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Research Article

Relaparotomy: review of indications and outcome in tertiary care hospital

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ABSTRACT

Background: Relaparotomy is a rare complication after surgery associated with significant morbidity and mortality. Inappropriate selection of patients for relaparotomy, especially those who will not clearly benefit from surgery can be deleterious. This study was thus, planned to identify the indications, procedure, risk factors and outcomes of relaparotomy.
Methods: This was a retrospective cohort study conducted in department of Obstetrics and Gynaecology, King George's Medical University from January 2008 to January 2014.
Results: 19 cases of relaparotomy were identified. 17 patients (89.5%) had emergency primary surgery while 2 (10.5%) had elective surgery. Majority of patients required relaparotomy in view of hemorrhage (63.15%) followed by burst abdomen (31.5%) and bowel injury (5.26%). Obstructed labor was the major indication of primary surgery in patients operated for burst abdomen while placenta previa was the major indication of primary surgery in patients operated for PPH. Increased duration of hospital stay, requirement of blood transfusion and incidence of post-operative fever and sepsis was seen in patients undergoing relaparotomy. Out of 19 patients, 3 (15.7%) patients died.
Conclusions: Relaparotomy is a rare condition which surgeon might have to encounter. However, ensuring proper hemostasis and asepsis during surgical procedures can reduce the incidence of relaparotomy. Calculative decision before embarking on relaparotomy can decrease the incidence of morbidity and mortality associated with the procedure.

Keywords: Relaparotomy, Hemorrhage, Burst abdomen, Sepsis

INTRODUCTION

Relaparotomy is one of the rare but important complications in post-operative period which surgeon might have to encounter. The term "relaparotomy" refers to laparotomy performed within 60 days following initial surgery. It is one of the rarest but dangerous complications of surgery. Relaparotomy is categorized as early or late; radical or palliative; urgent or elective; and planned or unplanned depending on performance period, its purpose, urgency and whether or not it is scheduled. Urgent abdominal re explorations following complicated abdominal surgeries are generally known as "final choice operations" with high mortality and morbidity rates.[1] Early relaparotomy refers to laparotomy performed within 21 days of original surgery.[2]

Over the last few years there has been an increase in number of gynaecological and obstetrical surgeries. Increase in number of gynaecological surgeries can be attributed to increased awareness, early diagnosis and easy accessibility of healthcare. The increased incidence

of cesarean section can be attributed to changing obstetrical practices and increased medico legal implications. This consequently has caused an increase in incidence of relaparotomy too. These cases are associated with significant morbidity and mortality. Also hasty decision of relaparotomy in patients who will not clearly benefit from it can prove to be deleterious.[2]

With this background, this study was planned. The objectives of the study were to study the indications, risk factors, procedures undertaken during relaparotomy and its final outcome following obstetrical and gynaecological surgeries.

METHODS

This was a retrospective cohort study conducted in department of Obstetrics and Gynecology King George's Medical University, Lucknow. Data was collected from January 2008 to January 2014.

All the patients undergoing obstetrical and gynaecological major surgery were studied and patients undergoing relaparotomy were identified for study. SPSS software was used to analyse pertinent data with respect to relevant clinical information like indications of primary surgery, indication of relaparotomy, procedure performed during relaparotomy and final outcome.

RESULTS

On reviewing the records, 19 cases of relaparotomy were identified. In 17 patients (89.5%) primary surgery done was cesarean section for emergent indications while 2 (10.5%) patients had elective abdominal hysterectomy in view of fibroid uterus. Further, 12 (63.6%) patients were operated in department itself while 7 (36.4%) patients were operated outside and referred to this hospital after the complication developed.

Most common indication for relaparotomy was hemorrhage seen in 12 (63.15%) patients which manifested as post-partum hemorrhage in 3 (15.7%) patients, rectus sheath hematoma in 3 (15.7%) patients or as intraperitoneal hemorrhage in 6 (31.5%) patients. Second most common indication for relaparotomy was burst abdomen seen in 6 (31.5%) patients. Bowel injury was the cause for relaparotomy in 1 (5.26%) patient.

All the cases requiring relaparotomy were analysed with reference to indication for primary surgery (Table 1). It was seen that majority of patients having relaparotomy for burst abdomen had primary surgery performed in view of obstructed labor. Similarly, patients undergoing relaparotomy in view of PPH had primary surgery for placenta previa. Indication of primary surgery per se did not appear to be a contributory factor in other cases for relaparotomy (Table 1).

Table 1: Correlation of primary surgery with indication of relaparotomy.

Indication of relaparotomy	Indication of primary surgery	No. of patients undergoing primary surgery
Hemoperitoneum (n=6)	Previous 2 LSCS	2 (33.33%)
	Fetal distress	1 (16.67%)
	Abdominal hysterectomy for fibroid uterus	1 (16.67%)
	Transverse lie	1 (16.67%)
	Unknown (operated outside)	1 (16.67%)
Rectus sheath hematoma (n=3)	Antepartum eclampsia with acute fetal distress	1 (33.33%)
	Fetal distress	1 (33.33%)
	Unknown (operated outside)	1 (33.33%)
Post-partum hemorrhage (n=3)	Placenta previa	2 (66.67%)
	Unknown (operated outside)	1 (33.33%)
Burst abdomen (n=6)	Obstructed labor	5 (83.33%)
	Fetal distress	1 (16.67%)
Bowel injury (n=1)	Abdominal hysterectomy for fibroid uterus	1(100%)

The cases were also analysed for the procedure performed during relaparotomy (Table 2). All the patients taken up in view of post-partum hemorrhage not controlled by medical management had hysterectomy as facility for uterine artery embolization was not available at our centre.

Increased morbidity was seen in patients undergoing relaparotomy in terms of increased duration of hospital stay, requirement of blood transfusion and incidence of post-operative fever and sepsis. 3 (15.7%) patients requiring relaparotomy died. 2 of these patients died of hemorrhagic shock and 1 patient with bowel perforation succumbed to septic shock.

DISCUSSION

Complications are not totally avoidable in surgery. In some cases surgeon may have to undertake a relaparotomy which may consequently be associated with increased morbidity and mortality of the patient. There is limited amount of data available with regard to relaparotomy studies after cesarean section and gynaecological procedures. In this study the indications and outcome of relaparotomy procedures, risk factors for relaparotomy, procedures undertaken during relaparotomy and steps that could be taken to prevent it were analysed.

Table 2: Analysis of procedures performed during relaparotomy.

Indication of relaparotomy	Procedure performed	No. of cases undergoing the procedure
Post-partum hemorrhage (n=3)	Hysterectomy	3(15.7%)
Intraperitoneal hemorrhage (n=6)	Hemoperitoneum drainage f/b Religature of uterine wound/surgical wound	3 (15.7%)
	Hemoperitoneum drainage f/b ligation of bleeding vessels	3(15.7%)
Rectus sheath hematoma (n=3)	Exploration of hematoma/ligation of bleeding vessels	3 (15.7%)
Burst abdomen (n=6)	Repair of abdominal wall with peritoneal lavage	6 (31.5%)
Bowel perforation (n=1)	Bowel repair	1 (5.26%)

Major indication of relaparotomy in present study was hemorrhage (63.15%) manifesting as either post-partum hemorrhage (15.7%), rectus sheath hematoma (15.7%) or as intraperitoneal hemorrhage (31.5%). Second most common indication for relaparotomy was burst abdomen seen in 31.5% of patients. Bowel injury was the cause for relaprotomy in 1 (5.26%) patient .Similar observations were seen in other studies too. In study by Sak ME et al bleeding and hematoma (70.8%) were the most common causes for relaparotomy followed by PPH (10.6%) and abscesses (8.8%).[2] Other (9.8%) causes included bowel perforation, DIC, endometritis and ureter ligation .In study by Biswas SP et al most common indication for relaparotomy was hemorrhage (83.64%) and burst abdomen (7.27%). Hemorrhage was in the form of PPH (56.36%) followed by rectus sheath hematoma (14.55%) and intraperitoneal hemorrhage (12.73%).[3] Study by Levin I et al showed major cause of relaparotomy to be intra-abdominal bleeding (50%) followed by uncontrolled post-partum hemorrhage (35.7%), bowel injury or infection (10.7%) , and abdominal wall bleeding (3.6%).[4] In study by Seal SL et al post-partum hemorrhage (42.4%) and rectus sheath hematoma (27.3%) were the leading causes for relaparotomy.[5] In study by Ahmed Khan NB et al major cause of relaparotomy was intraperitoneal hemorrhage (44.44%) followed by PPH (33.33%), rectus sheath hematoma (7.4%), broad ligament hematoma (7.4%), uterine necrosis (3.7%) and bowel ischemia (3.7%).[6] Study by Shyamal D et al showed major cause of relaparotomy to be intraperitoneal hemorrhage (48.93%), rectus sheath hematoma (21.28%), sepsis (12.76%), intestinal complications (6.39%), burst abdomen (6.39%) and post-partum hemorrhage (4.25%).[7]

Bleeding can occur from hypogastric, epigastric or uterine arteries or even the uterine incision.[1] In case of hysterectomy failure to ligate securely a significant bleeding vessel, bleeding from vaginal cuff, and slippage of ligature or avulsion of tissue before or after clamping can be the cause of hemorrhage.[8] It is essential to achieve proper hemostasis to ensure a safe and successful surgery. It is important to be careful about bleeding during transverse cutting and suturing of lateral extensions of rectus sheath.[7] Bleeding points on under surface of rectus sheath should always be checked and secured to prevent rectus sheath hematoma.[3] In case of cesarean section bleeding may be present along uterine incision especially at uterine angles due to loose knot or loose sutures. Proper hemostasis during repair of uterine incision should be achieved. In case of hysterectomy lateral angles of vaginal vault should be carefully secured and all stumps should be checked for bleeding before closure of parietal peritoneum.[7] Blunt dissection of subcutaneous tissue and unipolar coagulation after delivery of infant can help achieve better hemostasis. According to a study best possible closure technique include : a mass closure (compared to layer closure), use of absorbable monofilament suture material, a simple running suture technique, a suture to wound length ratio of 4:1.[1] In cases with placenta previa, proper hemostasis of placental bed is to be ensured before closing the uterine incision.[3] A careful surgical approach keeping in mind these practices could help to reduce the incidence of relaparotomy due to hemorrhage.

Wound dehiscence and burst abdomen are very serious complications associated with high mortality and morbidity. Peritonitis, wound infection and failure to close the abdominal wall properly are the most important causes of wound dehiscence. Other factors of importance are type of suture, technique of closure, type of incision, post-operative respiratory tract infections, obesity(BMI >30), surgical time exceeding 38 min, jaundice, malignancy, diabetes mellitus, hypoproteinemia, anaemia, immunosuppressant and wound infection.[1,2,9] Ensuring proper sterilization and aseptic precautions is a major remedial factor in preventing post-operative infections. Infection and sepsis contribute significantly in increasing health care cost, both for patients and hospitals.

Injury to other organs in abdomen can increase the morbidity and mortality. In present study 1 patient had perforation of small bowel further leading to sepsis and peritonitis resulting ultimately into patient's death. Therefore surgeon should be careful not to damage other abdominal organs during surgery.[1]

Obstructed labor in 5 (26.31%) patients and fetal distress in 4 (21.05%) patients were the major indications for

initial surgery in patients undergoing relaparotomy in this study. In the present study we tried to correlate the indication of primary surgery with the indication for relaparotomy. It was found that obstructed labor was the most common indication for initial surgery in patients undergoing relaparotomy for burst abdomen while placenta previa was the most common indication for cesarean section in patients reoperated for post-partum hemorrhage. This correlation was not found in other studies available on this subject. In study by Sak ME et al the initial surgery performed was cesarean section in 69% cases followed by total abdominal hysterectomy in 21.2% cases, subtotal hysterectomy in 3.5% cases, and vaginal hysterectomy in 2.6% cases.[2] Leading indications for initial operation were placental abruption in 8.8% cases, HELLP syndrome in 4.4% cases, previous cesarean section in 4.4% cases and post-partum atonia in 3.5% cases. Out of total 55 patients requiring relaparotomy after cesarean section in study by Biswas SP et al , 40% patients had cesarean section in view of prolong labor and fetal distress, 10.91% for hypertensive disorders of pregnancy, 10.9% for previous one or more cesarean sections, 9.09% of patients each for obstructed labor and placenta previa, 5.45% for post cesarean placenta previa.[3] Levin I et al showed indication of initial surgery to be non-reassuring fetal heart rate in 25%, pregnancy induced hypertension in 14.3%, arrest of descent or dilatation or both in 28.6% and placental abruption in 17.9%.[4] In study by Ahmed Khan NB et al indication of cesarean section in patients undergoing relaparotomy was non progress of labor in 29.63%, fetal distress in 22.22%, previous cesarean section in 22.22%, placenta previa in 14.81%, failed induction in 7.4% and placental abruption in 3.75%.[6]

Emergency surgery was a major risk factor in the cases needing relaparotomy in present study as well as in other studies. In study by SP Biswas et al 39 out of 55 patients had surgery for emergency indications.[3] In study by Ahmed Khan NB et al 85.19% patients were operated for emergency indications.[6]

Lately cesarean section rate has increased considerably due to early diagnosis of fetal distress, medico legal implications, better anesthetic facilities and availability of blood and expert care, and increased compliance of health care personnel to cesarean section on demand by patients. However physicians should be aware of and also inform the patient about complications, mortality and morbidity rates associated with the cesarean section as compared to vaginal delivery. WHO recommends cesarean section rate between 10-15%.[1] VBAC (vaginal birth after caesarean) should be encouraged to decrease cesarean section rate.[8]

In present study all the 3 (15.7%) cases undergoing relaparotomy for PPH had hysterectomy. The incidence of hysterectomy could be reduced by increasing the use of uterine artery embolization. However, this facility is not available at our institute, hence, the increased incidence of hysterectomy. In study by Sak ME et al most frequently performed procedures at relaparotomy were drainage and resuturing of hematomas (37.1%), hysterectomy (27.5%) drainage of abscess (6.2%), salpingo oophorectomy (6.2%) and excision of cervix (4.4%).[2] In study by Biswas SP et al major procedure performed during relaparotomy was hysterectomy (38.18%).[3] Other procedures were resuturing of uterine wound and uterine brace sutures (23.63%), ligation of B/L uterine artery and ovarian vessels (12.73%), exploration of sub rectus hematoma and ligation of vessels (14.55%), repair of anterior abdominal wall and peritoneal toileting (9.09%) while no finding was found during relaparotomy in 1.82% of patients. In procedures undertaken during relaparotomy in study by Seal SL et al were resuturing of uterine incision in 33.3% cases, uterine artery ligation in 28.8% cases and drainage of hematoma in 27.3% cases.[5] In study by Ahmed Khan NB et al 77.78% of patients required hysterectomy.[6]

High mortality rate of patients undergoing relaparotomy in our study was also shared by other studies. Mortality rate in was 3.5% in study by Sak ME et al, 12.7% in study by SP Biswas et al, 12.12% in study SL Seal et al, 12.76% in study by Shyamal D et al, 18.52% in study by Ahmed Khan NB et al.[2,3,5-7]

There is not sufficient evidence in literature to prove correlation of interval between initial surgery and relaparotomy with patient's prognosis. However it is seen that early relaparotomy may not prove to be a wise decision in all the cases especially in those cases associated with sepsis. In such cases optimization of patients' condition and control of infective component as much as possible before taking up the patient for relaparotomy if required might prove to be more beneficial.

Relaparotomy is a rare complication of surgery. Not much studies or evidence is available on this topic in the literature. This study was conducted to identify the risk factors for relaparotomy and measures that could be taken to reduce associated morbidity and mortality. Ours was a retrospective study with a small sample size. More prospective multicentric studies are required to formulate a protocol for management of the patient for relaparotomy.

Calculative decision of taking up a patient for relaparotomy might help to reduce the incidence of relaparotomy and consequently morbidity and mortality associated with it. Factors like general condition of the patient, availability of expertise and ICU facility, indication of previous surgery and relaparotomy, associated infections and its severity and presence of other co morbid conditions are the decisive factors before taking up a patient for relaparotomy. If inspite of existing high risk factors, relaparotomy is essential, then it could be scheduled in hands of expert and skilled surgeon after maximum possible optimization of patient. Also,

patients' relatives should be clearly counselled about the condition and prognosis of the patient

CONCLUSIONS

Relaparotomy is a rare condition which surgeon might have to encounter in practice of obstetrics and gynaecology. However, undertaking proper precautions to ensure proper haemostasis and asepsis can go a long way in decreasing the incidence of relaparotomy. Taking calculative decision before embarking on hasty decision of relaparotomy is important for decreasing the incidence of relaparotomy.

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