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Original Research Article

An analysis of relaparotomy in operative obstetrics

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ABSTRACT

Background: Relaparotomy in obstetrics following caesarean section or laparotomy is associated with high morbidity and mortality and hence, considered as maternal near miss. Selection of patient for the same is crucial. This study was done to know the incidence, indications, the risk factors, intraoperative procedures and mortality rates of relaparotomy.

Methods: A retrospective analysis of relaparotomy after primary obstetric surgery over a period of two and half years (June 2016 to November 2018) was done in department of obstetrics and gynecology of Rajendra Institute of Medical Sciences, Ranchi, India.

Results: During study period 28 cases of relaparotomy (18 inhouse and 10 referred cases) were identified. The incidence of relaparotomy was 0.24%. Intraperitoneal hemorrhage (39.2%) was commonest indication of reoperations followed by PPH (17.8%), rectus sheath hematoma (14.8%) and burst abdomen (10.7%). Obstructed labor (32.1%) was commonest indication of primary cesarean. Hysterectomy was required in 8 cases (25.7%), evacuation of blood for hemoperitoneum was required in another 8 cases. Most cases of hemorrhage were reopened within 24 hours, whereas most case of the rectus sheath hematoma, burst abdomen, and broad ligament hematoma were reopened between 5-9 days.

Conclusions: Relaparotomy is often a lifesaving procedure. Decision to perform and manage relaparotomy should always be done by senior obstetricians. Meticulous surgical techniques to secure hemostasis at time of primary surgery should be adopted. Strict postoperative vigilance, is of utmost importance for early detection of intraperitoneal hemorrhage and other complications requiring relaparotomy as timely intervention.

Keywords: Cesarean section, Intraperitoneal hemorrhage, Maternal near miss, Postpartum hemorrhage, Relaparotomy

INTRODUCTION

One of the rare but serious complication of surgery is the need to perform reoperation in the postoperative period. Not only this remains a big dilemma for the surgeon, but also a crucial challenge for the patient to undergo repeat surgery within a short period of time. Relaparotomy can be classified as early or late; radical or palliative; urgent or elective. If laparotomy is done which is plannable, repeated and multiphasic to complete the primary surgery, it is not considered a relaparotomy. Laparotomy done within sixty days of primary surgery is called

relaparotomy.¹ Early relaparotomy are those which are done within 21 days of primary surgery.² There has been increase in caesarean all over the world.³ This has also translated into increased risk of rare but serious complication- need for relaparotomy with high maternal mortality and morbidity, so much so that it is considered as maternal near miss (MNM).⁴ Therefore, selection of cases for the same is also important. Common indications for reoperations are to manage complications of previous surgery such as intra-abdominal hemorrhage, postpartum hemorrhage, rectus sheath hematoma, sepsis etc. With this background, the present study was undertaken to

know the incidence of relaparotomy, its indications, risk factors, intraoperative procedures and mortality rates in a tertiary care teaching institution. This would help to identify the risk situations where relaparotomy might be needed and due precautions might be taken to prevent such complications.

METHODS

This was a retrospective observational study over a period of two and half years from June 2016 to November 2018 in the department of obstetrics and gynecology of Rajendra Institute of Medical Sciences (RIMS), a tertiary care teaching institution and highest referral centre for state of Jharkhand, India.

Inclusion criteria

- Cases of relaparotomy done within 6 weeks following primary cesarean section
- Cases of relaparotomy done within 6 weeks following primary laparotomy for rupture uterus or rupture ectopic.

Exclusion criteria

- Cases requiring relaparotomy after primary gynecological surgeries (abdominal hysterectomy, vaginal hysterectomy laparoscopic hysterectomy, staging laparotomy for ovarian tumor).

There was no case of relaparotomy following laparotomy for ectopic pregnancy. Total 28 cases of relaparotomy following primary cesarean section or laparotomy for rupture uterus identified during the study period and were analysed. The obstetric and demographic variables studied were: age, parity, indications of primary surgery, time interval between primary surgery and reoperation,

intra-operative findings, surgical procedures done during relaparotomy and outcome of reoperations including maternal mortality.

Statistical analysis

Descriptive statistics like percentage and mean calculations were used to interpret data with the help of Microsoft office 2007.

RESULTS

During the study period of two and half years, total number of deliveries in the institution was 17,224. Out of which 7403 were cesarean section, giving C-section rate of 42.9%. During the same period 28 cases had relaparotomy as per inclusion criteria. Of these, 18 cases had primary surgery at study institution itself, while 10 cases had primary surgery (cesarean) outside study institution.

The incidence of relaparotomy following institutional cesarean delivery was thus 0.24% (18/7403). The percentage of cases undergoing re-laparotomy could not be calculated for referral cases, as they came from diverse peripheral hospitals (district hospitals to private hospitals of different parts of Jharkhand) for which the total number of cesarean sections was not known.

Patient profile

Majority of the patients (42%) were primigravida between age 19-24 years. In most of cases, primary surgery was performed between 34-40 weeks. One referred case (G3 previous 2 LSCS) had undergone hysterotomy at 18 weeks for 2nd trimester induced abortion.

Table 1: Indications of primary surgery.

Indications of primary surgery	Institution (n=18)	Referred (n=10)	Total (n=28)
CPD	2	1	3 (10.7%)
NPOL	3	1	4 (14.28%)
Breech	1	-	1 (3.57%)
Obstructed labour/DTA	6	3	9 (32.14%)
Prev 1 or 2 CS	2	4	6 (21.42%)
Severe PE with complications or failed induction	3	-	3 (10.7%)
Others (IVF conception and twin)	-	1	1(3.57%)
Rupture uterus following VBAC	1	-	1(3.57%)

Analysis of primary surgery

Table 1 shows indications for primary cesarean section or laparotomy. 35.7% (10/28) were elective cesarean - previous section 6 cases, one case each of breech, IVF conception, severe preeclampsia and cephalopelvic

disproportion. Rest 18 cases (64.2%) were emergency cesarean sections.

Obstructed labor was commonest indication of emergency cesarean in 50% (9/18). Sepsis was associated co-morbidity in 5 cases and anemia in 10 cases.

Analysis of relaparotomy (indications, time interval and procedure performed).

The cases were analysed on basis of indication of relaparotomy (Table 2). Intraperitoneal hemorrhage was commonest indication of repeat surgery in 39.2% (11/28) - 8 inhouse and 3 referred cases. Five cases (17.8%) had reoperations for postpartum haemorrhage. One of them was a referred case of placenta accrete (incretta)

diagnosed intraoperatively while doing hysterotomy at 18 weeks for 2nd trimester MTP in a woman with previous 2 cesareans. Four cases (14.28%) had rectus sheath hematoma. We included rectus sheath hematoma in study series because we inspected peritoneal cavities as a routine in all such cases. Three cases (10.7%) has burst abdomen. Surprisingly in all 3 cases, primary cesarean was done in-house for obstructed labour with longitudinal abdominal incision.

Table 2: Indications of relaparotomy.

Indications of relaparotomy	In house (n=18)	Referred (n=10)	Total (n=28)
PPH			
Atonic PPH	2	1	
Morbid adherent placenta	-	1	5 (17.85%)
Secondary PPH	1	-	
Intraperitoneal haemorrhage	8	3	11 (39.2%)
Rectus sheath hematoma	3	1	4 (14.28%)
Burst abdomen	3	-	3 (10.7%)
Abdomen distension	1	2	3 (10.7%)
Rupture uterus	-	1	1 (3.75%)
Broad ligament hematoma	-	1	1 (3.57%)

Table 3: Intraoperative procedures.

Procedure at relaparotomy	Number (%) (n=28)
Hysterectomy	8 (28.57%)
Evacuation of hemoperitoneum and hemostasis*	8 (28.57%)
Drainage of blood clots from under surface of rectus sheath and peritoneal cavity	4 (38.26%)
Repair of anterior abdominal wall	3 (10.7%)
Drainage of pus/ascites	2 (7.14%)
Repair of uterus	1 (3.57%)
Negative relaparotomy	1 (3.57%)
Drainage of broad ligament hematoma	1 (3.57%)

*one case had splenic hilum rupture.

Table 3 summarises the intraoperative procedures performed during repeat surgery. Eight cases (28.57%) had hysterectomy of which 5 had atonic PPH and 3 had intraperitoneal hemorrhage, but in addition to drainage of blood, these 3 cases also required hysterectomy due to flabby uterus and oozing from one of the uterine angles. In 8 cases of intraperitoneal hemorrhage diagnosed from unexplained pallor and later confirmed by ultrasonography, evacuation of hemoperitoneum with placement of intraperitoneal drain was done. Rectus sheath hematoma cases were managed by drainage of blood clots along with inspection of peritoneal cavity in all cases. In one of these cases, a third relaparotomy was required to evacuate the intraperitoneal clots from drain site. Burst abdomen cases were managed by repair of abdominal wall.

Table 4 shows details of 10 referred cases requiring relaparotomy when primary surgery was done at district

hospitals or private nursing homes. One case referred to study institution in state of shock with abdominal distension turned out to be negative laparotomy as there was no intraperitoneal collection, well contracted uterus with modified B-lynch sutures in place.

Table 5 shows analysis of time interval between primary surgery and relaparotomy. Sixteen cases (57.14%) were re-explored within 24 hours, of these 4 had primary PPH, 9 had intraperitoneal hemorrhage with pallor and shock, 2 referred cases had postoperative distension, 1 was rupture uterus following VBAC (vaginal birth after caesarean) at private nursing home. Four cases were reopened after 24 hours up to 5 days (two cases of intraperitoneal hemorrhage, 1 case of rectus sheath hematoma and 1 case of postoperative distension. But most cases of rectus sheath hematoma and burst abdomen required relaparotomy between 6-9 days. One case of broad ligament hematoma was opened on 7th day and one case

of slow intraperitoneal hemorrhage was reopened on 6th day. Figure 1 shows total maternal death in study series was 8 out of 28 cases (28.57%). Mortality rate in referred cases was 50% (5/10), whereas mortality in relaparotomy

for inhouse primary surgery was 16.6% (3/18) only. All deaths occurred within 24 hours, except one case who died on 6th day after cesarean due to multiorgan failure.

Table 4: Details of referred cases.

Pt. profile	Pr. surg and indication	Ind. of relap	Time interval from previous surgery	Intraop. findings	Procedure done	Outcome
G ₃ P ₂₊₀	CS (Prev. 2 CS)	Intra-peritoneal haemorrhage	12 hours	Improper stitching of uterus	Hysterectomy	Survived LOS-10 days
G ₂ P ₁₊₀	CS (Prev. 1CS)	Atonic PPH	4 hours	Flabby uterus	Hysterectomy	Died after 12 hours, DIC
G ₂ P ₁₊₀	CS (Prev. 1CS)	Massive hemoperitoneum, blood oozing from abd. incision	6 hours	Blood oozing from rt. angle	Hysterectomy	Died after 8 hours, DIC
Primi	CS (CPD)	Haemorrhagic shock	6 hours	Negative relap B-Lynch suture in place	-	Survived LOS - 7 days
Primi	Obstructed labour →rupture uterus→closed	Rupture uterus	8 hours	Massive hemoperitoneum transverse rupture of LUS	Repair done	Died after 5 hrs of DIC
Primi	Obstructed labour	Abdominal distension (Intra-peritoneal collection)	18 hours	Intra-peritoneal pus	Drainage	Survived LOS- 10 days
Primi	Twin preg. after IVF -CS f/b hysterectomy for atonic PPH	Intra-peritoneal haemorrhage	4 hours	Oozing from Infundibulopelvic ligament and vault	Resuturing with drainage of hemoperitoneum	Died on 6 th post-op day multiorgan failure
G ₃ P ₂₊₀	Hysterotomy in Prev 2 CS for 2 nd Trim MTP - Morbid adherent placenta	Atonic PPH	5 hours	Continued hemorrhage	Total Hysterectomy	Died after 14 hours, multiorgan failure
G ₂ P ₁₊₀	Prolonged labour	Rectus sheath hematoma	5 days	-	Drainage of hematoma	Survived LOS-12 days
G ₂ P ₁₊₀	Prev. CS, obst. labor	Broad ligament hematoma	7 days	Big hematoma in right. BL, visible from posterior surface	Drainage of hematoma	Survived LOS- 18 days

CS- cesarean section, pr. Surg. Primary surgery, Ind - indication, re-lap- relaparotomy, intraop- intraoperative, LOS- length of stay, BL- broad ligament

DISCUSSION

Reoperations are the life saving procedures in cases of intraperitoneal hemorrhage. Factors which can affect the outcome of relaparotomy after cesarean are indications of primary cesarean, preoperative condition, skills of

operating surgeons, associated medical conditions, time interval between primary surgery and reoperations, high index of suspicion for early postoperative complications, availability of senior obstetricians and anesthetists, ICU and blood bank facilities. The cesarean section rate in the study institution was 42.9% during the study period and

incidence of relaparotomy after inhouse primary surgery was 0.24%. One such study from teaching hospital in Ghana with cesarean rate of 17.66% had relaparotomy rate of 0.7%.⁵

Table 5: Time interval between primary surgery and relaparotomy.

Time interval	Number (%) (n=28)
Within 8 hours	7 (25%)
>8-24 hours	9 (32.1%)
1-5 days	4 (14.28%)
6-10 days	8 (28.57%)

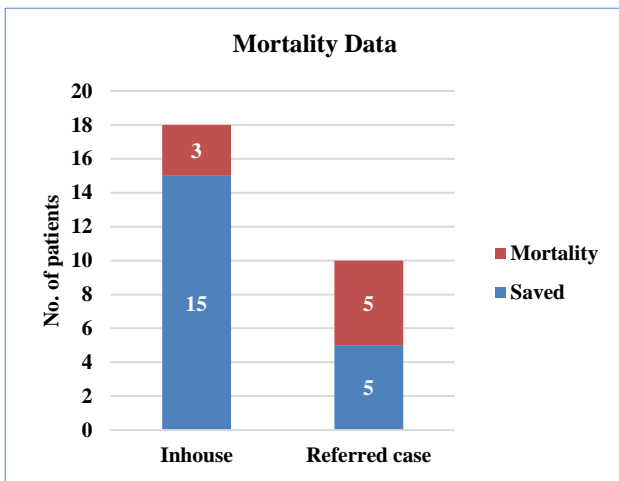


Figure 1: Maternal mortality.

A study from teaching hospital in India with cesarean rate of 34.8% has shown relaparotomy rate of 0.33%.⁶ Another study from tertiary care in Andhra Pradesh, India shows incidence of obstetric relaparotomy to be 0.11%.⁷ Another study from tertiary care urban hospital has shown incidence of relap to be 0.22%.⁴

In this study, obstructed labour was the commonest indication for primary cesarean similar to study by Seal SL et al.⁶ Second stage cesarean is technically difficult with increased chances of extension of uterine incision of fragile and edematous lower uterine segment. Second stage cesarean section when done by less skilled obstetricians thus have more chances of bleeding from extension of uterine incision, hematoma formation or intraperitoneal hemorrhage requiring relaparotomy. Morbidity can be reduced in 2nd stage cesarean section by using shoulder first (Patwardhan's) method of delivery.⁸ Emergency surgery is major risk factor in other studies.^{6,9} However, significant proportion (35.7%) in study series had elective LSCS.

Intraperitoneal hemorrhage was the most common indication of relaparotomy in study series (39.2%) followed by PPH in 17.8%, rectus sheath hematoma in 14.8%, burst abdomen in 10.7%. Similar observations were seen in other studies too. In study by Ahmed et al,

reoperation was needed for hemoperitoneum in 62%, rectus sheath hematoma in 28.6% and for PPH in 9.5%.⁴ Study by Srivastava et al also has intraperitoneal hemorrhage (31.5%), PPH (15.7%) and rectus sheath hematoma (15.7%) as main indications for relaparotomy.⁹ However, in study by Seal et al, PPH was the commonest reason for relaparotomy in 42% followed by rectus sheath hematoma in 27.3% and hemoperitoneum in 7.58% only.⁶ Intraperitoneal bleeding after cesarean usually occurs from uterine incision angle due to loose suture or from retracted uterine arteries not taken care of during closure of uterine angles. Before closure of abdominal wall, posterior surface of broad ligament must be inspected for hematoma, oozers or any bleeding points. This small step would be of much help in reducing need of relaparotomy for intraperitoneal hemorrhage and broad ligament hematoma.

Kessous et al reported that hemorrhage accounted for 70% of indications for relaparotomy and additional risk factors are previous cesarean, placental abruption and cervical tear, severe pre-eclampsia.¹⁰ Lavin I et al reported that placental abruption and duration of primary surgery and experience of surgeons are significant risk factors for relaparotomy.¹¹ In this series, however, we had no case of placental abruption as an indication for primary cesarean. Obstructed labour and previous cesarean (mostly second stage cesarean) were important risk factors. The skill of surgeon doing primary caesarean was an important risk factor requiring reoperations. One case of relaparotomy in study series, primary cesarean was done by general surgeon at district level hospital. In another case of relaparotomy where unfortunately mother died, community based maternal death review revealed that primary cesarean for obstructed labour was done at private nursing home run by quack. Cases of obstructed labor, placenta previa, previous caesarean with adhesions and suspected accrete must be done by senior skilled obstetricians. Strict guidelines should be made regarding eligibility of hospitals and qualification of doctors who can perform cesarean section.

Rectus sheath hematoma was the indication for relaparotomy in 14.28% in study series. Most of them had transverse abdominal incision. Careful suturing of rectus sheath and securing the bleeders on undersurface of rectus sheath and from rectus muscle can minimize rectus sheath hematoma. For abdominal wall hemostasis best possible closure technique include- mass closure compared to layer closure, use of absorbable monofilament suture material, a simple running suture technique and suture length to wound length ratio of 4:1.¹

Cases requiring relaparotomy within 24 hours were due to intraperitoneal hemorrhage or primary atonic PPH. Similar observations were found in other studies.^{4,6} This reinforces the need for strict postoperative monitoring of vitals, documentation and to have high index of suspicion at the earliest to detect complications requiring relaparotomy. One case of intraperitoneal hemorrhage in

study series was diagnosed on 5th day when patient went into shock. On relaparotomy massive hemoperitoneum was present. No oozers or bleeders were identified from uterine angles or uterus. Surgeon was called for help then bleeding from splenic hilum was identified and secured. Ahmed et al reported 3 cases of second relaparotomy in their series (one each for wound infection, colostomy closure and hemoperitoneum). Seal et al reported need for second relaparotomy in 11 cases of secondary PPH in an effort to conserve uterus in first relaparotomy ultimately requiring second relap for hysterectomy. We did not have any case of second relap for 5 cases of PPH as hysterectomy was done in all these cases in first relaparotomy. This study has one case of second relaparotomy, done in a case of rectus sheath hematoma due to intraperitoneal collection of blood from inner edge of drain site. While putting intraperitoneal drain precaution should be taken to pass drainage tube through peritoneum and sheath only avoiding rectus muscle.

Maternal mortality rate in study series was relatively higher 28.5% (8/28). If we look at death rate in referral cases, it was 5/10 (50%) whereas in cases of inhouse relaparotomy it was 3/18 (16.6%). All deaths occurred within 24 hours except one case on 6th day due to multiorgan failure. This again reinforces the need for strict postoperative vigilance and timely referral to manage complications. Maternal death occurred in 3 cases of in-house deliveries. One case of atonic PPH was managed with medical measures and balloon tamponade with aim to conserve uterus. Ultimately hysterectomy was done 18 hours after delivery to manage atonic PPH, but patient succumbed to death. This case gives us the lesson, that quick and timely decision for hysterectomy as life saving measure after proper counselling of patient attendants may help to prevent maternal death. Another woman went into irreversible shock, was identified too late (after 6 hours) in postoperative period. Maternal death review revealed that she remained unattended due to casual approach of junior residents during postoperative vitals monitoring. Third case was found to have massive ascites on relap, who finally succumbed to death. Mortality rate in other studies vary from as low as 2.8% in study by Ahmed et al to high rate of 12.1% and 15.78%.^{4,6,12}

CONCLUSION

Relaparotomy following cesarean section is considered a near miss mortality. Most of the time it is a lifesaving procedure. Decision to perform and manage relaparotomy should always be multidisciplinary team approach with senior obstetricians and senior anaesthesiologists, as these patients are usually in state of shock with multiorgan dysfunction and sepsis.

Meticulous surgical technique to secure haemostasis at time of primary surgery especially careful suturing of uterine angles, putting intraperitoneal drain wherever indicated, visualising posterior surface of broad ligament

for any hematoma or bleeders are important to prevent the need for relaparotomy. Cases of obstructed labour, placenta previa, accrete should be supervised by senior consultants rather than done by residents. Time interval between primary operative procedure and relaparotomy is the most significant factor deciding outcome. Strict postoperative vigilance, documentation of vitals in postoperative period is of utmost importance for early detection of intraperitoneal haemorrhage and other complications requiring relaparotomy. Finally lowering the primary cesarean rate will definitely lead to reduction rate of its complications including relaparotomy. Unnecessary cesarean should be avoided. Increasing trends of cesarean section, surgery at peripheral centres by less skilled obstetricians, non-availability of blood bank increases the complications such as need for relaparotomy. Timely referral in these cases before patient goes in irreversible shock will reduce the complications of relaparotomy including mortality.

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