Elective Caesarean Deliveries at Term and Evaluation of the Neonatal Outcomes

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Abstract

Background: Timing of elective caesarean delivery is very important, as elective caesarean deliveries before 39 weeks are associated with adverse neonatal outcomes as increased rates of respiratory complications and neonatal intensive care admission.

Aim of the Study: To evaluate neonatal outcomes of elective repeated cesarean deliveries at term (37, 38 and 39 weeks of gestation) and assess adverse neonatal outcomes in elective deliveries before 39 weeks.

Methods: This study included 162 low risk pregnant patients who were delivered by elective cesarean section at term from February 2012 to January 2013 at the Department of Obstetrics and Gynecology, Kasr El Aini Hospital, Cairo University Hospitals. Adverse neonatal outcome included neonatal death, respiratory complications, hypoglycemia, newborn sepsis, and admission to the neonatal intensive care unit (NICU).

Results: Elective deliveries were 69.7% before 39 weeks, 13.58% at 37 weeks and 56.1% at 38 weeks. At 39 weeks 30.2% of the cases underwent cesarean section. One neonatal death occurred. As compared with deliveries at 39 weeks, deliveries at 37 weeks and at 38 weeks were associated with an increased rate of adverse respiratory outcomes, admission to the neonatal ICU, mechanical ventilation, and hospitalization for days.

Conclusions: Timing of elective Caesarean delivery at term is associated with neonatal outcome. Elective cesarean delivery is discouraged before 39 weeks of gestation in the absence of medical or obstetric indication unless there is evidence of fetal lung maturity.

Key Words: Elective caesarean section — Neonatal outcome.

Introduction

TIMING of elective of cesarean deliveries at term has become an important issue nowadays due to the progressive increase in cesarean delivery rates in recent years all over the world [1,2]. Advanced maternal age (35) at conception, the spread of fetal heart rate monitoring, legal considerations, assisted reproductive techniques and maternal request play an important role in the increased rates of elective repeated cesarean delivery [3,4]. However the most important cause is the increased number of cases with repeated cesarean sections [3].

Elective caesarean deliveries are usually performed at 37 or 38 weeks of gestation [2]. However current studies shows that infants born before 39 weeks of gestation are at increased risk for neonatal adverse respiratory outcomes (respiratory distress, and transient tachypnea of new born) and neonatal admission in nursery, and the risk increases progressively as gestational age at birth declines [5].

On the otherhand, if caesarean section is delayed up to 39 weeks there is increased risk of emergency caesarean section [6,7]. Studies reported that 10% of women go into spontaneous labor between 38 and 39 weeks of gestation, thus planned cesarean deliveries are converted to emergency ones [8]. The incidence of maternal and neonatal complications is significantly higher among women undergoing emergency cesarean delivery than those undergoing elective cesarean delivery [6,7]. There may be an increased risk of complications, such as uterine rupture and infections [5], so timing becomes an important issue to the obstetrician in which a proper decision has to be taken.

The aim of this study is to evaluate neonatal outcomes at different weeks of gestation (37, 38 and 39) in selected low-risk pregnant women and to determine that elective caesarean section deliveries before 39 gestational weeks should not be performed due to increased risk of adverse neonatal outcomes.
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Material and Methods

This is an observational prospective study that included selected 162 low risk pregnant patients with history of one cesarean section at least, who underwent elective cesarean delivery at term, from February 2012 to January 2013 at the Department of Obstetrics and Gynecology, Kasr El Aini Hospital, Cairo University Hospitals. All maternal data including personal, medical and obstetric history were recorded. Gestational age was determined according to the date of the last menstrual period, if the dates were not sure, then gestational age was determined according to the results of the first trimester ultrasound scan. All the patients had elective cesarean deliveries at term (37 weeks of gestation or more) The patient groups were categorized according to the number of completed weeks of gestation (37 +0-6, 38 +0-6 and 39 +0-6 weeks) and compared in terms of demographic data, number of previous cesarean deliveries, and neonatal outcomes with gestational age at delivery.

Neonatal outcomes Adverse neonatal outcomes in the form of neonatal death, respiratory complications (respiratory distress syndrome RDS, transient tachypnea of the newborn), admission to neonatal intensive care unit (NICU), hypoglycemia (plasma glucose level less than of 50mg/dL), neonatal sepsis (proven infections with positive cultures), any neurologic morbidity (convulsions), mechanical ventilation required in first 24 hr or prolonged hospitalization (5 days or longer) were recorded and compared according to different weeks of gestation. Neonatal birth weight was also recorded. The follow-up of neonates continued till discharge from the hospital or till one week after birth for hospitalized cases.

Inclusion criteria:
- Patients with full term (37 weeks of gestation or more), singleton, viable pregnancy.
- History of previous cesarean delivery.
- Sure gestational age of pregnancy.

Exclusion criteria:
- Preterm delivery (before 37 weeks).
- Multiple pregnancies.
- Intrauterine fetal death or growth retardation (birth weight less or equal to 10th percentile).
- Emergency cesarean delivery or fetal distress.
- Patients with bad obstetric history or unsure of their dates.
- Major congenital fetal anomalies.

- Medical disorders:
  - Pre-eclampsia, eclampsia, HELLP, gestational and chronic hypertension.
  - Pre-gestational diabetes mellitus, gestational diabetes.
  - Any cardiac disease as valve replacements, aortic or mitral stenosis, mitral regurgite.
  - Any renal disease as nephropathy, renal transplants.
  - Connective-tissue disorders as antiphospholipid syndrome, systemic lupus.
  - Erythematous or blood abnormalities as thalassemias, thrombocytopenia

- Obstetrics complications:
  - Pre-mature Rupture of membranes or Chorioamnionitis.
  - Placental abruption or placental abnormalities (placenta previa, accreta).
  - Oligohydraminos or polyhydramnios.

Statistical methods:

Descriptive statistics are described in terms of mean, standard deviation, frequencies and percentages. For comparing categorical data, Chi square test was performed. A probability value less than 0.05 (p<0.05) was considered statistically significant. Statistical analysis was performed using SPSS (Statistical Package for the Social Science; SPSS) version 15 for Microsoft Windows.

Results

A total of 162 low risk pregnancies were included in the study period from February 2012 to January 2013 at the Department of Obstetrics and Gynecology, Kasr El Aini Hospital. Patients with multiple gestations or major congenital anomalies, medical disorders, obstetric complications or those requiring immediate delivery were excluded from the study. All 162 patients had elective cesarean delivery at 37 weeks of gestation and before completed 39 weeks of gestation. Deliveries were categorized according to the number of completed weeks of gestation. The percentages of deliveries before 39 weeks were 69.7%, 13.58% (22 cases) at 37 weeks and 56.1% (91 cases) at 38 weeks. At 39 weeks 30.2% (49 cases) underwent caesarian section. Table (1) illustrates maternal characteristics according to the weeks of completed weeks of gestation at cesarean delivery. Fig. (1) shows number of elective cesarean deliveries at 37, 38, and 39 weeks of gestation. In this study the only indication for cesarean delivery was previous cesarean section.
The mean maternal age±standard deviation (SD) in this study was 29.52±4.51 years, the range of age was (from 18 to 44 years). In this study the percentage of pregnant women 35 years was 17.91%, 5.55% <20 years and 76.54% between 20-34 years. (Table 1) shows that the percentage of pregnant women 35 years old increased as gestational age at delivery decreased, 22.7% (5 cases) at 37 weeks, 17.58% (16 cases) at 38 weeks and 16.3% (8 cases) at 39 weeks of gestation. The mean Body mass index (BMI) of the pregnant women in this study was 32.86±4.38. The rate of maternal smoking during pregnancy was 4.3%.

The outcomes for deliveries at 37, 38 and 39 completed weeks of gestation was assessed. The incidence rates of adverse neonatal outcomes were calculated for each completed week of gestation at the time of cesarean delivery, the results are demonstrated in (Table 3).

Table (2) shows the neonatal birth weight (grams) according to completed weeks of gestation at delivery. The percentages of neonates between (2500-3999 g) were 95.5% (21 cases), 90.1% (82 cases) and 89.8% (44 cases) at 37, 38 and 39 weeks respectively. There was no significant relation between neonatal birth weight and weeks of gestation (p=0.518).

Table (2): Neonatal Birth weight (grams) according to completed weeks of gestation at delivery.

<table>
<thead>
<tr>
<th>Weeks of gestation (n)</th>
<th>37+0-6</th>
<th>38+0-6</th>
<th>39+0-6</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth weight (g) (%)</td>
<td></td>
<td></td>
<td></td>
<td>0.518</td>
</tr>
<tr>
<td>&lt;2500</td>
<td>0 (0%)</td>
<td>3 (3.30%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>2500-3999</td>
<td>21 (95.45%)</td>
<td>82 (90.11%)</td>
<td>44 (89.8%)</td>
<td></td>
</tr>
<tr>
<td>4000</td>
<td>1 (4.55%)</td>
<td>6 (6.59%)</td>
<td>5 (10.2%)</td>
<td></td>
</tr>
</tbody>
</table>

The outcomes for deliveries at 37, 38 and 39 completed weeks of gestation was assessed. The incidence rates of adverse neonatal outcomes were calculated for each completed week of gestation at the time of cesarean delivery, the results are demonstrated in (Table 3).

Table (3): Incidence of adverse neonatal outcomes according to completed weeks of gestation at delivery.

<table>
<thead>
<tr>
<th>Weeks of gestation (n)</th>
<th>37+0-6</th>
<th>38+0-6</th>
<th>39+0-6</th>
<th>value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonatal death</td>
<td>0 (0.0%)</td>
<td>1 (1.1%)</td>
<td>0 (0.0%)</td>
<td>0.675</td>
</tr>
<tr>
<td>Admission to the NICU</td>
<td>3 (13.64%)</td>
<td>7 (7.69%)</td>
<td>3 (6.12%)</td>
<td>0.551</td>
</tr>
<tr>
<td>Respiratory complications:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TTN</td>
<td>5 (22.7%)</td>
<td>8 (8.79%)</td>
<td>3 (6.12%)</td>
<td>0.022</td>
</tr>
<tr>
<td>RDS</td>
<td>1 (4.55%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0.136</td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>1 (4.55%)</td>
<td>1 (1.1%)</td>
<td>0 (0.0%)</td>
<td>0.272</td>
</tr>
<tr>
<td>Hospitalization days</td>
<td>1 (4.55%)</td>
<td>1 (1.1%)</td>
<td>1 (2.04%)</td>
<td>0.577</td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td>0 (0.0%)</td>
<td>2 (2.19%)</td>
<td>1 (2.04%)</td>
<td>0.785</td>
</tr>
<tr>
<td>Sepsis</td>
<td>1 (4.5%)</td>
<td>0 (0.0%)</td>
<td>1 (2.04%)</td>
<td>0.185</td>
</tr>
<tr>
<td>Convulsions</td>
<td>1 (4.5%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0.136</td>
</tr>
</tbody>
</table>

In this study there was only one neonatal death at 38 weeks gestation. The rate of the NICU admission was 8.02% in the study. The percentage of NICU admissions was higher at 37 weeks (13.64% (3 cases), and the rate of NICU admission decreased as gestational age at delivery increased. At 38 weeks and 39 weeks, the percentage of NICU admission was 7.69% (7 cases) and 6.12% (3 cases) respectively. However there was no significant relation between weeks of gestation and the rate of NICU admission (p=0.551).

Among the 162 patients in the study 10.5% (17 cases) of the born neonates had respiratory prob-
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Problems which included transient tachypnea of the newborn (TTN) and respiratory distress syndrome (RDS). There was a statistical significance between respiratory complications & weeks of gestation at delivery. It is clear that incidence of neonatal respiratory problems increases as the gestational age at delivery decreased (p<0.05). There was only one case of RDS that was observed at 37 weeks of gestation. The transient tachypnea of the newborn (TTN) rate in the study was 9.8% and the rate increased as the gestational age decreased. At 37 weeks it was 22.7% (5 cases), 8.7% (8 cases) and 6.12% (3 cases) at 38 & 39 weeks respectively. There was a statistical difference between developing TTN and the weeks of gestation at delivery (p<0.05).

![Figure 2](image-url)  
**Fig. (2):** Percentage of NICU and TTN according to weeks of gestation.

Fig. (2) shows the percentage of NICU admissions and TTN, which were found lower at 39 weeks of gestation. As shown also in (Table 3) the percentage of hospitalizations for days was higher at 37 weeks of gestation (4.5%) however it was lower at 38 (1.1%) weeks than 39 weeks of gestation (2.04%). There was not a statistical difference between the weeks of gestation and hospitalization (p=0.557). There were two cases of neonatal sepsis in this study; one case suffered convulsions at 37 weeks, 2 cases of hypoglycemia at 38 weeks, one at 39 weeks. Other causes for NICU admission than respiratory complications included hypoglycemia (p=0.785), need for mechanical ventilation in first 24 hours (p=0.272) convulsions, which all did not demonstrate a statistically significant difference between the weeks of gestation.

**Discussion**

Timing of elective cesarean delivery has been a popular topic recently. Current studies reported states that elective cesarean delivery before 39 weeks of gestation is associated with poor neonatal outcomes as increased risk of respiratory complications as TTN and RDS, neonatal intensive care unit (NICU) admission and longer hospitalization time [1,2,5]. Despite this data, the rates of elective repeated cesarean delivery before 39 weeks of gestation are still very high [1,2,9]. In this study the percentages of deliveries were 13.58% at 37 weeks, 56.1% at 38 weeks and 30.2% at 39 weeks. It is recommended that prelabor elective delivery in the absence of maternal or fetal indication should not be done before 39 weeks unless fetal lung maturity is demonstrated [10].

In this study primary neonatal outcomes were recorded in the form of neonatal birth weight, any neonatal death, respiratory complications (respiratory distress syndrome RDS, transient tachypnea of the newborn) admission to neonatal intensive care unit (NICU), hypoglycemia (defined as a serum or plasma glucose level less than of 50mg/dL), neonatal sepsis (proven infections with positive cultures) or need for mechanical ventilation in first 24 hours.

The rate of the NICU admission was 8.02% in this study. The percentage of NICU admissions was higher at 37 weeks (13.64%), the rate of NICU admission decreased as gestational age at delivery increased. At 38 and 39 weeks, the percentage of NICU admission was 7.69% and 6.12% respectively. However using the Cqui square test (p=0.551) and there was no significant relation between weeks of gestation and the rate of NICU admission. Studies showed that NICU admission rate after elective cesarean delivery were 15.3%, 11.0% and 8.0% for 37, 38 and 39, weeks of gestation respectively [2] which were closer to our results, however in another study the percentages of NICU admissions were higher, for 37, 38 and 39 weeks of gestation were 20.6%, 12% and 9.5% respectively III.

Respiratory complications are a common reason for NICU admission after elective cesarean deliveries [3]. Transient tachypnea of the newborn (most common) and RDS make up 33-50% of the respiratory complications III. In this study 10.5% of the neonates had respiratory problems. Many studies reported that the incidence of neonatal respiratory problems increases as the gestational age at delivery decreased. There was also a statistical significance between respiratory complications & weeks of gestation at delivery in this study (p<0.05). There was only one case of RDS observed at 37 weeks of gestation. The transient tachypnea of the newborn (TTN) rate was 9.8% and the rate in-
creased as the gestational age decreased. At 37 weeks TTN rate was 22.7%, 8.7% and 6.12% at 38, 39 weeks respectively. There was a significant statistical difference between the weeks of gestation and TTN (p<0.05). In similar studies that included only cases of elective cesarean delivery, the rates of TTN reported were 2.12% RI and 3.2% [2] which were lower than our results. Other reasons for the NICU admission included hypoglycemia, mechanical ventilation and convulsions did not demonstrate a statistically significant difference between the weeks of gestation.

In conclusion many cases of elective cesarean deliveries in our country, as in many countries are performed before 39 weeks completed gestation. At 39 weeks of gestation, there was lower adverse neonatal outcomes as compared to 37 and 38 weeks gestation There was lower rates for NICU admission (6.12%), and respiratory complications as TTN (6.12%), no cases of RDS, hospitalizations for days was (2.04%). When comparing the results of deliveries at 39 weeks with outcome of deliveries at 37 weeks of gestation, there is higher risks of NICU admission (13.64%), TTN (22.7%) and hospitalizations for days was higher at 37 weeks of gestation (4.5%). So it appears to be the most appropriate week for elective cesarean delivery not before 39 weeks of gestation.

References


