

Mode of delivery for twins

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INTRODUCTION

Twin pregnancies comprise approximately 1% of all pregnancies¹, and this figure is on the rise globally as a result of an increase in births to older mothers and increased use of fertility treatments and assisted conception². However, twins have perinatal mortality and morbidity rates 4-6 times higher than those of singletons³ and account for nearly 10% of all perinatal mortality⁴. This high perinatal morbidity and mortality is caused by low birth weight, prematurity⁵ specific complications of monochorionic twins such as twin twin transfusion syndrome⁶, and intrapartum complications. Kiely reported that the relative risk of intrapartum fetal death for twins vs singletons more than 2500g was more than 3 times⁷.

The optimal mode of delivery is dependent on the presentation of the first twin, the presentation of the second twin after delivery of the first twin and the estimated fetal weight or gestational age of both twins. Approximately 40% of twins present as vertex / vertex, 35% as vertex / non-vertex and the remaining 25% of twins present with twin A in the non-vertex presentation⁸.

For pregnancies at gestational age ≥ 26 weeks where the first twin lies nonlongitudinally, Caesarean section is the optimal mode of delivery. For first twin lying longitudinally, considerations of the optimal mode of

delivery are made with respect to whether the first twin is breech or cephalic, and whether the twins are preterm or near term (or the equivalents of the estimated fetal weights).

In 1999, the American College of Obstetricians and Gynaecologists (ACOG) recommended that vaginal birth be offered for vertex / vertex twin gestations unless there are specific contraindications to vaginal birth, while vaginal birth is reasonable for vertex / non-vertex twins if infants weigh more than 1500g and if the criteria for vaginal breech delivery are met⁹. With accumulation of new data, this paper presents recent thoughts on this subject matter.

Twins <32 weeks or 1500g

40% of twin pregnancies are vertex / vertex, but 20% of vertex second twins change presentations following the birth of the first twin¹⁰. 35% of twin pregnancies are vertex / non-vertex while in 25% the first twin is non-vertex⁸.

For twins delivered vaginally below 32 weeks in gestation, vaginal delivery of a breech twin was associated with an odds ratio of 2.91 (95% CI 1.73, 4.90) for neonatal death versus a vertex twin¹¹. In the same study, breech vaginal delivery was reported to have an odds ratio of 2.50 (95% CI 1.58,3.99) for neonatal death over Caesarean section.

Preterm second twins delivered vaginally have increased morbidity compared to first twins. Arnold et al found that vaginal delivery increased the risk of respiratory distress syndrome for the second twin compared to the first (matched OR 14.2 95% CI 2.5,81.1)¹². Barrett et al reported that vaginally delivered second twins had significantly lower Apgar score and increased risks of neonatal morbidity in comparison to their siblings. There was no difference among the twin pairs delivered by cesarean section for both studies¹³.

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Cephalic first twin <32 weeks or 1500g

No evidence has been found specific for vertex first twins delivered at this gestational age. However, the findings suggest that the optimal mode of delivery for all preterm twins <32 weeks is elective Cesarean section.

Breech first twin <32 weeks or 1500g

In 108 preterm breech first twins weighing less than 1500g, Blickstein et al reported that vaginal birth was associated with significantly more depressed Apgar scores (OR 2.4 95% CI 1.2, 4.7) and neonatal deaths (OR 9.5 95% CI 4.0, 23.4)¹⁴ than Cesarean section. This evidence supports Cesarean section for this group of patients and agrees with the current favoured mode of delivery for preterm breech singletons as well.

Twins >= 32 weeks or 1500g**Breech first twin >=32 weeks or 1500g**

In 505 breech first twins weighing at least 1500g, Blickstein et al did not find poorer Apgar scores or neonatal deaths associated with vaginal delivery (OR 1.1 95% CI 0.6, 2.1)¹⁴. However, most obstetricians extrapolate the results of the Term Breech Trial in singletons to breech first twin. This trial showed that the perinatal mortality, neonatal mortality, or serious neonatal morbidity was significantly lower for the planned cesarean section group than for the planned vaginal birth group (17 of 1039 [1.6%] vs 52 of 1039 [5.0%]; relative risk 0.33 [95% CI 0.19-0.56]; $p < 0.0001$)¹⁵. This trial changed the practice to planned Cesarean section for almost all term breech babies^{16,17}. Advocates of Cesarean section also cite the rare complication of locked twins¹⁸ that may occur in 1 of 645 vaginal breech delivery of first twin, and is associated with mortality risks of 30-43%¹⁹⁻²¹.

Vertex first twin >= 32 weeks or 1500g

Studies have found that for vertex first twin deliveries of gestation 32 weeks or more, the mode of delivery did not influence the neonatal outcome^{3-14,22-23-24}. A systematic review by Hogle et al showed that there was no significant reduced likelihood of a low 5 min Apgar score, perinatal, or neonatal mortality, for twins having a planned cesarean section compared to those having a planned vaginal birth for vertex / non-vertex twins²². In the review and meta-analysis, the authors included 966 twin pairs from 4 studies: 3 retrospective cohort studies, and 1 randomised controlled trial^{8,14,23,24}.

However, other studies have shown increased mortality for vaginal deliveries. Smith et al reported that for term births at or beyond 36 weeks, second twins have a higher risk of death ($P=0.004$) than first twins

due to complications of delivery and that 75% of these deaths were due to intrapartum anoxia mostly resulting from mechanical problems after vaginal delivery of first twins ($n=2436$).²⁵ Kiely⁷ reviewed a large population-based registry and reported that the neonatal mortality rate was more than four times higher in vaginal deliveries than in Cesarean sections for twins in vertex presentation who weighted more than 3,000 grams.

An increased morbidity for the second twin was also noted, but it was not associated with route of delivery. A randomized controlled trial of 60 vertex / non-vertex twin pairs by Rabinovici et al found that at 35 weeks of gestation or more, no difference in Apgar scores and morbidity was demonstrated between vaginal delivery and Cesarean births. However, first-born twins had higher Apgar scores than the second-born infants irrespective of route of delivery²³.

There is an increasing trend for elective Cesarean births for this group of patients as well, for various reasons. Firstly, vertex second twins change presentation up to a fifth of the time following the delivery of the first twin¹⁰, thus increasing the likelihood of requiring a cesarean section when the second twin is not vertex²⁷. Secondly, Kiely reported that neonatal mortality was four times more for vaginal delivery than Cesarean section for vertex twins more than 3000g at birth⁷. Thirdly, substantial accounts of vertex twins present with acute intrapartum complications which require emergency Cesareans in 15% (a figure derived from the data of Hogle et al²²) which increases morbidity and mortality for the mother^{23,29,30}. Fourthly, neonatal outcomes for the second twin are poorer following vaginal birth compared to their first-born siblings²⁵. Additionally, for the mother, Cesarean section avoids the urinary incontinence which may result from vaginal delivery³¹, as well as faecal incontinence and incontinence of flatus.

Hence the optimal mode of delivery in this group remains controversial.

Conduct of Planned Vaginal Delivery**Delivery of second twin***Active vs expectant management*

In delivering the second twin, an active approach reduced the rate of Cesarean delivery³², although there was no benefit in terms of neonatal outcome in terms of 5 min Apgar scores and NICU transfers, when compared to an expectant approach. The study by Pons et al ($n=191$) thus concluded that after 32 weeks, the safety of the second twin's birth is not compromised by intrauterine manipulation in the active approach or consequential interdelivery delay

in expectant management.³²

External Cephalic Version vs Breech Extraction

External cephalic version (ECV) was advocated by Chervenak et al in 1983³³ to deliver the non-vertex second twin vaginally. Other investigators published results to support such an approach subsequently.^{34,35} In a study of 142 sets of vertex / non-vertex twins, external cephalic version (ECV) of the second twin allowed subsequent successful vaginal delivery in 75% of cases with no complications.³⁴

More recent data favours breech extraction. Studies have reported that breech extraction had higher incidences of vaginal delivery^{24,36} and that the procedure was associated with higher success rates and lower Cesarean section rates than ECV with significantly less intrapartum fetal distress³⁷. Barrett et al³⁸ reported more frequent intrapartum complications like abruption placentae, fetal distress and cord prolapse among the ECV group. Also, there were more NICU admissions and a greater incidence of intraventricular haemorrhage and respiratory distress syndrome although Apgar scores and incidence of neonatal trauma was not significantly different.

Emergency Cesarean-caesarean and Vaginal-caesarean section

The policy of planned vaginal delivery, is associated with an incidence of 15.5% eventually still undergoing an emergency Cesarean section²² while the incidence of vaginal-caesarean delivery has been reported at 4.30%²⁷ - 9.45%³⁹. Factors like second non-vertex twin, >25% birth weight discordance, and gestational age were associated with emergency cesarean²⁷. Based on singleton literature, neonatal morbidity was higher (5 min Apgar scores and arterial cord blood pH)⁴⁰ following emergency cesarean section, although there was no significant difference in maternal morbidity versus vaginal-vaginal delivery. Maternal mortality, however, is higher with emergency Cesarean (18.2 for emergency Cesarean vs. 2.1 for vaginal birth, per 100 000)³⁰. It is difficult to attribute this result solely to the intervention per se as results may be biased because of the underlying gestational complications which necessitated the emergency delivery.

Vaginal-caesarean delivery is associated with non-vertex second twin, prolonged interdelivery interval of over 60 mins²⁷, ECV failure, cord prolapse and fetal heart rate changes that indicate fetal distress³². However, the selective Cesarean delivery of the second twin was not associated with an increase in perinatal morbidity or mortality²⁷. In terms of maternal morbidity however, vaginal-caesarean delivery had a

22-fold higher use of general anesthesia compared with vaginal delivery as well as an increased risk of puerperal infection (RR 6.35 95% CI 1.7,25.3) and a longer postpartum hospital stay (P <0.001)²⁷.

Previous Cesarean section

From the maternal point of view, a study by Delaney et al⁴¹ (n=121) reported that in twin pregnancies with twin A presenting as a vertex, a cautious trial of labour may still be an effective and safe alternative to an elective repeat Cesarean section. There were no uterine ruptures, scar dehiscences, maternal deaths or increase in neonatal morbidity or mortality reported.

Planned Cesarean Section

As mentioned previously, there may be benefits of Cesarean section in twins in terms of neonatal mortality and morbidity and maternal morbidity such as urinary incontinence and prolapse.

Neonatal problems

However, neonatal respiratory disorders are more common in twin pregnancies with cesarean delivery performed before labour before 38 weeks gestation⁴². Even at 37 weeks or more, Morrison et al showed that respiratory distress syndrome and transient tachypnoea were more likely to occur in infants delivered by cesarean section than in those delivered vaginally⁴³. Additionally, there is a problem of increasing premature birth with a policy of elective cesarean because maternal uterine contractions may be misinterpreted as spontaneous preterm labour³⁷.

Maternal problems

For the mother, cesarean delivery is associated with higher maternal mortality than vaginal birth (5.9 for elective cesarean delivery vs. 18.2 for emergency Cesarean vs. 2.1 for vaginal birth, per 100 000 completed pregnancies in the United Kingdom during 1994-1996)³⁰. Also, it requires a longer recovery time, and is associated with operative complications such as lacerations and bleeding. Again, rates are higher for an emergency vs an elective cesarean²⁸. Having a cesarean delivery also increases the risk of major bleeding in a subsequent pregnancy because of placenta previa and placental abruption²⁹. Rabinovici reported that maternal febrile morbidity was also significantly higher with Cesarean section (40.7% versus 11.1%, p < 0.05)²³

Timing of delivery

In twin pregnancies that are uncomplicated up to around term, the appropriate timing of birth is another relevant issue. A small randomized controlled trial (n=36) compared elective induction of labour at 37 weeks for women with a twin pregnancy, with

expectant management, but was underpowered to provide any statistically viable information⁴⁴. Another study (n=329) that evaluated the timing of twin delivery associated with perinatal outcome in gestations of at least 36 weeks showed that delivery between 36 and 37 weeks of gestation was associated with a 13-fold likelihood for neonatal intensive care compared with those who delivered at or after 38 weeks (95% CI: 1.8-95.9)⁴⁵. Delivery before 39 weeks has been advocated by Sairam et al⁴⁶ as the relative risk of stillbirths compared with postterm singleton pregnancies is 7.61 (95% CI 3.52, 16.4) while the risks of delivery at 37-38 were not significantly different. Hence, dichorionic twins should optimally be delivered within the 38th week. However, the optimal timing of delivery of monochorionic twins is not known yet.

Twin Birth Study

The Twin Birth Study is a multicentre international randomised controlled trial comparing planned Caesarean section to planned vaginal birth for twins at 32-38 weeks gestation, before, in the absence of evidence, Caesarean section becomes the standard of care for women with twins. To date, more than 140

centres in 30 countries have indicated their willingness to join the trial, with recruitment of eligible women expected to begin late in 2003. Twins at 32-38 weeks gestation with twin A presenting vertex, both twins alive, and estimated fetal weight 1500-4000g are included. Its exclusion criteria include monoamniotic twins, lethal anomaly of either twin, and contraindications to labour or vaginal birth.

Primary outcomes studied include perinatal or neonatal mortality and/or serious neonatal morbidity (excluding lethal congenital anomalies) while secondary outcomes include: i) death or poor neurodevelopmental outcome of the children at 2 years of age; ii) problematic urinary or faecal/flatal incontinence for the mother at 2 years postpartum.

Conclusion

In summary, non-vertex first twins should be delivered by Caesarean section regardless of the gestational age. Vertex first twins at less than 32 weeks of gestation should also be delivered by Caesarean. For vertex first twins at 32 weeks of gestation or more, the optimal mode of delivery is still controversial. We hope that the Twin Birth Study will provide answers to this issue.

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Editorial Note:

The Twin Birth Study (TBS) is co-ordinated by the University of Toronto Maternal, Infant and Reproductive Health Research Unit at The Centre for Research in Women's Health in Toronto

(Email: tbs@sw.ca website: www.utoronto.ca/miru/tbs)
Till November 2004, 161 women had been recruited worldwide. KK Women's and Children's Hospital is one of the centres participating in this trial.