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Time and Mode of Delivery in Twin Pregnancies

Eduardo Félix Martins Santana, Vivian Melo Corrêa,
Isabela Bottura and José Pedro Parise Filho

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Abstract

There are many suitable recommendations for twin gestation term in the literature. In many protocols, resolution is recommended for dichorionic pregnancies around 38 weeks, at 36 weeks for monochorionic (devoid of complications) and at 32–34 weeks in cases of single amniotic chamber. The main risk associated with vaginal delivery is connected to the possibility of anoxia of the second twin. However, a cesarean delivery performed by non-cephalic presentation of the second twin is associated with increased maternal morbidity without improved neonatal outcome. The most important factors in the decision of the delivery mode include the presentation of the fetus, gestational age, and weight or the weight difference between the fetuses.

Keywords: twin pregnancy, delivery, labor

1. Introduction

It is known that multiple pregnancy presents morbidity and mortality rates about 3–7 times greater than single pregnancies, and these are often determined in delivery care [1].

Among the difficulties in twin birth, we highlight: prematurity, non-cephalic presentations, dystocia, funicular prolapse, placental abruption, increased operative incidence, postpartum hemorrhages, perinatal anoxia and tocotraumatism [2].

In this chapter we will review the main aspects related to the time and mode of delivery in multiple pregnancies and issues related to fetal weight assessment.

2. Risk of fetal death in the third trimester for twin pregnancies

Multiple pregnancies have high rates of mortality and morbidity when compared to single pregnancies. This is mainly due to prematurity, complications close to delivery, and placental insufficiency [1].

In fact, this risk is related to chorionicity. The monochorionic (MC) pregnancies present a higher incidence of perinatal mortality, higher admission in neonatal intensive care unit and low birth weight [3]. It is possible that the single placental mass shared between pairs originates from an imbalance in placental anastomoses, may be overloaded in the third trimester [4].

A large Dutch cohort with 1407 multiple pregnancies showed that after 32 weeks' gestation, mortality was 11.6% in MC and 5% in dichorionic (DC) [5]. The risk of uterine death was significantly higher in MC than in DC (hazard ratio 8.8, 95% CI 2.7–28.9), and in most cases no change in fetal status was observed. The authors concluded that fetal vitality control was not sufficient to prevent adverse events and delivery should be planned up to the 37th week for MC.

A study with 94,170 multiple deliveries showed that the risk of fetal death increased significantly between 37 and 38 weeks of gestation in twin pregnancies. This risk was higher between 34 and 37 weeks of gestation in triplet pregnancies. The risk of child death after delivery gradually declined as pregnancies neared full term. This group recommended increased fetal surveillance after 34 weeks of gestation in multiple pregnancies [6].

3. Time of delivery in dichorionic pregnancies

The American College of Obstetricians and Gynecologists (ACOG) suggests that delivery be performed between 38 + 0 and 38 + 6 weeks in uncomplicated twin dichorionic pregnancies [7]. Depending on complications such as fetal growth restriction, termination of pregnancy is recommended before 38 weeks.

In 2016, a systematic review included 32 studies (29,685 dichorionic, 5486 monochorionic pregnancies) and showed that in dichorionic pregnancies beyond 34 weeks (15 studies, 17,830 pregnancies), the weekly risk of stillbirths due to expectant management and the risk of neonatal death were balanced at the 37th week of gestation. When delivery was delayed for 1 week (up to 38 weeks) led to an additional 8.8 perinatal deaths per 1000 pregnancies [8].

4. Time of delivery in monochorionic pregnancies

The same review showed that monochorionic pregnancies beyond 34 weeks (13 studies, 2149 pregnancies), had a tendency for an increase in stillbirths compared to neonatal deaths after 36 weeks, with an additional 2.5 per 1000 perinatal deaths, which was not significant [8].

Just like DC gestations, there are no high-quality studies to respond with great certainty the right time for terminate monochorionic pregnancies. Most specialists in large reference centers recommend delivery of monochorionic/diamniotic twins between 36 + 0 and 36 + 6 weeks. This may be the point of balance between the already reduced risk of prematurity and the risk of fetal death [9].

There is still a lot of divergence between medical societies for the correct time of delivery. ACOG suggests delivery of monochorionic twins between 34 + 0 to 37 + 6 weeks of gestation [7] and the North American Fetal Therapy Network suggests delivery at 36 + 0 to 37 + 6 weeks of gestation [9]. However, others delegate delivery at 32 weeks of gestation [10]. It is clear that in cases of Twin-Twin Transfusion Syndrome, most of deliveries are performed earlier and this depends on the degree of complication that is present.

On the other hand, in monoamniotic pregnancies, most specialized centers in the world recommend delivery between 32 and 34 weeks. This fact is justified by the high rate of perinatal mortality in the third trimester (30–70%) and has as main motive the umbilical cords entanglement in the same amniotic chamber [4, 11, 12].

5. Delivery mode: vaginal delivery vs. cesarean section

The mode of delivery in twin pregnancy depends on multiple factors and is very controversial in the literature. The most important factors to be considered on deciding the delivery mode are the fetus presentation, especially the first twin, fetal weight, weight difference between the fetuses, gestational weight and maternal clinical conditions. Women's parity is also a condition with high influence in mode of delivery in a twin pregnancy, as nulliparous usually result in less success when attempting a vaginal delivery [13].

The decision on either performing an elective cesarean delivery must consider the best neonatal and maternal outcomes, to reduce neonatal morbidity and mortality, maternal complications and preserving the women's reproductive future. The biggest risk in a vaginal delivery is for the second twin, as complications can occur after the delivery of the first twin, including placental abruption, cord prolapse and long delivery intervals [14].

It is important to consider that conditions that would indicate a cesarean section in singleton pregnancies should also be applied in multiple pregnancies.

5.1. Fetus presentation

Determining fetal presentation is fundamental in the decision of the mode of delivery. The presentation of twin pairs in a term twin pregnancy is 40% of the times cephalic/cephalic, 35–40% cephalic/non-cephalic and only 20% with the first twin non-cephalic [15]. It is a general consensus that, when both fetuses are in cephalic presentation, a vaginal delivery should be attempted [13–15]. However, it is important to notice that the second twin change its presentation in about 20% of the time, after the first one is born [15].

When the second twin is in a non-cephalic presentation, vaginal delivery is controversial. Some studies say that neonatal morbidity is higher for the second twin in those cases and an elective cesarean section should be planned [16, 17]. However, both a systematic review and meta-analysis [14] and a recent published prospective cohort study [18] support that cesarean deliveries neither add neonatal morbidity nor mortality. Therefore, a vaginal delivery is a safe option. In those cases, the second twin can either be delivered by breech extraction or an external cephalic version can be attempted [19].

Finally, when the first twin is non-cephalic, the safest delivery mode is the cesarean section. A randomized multicenter trial, The Breech Trial, showed that a planned cesarean delivery decreases significantly perinatal mortality and neonatal serious morbidity, when compared with a planned vaginal delivery in pregnancies with a non-cephalic presenting twin [20].

5.2. Fetal weight estimation in twin pregnancies

Twin pregnancies are more likely to show deviations in fetal growth curve. Conditions such as prematurity, intrauterine growth restriction and fetal malformations are common in multiple gestations, raising the risk of mortality and perinatal morbidity to 3–7 times when compared to single pregnancies [21]. Prematurity is present in approximately 55% of twin pregnancies, with adverse consequences even in short and long term [22].

When comparing the weights of fetuses from twin pregnancies to those of single pregnancies, it is observed that fetuses of twin pregnancies have a lower weight than fetuses of single pregnancies, especially from the end of the second trimester. It is known that this variation between the weights starts at around 28 weeks and at 38 weeks the 50th percentile for a twin pregnancy corresponds to the 10th percentile for a single pregnancy [23], but this difference does not seem to increase neonatal mortality. Therefore, it is argued that the lower weight of twin fetuses, when compared to that of single pregnancies, may be physiological of this condition.

Accuracy in the estimation of fetal weight is of paramount importance for the proper follow-up of prenatal care and ultrasonography study has been the main tool for this evaluation.

Currently fetal weight estimation by ultrasonography is most commonly performed by the formula of Hadlock et al. [24], which uses two-dimensional measures of cephalic pole, abdominal circumference and femur length. However, studies have shown that formulas using two-dimensional parameters can generate variations of up to 15% in relation to the real weight of the fetus [25].

New methods have been sought to improve the accuracy of fetal weight estimation such as three-dimensional ultrasonography. In the early 2000s, Lee et al. [26] introduced a new sonographic parameter, the fraction limb volume. This parameter is based on evaluation of 50% of bone diaphysis length (arm and thigh).

This method has the advantage of reducing the time spent to perform the test, maintaining a good accuracy for the estimation fetal weight.

In general, the accuracy of estimation weight in twin pregnancies is worse than single pregnancies. Biometric measurement of these fetuses in the third trimester is greatly impaired due to the technical difficulty of examination. When using 33 formulas to assess the accuracy of estimation weight by two-dimensional ultrasonography, 25 of these formulas present a weight variation of less than 10% for single pregnancies, but only 3 of these formulas present the same result for twin pregnancies [27].

An ongoing study that has been developed in multiple pregnancy unit of Federal University of São Paulo has shown that the use of fraction limb volume in twin pregnancies can improve the accuracy of estimation weight in these pregnancies, as well as reduce the time of the examination.

Although evaluation of fetal body volume through the use of magnetic resonance imaging is still considered an expensive method, there is good accuracy in fetal weight estimation, besides being a good predictor in the diagnoses of small fetuses for gestational age when compared to two-dimensional ultrasonography [28].

Estimating weight in twin pregnancies remains a challenge. New research needs to be conducted in search for new methods in order to improve accuracy.

Fetal weight should not be considered when both fetuses are cephalic. In those cases, regardless the fetal weight, a vaginal delivery can be attempted. However, in cephalic/non-cephalic twin pregnancies, the influence of weight on mode of delivery is controversial. Most studies showed worst perinatal outcomes for vaginal deliveries when the second twin was non-cephalic and under 1500 g [29, 30].

Weight difference is related to worst neonatal outcomes, regardless the delivery mode [31], and also to unsuccessful attempt of labor [32]. Furthermore, a weight difference above 40% has been associated with higher neonatal mortality rates in vaginal deliveries, regardless fetal presentation, in a retrospective study in 2005 [33].

5.3. Previous C-section

A previous cesarean delivery is considered a risk factor for an emergency C-section after attempting a vaginal delivery in twin pregnancies [34]. Regardless, a caution trial of labor can be a safe option in those patients, when the first twin is cephalic [35].

On the other hand, patients with two or more previous cesarean sections should not attempt a vaginal delivery due to higher risk of uterine rupture.

5.4. Preterm pairs

There is limited existing evidence to determine the safest mode of delivery for extremely preterm twins. Therefore, it is important to consider the fetal presentation and weight when deciding the delivery mode, regardless gestational age.

A recently published meta-analysis showed no significant difference in neonatal death and severe brain injury by mode of delivery for cephalic/non-cephalic twins with a gestational age under 28 weeks [36]. This study found higher rates of maternal complications in growth-discordant twins.

5.5. Maternal conditions

Higher rates of maternal morbidities are found in multiple gestations, compared to singletons. There is a higher risk of pre-eclampsia, diabetes and post-partum complications, as uterine atony and postpartum hemorrhage. Regardless, maternal conditions are rarely an indication of a cesarean section. An elective cesarean delivery can be performed after maternal request, after exposing the risks of the procedure, as longer maternal hospital stay, increased risk of the newborn going to the ICU due to respiratory problems and increased risks for subsequent pregnancies, as placenta previa and uterine rupture [37]. In those cases, the surgery should be planned to the appropriate gestational age, considering chorionicity and amnionicity.

6. Exceptional situations

Although the data about triplet pregnancies are still limited, and the monoamniotic and diamniotic triplets should be delivered between 32 + 0 and 32 + 6 weeks [38], most studies and guidelines suggest delivery time at no later than 36 weeks, even in uncomplicated triamniotic triplets [6, 39, 40]. The preferred delivery route is the cesarean section because vaginal delivery is associated with an increased risk of adverse outcomes if compared with the cesarean [41, 42].

In conjoined twins, the data available is based in small case report studies and expert opinion, but what is suggested is the delivery time and mode of the viable ones must be near term cesarean section after confirming lung maturity. In selected cases an EXIT procedure can be performed in order to stabilize the fetuses with cardiac union to examine and close the vessel communication safely [43].

7. Twin-to-twin delivery time intervals

Another controversial subject about delivery in twins is the time interval between fetuses in vaginal delivery.

New guidelines such as the American College of Obstetricians and Gynecologists do not recommend an upper limit to the time interval between fetuses, if the fetal heart rate is reassuring, as some studies also suggests [44–47]. However, there are studies that provide evidence of an association, but not necessarily causality, between longer twin-to-twin time interval and poor second twin outcome, such as lower apgar grades and decreasing pH in umbilical arterial blood gas [48–50]. This lack of strong evidence leaves space for different approach and expectant management [51].

A very specific approach can be performed in the case of a dichorionic twin pregnancy with spontaneous preterm delivery <24 weeks and never above 28 weeks, which is called delayed interval delivery when the second twin do not have an indication for labor such as infection among other complications. Several techniques and interventions are described but the evidence is not strong, but the main goal is to provide a better outcome for the second twin, and success rates of these particular cases are good according to a systematic review of 2016 [52].

8. Associated risks: vaginal and cesarean delivery

During the last few years, a lot of studies were performed trying to elucidate the question about the best delivery route for twins, according to the associated risks and benefits of planned cesarean section or planned attempt vaginal delivery.

The twin birth study, showed that planned cesarean section was not superior to planned vaginal delivery regarding maternal risk or neonatal mortality or morbidity [53], and ever since some society guidelines suggest attempt to vaginal delivery to diamniotic twin pregnancies if the first twin is in cephalic presentation [54].

The concern about the risks includes the possibility of combined delivery, which involves an unplanned cesarean after attempt of vaginal delivery and is associated with higher second twin morbidity [14] and may be an increased risk of neonatal and/or maternal infection probably because the exposure to labor and rupture of membranes are higher than in a planned cesarean delivery.

Cesarean delivery can expose mothers to short-term risks such as endometritis, wound complications, surgical injuries, hemorrhage [55], although maternal outcomes past 3 month and long-term risks, including abnormal placentation, are similar both ways cesarean an vaginal planned delivery [56, 57].

Newborns delivered by planned cesarean present a higher risk in developing allergic disorders [58–60].

9. Adverse neonatal outcome

The twin birth study did not found statistically significant difference in morbidity and fetal or neonatal mortality between planned cesarean or planned vaginal delivery [14, 53], and a 2-year follow up after delivery found no difference in neurodevelopment and death in both groups [61].

A retrospective study with 1070 twin pregnancies attempted trial of labor between 2003 and 2015 showed that in planned cesarean, the first twin has a lower blood pH and base excess than in vaginal delivery, but the study was unpowered for neonatal outcome assessment [13].

10. Conclusion

The time of delivery in twin pregnancies is around 38 weeks for dichorionic pairs, 36 weeks for monochorionic and 32 weeks for monoamniotic. When both fetuses are on cephalic presentation at delivery, the vaginal route is preferable regardless of weight. Being the first twin in non-cephalic presentation, cesarean section is the best choice. When the first twin is in cephalic presentation and the second non-cephalic, cesarean section is indicated if the fetus weight is less than 1,500g. However, vaginal delivery is possible if the fetus' weight is above

1,500g. In those cases, the second twin can either be delivered by breech extraction or an external cephalic version can be attempted.

Author details

Eduardo Félix Martins Santana^{1,2*}, Vivian Melo Corrêa¹, Isabela Bottura² and José Pedro Parise Filho²

*Address all correspondence to: dudes.felix@gmail.com

1 Department of Obstetrics, Paulista School of Medicine, Federal University of São Paulo (EPM-UNIFESP), São Paulo, SP, Brazil

2 Department of Perinatology, Albert Einstein Hospital, São Paulo, SP, Brazil

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