

Labor and Delivery of Twin Pregnancies



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KEYWORDS

• Twins • Labor • Delivery • Breech extraction • Active management • Cesarean

KEY POINTS

- In twin pregnancies, planned vaginal delivery is not associated with adverse maternal or neonatal outcomes, compared with planned cesarean delivery, assuming the obstetrician is experienced in twin delivery.
- Active management of the second stage of labor consists of breech extraction of the non-vertex second twin and internal podalic version and breech extraction of the unengaged vertex second twin.
- Active management of the second stage of labor achieves a high rate of vaginal deliveries and very low rates of combined vaginal-cesarean delivery.

INTRODUCTION

The incidence of twin pregnancies in the United States has increased over the past few decades, and twins now represent 3.4% of all US live births.¹ In the United States, approximately 75% of twins are delivered by cesarean delivery (CD).² Reasons for the high CD rate in the United States include malpresentation of the first or second twin, prematurity, maternal comorbidities, and patient preference. However, recent literature suggests that, for many women with twin pregnancies, vaginal delivery can be achieved without increasing maternal or neonatal morbidity. This article reviews the management of labor in twin pregnancies.

BACKGROUND

Mode of Delivery and Success Rates of Twin Vaginal Delivery

Overall, the goal of a twin delivery is to provide a safe delivery for the mother and both babies. With regard to mode of delivery, there are 3 potential outcomes:

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- Vaginal delivery of both twins
- CD of both twins
- Vaginal delivery of twin A followed by CD of twin B (combined vaginal-CD)

In general, vaginal delivery of both twins is the most desirable outcome (discussed later) because neonatal outcomes are similar regardless of mode of delivery and because it avoids the maternal morbidity associated with CD for the current pregnancy and future pregnancies. CD of both twins is the next desirable outcome. The least desirable outcome is a combined vaginal-CD. This type of delivery adds the morbidities of labor, vaginal delivery, and CD. It also frequently is associated with a complication between the delivery of the first and second twin.

Rates for the 3 modes of delivery vary in the literature. In the United States, the overall rate of CD for twins is approximately 75%² and up to 10% of women who deliver the first twin vaginally have an unplanned CD of the second twin.³ In Ireland, the CD rate for twins is 65% (23% for women who labored) with a 3% rate of combined vaginal-CD.⁴ A study from France of 657 women with twin pregnancies attempting labor showed a CD rate of 21.1% with a combined vaginal-CD rate of only 0.5%.⁵

The different CD rates and different combined vaginal-CD rates are mostly caused by differences in management of a nonvertex second twin. In the United States, malpresentation of the second twin is often the reason for CD because most modern-trained obstetricians lack the knowledge and experience to perform a breech delivery. However, in France, where the success rates were best, the obstetricians were comfortable with delivery of the second twin regardless of presentation because they routinely used active management of the second stage of labor, which consists of 2 essential tools: breech extraction of the nonvertex second twin and internal podalic version and breech extraction of the unengaged vertex second twin. Studies in the United States are consistent with these approaches. For example, among 130 women with twin pregnancies attempting labor, the CD rate was 15.4% with 0% having a combined vaginal-CD.⁶ In a follow-up study of 286 women with twin pregnancies attempting vaginal delivery, these rates were 17.8% and 0%, respectively.⁷

Active management of the second stage in a twin gestation is used to deliver the second twin by breech extraction in all cases except when the second twin is in an engaged vertex presentation. If there are no contraindications to vaginal delivery, patients with twin pregnancies who labor and have active management of the second stage should expect high rates of vaginal deliveries and very low rates of combined vaginal-CD.^{5,6} Both retrospective studies showed similar short-term neonatal outcomes for twins, regardless of planned mode of delivery.^{5,6}

Mode of Delivery: Safety of Vaginal Twin Delivery

Most older studies examining the safest mode of delivery for twins were retrospective and compared either twins born vaginally with twins born by CD, or compared twins with planned vaginal delivery with twins with planned CD. The conclusions of those studies were mixed,^{5,6,8-11} with some finding benefit to CD and others finding no difference in outcomes. However, the retrospective studies all contain significant selection bias, and it is difficult to make any definitive conclusions from these types of analyses.

The Twin Birth Study was a prospective, randomized trial of planned vaginal delivery versus planned CD for twin pregnancies, and the results were published in 2013.¹²

This multicenter study from 2003 to 2011 across 106 centers in 25 countries included 2804 women with twin pregnancies 32 0/7 to 38 6/7 weeks who were randomized to planned vaginal delivery versus planned CD. Inclusion criteria included estimated fetal weights 1500g to 4000g; the first twin had to be in vertex presentation; both twins had to be alive, and there were no other contraindications to labor. Both dichorionic and monochorionic twins were included, but monoamniotic twins were excluded. The primary outcome was a composite of fetal and neonatal mortality or serious neonatal morbidity at 28 days of life, and did not differ significantly between the two groups (2.2% in the planned CD group vs 1.9% in the planned vaginal delivery group; $P = .49$). There were no differences in any secondary outcomes between the groups, including individual fetal or neonatal outcomes, and maternal composite morbidity. Also, the primary outcome was not affected by position of the second twin, gestational age, chorionicity, maternal age, or perinatal mortality in the country of residence. Follow-up examination of the children at 2 years of life did not show any differences in neurodevelopmental outcomes between the groups.¹³ Maternal outcomes also did not differ at 3 months after delivery.¹⁴ Based on the results of this randomized trial, for women with a twin pregnancy greater than 32 weeks with the first twin in vertex presentation, planned CD is not associated with any known improvement in maternal or neonatal morbidity or mortality.

In the Twin Birth Study, among the 1393 women in the planned vaginal delivery group, the CD rate was 39.6% and the combined vaginal-CD rate was 4.2%. After removing the 196 women who had their CD before labor, for the women who attempted labor, the CD rate was 34.4% (412 out of 1197) and the combined vaginal-CD rate was 4.9% (57 out of 1197). All delivering obstetricians were reported to be experienced at vaginal twin delivery, but no specific details were reported regarding expertise in breech extraction or internal podalic version.

Mode of Delivery: Conclusion

Patients with twin pregnancies greater than 32 weeks with the first twin in vertex presentation should be counseled that planned vaginal delivery is not associated with adverse maternal or neonatal outcomes, compared with planned CD, assuming the obstetrician is experienced in twin delivery. If the mother does attempt labor, the likelihood of a vaginal delivery is approximately 65% to 75% and the likelihood of a combined vaginal-CD is approximately 3% to 10%. However, if the delivering obstetrician is comfortable with active management of the second stage, including breech extraction and internal podalic version, the likelihood of vaginal delivery can be as high as 85% and the combined vaginal-CD rate could be less than 1%. Planned vaginal delivery of twins is currently encouraged in well-selected patients.¹⁵

PROTOCOL FOR DELIVERY OF TWINS

The approach to vaginal delivery of twins usually involves institutional guidelines about selection and management. There are no specific approaches that have been well studied compared with others. Thus, this article presents an example of a specific protocol for the delivery of twin pregnancies. This protocol has several components.

Patient Selection

Not all women with twin pregnancies should attempt a trial of labor. First, the patient should desire a vaginal delivery and there should be no other contraindications to vaginal delivery. In addition, the following is required:

- Twin A must be in vertex presentation.
- Twin B's estimated fetal weight should be greater than 1500g.^a
- If the estimated fetal weight of twin B is greater than twin A, the discordance should be less than 20%.^a

Third-Trimester Counseling

All patients with twin pregnancies considering vaginal delivery are counseled in the third trimester, including:

- A devoted counseling session with a delivering obstetrician
- An opportunity to accept or decline an attempt at vaginal delivery
- Detailed documentation in the prenatal record

Timing of Delivery

Because of the increased risk of intrauterine fetal demise in twin pregnancies, uncomplicated twin pregnancies are delivered earlier than singletons. Delivery is commonly recommended for twin pregnancies at the following gestational ages, or sooner if other indications are present¹⁶

- Dichorionic diamniotic twins: 38 weeks
- Monochorionic diamniotic twins: 37 weeks

These recommendations are made to balance the increasing risk of stillbirth and the decreasing risk of prematurity as a pregnancy progresses, as well as the small risks of early term deliveries.

Induction of Labor

When a woman with a twin pregnancy has an indication for delivery, or she has reached the gestational age at which delivery is recommended, induction of labor is offered as an option.

Twin pregnancies can use the same approaches as singleton gestations; for example, cervical ripening with prostaglandins or a transcervical Foley balloon catheter.

Induction of labor has similar success in twin pregnancies as in singleton pregnancies, and the risk factors for failed induction are the same (nulliparity, advanced maternal age, low Bishop score).¹⁷ For example, in one study, for women with twins undergoing induction of labor, nulliparous women had a 27.9% likelihood of CD, whereas multiparous women had a 5.1% likelihood of CD.¹⁷

Regional Anesthesia

For all women with twin pregnancies attempting labor, regional anesthesia (epidural) is recommended for several reasons:

- In the event of an unplanned CD in labor. Trying to place an epidural in this setting could be difficult in a woman with twins and general anesthesia carries an increased risk of aspiration.

^a If twin B is in vertex presentation, then the estimated fetal weight criteria for twin B listed earlier do not apply. The criteria are meant to decrease the risk of head entrapment. Head entrapment at the cervix is thought to be more common in preterm babies in whom the head circumference is larger than the abdominal circumference or in deliveries in which twin B is significantly larger than twin A. However, data supporting this concern are limited. Patients in this scenario must be counseled that they are at increased risk for combined vaginal-CD because they would not be candidates for breech extraction.

- Maternal comfort can facilitate easier fetal monitoring of both twins.
- Most importantly, to allow for breech extraction of the second twin. Breech extraction cannot be easily performed without anesthesia.

Management of Labor

Most labor management for twins is similar to that for a singleton gestation. Patients are given a clear liquid diet, and intravenous fluids are administered at a maintenance rate (typically 125 mL/h). Continuous external fetal heart rate monitoring is performed for both twins until delivery. Because monitoring both twins externally can be technically challenging, placement of an internal scalp electrode for twin A can be performed as needed, leaving only twin B with external monitoring. If continuous fetal heart rate monitoring cannot be achieved, CD is recommended.

Assessment of the labor curve and appropriate progress in labor does not differ for twin pregnancies compared with singleton pregnancies. Obstetric interventions in labor and the decision to perform a CD for arrest of labor or nonreassuring fetal heart rate are according to the same indications as in singleton pregnancies.

During labor, the patient remains in a standard labor room until the cervix is fully dilated, at which point she is transferred to the operating room for delivery. Consideration should be given to delivering all twins in the operating room for several reasons:

- The operating room is the largest room on labor and delivery, which allows space for all personnel present for delivery.
- The overhead lighting allows for better visualization.
- Decreased time to delivery if an emergent CD is warranted.

For all twin deliveries, the following personnel are present in the operating room:

- Two obstetricians (ideally one of whom is a learner, such as a resident or junior attending).
- Two pediatric teams, 1 for each twin.
- Three nurses: – 1 for the patient and 1 for each twin.
- A surgical technician, in the event of a CD, or to assist with instruments needed for vaginal delivery.
- An anesthesiologist.

The patient pushes in the second stage in the operating room using foot rests attached to the operating room table and using a large foam wedge behind her to allow her to be sitting at a 45° angle. Her partner is encouraged to be with her, similar to a singleton vaginal delivery. Continuous fetal heart rate monitoring is maintained for both twins during the second stage of labor.

All personnel in the operating room wear surgical scrubs, masks, and head covers, but no one aside from the surgical technician is scrubbed at this time.

Delivery: Active Management of the Second Stage

The delivery of twin A proceeds as a standard singleton vertex delivery, with the use of operative delivery and episiotomy as indicated. After the first twin delivers, the cord is clamped twice with small plastic cord clamps and cut and twin A is handed to the mother or the awaiting pediatricians. A single clamp is left on the cord of twin A (to help differentiate the 2 placentas after birth).

After delivery of the first twin is complete, a vaginal examination is done to determine the presenting part of twin B and the mode of delivery for the second twin.

Twin B: cephalic and engaged

If twin B is cephalic and engaged in the maternal pelvis, continuous fetal heart rate monitoring is continued until delivery and the mother begins to push again. Frequently, oxytocin needs to be given (or the rate increased) to maintain a regular contraction pattern. As maternal contractions bring the fetal head further into the pelvis, artificial rupture of membranes is performed with maternal expulsive efforts to facilitate delivery. Operative delivery and episiotomy are performed for the usual indications.

Twin B: breech or transverse

If twin B is in breech or transverse presentation, a total breech extraction is performed. This extraction should occur within several minutes of delivery for twin A. Delivering twin B before the cervix contracts decreases the likelihood of a head entrapment in the cervical canal.

To perform breech extraction, the fetal feet are grasped at the ankles and pulled caudally, maintaining a good hold because the membranes typically rupture at this time. If not, artificial rupture of membranes is performed. If both feet cannot be grasped, it is appropriate to pull on 1 foot until the foot reaches past the introitus, at which point the second leg and foot can usually be identified and delivered.

As the breech delivers past the introitus, the umbilical cord is lengthened and the infant is grasped with 1 hand on each hip. The operator's thumbs should be placed on the sacrum and the hands wrapped around the sides and grasping the front of the infant with the index fingers on the anterior superior iliac spines. Pressure higher or more lateral on the back could cause trauma to the kidneys or adrenal glands. Pulling caudally delivers the fetal abdomen and chest, with concurrent 180° clockwise and counterclockwise rotation to dislodge a possible nuchal arm, as needed. As the fetal scapulae come into view, the arms are then delivered. If the right scapula is visible, the provider's right hand is used and the right thumb is placed on the right scapula, and the fingers are used to sweep the right arm in a down-and-out fashion. The infant is then rotated clockwise, and the left arm is delivered in the same fashion with the operator's left hand.

The head is delivered by performing the Mauriceau-Smellie-Veit maneuver. The first and middle fingers of the obstetrician's dominant hand are placed on the fetal mandible on each side of the fetal mouth with the palm on the baby's chest. The nondominant hand is placed along the upper back with the middle finger on the occiput. By pulling down on the maxillae and pushing down on the occiput, this maintains flexion of the fetal head. An assistant can also provide suprapubic pressure to aid with flexion of the head. As the body is elevated, the head is then delivered through the vagina. If further fetal head flexion is needed, Piper forceps can be used.

Twin B: Unengaged

If twin B is vertex or oblique, but unengaged, there is an option for an internal podalic version of twin B. To perform this maneuver, one hand is placed in the vagina and the other on the maternal abdomen. The hand in the vagina should be the one opposite the side of the fetal back. So, if the fetal back is to the maternal right, the operator's right hand is placed in the vagina and the left hand on the maternal abdomen. The operator's internal hand first elevates the vertex higher into the uterine cavity and then reaches for a fetal foot. The outer hand then continues to elevate the vertex, while the internal hand pulls the feet caudally, rotating the baby to complete breech presentation. Delivery then proceeds as a breech extraction, as described earlier.

After delivery of the second twin, the umbilical cord is clamped and cut and then marked as twin B with 2 clamps. The baby is handed to the mother or the second team of pediatricians. Cord blood gases are obtained and the placentas are then delivered. Oxytocin is administered, as well as any additional uterotonics as needed. Any lacerations are repaired and the patient is returned to the supine position.

TWIN DELIVERY: COMPLICATIONS AND MANAGEMENT

Twin pregnancies are at increased risk for delivery complications relative to singleton pregnancies. There is an increased risk for uterine atony, postpartum hemorrhage, and difficult extraction. There are also potential complications associated with active management of the second stage, such as cord prolapse, hand presentation, nuchal arm, and head entrapment. With proper patient selection and provider training, most of these complications can be prevented or mitigated to achieve a safe delivery. Some of the most common complications and their management are listed here.

Uterine Atony

An enlarged uterus (overdistended by twins) is a known risk factor for uterine atony and postpartum hemorrhage. On admission to the hospital, a sample of blood should be sent to the blood bank to crossmatch at least 2 units of packed red blood cells for all twin deliveries. After delivery, routine active management of the third stage of labor (uterine massage and intravenous oxytocin) should be used and there should be a low threshold to administer any additional uterotonic agents.

Difficult Extraction

Regardless of mode of delivery, extraction of twins can sometimes be a challenge. Occasionally, it can be difficult during CD to deliver twin A in vertex presentation. If an unengaged (floating) vertex is noted at the time of CD, twin B can be delivered first, instrumental delivery with vacuum or forceps can be used for twin A, or an attempt can be made to deliver twin A as a breech presentation. The pediatric team is present in the delivery room for all twin deliveries in case neonatal support or resuscitation is needed.

Unengaged Vertex of Twin B

If twin B is unengaged and vertex and given time to descend, there is a risk that the cord or fetal hand could descend below the vertex while it is unengaged. A CD is required in this setting because it is unsafe to perform an operative delivery with an unengaged vertex and unsafe to perform breech extraction because of the risk of head entrapment if too much time has elapsed after delivery of twin A.

Complications of Active Management During the Second Stage

Uterine hypertonicity

After delivery of twin A, the uterus may contract rapidly on twin B. In cases of malpresentation, it can be difficult to perform the necessary maneuvers to rotate and deliver the second twin in this setting. A single dose of nitroglycerin (100 µg intravenously given by the anesthesiologist) or a dose of terbutaline (250 µg given subcutaneously) can be used to relax a hypertonic uterus.

Malpresentation

In experienced hands, internal podalic version and breech extraction are used.

Failed breech extraction

If an attempt is made at breech extraction of twin B and it proves difficult, the obstetrician must know when to abandon the procedure and proceed with CD for twin B (combined vaginal-CD). In general, most internal podalic versions and breech extractions are performed within a few minutes of birth of twin A. If breech extraction of twin B has not been achieved after 5 minutes, staff should be notified to prepare for CD and an assistant should begin scrubbing. Maneuvers to achieve breech extraction should continue while final preparations are being made. In addition, CD should be started after 8 to 10 minutes have passed from the birth of twin A. The provider must consider whether it would be appropriate to use a midtransverse or classic incision rather than a low transverse incision depending on the clinical setting and maternal anatomy (fetal lie, distended bladder, length of second stage, and so forth).

Cord prolapse/hand presentation/funic presentation

Each of these conditions may be diagnosed after twin A has delivered. Internal podalic version and breech extraction of twin B can be performed promptly, avoiding the need for CD.

Nuchal arm

This condition occurs when the fetal arm is behind the fetal head and neck during breech extraction. It is relieved with rotation of the fetal body. For example, as twin B delivers, the sacrum is oriented anteriorly. If the left arm is reaching up and around behind the fetal head toward the fetal right shoulder (ie, the left arm is between the fetal head and the maternal bladder/anterior uterine wall), the fetal body should be rotated clockwise until the arm passes in front of the head, and then is delivered in standard fashion. A right nuchal arm is relieved with counterclockwise rotation of the fetal body. Another way to remember this is whichever arm is nuchal, that shoulder needs to rotate toward 12 o'clock (like windshield wipers).

Head entrapment

Head entrapment refers to the inability to deliver the fetal head during a breech extraction because it cannot pass through a contracted cervix. This situation is most likely to occur:

1. When twin B is significantly larger than twin A
2. In certain cases of prematurity (caused by the larger ratio of head to abdominal circumference)
3. When breech delivery is not performed in a prompt fashion

As the cervix contracts, the fetal abdomen and thorax can pass through, but the cervix prevents delivery of the fetal head. There are several maneuvers to assist with fetal head entrapment. The anesthesiologist should ensure the patient has good pain relief and administer a rapid-acting uterine relaxant. The assistant should provide suprapubic pressure, which flexes the fetal head and may assist in delivery. Dührssen incisions can be made on the cervix using bandage scissors, incising at 2, 6, and 10 o'clock. This technique increases the diameter of the cervix, allowing the fetal head to pass through. If unsuccessful, CD is required.

SUMMARY

Obstetricians who care for twin pregnancies should be aware of the challenges that may arise during the labor and delivery. With recognition of these issues and proper

training, providers should be able to help women with twin pregnancies achieve a safe delivery for them and their babies. With the use of breech extraction of the second twin and active management of the second stage of labor, women with twin pregnancies can also achieve a high vaginal delivery rate of both twins.

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