Intrapartum Interventions for Singleton Pregnancies Arising From Assisted Reproductive Technologies

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Abstract

Objective: To assess whether singleton pregnancies conceived by assisted reproductive technology (ART) are associated with an increased use of intrapartum interventions when compared with spontaneous singleton pregnancies.

Methods: In total, 1327 ART pregnancies and 5222 spontaneous pregnancies during the period 2004 to 2008 were extracted from BORN (Better Outcomes Registry & Network) Ontario's information system. The incidences of common intrapartum interventions were compared, and different classification systems for Caesarean section were used to compare the indications for these between singleton pregnancies following ART with or without intracytoplasmic sperm injection and singleton spontaneously conceived pregnancies.

Results: Compared with spontaneous singleton pregnancies, the ART group had increased incidences of internal electronic fetal monitoring (OR 1.60; 95% CI 1.37 to 1.87), artificial rupture of membranes (OR 1.39; 95% CI 1.17 to 1.66), oxytocin augmentation of labour (OR 1.51; 95% CI 1.28 to 1.77), induction of labour (OR 1.31; 95% CI 1.14 to 1.50), and Caesarean section (OR 1.40; 95% CI 1.24 to 1.60).

Conclusion: Singleton pregnancies resulting from ART were associated with more frequent use of several intrapartum interventions, including Caesarean section.

Key Words: Assisted reproductive technologies, intrapartum interventions, singleton pregnancies

Competing Interests: None declared.

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Résumé

Objectif : Déterminer si les grossesses monofœtales attribuables aux techniques de procréation assistée (TPA) sont associées à une hausse du recours à des interventions intrapartum, par comparaison avec les grossesses monofœtales spontanées.

Méthodes : Au total, 1 327 grossesses attribuables aux TPA et 5 222 grossesses spontanées s'étant déroulées au cours de la période 2004-2008 ont été extraites du système informatique BORN (*Better Outcomes Registry & Network* ou, en français, « bons résultats dès la naissance ») de l'Ontario. L'incidence des interventions intrapartum courantes a été comparée et divers systèmes de classification des césariennes ont été utilisés pour en comparer les indications dans le cadre des grossesses monofœtales attribuables aux TPA (avec ou sans injection intracytoplasmique d'un spermatozoïde) et dans le cadre des grossesses monofœtales spontanées.

Résultats : Par comparaison avec le groupe « spontanée », le groupe « TPA » présentait une hausse de l'incidence du monitorage fœtal électronique interne (RC, 1,60; IC à 95 %,

1,37 - 1,87), de la rupture artificielle des membranes (RC, 1,39; IC à 95 %, 1,17 - 1,66), de l'accélération du travail au moyen d'oxytocine (RC, 1,51; IC à 95 %, 1,28 - 1,77), du déclenchement du travail (RC, 1,31; IC à 95 %, 1,14 - 1,50) et de la césarienne (RC, 1,40; IC à 95 %, 1,24 - 1,60).

Conclusion : Les grossesses monofœtales attribuables aux TPA ont été associées à une utilisation plus fréquente de plusieurs interventions intrapartum, dont la césarienne.

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INTRODUCTION

Assisted reproductive technology has been increasingly used for subfertility problems since the first "test-tube" baby was born in 1978.[1] Worldwide, more than five million babies have been born with ART.[1] The safety of ART in terms of its effect on maternal, fetal, and infant outcomes has been examined in a number of recent studies.[2–5] Pregnancies achieved with ART, including singleton pregnancies, appear to have an increased risk of obstetric and perinatal complications,[6] indicating a need for closer surveillance.[7]

However, there is a lack of evidence regarding the effect of intrapartum interventions used in pregnancies achieved with ART compared with those resulting from spontaneous conception. It is important that this issue be explored. Previous studies have estimated the risk of Caesarean section or induction of labour in ART pregnancies, but few have investigated the roles of other potentially confounding intrapartum interventions, such as fetal surveillance, pain relief, or augmentation of labour, owing to insufficient information in their data sets.[6,8,9] Second, although pregnancies achieved with ART are at an increased risk of delivery by Caesarean section,[4,9] previous studies have not been able to determine what some of the factors driving this risk were. It has been suggested that maternal request or physician preference may be contributing to the increased risk, although no data have been available to support this speculation.[5]

The objective of this study was to investigate whether singleton pregnancies resulting from ART are associated with an increased risk of intrapartum interventions because of adverse outcomes when compared with singleton pregnancies conceived spontaneously.

ABBREVIATIONS

ARM	artificial rupture of membranes
ART	assisted reproductive technology
BORN	Better Outcomes Registry & Network
EFM	electronic fetal monitoring

METHODS

Data included in this study were extracted from BORN Ontario's database, a web-based information system with manual data entry and uploads from electronic medical records. The database contained perinatal data on hospital births in Ontario from most hospitals and midwifery practice groups, representing between 85% and 98% of total births in Ontario for the period 2004 to 2008. Prenatal information includes maternal demographic characteristics, maternal health behaviours, pre-existing maternal health conditions, types of assisted reproductive technologies, pregnancy complications, intrapartum complications and interventions, and maternal and neonatal outcomes.

The study included pregnant women who delivered a single live baby with a birth weight of 500g or greater or a gestational age of 20 weeks or greater during the period from March 1, 2004, to December 31, 2008. Excluded were women who had stillbirths (intrauterine fetal death occurring at ≥ 20 weeks) and women with pre-existing maternal health problems (chronic hypertension, type 1 and type 2 diabetes, heart disease, thyroid disease, systemic lupus erythematosus, alcohol dependence syndrome, asthma, HIV, hepatitis B, or psychiatric disorders).

The ART group consisted of singleton pregnancies conceived through ART defined as vitro fertilization with or without intracytoplasmic sperm injection. For each ART case, four singleton pregnancies conceived spontaneously were matched by maternal age (within 2 years), parity (nulliparous and multiparous), and hospital level (small community, large community, or teaching hospital) at delivery and randomly selected. A total of 1327 eligible ART pregnancies and 5222 matched spontaneous pregnancies were identified in the BORN Ontario's database for the study period.

Between ART pregnancies and spontaneous pregnancies, we examined the differences in fetal surveillance during labour and delivery (external EFM, or internal EFM), augmentation of labour (artificial rupture of membranes, or use of oxytocin or prostaglandin, which was recorded only if labour type was spontaneous), pain relief (epidural analgesia), induction of labour, and Caesarean section.

To explore the reasons for the differences in Caesarean section between the two study groups, we used the Robson classification system (Table 1), which classifies women in 10 categories according to parity, course of labour and delivery, gestation, previous record of pregnancy, presence of a uterine scar, and type of pregnancy (single or multiple); these categories are mutually exclusive, totally