Original Article

Rising rate of Emergency Caesarean sections in low risk pregnancies

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ABSTRACT

Background: Worldwide, there has been an upward trend in the number of caesarean sections performed, electively or as an emergency. According to Australian Institute of Health and Welfare, the caesarean section rates have gone up nationally from 23.3% in 2000 to 31.55% in 2010. Aim: The main aim of the study was to determine the emergency caesarean section (ECS) rates in low risk pregnancies and to identify the common indications, obstetric risk factors and maternal and foetal outcomes associated with ECS. Methods: This was a retrospective study, with data obtained from the medical records of women who delivered in a 193 bed, Swan District Hospital, peripheral hospital in Perth which provides obstetric and neonatal care to low risk mothers, over a period of six months (between March 2013-August 2013). The data obtained was further used to identify obstetric risk factors that could have influenced the decisions for ECS. Besides ECS rates, outcomes variables included were maternal postpartum haemorrhage and APGAR scores after 1 and 5 minutes. Results and Conclusions: During the study period of the 713 women who delivered, 109 underwent ECS. The most common indication for ECS was failure to progress, (n=47, 43%). Primigravidas, induced labour and Gestational age were risk factors associated with ECS. Identifying the risk factors associated with ECS will aid in counselling the women prenatally and antenatally. Risk factors amenable to lifestyle changes can be addressed prenatally thereby aiding the clinician in reducing the overall caesarean section rates.

1. Introduction

There has been an upward trend in number of caesarean sections performed worldwide, with large variations in developed and developing countries (1,2). Though WHO had initially recommended a caesarean rate no greater than 10-15%, it has withdrawn its recommendation. The official statement from WHO is that there is no empirical evidence to suggest an optimum caesarean section rate(26). According to the Australian Institute of Health and Welfare, the caesarean section rate in Australia has gone up from 23.3% in 2000 to 31.55% in 2010. Irrespective of the variations in the rates of caesarean section, it is imperative to identify the reasons for the rising caesarean rate.

The rising caesarean rate is a cause of concern, especially among women who are deemed to have a low risk pregnancy. Women who have a low risk pregnancy have expectations to have a vaginal delivery and when they end up with an emergency caesarean section, it has implications for the mother’s physical and mental health besides neonatal considerations (3,4). Complications like post partum haemorrhage, infections, difficulty in post partum recovery and breast feeding are higher in women undergoing caesarean section as compared to vaginal birth(5).

Over the years, depending upon the obstetric practice, the indications for caesareans have varied but the most common indications for doing emergency caesareans are failure to progress, foetal distress and previous caesarean(6).

In our study, our aim was to determine the emergency caesarean section rates in low risk pregnancies and to identify the common indications, risk factors, maternal and foetal outcomes associated with emergency caesarean section (ECS). Factors such as Body Mass Index, Maternal age, Induced Labour, Birth weight of baby, Gestational age were looked at, to determine obstetric risk factors.
By identifying the risk factors and common association with ECS, recommendations could be made to reduce the overall caesarean section rate.

**MATERIAL AND METHODS**

This was a retrospective descriptive study with data obtained from the medical records of women who delivered in a Swan District Hospital in the metro region of Perth, over a period of six months (between March 2013 – August 2013). The hospital provides midwifery, obstetric and neonatal care to mothers who are deemed to have a low risk pregnancy.

Inclusion criteria used: Singleton pregnancy, Term pregnancy. Exclusion criteria: Premature delivery, Multiple pregnancy, Severe Pre eclampsia, Gestational Diabetes Mellitus requiring insulin, Mothers with known pre existing medical condition.

A total of 169 caesarean sections were carried out at the hospital in the six month time period. Of these seven patients were excluded from the analysis due to prematurity.

The four grade classification was used to classify the urgency of caesarean sections (RANZCOG. Decision to delivery interval for Caesarean section. College Statement Jul 2009; C-Obs 14):

- Category 1: Immediate threat to the life of the woman or foetus.
- Category 2: Potential or actual maternal or foetal compromise but not immediately life-threatening.
- Category 3: No maternal or foetal compromise but needs early delivery.
- Category 4: Elective. Delivery timed to suit the woman and the caesarean birth team

The three main indications for caesarean section were: (1) Failure to progress, (2) Foetal distress, (3) Others: Booked caesareans in labour, obstructed labour.

Failure to progress included failed induction where the patient did not progress from the latent to active phase of labour, malposition like persistent occipito posterior and labour dystocia. Labour dystocia was defined as no or little progress (2cm or less) in cervical dilatation >= 4 hours, despite adequate uterine contractions in the first stage of labour or no descent for 2 hours or 3 hours if epidural analgesia is used, in second stage of labour. It is usual practise in the hospital for oxytocin augmentation in cases of suspicion of labour dystocia. Foetal distress was determined on basis of abnormal cardiotocography.

The data obtained was further used to investigate obstetric risk factors: Body Mass Index, Maternal age, Induced Labour, Birth weight of baby, and Gestational age that could have influenced the decisions and complications arising from emergency caesarean section.

Besides emergency caesarean section rates, we also looked at complications of maternal postpartum haemorrhage and neonatal outcomes in terms of APGAR scores after 1 and 5 minutes.

**Ethics Approval**

The study was approved by the local hospital ethics committee. All the data would be deidentified for analysis and presentation.

**Statistical Methods**

Summary statistics are provided for demographics and measured characteristics of individuals. For continuous variables, means and standard deviations are given. For categorical variables, frequencies are presented.

To examine the relationship between the 4 grade classification and continuous outcomes, Maternal age, Gestational age, Body Mass Index (BMI), Birth weight, VBG (Umbilical Venous blood gas) and ABG (Umbilical arterial blood gas), ANOVA was used. Chi-squared tests and Fishers exact tests were used to examine the relationship between the 4 grade classification and the categorical outcomes of pregnancy number, maternal complications, whether the patient was induced, and whether or not the APGARS had increased from 1 minute to 5 minutes.

All data was analysed using the R environment for statistical computing.

**Results**

Of the 162 caesarean sections performed, 16.7% were Cat 1, 34% were Cat 2, 16.7% were Cat 3 and the elective caesareans i.e Cat 4 were 33%. The median maternal age of patients was 29 with minimum 16 and maximum 42 (IQR=9). The mean BMI of all patients was 26.9 (SD=4.64) and the mean birth weight was 3467g (SD=494). The gestational age ranged from 37 to 42.5 weeks with median of 39.2 weeks.

Table 1 and Figure 1 shows the breakdown of the continuous variables by the 4 grade classification. Using analysis of variance techniques no differences in the mean responses between the categories was observed for VBG, ABG, Maternal Age, BMI and Birth weight. Gestational age showed a significant difference in the means of each of the 4 categories (P=0.0311). Upon further examination of these differences it is noted that category 4 provided statistically lower gestational age than categories 1 and 2 (P=0.0075 and P=0.0354 respectively).

Table 1 also describes frequencies of all categorical variables by the 4 grade classification. A significant difference in the proportions of maternal complications was observed (P=0.0302) with a much lower percent complications in category 1 (7.41%) compared to categories 2, 3, and 4 with 36.4%, 29.6% and 37.7% respectively. Among patients having emergency caesareans, 11% of category 1, 44% of category 2 and 7% of category 3 patients were...
induced. A relationship between pregnancy number and category was also observed (P<0.001) with 56% of category 1, 62% of category 2 and 41% of category 3 being primigravida compared to only 11% of category 4 primigravida. Upon examination of APGARS at 1 minute for categories 2, 3, 4 the vast majority of the response are at 9, however for category 1 there was a substantial number of patients providing response 8. At 5 minutes, most patients were at a 9 or 10 for all 4 categories. We modelled the increase in APGARS as a binary response and noted a significant difference between the proportions increasing from 1 to 5 minutes (P=0.022) with 52% of category 1 patients increasing from 1 minute to 5 minutes whilst the corresponding numbers for categories 2-4 are 33%, 26%, 19% respectively.

Of 109 patients, 47 had an emergency caesarean section for failure to progress and 10 patients for foetal distress, the remainder of patients had caesareans for other reasons.

Table - 1

Rising rate of Emergency Caesarean sections in low risk pregnancies

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1: Immediate threat to the life of the woman or foetus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2: Potential or actual maternal or foetal compromise but not immediately life-threatening</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3: No maternal or foetal compromise but needs early delivery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4: Elective. Delivery timed to suit the woman and the caesarean birth team</td>
<td></td>
</tr>
<tr>
<td>Maternal Age</td>
<td>(N=27)</td>
<td>(N=55)</td>
</tr>
<tr>
<td>BMI</td>
<td>27.96 (6.44)</td>
<td>28.35 (5.87)</td>
</tr>
<tr>
<td>Birth weight</td>
<td>3280 (528)</td>
<td>3482 (585)</td>
</tr>
<tr>
<td>Gestational Age</td>
<td>39.80 (1.22)</td>
<td>39.53 (1.32)</td>
</tr>
<tr>
<td>APGARS at 1 min</td>
<td>8.33 (1.18)</td>
<td>8.46 (1.23)</td>
</tr>
<tr>
<td>APGARS at 5 mins</td>
<td>9.07 (0.47)</td>
<td>9.02 (0.53)</td>
</tr>
<tr>
<td>Maternal Complication*</td>
<td>Yes</td>
<td>2 (7.41)</td>
</tr>
<tr>
<td>Induced*</td>
<td>Yes</td>
<td>3 (11.11)</td>
</tr>
<tr>
<td>Pregnancy Number*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primigravida</td>
<td>15 (55.56)</td>
<td>34 (61.82)</td>
</tr>
<tr>
<td>APGARS Change* [Increase]</td>
<td>14 (51.85)</td>
<td>18 (32.73)</td>
</tr>
</tbody>
</table>

Mean (SD) for continuous variables or N(%) for categorical variables*

*ANOVA p-value for continuous variables and chi-squared/fisher exact p-value for categorical variables.
Rising rate of Emergency Caesarean sections in low risk pregnancies Figure 1:

Discussion:

The study showed of 162 caesarean sections, the non elective /emergency caesarean sections were done for 109 patients. Primigravidas accounted for 55% of emergency caesarean sections with failure to progress as the most common indication which is consistent with other studies (7-9).

The study did not find an association between increased incidence of caesareans and maternal age, body mass index or foetal birth weight. However there was an association seen with gestational age and emergency caesarean section. Induction of labour was another common association with patients who ended up with caesarean section (10, 11-13).

There are a number of factors that have contributed to the rising caesarean section rate. Iatrogenic factors like the use of Epidural analgesia (14, 15) and the medical staff’s obstetric practice are certain factors which are difficult to modify (16,17).

Currently, there is no standard definition for failure to progress and there are no clear guidelines for management of labour dystocia, use of scalp ph for identifying foetal distress are some interventions that could help in reducing the overall caesarean section rates(2). Caesarean section whether emergency or elective are known to have economic implications (19) but the effect of emergency caesarean on other resources, especially the staff also need to be considered, especially when most of the peripheral hospitals are facing a shortage of trained personnel. This resource crunch is most obvious whenever there is an emergency caesarean and the birth suite is full(27).

Avoiding unnecessary inductions of labour, clear guidelines for management of labour dystocia, use of scalp ph for identifying foetal distress are some interventions that could help in reducing the overall caesarean section rates(2). Caesarean section whether emergency or elective are known to have economic implications (19) but the effect of emergency caesarean on other resources, especially the staff also need to be considered, especially when most of the peripheral hospitals are facing a shortage of trained personnel. This resource crunch is most obvious whenever there is an emergency caesarean and the birth suite is full(27).

Conclusion

The causes for the increase in caesarean section rates are multi factorial and it would be extremely difficult to come to a consensus regarding the ideal rate.

It is imperative that irrespective of whether the woman has an emergency or an elective caesarean section, she is adequately counselled and fully informed of the reasons and the implications of her caesarean. The term 'Emergency' is by itself quite frightening and to be associated with child birth especially for women with low risk pregnancy is traumatic not just for the women concerned but also for personnel involved in the birth. It is known to have potential long term effects on her mental health (20).

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4011


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