Need for blood transfusion during cesarean section in rivers state university teaching hospital


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Abstract

Background: Cesarean Section (CS) has been associated with major intra operative Blood loss. Obstetric hemorrhage has been identified as a major cause of direct maternal mortality, maternal near miss and Maternal morbidity. Blood transfusion is often associated with CS. With the advent of various medical and surgical techniques to prevent excessive blood loss during CS, the need for blood transfusion has been reduced. However, the need for blood transfusion remains a lifesaving intervention despite the attendant risks.

Method: This was a retrospective cross sectional study of 1000 patients who had Cesarean section between January 2020 to December 2021. Fifty (500) of them were cases associated with high risk factors for massive hemorrhage at CS, and thus with increased need for blood transfusion. The other 500 were low risk cases for intra-operative hemorrhage during CS. It was expected that blood transfusion would be minimal within this group. The result was that these blood loss preventive measures helped to reduce intra-operative blood loss, thus reduced the need for blood transfusion. In addition, the modal units of blood transfused was 2units, unlike previous studies where modal Transfusion was 3 units.

Conclusion: The need for blood transfusion during cesarean section was reduced with adequate peri-operative preparations. Optimizing maternal hemoglobin concentration during the antenatal period may reduce the incidence of cesarean section related blood transfusion.

Keywords: Cesarean section, blood transfusion, high risk, low risk, RSUTH

Introduction

Cesarean section (CS) is associated with a risk of major intra-operative blood loss [1]. This often necessitates the need to make blood available for transfusion before surgery is commenced [1, 2]. With the advent of various medical and surgical techniques to prevent intra-operative and post-operative blood loss, unnecessary dependence on blood transfusion or delay of surgery due to lack of adequate pints of blood may soon be a thing of the past [2, 3].

Although the safety of CS has improved, operative blood loss during CS is still an important medical issue [1, 3, 4, 5]. Obstetric hemorrhage has been identified as a major cause of direct maternal mortality, maternal near miss and material morbidity [1, 3, 4]. There is considerable clinical heterogeneity within the population of women who undergo CS [1]. The quantity of blood loss during CS depends on presence or absence of risk factors associated with massive hemorrhage during CS [2]. In addition, it also depends on the type of anaesthesia used during the surgery, the skill of the surgeon, availability of various peri-operative medications and procedures aimed at reducing blood loss during surgery [1, 2].

Intra-operative extra uterine Hemostatic compression sutures like Purse string compression sutures [2], B-lynch compression sutures, Hayman uterine sutures and Erika operative techniques are also very useful in reducing blood loss during CS [2].

Despite all these, some patients will still receive blood transfusion during CS [1]. Blood transfusion remains a lifesaving intervention despite its attendant risks [1].
Judicious utilization of available blood is required to achieve the overall goal of blood transfusion [2-3].

In RSUTH, every woman who registers for antenatal care is expected to provide two (2) units of cross matched blood, irrespective of the anticipated mode of delivery during the antenatal period. This is a practice that is obtainable in other tertiary institutions within Nigeria [1, 3, 4, 5, 6].

Aim/Objective
This study is aimed at identifying the need for blood transfusion during cesarean section, need to prevent unnecessary blood preservation and transfusion. It is also aimed at highlighting the current and available methods of preventing, or reducing excessive blood loss during CS, thus preventing unnecessary blood transfusion, with its attendant complications at RSUTH.

Method
This was a retrospective, cross sectional study that was done in RSUTH, Nigeria. This tertiary institution is a referral center. It provides referral services to both public and private hospitals within Rivers State and five states within its environs.

A total of 3,579 deliveries took place between January 2020-December 2021, a 2-year period. Those that delivered by cesarean section were 1,989 within this period (CS rate 55.6%). For the purpose of this study, 1,000 cases were selected among the CS group. Five hundred [500] women who had CS with high risk factors for excessive blood loss and intra-operative transfusion. Five hundred [500] women who had CS with low risk factors for intra-operative blood loss and possible blood transfusion. Information was obtained from their case notes, antenatal ward, theatre and post-natal ward records of the subjects recruited for the study under review. All the subjects had term pregnancy ≥ 37 weeks gestation. All the subjects had records of pre-operative Haemoglobin/Haematocrit, no allergy to anaesthetic drugs or any medication used and had no blood transfusion reactions. High risk cases in the study included CS done for prolonged second stage of labour, placenta Previa, abruptio placenta, previous scar on uterus, multiple pregnancy, fetal macrosomia, polyhydramnios, prolonged labor, pre-eclampsia/eclampsia, maternal blood disorders, sickle cell disease patients, fibroids co-existing with pregnancy and patients that had general anaesthesia.

The low risk cases included in this study were primigravida with cephalo pelvic disproportion (CPD), primigravida with mal-presentation, failed induction of labor, pelvic deformity, non-reassuring fetal status and maternal request.

Blood loss reduction strategies taken during the CS procedures included
1. Injection of oxytocin, carbetocin (an oxytocin derivative) Tranexamic Acid, ergometrine and prostaglandin F2 alpha.
2. Tablets used were oral misoprostol (prostaglandin E1 analogue) sublingual misoprostol (after clamping of umbilical cord), rectal misoprostol.
3. Spinal Anaesthesia was used for ≥90% of the cases
4. Suture techniques employed were extra uterine compression sutures-purse-string Haemostatic compression sutures, B-lynch Haemostatic brace sutures.

Blood loss estimation during CS was done by counting each fully soaked abdominal pack as 150 ml, fully soaked gauze as 15ml, measurement of blood on delivery mat and floor, blood expelled from uterus and vagina was also measured. Intra operative transfusion was done if blood loss>800 ml. Post-operative transfusion was done if difference in Pre-operative packed cell volume and post-operative packed cell volume was >10%. Also clinical status of the patient was used to determined need for transfusion.

The cesarean section procedure for high risk patients were done by consultants and senior registrars. Data were collected to a spreadsheet of SPSS version 25 and analyzed. Data was summarized in a table as frequencies and percentages. A P-value of <0.05 was significant.

Results

Table 1: Socio-Demographic Characteristic of Patients Who Had Cesarean Section

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of respondents (n=1000)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (Years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-20</td>
<td>15</td>
<td>1.5</td>
</tr>
<tr>
<td>21-25</td>
<td>118</td>
<td>11.8</td>
</tr>
<tr>
<td>26-30</td>
<td>339</td>
<td>33.9</td>
</tr>
<tr>
<td>31-35</td>
<td>290</td>
<td>29.1</td>
</tr>
<tr>
<td>36-40</td>
<td>168</td>
<td>16.8</td>
</tr>
<tr>
<td>≥40</td>
<td>70</td>
<td>7.1</td>
</tr>
<tr>
<td><strong>Mean age</strong></td>
<td>31.09</td>
<td>30.64</td>
</tr>
<tr>
<td><strong>Parity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>290</td>
<td>29.0</td>
</tr>
<tr>
<td>1</td>
<td>300</td>
<td>30.0</td>
</tr>
<tr>
<td>2</td>
<td>214</td>
<td>21.4</td>
</tr>
<tr>
<td>3</td>
<td>84</td>
<td>8.4</td>
</tr>
<tr>
<td>4</td>
<td>62</td>
<td>6.2</td>
</tr>
<tr>
<td>≥5</td>
<td>50</td>
<td>5.0</td>
</tr>
<tr>
<td><strong>Education status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal Education</td>
<td>5</td>
<td>0.5</td>
</tr>
<tr>
<td>Primary</td>
<td>34</td>
<td>3.4</td>
</tr>
<tr>
<td>Secondary</td>
<td>474</td>
<td>47.4</td>
</tr>
<tr>
<td>Tertiary</td>
<td>487</td>
<td>48.7</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christianity</td>
<td>946</td>
<td>94.6</td>
</tr>
</tbody>
</table>
### Table 2: Total Deliveries Within the 2 year Period in RSUTH

<table>
<thead>
<tr>
<th>Year</th>
<th>2020</th>
<th>2021</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1,798</td>
<td>1,781</td>
<td>3,579</td>
</tr>
</tbody>
</table>

**Cesarean section**

<table>
<thead>
<tr>
<th>Elective</th>
<th>308</th>
<th>387</th>
<th>695</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>681</td>
<td>613</td>
<td>1,294</td>
</tr>
<tr>
<td>Total</td>
<td>989</td>
<td>1,000</td>
<td>1,989</td>
</tr>
</tbody>
</table>

CS rate (1989/3579) * 100 = 55.57%

### Table 3: Total number of CS cases used for the Study n=1000

<table>
<thead>
<tr>
<th>CS Cases</th>
<th>Transfused</th>
<th>Not Transfused</th>
</tr>
</thead>
<tbody>
<tr>
<td>High risk</td>
<td>500</td>
<td>203</td>
</tr>
<tr>
<td>Low risk</td>
<td>500</td>
<td>11</td>
</tr>
<tr>
<td>Total number</td>
<td>1000(100%)</td>
<td>214(21.4%)</td>
</tr>
</tbody>
</table>

Transfusion rate 21.4%

### Table 4: Units/pints of blood Transfused n=214

<table>
<thead>
<tr>
<th>Units</th>
<th>Number of cases</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>185</td>
<td>86.4</td>
</tr>
<tr>
<td>3-4</td>
<td>24</td>
<td>11.2</td>
</tr>
<tr>
<td>5-6</td>
<td>5</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Modal unit of blood Transfusion =2 units

### Table 5: Types of High risk and Low risk factors considered for this study

#### High risk factors n=500

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second stage CS</td>
<td>22</td>
</tr>
<tr>
<td>Placenta Previa</td>
<td>58</td>
</tr>
<tr>
<td>Abruptio Placentae</td>
<td>26</td>
</tr>
<tr>
<td>Hypertensive Disorders</td>
<td>102</td>
</tr>
<tr>
<td>Sickle cell diseases</td>
<td>5</td>
</tr>
<tr>
<td>Multiple pregnancy</td>
<td>20</td>
</tr>
<tr>
<td>General Anaesthesia</td>
<td>4</td>
</tr>
<tr>
<td>Polyhydramnios</td>
<td>8</td>
</tr>
<tr>
<td>Previous scar on uterus</td>
<td>152</td>
</tr>
<tr>
<td>Leiomyoma co-existing with pregnancy</td>
<td>21</td>
</tr>
<tr>
<td>Ammonites</td>
<td>30</td>
</tr>
<tr>
<td>Prolonged Labor</td>
<td>30</td>
</tr>
<tr>
<td>Blood disorders</td>
<td>4</td>
</tr>
<tr>
<td>Prolonged operation time</td>
<td>10</td>
</tr>
<tr>
<td>Pre-operative anaemia</td>
<td>8</td>
</tr>
</tbody>
</table>

#### Low risk factor n-500

<table>
<thead>
<tr>
<th>Types</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primigravida with CPD</td>
<td>250</td>
<td>50.0</td>
</tr>
<tr>
<td>Primigravida with Malpresentations</td>
<td>195</td>
<td>39.0</td>
</tr>
<tr>
<td>Post term pregnancy/failed induction</td>
<td>32</td>
<td>6.4</td>
</tr>
<tr>
<td>Pelvic Deformity</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>Non reassuring fetal heart sound</td>
<td>10</td>
<td>2.0</td>
</tr>
<tr>
<td>Patients’ request</td>
<td>10</td>
<td>2.0</td>
</tr>
</tbody>
</table>

### Analysis of Result

Socio demographic characteristics were similar for patients with high and low risk factors for blood transfusion (Table 1). The mean age of women who had cesarean section (CS) was 31.09 SD 4.5 (95% CI: 30.6, 31.1) (range 20-43 years). This is similar to findings in other hospital based studies among hospital booked pregnant women [10, 11, 12]. Highest parity among study group was para 1 (30%)
CS rate was 55.57%.
Blood Transfusion rate was 21.4%.
Modal unit of blood transfused was 2 units.

**Discussion**

The rate of blood transfusion in this study group was 21.4%, which was high compared to 20.8% in the study by FM Akinlusi *et al.* at the Lagos State University Teaching Hospital (LASU) in 2018, though the number studied in this group is larger [1].

The modal transfusion in that study was 3 units of blood, compared to this study where modal transfusion is 2 units of blood [2-4]. More than 86% of patients that had blood transfusion received only 1-2 units of blood. This was possible because of the different preventive measures available in obstetric unit of RSUTH to reduce blood loss during CS.

These measures include injectables like; Oxytocin, Carbetocin (an oxytocin derivative) Tranexamic acid, Ergometrine and Prostaglandin F2 alpha. Tablets like Oral Misoprostol (Prostaglandin E1 analogue), sublingual misoprostol and rectal misoprostol. Extra uterine haemostatic compression sutures like purse-uterine haemostatic compression sutures and B-Lynch brace sutures.

Ezike techniques for management of post-partum haemorrhage is also effective. Others measures to reduce blood loss at CS are uterine artery ligation and embolization.

Regional anaesthesia (spinal and epidural) were used to perform >90% of the cases studied. It has been confirmed that regional anaesthesia contributes to reduced blood loss during surgery [5], thus reduced need for blood transfusion. General anaesthesia pre-disposes to uterine a tone and thus increased blood loss during surgery. The increase in CS rate over the years have resulted in high incidence of repeat CS/Scar on the uterus, with its attendant complications leading to transfusions. The World Health Organization recommended a Cesarean section rate of 5-15% in any facility, but this has been difficult to attain in most studies carried out [1, 3, 5, 6].

In this study, the high risk factors for excessive blood loss and need for transfusion were majorly-previous CS scar on uterus (152=30.4%). It predisposed to morbidity, adherent placenta and increased intra-operative blood loss. This was followed by hypertensive disorders in pregnancy (Pre-eclampsia/Eclampsia) 102=20.4%. The emergent presentation of these cases led to increased need of blood transfusion. Placenta Previa and Abruptio Placentae were huge risk cases in which the patient had bleeding episodes before surgery (antepartum Haemorrhage) and this predisposed them to increased blood loss and need for intra-operative transfusion. Second stage CS, prolonged labour, multiple pregnancy, polyhydramnios and General anaesthesia predisposed patients to uterine over distention, uterine a tone and increased blood loss. With increased intra-operative blood loss, there was increased need for blood transfusion. The sickle cell disease patients usually have reduced pre-operative Haemoglobin/Haematocrit prior to surgery, thus the need for intra-operative blood transfusion.

Patients with blood disorders like thrombocytopenia, ant phospholipid syndrome need adequate fresh whole blood and blood product during surgery to prevent excessive blood loss and mortality.

The low risk patients in this study mainly were primigravida with cephalo pelvic disproportion (CPD) 250=50%. Some of who did not receive antenatal care in our facility, had pre-operative packed cell volume of<30%. Deeply impacted fetal head at CS led to lateral extension of the transverse lower segment incision with increased blood loss.

Primigravida with mal presentations (breech, transverse lie) were also amongst low risk patients in this study (205=41%).

Non-reassuring fetal heart sounds were also indication for emergency CS.

Patient’s request for elective CS is a trend in this century that is gradually gaining ground. With increase in number of women becoming more educated, more aware of their rights and becoming more motivated, the desire of some to avoid labour pain is increasing. They request for elective CS during their antenatal visits. When there is respect for human rights and dignity, such requests should not be overlooked.

**Conclusion**

Adequate Perioperative preparation is needed for prevention of massive blood loss and blood transfusion for every case of cesarean section. This is more so, if there are high risk factors associated with that pregnancy.

The practice of low risk patients providing 2 units of blood during the antenatal period, should be revisited as most of them in this study did not need transfusion, in presence of adequate blood loss preventive mechanisms. There should be a need for blood transfusion before it is given, in order to prevent and reduce blood transfusion reactions and transmission of infections.

Optimizing maternal hemoglobin concentration during antenatal period may reduce the incidence of cesarean related blood transfusion.

**Ethical Approval**

Ethical approval was obtained from RSUTH ethical research committee before commencement of studies.

**Author’s Contribution**

Not available

**Conflict of Interest**

Not available

**Financial Support**

Not available

**References**


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