently by sonographers during the pregnancy than it is by pediatricians at birth. Having such different definitions cannot be of benefit and can lead to confusion in specific clinical scenarios. The antenatal convention of using the gestational sac closer to the cervix as containing Twin 1 will be reliable in the 10% of pregnancies that have a top/bottom orientation. However, in the 90% of pregnancies that have a left/right orientation, there is a switch in presentation in approximately 10% of cases. The data of this study demonstrate that antenatal labeling of twins according to lateral (left/right) or vertical (top/bottom) orientation is more reliable and reproducible than labeling twins as 1 and 2. It ensures continuity of biometric assessment from serial scans at each visit, and as such should be adopted as the preferred method of twin labeling. Furthermore, the use of a left/right or top/bottom protocol for antenatal labeling of twins precludes any misconception regarding which twin will be born first, and ensures that parents and pediatricians are aware of the peripartum switch that occurs in as many

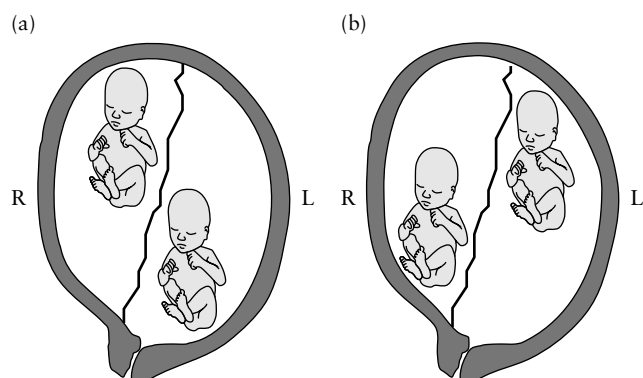


Figure 2 Diagrammatic representation showing how labeling by twin's proximity to the cervix is changeable throughout gestation in a left (L)/right (R) oriented pregnancy. At any given time, either twin may present, leading to a switch from Twin 1 presenting (a) to Twin 2 presenting (b). In contrast, the orientation of the gestational sac will remain unchanged throughout pregnancy because of the fixed nature of the base of the intertwin membrane.

as 25% of pregnancies. The only limitation of this technique is in monoamniotic twin pregnancies, where the lack of an intertwin membrane results in both universal cord entanglement and continuously variable fetal position^{11,12}.

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