Comparison of Fetal Outcomes of Emergency and Elective Caesarean Sections in a Teaching Hospital in Kerala

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Abstract

The incidence of primary Caesarean Sections (CS) is on the rise throughout the world. Due to advances in surgical technology, anesthesia techniques and better surgical skills, maternal and neonatal mortality rates have come down in Cesarean Sections; but the morbidity is still high in comparison to vaginal delivery. This study was conducted to compare the fetal outcomes of Elective and Emergency Caesarean Sections.

All patients who underwent Emergency and Elective Caesarean Sections in a teaching hospital in Thiruvananthapuram district of Kerala during a one year period were included in the study. Patients who had definite antenatal complications that would adversely affect neonatal outcome were excluded from the study. There were a total of 89 cases of Emergency Caesarean Sections and 76 cases of Elective Caesarean Sections. Neonatal outcomes were compared between Elective and Emergency Caesarean section babies. Information regarding fetal morbidity was collected by noting history and clinical examination findings. The babies were followed up for 6 weeks postpartum.

Neonatal morbidity was significantly higher in the Emergency Caesarean group than in Elective Caesarean. Hence the decision for Emergency Caesarean section has to be taken judiciously.

Key words: Neonatal Outcome, Emergency Caesarean Section, Elective Caesarean Section, Neonatal Morbidity, Teaching Hospital, Kerala.

Introduction

Incidence of Caesarean deliveries has increased both in developed and developing countries. Though Medical and surgical techniques have advanced, Caesarean delivery is still associated with increased maternal and fetal morbidity. The Social and Medico Legal expectation of a perfect perinatal outcome has influenced obstetric care. Advancing age at pregnancy and artificial reproductive techniques have led to rise in number of so called precious pregnancies and hence the rise in expectations of perinatal outcome. Dramatic advances in neonatal care have lowered the gestational age at which CS can be done for indicated cases. According to WHO, Caesarean rate of more than 15% is not justified. With the increase in Caesarean Section rate, there is also increase in incidence of maternal and neonatal morbidity.

Caesarean Section can be done as an Elective as well as Emergency procedure. The maternal morbidity is definitely high with Emergency Caesarean Section. This study was conducted to assess whether there was significant increase in neonatal morbidity and mortality with Emergency Caesarean Section.

Objectives

To compare fetal outcomes between Elective and Emergency Caesarean Sections in a Tertiary care centre.

Operational Definitions

Elective Caesarean is a term used when the procedure is done at a pre-arranged time during office hours, to ensure the best quality of obstetrics, anesthetic, neonatal and nursing services. The procedure is termed as Emergency Caesarean Section when it is performed due to unforeseen or acute obstetric or fetal emergencies irrespective of the time of the day.

Office hours was defined as working hours of the hospital, that is 8.00 am to 5.00 pm when the staff manning the operation theater, Anaesthesia department, Neonatal intensive care unit, and the Surgeons were at the best of their abilities.

Fetal outcome was studied on the basis of Neonatal complications like still birth, birth asphyxia, transient tachypnea of newborn, respiratory distress syndrome, sepsis, NICU stay > 24 hrs and Neonatal death.

Methodology

This was a Longitudinal Descriptive Study conducted in the Obstetrics and Gynaecology Department of Sree Gokulam Medical College and Research Foundation, Thiruvananthapuram, Kerala, during a period of one year from December 2011 to November 2012. All patients undergoing Caesarean Sections in the hospital were included in the study.

Since the study aimed at comparing fetal outcomes that can be attributed to the type of Caesarean Section chosen, cases with maternal or fetal complications that could have adversely affected the neonatal outcome were excluded from the study. These included gestational age <32 weeks, meconium stained liquor and severe IUGR with estimated baby weight <3rd centile for the gestational age. The major indications of Caesarean Sections that were included in the study were failed induction, fetal distress, CPD and Previous Caesarean Sections. The cases of fetal distress that were included in Emergency Caesarean Section were those patients who had no complications during the antenatal period that could affect the fetus adversely, but during the course of labor went in for fetal distress.

There were a total of 89 Emergency Caesarean Sections which were compared to 76 Elective Sections. Information regarding fetal morbidity was collected by noting history and clinical examination findings. The babies were followed up for a period of 6 weeks. Informed consent from the participants was obtained prior to collection of data.

The outcome variables studied were incidence of Elective and Emergency Caesarean Sections, timing of Caesarean Sections, antenatal complications and neonatal complications including still birth, Birth Asphyxia, Transient Tachypnoea of new born, Respiratory Distress Syndrome, Sepsis, NICU stay > 24hrs and Neonatal death.

The data collected, were coded and fed into MS Excel and analyzed using SPSS v 19 with the assistance of a statistician. Statistics such as mean, standard deviation and percentage were used to describe the data and Chi square test was used to find associations.

Results

During the study period there were a total of 575 deliveries. There were 89 (53.9%) cases of Emergency Caesarean Sections. These were compared to 76 (46.1%) cases of Elective Caesarean Section (Figure 1). The rate of Caesarean Section was 28.7%. The youngest woman included in the study was 18 years old and the oldest was 37 years old.

Of the women who were <20 years of age 1.3% (n=1) had Elective CS and 5.6% (n=5) had Emergency CS. In the above 30 yrs group 28.9% (n=22) had Elective CS and 10.1% (n=9) had Emergency Caesarean Section. The majority of patients were between 20 and 30 years of age among whom 69.7% (n=53) and 84.3% (n=75) had Elective and Emergency Caesarean Sections respectively.

In Elective Caesarean group 1.3% were early preterm, 1.3% were late pre term and the rest (97.4%) were term CS. In the Emergency Caesarean group 1.1% was early pre-term 16.9% late pre-term and the rest (82%) were term (Table 1). Mean period of gestation in which Caesarean Section was done was similar in both groups, i.e. 38 weeks.

All cases of Elective Caesarean Sections were done during the office hours, that is between 8.00 am and 5.00 pm. Among the 89 cases of Emergency Caesarean Section, 49 cases were done during office hours, 23 cases between 5.00 pm and 8.00 pm 11 cases between 8.00 pm and 11.00 pm 4 cases between 11.00 pm and 2.00 am and 2 cases between 2.00 am and 5.00 am.

Occurrence of antenatal complications was found similar in both groups i.e. 48%. There was no significant difference between antenatal complications in both the groups (Table 2).
In the Emergency Caesarean group, incidence of GDM, Gestational Hypertension and Malpresentation was less than that in the Elective Caesarean group.

In the present study, 40.4% of babies delivered by Emergency Caesarean Section developed neonatal complications whereas only 9.2% of babies delivered by Elective Caesarean Section developed neonatal complications (Table 3). This was in spite of the fact that all antenatal complications that might predispose to adverse fetal outcomes were excluded from the study. The difference was statistically significant. The odds ratio 0.15 indicates that there is 85% less risk of neonatal complication among patients who underwent Elective CS than those who had Emergency CS.

Table 3. Neonatal Complications

<table>
<thead>
<tr>
<th>Neonatal Complications</th>
<th>Elective CS</th>
<th>Emergency CS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count (%)</td>
<td>Count (%)</td>
</tr>
<tr>
<td>Yes</td>
<td>7(9.2)</td>
<td>38(40.4)</td>
</tr>
<tr>
<td>No</td>
<td>69(90.8)</td>
<td>56(59.6)</td>
</tr>
</tbody>
</table>

Chi-square value - 21.04, p = 0.001
Odds ratio 0.15 (95%) confidence interval 0.06-0.38

When we study the time of Caesarean Section and development of complications, it is seen that the fetal complications were much higher when the cases were done after the office hours. The further away from office hours the section was performed, the greater the proportion of fetal complications (Figure 2).

Figure 2. Distribution of cases according to time and neonatal complications

The neonatal complications were Birth Asphyxia, TTN, RDS, and Sepsis. Birth asphyxia was seen in 2.1% newborns after Emergency Caesarean Section whereas it was 1.3% after Elective Caesarean Section. Difference was not statistically significant (p=0.689). TTN was seen in 12.8% after Emergency Caesarean Section as compared to 3.9% after Elective Caesarean Section. Difference was significant (p=0.004).

RDS was seen in 7.4% after Emergency Caesarean Section as compared to 0% after Elective Caesarean Section. Difference was significant (p=0.015). Sepsis was seen in 23.4% after Emergency Caesarean Section as compared to 3.9% after Elective Caesarean Section. Difference was significant (p=0.001). There were no cases of still birth (Table 4).

Table 4. Details of Neonatal Complications

<table>
<thead>
<tr>
<th>Neonatal complications</th>
<th>Elective CS</th>
<th>Emergency CS</th>
<th>( \chi^2 )</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
</tr>
<tr>
<td>Still birth Yes</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Birth Asphyxia Yes</td>
<td>1</td>
<td>1.3</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>TTN Yes</td>
<td>3</td>
<td>3.9</td>
<td>12</td>
<td>12.8</td>
</tr>
<tr>
<td>RDS Yes</td>
<td>0</td>
<td>0.0</td>
<td>7</td>
<td>7.4</td>
</tr>
<tr>
<td>Sepsis Yes</td>
<td>3</td>
<td>3.9</td>
<td>22</td>
<td>23.4</td>
</tr>
</tbody>
</table>

Table 5. NICU stay more than 24 hrs

<table>
<thead>
<tr>
<th>NICU stay &gt;24Hr</th>
<th>Elective CS Count (Percent)</th>
<th>Emergency CS Count (Percent)</th>
<th>( \chi^2 )</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>8(10.5)</td>
<td>37(39.4)</td>
<td>17.95**</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Discussion

Caesarean sections have been long practiced as a lifesaving procedure for the mother and fetus. Though it is classified as a major procedure, the incidence of Caesarean Section has risen considerably over the years. The situation now is that Caesarean Section is adopted for even trivial cases. Though advances in the field have reduced maternal mortality considerably, the problem of maternal and fetal morbidity after Caesarean Section still persists. The present study was on neonatal morbidities following Caesarean Section, with particular emphasis on a comparison between Elective and Emergency Caesarean Sections and the timing of the procedure.

Premature labor, maternal medical illnesses, repeated vaginal examination and PROM all contribute to increase in neonatal morbidity. A common cause of neonatal morbidity and mortality is Respiratory Distress Syndrome, which is a function of gestational age. Inappropriately timed Caesarean delivery (Elective / Emergency) has been known to result in this complication. According to a study by Morrison J. J, et al, a significant reduction in neonatal respiratory morbidity can be obtained if Elective Caesarean Section was performed in the week 39+0 to 39+6 of pregnancy. In another study by Roth-Kleiner M, et al, it was found that severity of respiratory distress was high for babies born after Elective Caesarean Section as compared to Emergency Cae-
sarean Section, probably because of the changes occurring to the fetal lungs when the mother gets into labor. The findings do not correlate with the present study though.

Transient tachypnea of the newborn may also follow Caesarean Section, although debate exists as to whether operative delivery contributes to the genesis of this disease. Elective repeat Caesarean Section has been implicated on the development of pulmonary hypertension of the newborn. When anesthesia is given it may affect the neonate directly or indirectly. The Caesarean Section may be done under general anesthesia or regional anesthesia. The fetal and neonatal morbidity due to regional anesthesia may be because of the maternal hypotension and large doses of local anesthetic agents.

If anesthetic drugs are used in adequate doses the complications encountered are minimum and alterations in neuro-behavioral scores are subtle and transient. Under normal circumstances there is not much difference in fetal and neonatal well-being after Caesarean Section, both with general anesthesia or regional block.

Subtle and inconsistent neurobehavioral residua may be present for a short period of time following general anesthesia. In a patient when we anticipate neonatal complications namely intra uterine growth restriction, the neonates may definitely benefit from regional block rather than general anesthesia.

Factors that would influence the outcomes of these babies would be duration of fetal distress, leaking membranes, asphyxia and prematurity. A study by Roberta De Luca compared the newborns delivered by Elective and Emergency Caesarean Sections. It was seen that neonates of Elective Caesarean had lesser morbidity compared to those of Emergency Caesarean Section in terms of admission to neonatal facility but mortality and respiratory morbidity were similar in both groups.

In this study the rate of Caesarean Section was 28.7%. This Caesarean Section rate is comparable to the U.S rate of 32.8% in 2010. It is also comparable to the Caesarean Section rate in tertiary hospitals in Raipur, India (26.2%).

In the present study, 40.4% of babies delivered by Emergency Caesarean Section developed neonatal complications in comparison to 9.2% of babies delivered by Elective Caesarean Section. The difference was statistically significant (p<0.001). This was in spite of the fact that all antenatal complications that might predispose to adverse fetal outcomes were excluded from the study. It was also seen that the neonatal complications were higher in patients undergoing Caesarean Section after the office hours.

The neonatal complications were birth asphyxia, TTN, RDS, Sepsis and Neonatal Jaundice. Birth asphyxia was more with Emergency Caesarean Section than with Elective Caesarean Section (2.1% vs 1.3%). A similar result had been seen in the study by Elvedi-Gasparović V, et al.

### Conclusion

Neonatal morbidity was significantly higher in the Emergency Caesarean group than in Elective Caesarean. The neonatal morbidity was found to be higher when the cases were done after office hours. Emergency Caesarean Sections are unavoidable. The selection of patients for Emergency CS should be in such a way that the benefits should far outweigh the morbidity associated with the procedure. The decision for Emergency Caesarean Section has to be taken judiciously. If during the progress of labor one anticipates Caesarean Section, it is advisable to take decision regarding the Emergency Caesarean Sections during office hours and day time to help bring down neonatal morbidity. Factors that contribute to the indications for Emergency Caesarean Section like failed induction, fetal distress, CPD, repeat Caesarean Section and cervical dystocia have to be evaluated independently in a further study to assess the contribution of each factor to the neonatal morbidity and how best these can be avoided.

### End Note

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**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CS</td>
<td>Caesarean Section</td>
</tr>
<tr>
<td>NICU</td>
<td>Neonatal Intensive Care Unit</td>
</tr>
<tr>
<td>TTN</td>
<td>Transient Tachypnea of New born</td>
</tr>
<tr>
<td>RDS</td>
<td>Respiratory Distress Syndrome</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
</tr>
<tr>
<td>GDM</td>
<td>Gestational Diabetes Mellitus</td>
</tr>
<tr>
<td>IUGR</td>
<td>Intra Uterine Growth Restriction</td>
</tr>
<tr>
<td>CPD</td>
<td>Cephalo Pelvic Disproportion</td>
</tr>
</tbody>
</table>

**Competing Interests:** None declared

### References

2. Rising rate of CS A year review [Internet]. [cited 2013 Dec 18]. Available from: http://nepjol.info/index.php/JoNMC/article/down-


