

Expert panel recommendation

Delivery mode for the extremely premature fetus: a statement of the prematurity working group of the World Association of Perinatal Medicine

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Abstract

Recent retrospective publications have suggested that cesarean delivery may be beneficial for the extremely premature fetus. This article displays the available evidence and discusses this issue, including many aspects such as the difficulty in deciding when delivery is imminent, the negative impact on maternal morbidity and mortality and the cost to society of such a policy. The available scientific evidence does not support a recommendation for cesarean delivery for improving survival or decreasing morbidity for the extremely premature fetus.

Keywords: Extremely premature fetus; fetal growth restriction (FGR); gestational age; intracranial hemorrhage (ICH).

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Introduction

A very important clinical question has been raised recently regarding the proper course of action when a woman presents with preterm labor at an extremely preterm gestational age with a cephalic presenting fetus. Should the cephalic-presenting, extremely preterm fetus be allowed a vaginal birth or be delivered by cesarean section? A combination of factors has provided the impetus to review this topic and develop this statement. These factors include a rising rate of cesarean delivery and recent scientific information purporting to show improved survival or decreased morbidity for the neonate when cesarean delivery is performed for extreme prematurity (Tables 1 and 2). This topic is very important for the health of women and infants worldwide.

Evaluation of the scientific literature

Table 1 shows the available quality studies examining the relationship of delivery mode and survival for cephalic-presenting preterm fetuses [7, 8, 11–14, 16, 17, 20, 21]. All of these studies are retrospective in nature, limiting the quality of the information available. There have been attempts to perform randomized trials, of which several have failed [4]. The highest quality scientific information is thus unavailable. Studies are included in each of the tables only if regression analysis, the scientific method that attempts to control for confounding variables that may produce positive results in univariate analyses, was performed. The simple fact that no “gold-standard” scientific evidence exists for this topic argues that further study is necessary before setting any standard. It is our opinion that any extreme intervention (i.e., a surgical procedure such as cesarean delivery) is unlikely to be justified for many reasons.

The results in Table 1 appear to be mixed. There are several studies that suggest that cesarean delivery is associated with improved survival of extremely preterm fetuses, while many others show no such association. The recent 2006 study, which far outweighs the others in numbers, shows mixed results for different gestational age or birth weight categories. Most of the fetuses in all of these studies were of significantly higher birth weights

Table 1 Relevant quality studies on the effect of delivery mode on survival of severely preterm cephalic fetuses.*

First author	Year	Number	Birth weight	Findings
Wylie	2008	2466	< 1500 g	Negative ^a for all Positive ^b for FGR
Lee	2006	40,116	< 1500 g	Positive for all Positive for FGR
Muhuri	2006	60,364	< 1500 g	Mixed results Positive for 500–749 g Negative for 750–999 g Positive for 1000–1249 g Harmful for 1250–1499 g
Riskin	2004	2955	< 1500 g	Negative
Jonas	1999	5182	500–1500 g	Positive for 500–749 g Negative for 750–999 g Negative for 1000–1249 g Negative for 1250–1499 g Harmful for 750–1499 g
Jonas	1997	2763	500–1500 g	Negative
Malloy	1991	1765	500–1500 g	Negative
Malloy	1989	3095	< 1500 g	Negative
Worthington	1983	214	500–1500 g	Negative

Studies are listed in the reference section beginning with the most recent first.

*All studies are retrospective and all attempt to find independent predictors of outcomes by using regression analysis.

^aNegative designates no independent effect of cesarean delivery on survival.

^bPositive designates an independent effect where cesarean delivery is associated with an improved survival.

FGR=fetal growth restriction.

Table 2 Relevant quality studies on the effect of delivery mode on the occurrence of intracranial hemorrhage (ICH) in severely preterm fetuses.*

First author	Year	Number	Birth weight	Findings
Wylie	2008	2466	< 1500 g	Positive ^a for ICH-OR 0.73 (0.55–0.97)
Riskin	2008	5033	< 1500 g	Negative ^b for ICH-OR 0.98 (0.77–1.24)
Haque	2008	213	< 1250 g	Negative for ICH-VD 47.7% vs. CD 46.8%
Ment	1995	505	600–1250 g	Positive for ICH-RR 0.41 (0.34–0.49)
Malloy	1991	1765	500–1500 g	Positive for ICH-RR 0.71 (0.55–0.90)
Worthington	1983	214	500–1500 g	Negative for IVH-VD 23% vs. CD 15%

Studies are listed in the reference section beginning with the most recent first.

*All studies are retrospective except for one randomized trial (Ment) and all attempt to find independent predictors of outcomes by using regression analysis.

^aPositive designates an independent effect where cesarean delivery is associated with a decreased occurrence of ICH.

^bNegative designates no independent effect of cesarean delivery on the occurrence of ICH.

than those of the extremely preterm gestational ages. This further limits the applicability of the results. These data do not provide enough scientific evidence to support a “blanket” recommendation for cesarean delivery as a method to improve survival for the severely preterm fetus.

An equally important issue is that of decreased morbidity. The most critical short-term morbidity for the extremely preterm fetus/neonate is intracranial hemorrhage (ICH). Table 2 shows the available quality studies evaluating the relationship between delivery mode and ICH for cephalic-presenting fetuses [6, 14, 15, 18, 20, 21]. These results also appear to be mixed. There are several studies that suggest that cesarean delivery is associated with a decreased incidence of ICH in extremely preterm survivors, whereas many others do

not. Even the two most recent and largest studies show mixed results. Most of the fetuses in these studies were of significantly higher birth weights than those of the extremely preterm gestational ages. This further limits the applicability of the results. These data do not provide enough scientific evidence to support a recommendation for cesarean delivery as a method to decrease the incidence of ICH in the extremely preterm fetus. The study by Ment et al. although randomized, did not directly examine the effect of delivery mode on ICH, but examined instead the possible protective effect of indomethacin on the occurrence of ICH. The study by Ment et al. does not provide “gold standard” evidence.

An important circumstance where cesarean delivery might be expected to be of benefit to the extremely preterm fetus is fetal growth restriction (FGR). The available

information on this topic comes from only two recent retrospective studies. These two studies are included in Table 1 [11, 21]. There are not enough data available to support a recommendation for cesarean delivery to improve survival for the extremely preterm fetus with FGR. Until further evidence is available, cesarean delivery in this circumstance should be limited to the occurrence of fetal heart rate abnormalities or other evidence of non-reassuring fetal status.

Although the scientific data show the possibility of a benefit of cesarean delivery on fetal and neonatal morbidity and mortality, it is likely that any possible effect, if present at all, is mild and not reliably reproduced. Until data from randomized trials are available [4] or further retrospective evidence accrues that demonstrates a benefit more clearly and consistently, a policy of cesarean delivery for the extremely premature fetus cannot be supported.

The decision for delivery

The difficulty in evaluating the scientific literature on this topic is compounded by some other issues. One of these is that a decision for cesarean delivery requires that obstetricians make a clinical decision that labor is active and that delivery is imminent. Unfortunately, it is not possible to reliably determine when a patient is truly in labor and delivery is imminent, due to the varying dynamics of preterm labor. Especially with tocolysis, patients can be 6 cm or more dilated – definitively meeting the criteria for “active labor” – and not deliver for days or even weeks. This means that retrospective studies that show that cesarean is of benefit are unable to consider the negative impact of the prospective decision to perform cesarean. Adding a week or more to the intrauterine life of the fetus may be of great benefit. An increase of gestational age at birth increases the chance for survival without handicap approximately by 3% per day in early gestation [2].

Maternal morbidity and mortality

Another issue is the impact of a policy to recommend cesarean delivery for the extremely premature fetus on the health of women worldwide, especially when it is predictable that they will want to have large families. Cesarean delivery, especially at an extremely preterm gestational age, increases the risk of morbidity and mortality to the woman and her future fetuses, and these risks increase with each additional cesarean [1, 3, 5, 9, 10, 19]. These risks are due to placenta previa/accreta, major obstetric hemorrhage, uterine rupture, fetal death, peripartum hysterectomy and maternal death during subsequent pregnancies.

Cost

Although speculative, it is probably true that a policy of recommending cesarean delivery for the very premature fetus would increase health care costs worldwide. This is another factor to consider in the evaluation of such a policy.

Summary

Although there are studies suggesting that delivery of the extremely premature infant by cesarean may be associated with a lower mortality and lower incidence of ICH, the evidence is not strong and conclusive enough to recommend routine cesarean delivery in this population. In addition, the difficulty in determining when delivery is imminent and the possible detrimental effects on maternal and fetal health in future pregnancies strengthen the position that the routine cesarean delivery cannot be recommended in this population.

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