RELAPAROTOMY AFTER CESAREAN DELIVERY: A PROSPECTIVE STUDY
AKTHER R¹, HOSSAIN T², RASHID M³

Abstract:
The present study aimed at exploring the causes of re laparotomy following Caesarean section and to find out the pathway how to avoid these complications. This is a hospital based prospective study conducted in the Department of Obstetrics and Gynaecology, Dhaka Medical College Hospital (DMCH), Dhaka, Bangladesh from August 2007 to August 2008. Bangladeshi pregnant women are at risk of serious complications during pregnancy and labor due to lack of antenatal, intra natal and postnatal care. DMCH is the largest referral hospital in Bangladesh and more than ten thousand patients admitted here each year with different pregnancy and childbirth related complications. Among them, 54 puerpera needed re laparotomy after Caesarean section within 6 weeks of Caesarean Section. Of the 54 cases, 28 had primary PPH, 14 patients had secondary post-partum hemorrhage (PPH), 4 cases had puerperal sepsis and 3 women had wound dehiscence, and 5 cases had sub rectus hematoma. Irreversible hemorrhagic shock (12cases), cardio genic shock (1 case), not reversed from anesthesia (1 case), acute renal failure (3 cases) and puerperal sepsis (1 case) were causes maternal death. It gave the overall case fatality rate was 33.33%. Obstetric patients who return to the operation theater face potential death. This study will help us to identify the risk situations where re laparotomy may be needed and due precautions and prevention may be taken as far as possible to avoid this complications following caesarean section and thereby reduce maternal mortality and morbidity.

Key word: Cesarean section, laparotomy, maternal morbidity, maternal mortality, case fatality.

Introduction:
Cesarean Section (CS) is a life-saving technique for both mother and infant; however, it is a major abdominal operation that causes medical risks to a mother’s health, including infections (40-80%)¹, hemorrhage (most often underestimated), and injury to other organs. During the last 20 years, cesarean section rates have risen to nearly 25% in some countries². In Bangladesh cesarean section rate is 8% . For 5% of birth, the mother experienced excessive bleeding and 3% (each) of births involved retained placenta and high fever with foul smelling discharge¹. Maternal mortality two to four times greater after cesarean section than vaginal birth². Cesarean section (CS) is easily the most common identifiable risk factor for development of puerperal complications. Most of the women are treated conservatively and few women needed relaparotomy. Prolonged rupture of the membrane (>24hours), chorioamnionitis, excessive number of digital vaginal examination, prolonged labour (>12hours), pre-eclampsia, intra partum and postpartum anemia, poor nutrition, low socioeconomic condition are the risk factors for development of complications. Risk of complications increases among women who attempted vaginal birth but ultimately was delivered by emergency cesarean section. Indication of CS, morbidity and mortality following CS in Bangladesh is not known. To address the complications following cesarean delivery, we critically evaluated cases of re laparotomy following cesarean delivery. The aim of this

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study to identify the risk situations where re-
aparotomy may needed, the operative findings, 
the measure taken to save patient’s life and 
the precautions that may be taken to prevent 
these emergency situation and maternal 
deaths.

Methods:
This was a cross-sectional study conducted in 
the Obstetrics and Gynaecology Department of 
Dhaka Medical College Hospital over a period 
of 13 months from August 2007 to August 2008. 
Fifty four women who underwent CS (Cesarean 
section) first and needed re laparotomy within 6 
weeks of Cesarean section were included in 
this study. Cause of hospitalization, indication 
of cesarean section and re laparotomy, time 
time interval between CS and re laparotomy 
, operative findings, procedures undertaken 
during re laparotomy and causes of death were 
analyzed. All relaparotomy cases were 
performed under general anesthesia by senior 
obstetricians (e.g. registrar, resident surgeon, 
consultant and professor).

Cases having primary PPH was managed by 
giving rapid infusion of volume expander, 
hartman solution, oxytocics drugs (Injection 
Oxytocin 20 unit in one liter Hartman solution, 
injection methergin 2 ampule I.V. stat and 8 
hourly, misoprostol 800 mg per rectally) and 2 
tablets 6 hourly and intrauterine balloon with 
condom to control uterine bleeding. Fresh blood 
and fresh frozen plasma were transfused to 
replace lost blood. When conservative 
management failed to stop PPH, patient’s 
condition did not improved and investigation 
were remarkable, decision for surgical 
interventions were undertaken. Ligation of 
uterine artery, utero-ovarian vessels, B-Lynch 
brace suture and subtotal/total hysterectomy 
were done. In all cases more than one 
procedure were tried to control hemorrhage.

Patients who were readmitted/referred with 
secondary hemorrhage, was treated with 
oxycocics drugs, antibiotics (ceftriaxone, 
metronidazole) and fresh blood and fresh frozen 
plasma transfusion. Complete blood count, 
coagulation profile, USG of lower abdomen, HVS 
for culture and sensitivity, estimation of ã-HCG 
were done to find out the causes of uterine 
bleeding. Evacuation and curettage also done 
in specific cases and specimen sent for histo-
pathological examination. When conservative 
management failed to stop PPH, patient’s 
condition did not improved and investigation 
were remarkable, decision for surgical 
interventions were undertaken. In cases of 
wound dehiscence and rectus sheath 
ematoma, peritoneal cavity was opened and 
inspected routinely to exclude intra-peritoneal 
bleeding. In case of anuria, peritoneal cavity 
was opened to exclude ureteric injury. In cases 
of puerperal sepsis hysterectomy (3 cases) was 
done to remove source of infection.

A questionnaire was designed encompassing 
all relevant clinical information which included 
data from admission register, OT register, 
report register, patient herself, patient’s 
attendant and patient’s file. Collected data 
checked and cleaned. Editing was done 
properly. Finally data was entered into the 
computer for statistical analysis by using MS 
EXCEL. Ethical clearance for the study was 
taken by the Departmental Ethical Committee.

Results:
During the study period a total of 15283 
patients were admitted at labor emergency. 
Nearly six hundred or more women admitted 
with the complaint of postpartum hemorrhage 
and puerperal infection. Majority of them 
delivered by cesarean section (CS). Total 54 
cases underwent laparotomy after CS, thirty 
eight CS done in the peripheral hospital and 
sixteen cases done in this hospital by junior 
doctors. In primary hemorrhage, laparotomy 
was done 15.6 hours after CS and in secondary 
hemorrhage, 17 days after CS.

Table-I shows indications for re laparotomy 
following CS. Of the 54 cases, twenty eight had 
primary hemorrhage. Atonic uterus (14 cases), 
loose knot at the corner of the uterine wound 
(1 case), incomplete rupture of the uterus (1), 
failure to suture lower uterine segment with 
upper uterine segment (1 case), undiagnosed 
uterine wound (1), cervical tear (1), massive 
hemorrhage progress to shock (3 cases) and 
retained bits of placental tissue in placenta 
previa (6 cases) were the cause of primary 
hemorrhage.
Fourteen patients had secondary hemorrhage, 4 cases had puerperal sepsis, 3 women had wound dehiscence, 5 cases had sub rectus hematoma. One case had bladder injury with acute pain abdomen. But no one had ureteric injury.

Table-II shows indication of cesarean section (CS). Indication of CS were include post cesarean section (7 cases), obstructed labor (7 cases), prolonged labor with foetal distress (4 cases), eclampsia (3 cases), heart disease (2 cases), APH due to placenta previa (4 cases), Post CS placenta previa (5 cases) and repeat CS (2 cases). In remaining cases indications of CS were unknown. There was one case of post CS placenta previa accreta and caesarean hysterectomy was done due to uncontrolled PPH.

The procedures performed during laparotomy are shown in Table-III. Hysterectomy or subtotal hysterectomy was performed in 35 (64.81%) cases and conservative surgery was done in 19 (35.19%) cases. Among the conservative surgery, re suturing of uterine wound and repair of cervical tear 6 cases (11.11%), ligation of uterine artery and ovarian vessels 3 cases (5.55%), exploration and removal of sub-rectus hematoma, ligation of vessels in 5 (9.25%) cases, repair of anterior abdominal wall 3 (5.55%) cases and tightening of ligature 2 (3.7%) cases. Table-IV shows the causes of maternal death after laparotomy. A total of eighteen mothers died 17.9 hours after laparotomy. Death occurs due to failure of adequate replacement therapy and irreversible hemorrhagic shock (12 cases), cardiogenic shock (1 case), not reversed from anesthesia (1 case), acute renal failure (3 cases) and puerperal sepsis (1 case).

### Table-I

<table>
<thead>
<tr>
<th>Variables</th>
<th>Causes</th>
<th>No. of cases (n=54)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary PPH</td>
<td>Atonic uterus</td>
<td>14</td>
</tr>
<tr>
<td>Shock and anuria</td>
<td>Fail to suture lower uterine segment, internal hemorrhage</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Retain bits of placental tissue(placenta previa, post CS placenta previa accrete, percreta)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Loose knot at uterine corner, uterine injury, incomplete uterine rupture, cervical tear</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Cervical tear</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>28</td>
</tr>
<tr>
<td>Secondary PPH</td>
<td>Infection</td>
<td>14</td>
</tr>
<tr>
<td>Puerperal sepsis</td>
<td>Purulent discharge, uterus was infected, congested and necrotic</td>
<td>4</td>
</tr>
<tr>
<td>Wound dehiscence, Burst abdomen</td>
<td>Nothing abnormality detected in the peritoneal cavity</td>
<td>3</td>
</tr>
<tr>
<td>Sub rectus hematoma</td>
<td>Torned vessels of rectus muscle, clotted blood under the rectus sheath</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>54</td>
</tr>
</tbody>
</table>

### Table-II

<table>
<thead>
<tr>
<th>Indication for CS delivery</th>
<th>Frequency (n=54)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Post-cesarean pregnancy (History of CS once before)</td>
<td>7</td>
</tr>
<tr>
<td>(b) Obstructed labor</td>
<td>7</td>
</tr>
<tr>
<td>(c) Post-CS placenta previa</td>
<td>5</td>
</tr>
<tr>
<td>(d) Prolonged labor with fetal distress</td>
<td>4</td>
</tr>
<tr>
<td>(e) Placenta previa</td>
<td>4</td>
</tr>
<tr>
<td>(f) Hypertensive disorders</td>
<td>3</td>
</tr>
<tr>
<td>(f) Repeat cesarean pregnancy (History of CS twice before)</td>
<td>2</td>
</tr>
<tr>
<td>(h) Heart disease</td>
<td>2</td>
</tr>
<tr>
<td>(i) Unknown</td>
<td>20</td>
</tr>
</tbody>
</table>
Discussion:

In Bangladesh, 85% delivery taken place at home and only 15% in the health facility. Incidence of caesarean section in Bangladesh is 8%. PPH and puerperal sepsis causes 4.7% and 6.25% hospital admission in 2007 and 2008 in DMCH. There are very few large case series in the world literature regarding repeat laparotomy following cesarean delivery. One such series from a teaching hospital in Ghana, with a CS rate of 17%, showed a relaparotomy rate of 0.7% out of a total of 36,100 deliveries. In that study, the commonest indication of CS were cephalo-pelvic disproportion and obstructed labor, and the commonest indication of re laparotomy was atonic uterus. In another series from a teaching hospital in India, the incidence of CS was 34.8% where re laparotomy was needed in 0.33% of CS and the incidence of laparotomy following vaginal delivery was 0.14%.

One of the limitations of the study was that 38 of the 54 cases, CS were done at peripheral hospitals. It is therefore not possible to calculate the exact overall incidence since we do not know the denominator. In this study, the incidence of CS was 34.86% in DMCH and repeat laparotomy was needed in 0.315% of cases. This finding is compatible with the Indian study. During the same period, there was no cases of laparotomy following vaginal delivery in hospital delivery cases. This finding is opposite to Indian study and indicating better management of vaginal delivery.

Caesarean section was done in the second stage of labor as an emergency procedure. CS

<table>
<thead>
<tr>
<th>Procedures</th>
<th>Frequency(n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hysterectomy</td>
<td>35 (64.81%)</td>
</tr>
<tr>
<td>Conservative surgery</td>
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</tr>
<tr>
<td>Resuturing uterine wound &amp; repair of cervical tear</td>
<td>6 (11.11%)</td>
</tr>
<tr>
<td>Ligation of uterine artery and ovarian vessels</td>
<td>3 (5.55%)</td>
</tr>
<tr>
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</tr>
<tr>
<td>Repair of anterior abdominal wall</td>
<td>3 (5.55%)</td>
</tr>
<tr>
<td>Tightening of ligature</td>
<td>2 (3.7%)</td>
</tr>
<tr>
<td>Total</td>
<td>54 (100%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table-IV Maternal mortality after relaparotomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cause of death</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Not Reversed from anaesthesia</td>
</tr>
<tr>
<td>Hemorrhagic Shock</td>
</tr>
<tr>
<td>Renal failure</td>
</tr>
<tr>
<td>Hemorrhagic Shock</td>
</tr>
<tr>
<td>Puerperal sepsis</td>
</tr>
<tr>
<td>Cardiac arrest</td>
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</tbody>
</table>

Table-III Procedures undertaken during laparotomy

<table>
<thead>
<tr>
<th>Procedures</th>
<th>Frequency(n=54)</th>
</tr>
</thead>
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<tr>
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done in second stage with an impacted fetal head can be technically difficult and is associated with increased trauma to the lower uterine segment and adjacent structures (tear extension to involve the uterine arteries, cervix, vagina and bladder), increased hemorrhage and infection.\textsuperscript{7,8,9} Hemorrhage necessitated the patient’s return to the operating theater following 0.2\% cases of CS\textsuperscript{10}. Ligation of vessels and B-lynch suture was not enough to control PPH.\textsuperscript{11} Vessel ligation was performed in 35\% of cases before proceeding to hysterectomy in a series of peri partum hysterectomy.\textsuperscript{12,13} Secondary PPH following CS is often difficult to control by vessel ligation. The exact cause of PPH could not be detected, as ultra sound failed to demonstrate any retained bits of placental tissue.\textsuperscript{6} During re laparotomy, it was found that uterine wound was open, the lower uterine segment could not be identified, uterus was edematous, congested, infected and necrotic, adherent with the surround structures. In this study, hysterectomy were done in 2ndary hemorrhage (12 cases) with the purpose of to remove infective focus.\textsuperscript{14} Currently, there are no recommendations for treatment of secondary PPH\textsuperscript{7} following CS where no cause can be identified. Proper hemostasis during the CS with prophylactic use of antibiotics\textsuperscript{1} may well reduce infection but aseptic precaution in all steps of labor from per vaginal examination to end of puerperium is the goal of infection prevention.\textsuperscript{14} Rectus sheath hematoma was another common indication of laparotomy\textsuperscript{7} (10.52\%). It was seen in cases who developed DIC (eclampsia, severe infection) and injury to vessels of rectus muscle. Proper haemostasis before suturing the rectus sheath can minimize the incidence of rectus sheath hematoma. Restlessness, tachycardia, hypotension and anuria following CS should raise suspicion of concealed hemorrhage. In this study there were nine cases of placenta previa. The morbidity and mortality related to placenta previa (increta and accrete) is still a nightmare of the obstetrician in this century\textsuperscript{15}. In cases of placenta previa, it is wise to refer the patient to higher centre in diagnosed cases and if undiagnosed, proper hemostasis should be done before closing abdominal wound. Where hemostasis is doubtful, one must examine the vagina and keep a drain before closing the peritoneal cavity to ensure the absence of active bleeding\textsuperscript{7}. Prophylactic balloon catheter of uterine cavity may be practiced to reduce the risk of PPH\textsuperscript{16}. PPH is the most common child birth related complication and surgical treatment is the most definitive treatment. Every obstetrician must be well trained to assess the emergency situation and also in surgical methods. PPH is not always preventable but can be definitely treatable.\textsuperscript{17}

Post-operative management of these patients is very important because majority of the patient died within 17.9 hours of laparotomy. Maternal mortality was quite high in patients who required laparotomy following CS. It was 9.1\% in the African series\textsuperscript{6} and 12.1\% in Indian series\textsuperscript{7} and 33.33\% in this study. This finding is very high in comparison with the African and Indian study. Probably triple delay is responsible for this near miss mortality. In this study, because of limited ICU facility, only one case admitted in intensive care unit and ten cases (18.51\%) required massive blood transfusion.

Home delivery is almost universal in Bangladesh\textsuperscript{2}. Critical indicators to comprehensively monitor skilled health attendance would include not just skilled birth attendants but also access to basic and comprehensive emergency obstetric care services and post-partum care. However to reduce maternal morbidity and mortality, more hospital delivery will mean a reduction in the overall rate of complication\textsuperscript{18}, including relaparotomy.

**Conclusion:**
Cesarean delivery is a life-saving and most common obstetric operation. To make it safe every effort must be adopted. Relaparotomy may be considered a near miss maternal mortality situation. To improve the standard of service from antenatal care to till delivery is essential for better outcome.

**Acknowledgment:**
We are thankful to the patient of the study, their families, nurses and staff of operation
theater, labour ward and post operative ward, anesthetists of Dhaka Medical College Hospital, for allowing me to carry out the study.

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