Maternal and Fetal Complications of Cesarean Deliveries

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Abstract: The objectives of this study were to document and compare complication rates of vaginal delivery with that elective and emergency cesarean delivery (cesarean section / or CS). A prospective study was performed base on 1745 pregnant women with live fetus, and delivered between November 15, 2001 through November 15, 2003 in Haji Adam Malik Hospital and Dr. Pirngadi Hospital Medan in Indonesia. Of those 1013 women delivered vaginally, 283 women with elective CS, and 449 women with emergency CS, whose follow – up to the 5th – 7th day were possible, data were recorded use the same standardize research protocol. The protocol has been developed by senior staff of the Epidemiology Unit, Prince of Songkla University, Hat-Yai, Thailand, also by the expert appointed by World Heath Organization (WHO). Maternal mortality rate of respective three modes of delivery were 6.9; 0.0 and 15.6 deaths per 1000 women. The statistically it’s significant highest in emergency CS group. Other maternal complications e.g. major wound complication, (i.e. bladder injury, abdominal wound dehiscence, peritonitis) and hemorrhage needing blood transfusion, follow the same pattern is lowest in vaginal delivery and highest in emergency CS group, except for hemorrhage needing hysterectomy. Only complication which is the highest in vaginal delivery is major secondary operation (i.e. manual removal of placenta, evacuation of uterine content, and suture perineal wound dehiscence).

Early neonatal mortality (deaths) rate was however highest in the emergency CS group and the difference is not statistically significant compare to vaginal delivery and elective CS group. But, the rates of moderate and severe birth asphyxia were statistically significant low among elective CS and vaginal delivery group compare to emergency CS group. CS of both types increase maternal complication, moderate and severe birth asphyxia, so unnecessary CS should therefore be avoided.

Keywords: mode of delivery, maternal complications, early neonatal complications

INTRODUCTION

Maternal mortality in developing countries it’s one of the most important reproductive health problems. CS facilities are an essential health service to increase safe motherhood. The procedure is the most important way to save the woman and the fetus with complications of labors including dystocia, placenta previa and fetal distress. The association CS and maternal mortality in developing countries is often
confounded by indication, prognostic factors and preceding complications of pregnancy. The cases had higher odds for several kinds of complications of pregnancy including anemia, oedema, eclampsia, and prolonged labor. In addition to emergency conditions, the equipment, facilities and skill of the operators may be inadequate in many places thus leading to high case fatality.

This study is as a part of multicenter involving 10 Asian countries, and all center shared the same standardize research protocol, which has been developed by chief and senior staff of the Epidemiology Unit, Prince of Songkla University, Faculty of medicine, Hat-Yai, Thailand, and the expert appointed by WHO.

The study objective was to document and compare the complication rates of vaginal delivery with those of elective and emergency CS, in the Haji Adam Malik Hospital and Dr. Pirngadi Hospital Medan Indonesia.

MATERIALS AND METHODS

The design was prospective study collecting data from pregnant women with live fetus and their new born infants who were delivered at and residing in proximity to the Haji Adam Malik Hospital and Dr. Pirngadi Hospital Medan, Indonesia. This database were collected at delivery 2nd and 5th days post partum. The same standardize research protocol has been developed by chief and senior staff of the Epidemiology Unit, Prince of Songkla University, Faculty of Medicine, Hat-Yai Thailand, and the expert appointed by WHO, and was approved by institute review board of each hospital, as well as WHO scientific and ethical review committee, as well as the institute review board of study center. The study was conducted during November 15, 2001 through November 15, 2003.

Consecutive eligible delivery cases were identified at the labor rooms and post-partum ward by midwife staff and invited to participate in the study. In cases of elective (planned) CS, admission to the study and informed consent was obtained prior to delivery as soon as reasonable after delivery. In cases of emergency CS, admission to the study and informed consent was obtained as soon as reasonable after delivery. In subjects with vaginal delivery, informed consent was obtained and admission to the study performed as soon as reasonable after delivery.

Case eligibility was confirmed by the principal investigator who also reviewed potential cases on the daily basis. For surveillance of complications, clinical check list on discharge from hospital was used. By this system, all complications of delivery within 48 hours were detected at the hospital. Using a similar check list, all CS patients and sample of patients with vaginal deliveries were followed – up at hospital or at home within 5 – 7 days. A surveillance system was also set up to identify patients who return to the hospital for any reason during six weeks postpartum.

Data coding, monitoring and verification were carried out by investigator as soon as the form arrives from the interviewers. Computerization of data was carried out using a specific data entry program compiled from Epi-Info Version 6.04. The data were transferred and analyzed using R statistical package. Fisher’s exact test where appropriate were used to test statistically significant difference of rates among groups of deliveries. A P value < 0.005 was considered statistically significant.

RESULTS

Between November 15, 2001 and November 15, 2003, there were records of 1745 women recruited in Haji Adam Malik Hospital and Dr. Pirngadi Hospital Medan Indonesia. These gave births 1728 singletons, 15 twins and, 2 women delivered of first twins out side hospital and second twins in hospital. The distribution of mode of delivery was 1013 women with vaginal deliveries, 283 women with elective CS and 449 emergency CS.

Table 1.
Maternal complication by mode of delivery

<table>
<thead>
<tr>
<th>Type of Maternal complication</th>
<th>Mode of delivery</th>
<th>Fisher’s exact test p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mayor wound complications or mayor secondary operation per 100 women</td>
<td>Vagina n=3013 women</td>
<td>Elective CS n=283 women</td>
</tr>
<tr>
<td>Hemorrhage needing blood transfusion per 100 women</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td>7.8</td>
</tr>
</tbody>
</table>
Hemorrhage needing hysterectomy per 100 women 0.3 0.4 0.9 0.315
Maternal deaths per 1000 women 6.9 0.0 15.6 0.001

Table 2. Early neonatal complication by mode of delivery

<table>
<thead>
<tr>
<th>Type of Early Neonatal Complication</th>
<th>Mode of delivery</th>
<th>Fisher's exact test p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vagina n₁=1005 live births</td>
<td>Elective CS n₂=285 live births</td>
</tr>
<tr>
<td>Moderate and severe early neonatal asphyxia per 100 live birth</td>
<td>1.3 1.0</td>
<td>8.7</td>
</tr>
<tr>
<td>Early neonatal deaths 1000 live birth</td>
<td>8.9 7.0</td>
<td>26.8</td>
</tr>
</tbody>
</table>

Shown in Table 1, a consistent ascending order of complications of delivery from vaginal delivery to elective CS and highest at emergency CS; and the difference is statistically significant, except for hemorrhage needing hysterectomy. These complications include major wound complication (i.e. bladder injury, abdominal wound dehiscence, peritonitis), and hemorrhage needing blood transfusion, maternal deaths, except for hemorrhage needing hysterectomy. The only complication which is the highest in vaginal delivery is major secondary operations (i.e. manual removal of placenta, evacuation of uterine content, and suture perineal wound dehiscence).

There were 14 maternal deaths out of 1745 women delivered; emergency CS group had the highest mortality rate (15.6 per 1000 women). This value is statistically significant higher than the rates among vaginal group and elective CS group (6.9 and 0.0 per 1000 women, respectively), and the difference between the two latter rates also is statistically significant.

Eclampsia and other pregnancy induced hypertensive condition were the most common contributing to seven of these 14 maternal deaths. This is high compare to other classic causes of maternal deaths i.e. four maternal deaths from postpartum hemorrhage, two maternal deaths from serious infection recorded as puerperal sepsis post emergency CS, and one due to coma hepaticum postpartum.

Altogether there were 1738 live born infants and 23 still births. Complication rates in the fetal side were somewhat different from maternal complications. Elective CS group has lowest early neonatal mortality rate, but not statistically significant compare than those in the vaginal delivery and emergency CS group.

**DISCUSSION**

This study confirms that in two hospitals the rate of various maternal complications generally ascending from vaginal delivery to elective and emergency CS. The findings of lowest rate of maternal complications from vaginal delivery were also reported from previous other studies.

From this study mayor complications on the maternal side are more serious in CS deliveries than in vaginal deliveries.

Among maternal complications, eclampsia, pregnancy induced hypertension and related disease, are the most common cause of death, than hemorrhage and infection. These figures have to be interpreted with caution due to that fact that the study is conducted in tertiary hospital. The pattern in each hospital can’t represent that of the whole region. Pregnancy induced hypertension which can lead to eclampsia and death are chronic obstetric condition that are in more easily detected. The advancement in obstetric facilities may have more benefit effect on case fatality of the classic obstetric complication triad (obstructions or dystocia, hemorrhage, and infections) than eclampsia. With any of these explanations, the study suggests that more research and development in obstetrics should be given to reduce this highest cause of obstetric death.

The relationship between mode of delivery and the outcomes however should be interpreted with caution. Selection of the mode was not randomly assigned by mainly by indication. Emergency cesarean delivery is generally considered as a life saving obstetric procedure. Patients who had indications for this procedure would have already been in worse conditions compared to elective cesarean and vaginal delivery, this prone to higher complications rate.
Hall and Bewley\(^7\), showed that where as emergency CS was associated with and almost ninefold risk of maternal death relative to that of vaginal delivery, even elective CS was associated an almost threefold risk. Harper and coauthor\(^8\), reported that CS was associated with an almost fourfold risk of maternal death, even after controlling for pregnancy complication.

Elective cesarean delivery is usually performed under a controlled condition. Although indications for elective cesarean delivery may predispose the patients to subsequent complications, with better prepared conditions, the level of predisposition would be lower than the emergency condition.

The findings on the fetal aspect were different from the maternal side, statistically significant low fetal complications rates for moderate and severe birth asphyxia was observed in elective cesarean delivery group.

Elective cesarean delivery group poses lowest risk for early neonatal mortality, but not statistically significant different compared to vaginal and emergency cesarean delivery group. These outcomes are combine results of selection of cases of elective cesarean delivery and the newborn care. On one hand, the procedure of elective cesarean delivery is carried out under proper planning and preparation while the fetus is still in good condition. These may lead to less chance of asphyxia.

In conclusion, our data suggest that elective cesarean delivery carried out under these hospitals does not pose special serious risk to the offspring. Matthew and coauthor\(^9\), have reported a consistent association between increasing cesarean delivery rates and falling perinatal death rates.

Increased risk for mayor wound complications and the need for blood transfusion are all related to surgery. Although vaginal delivery is associated with mayor secondary operation, e.g. due to retention of placenta, perineal wound dehiscence, the surgical risk of cesarean delivery out-weight this less serious risk.

**CONCLUSION**

Our data suggest that various procedures in cesarean delivery did exert statistically significant additional risk to the women. Cesarean deliveries can increase maternal complication, it should be as signed the patients with high precautions. Elective cesarean deliveries, when properly chosen, can reduce maternal complications from emergency cesarean deliveries and safe the fetal health from complications.

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**REFERENCES**

