Prevalence of Spontaneous Labor Pain Prior to Scheduled Cesarean Section in Pregnant Women with Previous Uterine Surgery

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Abstract

Objectives: To determine the prevalence of spontaneous labor pain prior to a schedule for cesarean section in pregnant women with previous uterine surgery. Maternal and neonatal complications from emergency cesarean deliveries in these women were compared to those in women who had scheduled or elective procedures.

Methods: Medical records of pregnant women with previous cesarean section or other uterine operations who underwent cesarean section at Faculty of Medicine Vajira Hospital between January 2004 and December 2006 were reviewed. Data collection included maternal clinical characteristics, maternal and neonatal complications.

Results: Total of 830 women met inclusion criteria. Of these, 602 women (72.5%) were scheduled for cesarean delivery at or after 39 weeks of gestation (≥39w weeks). Overall, the operations were done in an emergency setting in 43.6% (382/830 women). The rate of emergency operation was significantly higher in women who had a schedule for cesarean section at or after 39w weeks compared to those who were planned at earlier gestational ages of 37w to 38w weeks (21.1% versus 52.2%, p-value <0.001). The rates of postpartum hemorrhage was significantly higher in the emergency group compared to the elective group (8.8% versus 1.5%, p-value < 0.001) Likewise, the emergency group had a significantly higher rate of low apgar score (4.1% versus 0.5%, p-value < 0.001) and tended to have more newborn intensive care unit admission (1.9% versus 0.6%, p-value = 0.113) as compared to the elective group.

Conclusion: Nearly half (43.6%) of women with previous uterine surgery had emergency cesarean section before the schedule. The maternal and neonatal complications were higher in the emergency than the elective groups.

Keywords: emergency cesarean section, previous uterine surgery, spontaneous labor pain

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บทความ

ความขุนของการเข็นครรภ์ก่อนกำหนดคัดคลอดในสตรีตั้งครรภ์ที่เกิดกรณีการแห้งเต้นกลูก

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วาจาธิคูติศาสตร์-เรื่องวิจัย คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

วัตถุประสงค์: เพื่อศึกษาความขุนของการเข็นครรภ์ก่อนกำหนดคัดคลอดในสตรีตั้งครรภ์ที่เกิดกรณีการแห้งเต้นกลูก และเปรียบเทียบภาวะแทรกซ้อนในกรณีที่เกิดกรณีการแห้งเต้นกลูก

วิธีการวิจัย: ทบทวนแนวโน้มความขุนเกิดกรณีการแห้งเต้นกลูก และพิจารณาการคัดคลอดแบบแพทย์-

สาครศาสตร์โรงพยาบาลศรีนครินทรวิโรฒ ปี พ.ศ. 2547 เล่ม ป.ศ. 2548 ทำการเก็บข้อมูลจากคลินิกหลายๆ ของกรุงเทพและจังหวัดทั่วประเทศ

ผลการวิจัย: มีสตรีที่ตั้งครรภ์ 830 รายที่เข็นครรภ์ก่อนกำหนด ในจำนวนนี้ 602 ราย (วัสดุ 72.5) ได้วิเคราะห์ผลคัดคลอดที่มีสุทธิ 39 สิ่งที่เข็นครรภ์ 830 ราย (วัสดุ 82.7) ได้วิเคราะห์ผลคัดคลอดที่มาจากข้อมูลที่เกิดกรณีการแห้งเต้นกลูก ในวัสดุที่เกิด

คัดคลอดที่มีสุทธิ 39 สิ่งที่เข็นครรภ์ 830 ราย (วัสดุ 82.7) ได้วิเคราะห์ผลคัดคลอดที่มาจากข้อมูลที่เกิดกรณีการแห้งเต้นกลูก ระหว่าง 37-38 สิ่งที่เข็นครรภ์ 830 ราย (วัสดุ 81.3) ได้วิเคราะห์ผลคัดคลอดที่มาจากข้อมูลที่เกิดกรณีการแห้งเต้นกลูก


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Introduction

Uterine rupture is one of the most catastrophic events in obstetrical management. Pregnant women with uterine scar from previous cesarean delivery or other uterine operations such as myomectomy are at increased risk of uterine rupture when spontaneous labor pain occurs. Uterine rupture certainly increases rates of maternal and fetal/neonatal morbidity and mortality, and this might be the main reason why vaginal birth after cesarean section has not been widely practiced. To prevent or minimize such unfavorable outcomes, an elective
cesarean section is a preferred mode of delivery in this particular group of women. The American College of Obstetricians and Gynecologists (ACOG) and the National Institute for Clinical Excellence (NICE) in the United Kingdom have established guidelines for timing an elective operation to be at or after 39 weeks of gestation. This is based on the evidence that risk of neonatal respiratory complications would be lower when compared to a cesarean delivery at 37–38 weeks.

In our daily obstetric practice, many pregnant women with previous uterine surgery experience symptoms of spontaneous labor pain or ruptured amniotic membranes, leading to an emergency cesarean section prior to a schedule for cesarean delivery. The emergency procedure is generally associated with an increased risk of maternal and neonatal complications e.g., postpartum hemorrhage (PPH), wound infection, neonatal low Apgar scores, as well as neonatal intensive care unit (NICU) admission. Despite a clinical significance, there has been no available data regarding a prevalence of spontaneous labor pain leading to an emergency operation in pregnant women.

This study was aimed to determine the rate of spontaneous labor pain prior to a schedule for cesarean section, and to compare maternal and neonatal complications between emergency and elective cesarean section. Further aim was to examine the optimal time to schedule a cesarean section in order to minimize maternal and neonatal complications from an emergency operation.

Methods

This study was approved by the Bangkok Metropolitan Administration Ethics Committee for Researches involving Human Subjects. The study population consisted of all pregnant women with previous cesarean section or other uterine operations who underwent cesarean section in our institution between January 2004 and December 2006. Eligible criteria were pregnant women who had correct gestational age by certain last menstrual period and/or by early ultrasonographic confirmation in their first antenatal visits. Exclusion criteria were women who had pregnancy termination before their schedule due to other obstetrical or medical complications such as placenta previa with active bleeding, eclampsia, fetal distress, etc.

Data collection were maternal age, parity, gestational age (GA) at first antenatal booking, number of prior cesarean section, GAs when cesarean section was primarily scheduled and when the operation was performed, maternal, and neonatal complications. Maternal and neonatal adverse outcomes including PPH, wound infection, low Apgar score, and NICU admission between elective and emergency cesarean section groups were compared. Low Apgar score referred to 1-minute Apgar score below 7. PPH was defined as blood loss in excess of one liter after delivery. Wound infection in this study included infected wound and any type of abdominal surgical wound dehiscence.

Statistical analysis was performed with the SPSS software package version 11.5 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were used for baseline clinical data which were summarized as number (percentage) or mean (standard deviation) as appropriate. Chi square test and student t-test were used for comparisons of categorical and continuous data, respectively. p-value < 0.05 was considered statistically significant.

Results

During the study period, 830 pregnant women with previous uterine surgery met all inclusion criteria. Their mean age was 30.5 ± 5.7 years and mean GA at first antenatal visit was 20.5 ± 7.0 weeks. Majority of them, 825 cases (99.4%), had at least one previous cesarean section. Only five women (0.6%) were nulliparous and had uterine scar from previous operative procedures of
myomectomy (n = 4) or IUD displacement inducing uterine perforation (n = 1). Characteristics of these women are shown in Table 1.

Out of 830 women, 593 (71.4%) were scheduled for cesarean delivery at 39 weeks of gestation (39° to 39° weeks) while 228 women (27.5%) had their schedule between 37 and 38 gestational weeks (37° to 38° weeks) and only nine (1.1%) were planned for surgery at 40° weeks or beyond. Overall, 362/830 women (43.6%) underwent emergency cesarean section because of labor pain and/or premature rupture of membranes (PROM) before their schedules. From these 362 women, we classified them into groups according to the GAs when the procedures were primarily scheduled. The numbers and percentages of women who had emergency operation at different GAs of the planned or scheduled cesarean section are shown in Table 2. We found that the rate of emergency operation was significantly higher (p-value < 0.001) in

### Table 1 Characteristics of the study population (n = 830)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 20</td>
<td>25</td>
<td>3.0</td>
</tr>
<tr>
<td>20–34</td>
<td>568</td>
<td>68.4</td>
</tr>
<tr>
<td>≥ 35</td>
<td>237</td>
<td>28.6</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nullipara</td>
<td>5</td>
<td>0.6</td>
</tr>
<tr>
<td>Primipara</td>
<td>710</td>
<td>85.5</td>
</tr>
<tr>
<td>Multipara</td>
<td>115</td>
<td>13.9</td>
</tr>
<tr>
<td>Number of prior cesarean section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>747</td>
<td>90.0</td>
</tr>
<tr>
<td>≥ 2</td>
<td>78</td>
<td>9.4</td>
</tr>
<tr>
<td>Others (prior myomectomy or repair of uterine perforation from IUD)</td>
<td>5</td>
<td>0.6</td>
</tr>
</tbody>
</table>

### Table 2 Numbers of women who had elective and emergency operations at different gestational ages of the planned or scheduled cesarean section (n = 830)

<table>
<thead>
<tr>
<th>Gestational age at planned cesarean delivery (weeks)</th>
<th>Elective operation, n (%)</th>
<th>Emergency operation, n (%)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>37°–37° (n = 21)</td>
<td>16 (76.2)</td>
<td>5 (23.8)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>38°–38° (n = 207)</td>
<td>164 (79.2)</td>
<td>43 (20.8)</td>
<td></td>
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<tr>
<td>39°–39° (n = 593)</td>
<td>286 (48.2)</td>
<td>307 (51.8)</td>
<td></td>
</tr>
<tr>
<td>≥ 40 (n = 9)</td>
<td>2 (22.2)</td>
<td>7 (77.8)</td>
<td></td>
</tr>
<tr>
<td>Total (n = 830)</td>
<td>468 (56.4)</td>
<td>362 (43.6)</td>
<td></td>
</tr>
</tbody>
</table>

* p-value by chi-square test compared between gestational age at planned cesarean delivery of < 39 vs ≥ 39 weeks and settings of cesarean section (elective or emergency surgery)
women who had a schedule for cesarean section at or after 39\textsuperscript{th} weeks compared to those who were planed at earlier GAs (37\textsuperscript{th} to 38\textsuperscript{th} weeks). The rate of emergency operations were 51.8\% at 39 weeks (39\textsuperscript{th} to 39\textsuperscript{th} weeks) and 77.8\% at 40\textsuperscript{th} weeks or later compared to 23.8\% and 20.8\% when cesarean deliveries were planned at GAs of 37 weeks (37\textsuperscript{th} to 37\textsuperscript{th} weeks) or 38 weeks (38\textsuperscript{th} to 38\textsuperscript{th} weeks), respectively.

Maternal and neonatal complications are presented in Table 3 and Table 4, respectively. The rates of PPH
and surgical wound infection were higher in the emergency group compared to the elective group (8.8% versus 1.5%, p-value < 0.001 and 4.1% versus 2.6%, p-value = 0.203, respectively). However, only the differences in PPH rate reached statistical significance. Regarding neonatal complications, the emergency group had a significantly higher rate of low Apgar score (4.1% versus 0.5%, p-value < 0.001) and a trend toward increasing rate of NICU admission (1.9% versus 0.0%, p-value = 0.113) as compared to the elective group.

We also studied whether neonatal complications depended merely on the GA or the setting of operations (i.e., elective versus emergency cesarean section) by comparing the adverse outcomes occurred in the two groups at the same gestational week (Table 4). Among 468 women who had elective procedure on their schedules, 180 women were operated before 39th weeks. We found that only two newborn experienced complications: one with low Apgar score (0.0%) and the other one with NICU admission (0.0%). These were not different from women who had an operation at or beyond 39th weeks (n = 288): one neonate (0.3%) had low Apgar score and two (0.7%) required NICU admission. For emergency cesarean section group, 392 women were operated before 39th weeks. We observed 13 newborns (4.0%) with low Apgar score and seven (2.1%) who required NICU admission. Among 33 newborns whose mothers had emergency operation at 39th weeks or later, two (6.1%) had low Apgar score.

**Discussion**

Over the past decades, the rates of cesarean deliveries in many parts of the world have increased from the advanced technologies in detecting suboptimal conditions of the fetus and more numbers of better trained personnel for the procedures.\(^{20-23}\) This consequently leads to an increased rate of elective cesarean delivery resulting from previous cesarean section.\(^{24}\) Because of the unfavorable condition of iatrogenic respiratory distress syndrome (RDS) if the procedure is performed at earlier GAs than 39 or 40 weeks of gestation (i.e., 37 or 38 weeks),\(^{11}\) the ACOG and the NICE expert committee have recommended that elective cesarean section should be performed at GA of 39 weeks or later to assure the fetal maturity.\(^{45}\)

At this recommended 39 weeks for a scheduled cesarean delivery, a certain number of women might have spontaneous labor pain prior to that and the emergency operation has to be performed. This unexpected operative procedure certainly leads to an increased risk of maternal and fetal/neonatal complications.\(^{12-14}\) Despite of its clinical significance, to our knowledge, no study has reported the prevalence of emergency cesarean section before the schedule in pregnant women with previous uterine surgery. We retrospectively studied the prevalence of emergency cesarean section by reviewing medical records of pregnant women with previous uterine surgery who underwent cesarean section in our hospital during a 3-year period.

Our institution usually follows the guideline of the ACOG that we generally schedule a cesarean section for women, who had prior uterine surgery from cesarean section or gynecologic uterine surgery, at the 39th week. The timing for booking the schedule is usually around 30–36 weeks of gestation when they come for an antenatal care. Although most of these women (71.4%) had been set for repeated surgery at 39th weeks (39th to 39th weeks), 27.5% had their schedules between GA of 37 and 38 weeks (37th to 38th weeks) upon the discretion of physicians according to the social or personal reasons of the women. Nine (1.1%) were even planned for surgery at GA of 40 weeks or beyond (≥ 40th weeks) due to their late follow-up antenatal care (later than 36 weeks of gestation) that the booking is impossible prior to that.

Overall, we observed that nearly half of the women (43.6%) came to the hospital with labor pain and/or
PROM prior to a schedule necessitating emergency caesarean section. We found that if the planned cesarean section was earlier, the rates would be significantly lower; at or less than the 38th week (≤ 38 weeks), 21.1% would have emergency operation and at or more than the 39th week (> 39 weeks), the rate would be 52.2%.

As generally known, any emergency operative procedure would carry greater risk over the scheduled procedure because the patient would be less well-prepared. Moreover, the operative team such as, surgeon, anesthesiologist, or blood bank personnel, would also be not ready.13 This is also found in our study that the maternal and neonatal complications were significantly higher in the emergency than the elective groups. Regarding maternal adverse outcomes, PPH was significantly higher in emergency cases compared to elective cases (8.8% versus 1.5%). Our results were in agreement with the findings of Magann et al 14 who observed a significant increase rate of PPH in non-elective cesarean section compared to elective procedure (6.8% versus 4.8%, p-value = 0.007).

For neonatal complications, the emergency group had a significantly higher rate of low apgar score and a trend toward increasing rate of NICU admission as compared to the elective group. In addition, our results showed that at the same gestational age, the rate of each neonatal complication was lower (although not statistically significant difference) in the elective group than the emergency group. This may reflect that these complications were probably due to the setting of the operations rather than the younger gestational ages of the fetus.

Generally, the optimal time for scheduled cesarean delivery should be balanced between the risk of neonatal complications and a chance of spontaneous labor pain prior to a schedule. Although there was some evidence that birth at younger GA would lead to more neonatal morbidity than that occurring at GA of 39 weeks or later, this was not found in our study. The rates of neonatal complications when performing elective cesarean section at 37 to 38 weeks were not significantly different from that performed at 39 weeks or later. However, since the incidence rates of low apgar score and NICU admission in general uncomplicated cases are very low, the sample population in this study might not have enough power to confirm this finding. On the other hand, we found that the rate of emergency cesarean section from spontaneous labor pain was significantly increased after gestational age of 38 weeks (> 38 weeks). To decrease the rate of emergency cesarean section, we propose that the optimal time to perform cesarean section should be between 38th and 39th weeks. Nevertheless, the aspects of neonatal complications are needed to be confirmed in the future research with larger sample population.

Some limitations of this study were observed. Firstly, due to its retrospective design in nature, only few items of maternal and neonatal complications were investigated. Secondly, there were a number of confounding factors that could affect maternal and neonatal outcomes that were unable to be controlled. Nevertheless, we controlled for some confounders by excluding women who underwent cesarean section from complications. Thirdly, our study included those who had cesarean deliveries due to either previous cesarean section or other uterine operations. The heterogeneity of prior uterine procedures might affect the pregnancy outcomes. Further prospective studies with larger numbers of women undergoing the same type of previous uterine surgery are warranted to verify our results and to explore more adverse outcomes from elective and emergency settings.

In conclusion, this study demonstrated that nearly half (43.6%) of spontaneous labor pain occurred before a schedule for cesarean section, resulting in a higher maternal and neonatal complications. A schedule for cesarean delivery prior to the 39th week might yield more advantages in terms of favorable outcomes in maternal health; however, more confirmations are required to ensure the good neonatal outcomes.
References


