


# Obstetric relaparotomies: 13 years of tertiary care experience

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## ABSTRACT

**Objective:** Postpartum hemorrhage is the most common cause of maternal morbidity and mortality. Relaparotomy (RL) is the most serious complication after delivery (normal delivery or cesarean section). RL is very rarely required and mostly performed due to intra-abdominal bleeding. This study aims to show the indications for obstetric RL due to hemorrhage and reveal hemorrhage areas.

**Material and Methods:** A total of 120 patients with an RL history due to cesarean and vaginal postpartum hemorrhage were included in the study. Data such as age, gravida, parity, the procedure performed in an RL, the time between surgeries, complications, and the need for blood transfusion were obtained from clinical files. Descriptive statistical analysis was performed.

**Results:** The RL incidence was 0.44%. Of all RLs, 18.3% (n=22) occurred after vaginal delivery while 81.7% (n=98) occurred after cesarean sections. The indications for an RL were intra-abdominal hemorrhage (83.4%, n=100) and atony (16.6%, n=20). Surgical procedures during an RL were hysterectomy (37.5%, n=45), vascular ligation (19.1%, n=23), secondary suturing (24.1%, n=29), rectus muscle repair (13.3%, n=16), and uterine rupture repair (5.8%, n=7).

**Conclusion:** Close follow-up of the patient after delivery is vital in terms of postpartum hemorrhage. The postpartum RL requirement is 0.44% and it is life-saving. Active management during this period is very significant in terms of reducing maternal morbidity and mortality.

**Keywords:** Cesarean sections, complication, relaparotomy.

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## INTRODUCTION

The delivery process, whether vaginal or cesarean, is associated with complications, which can even be fatal.<sup>[1]</sup> The risk of complications is 3 times higher in a cesarean section than in vaginal delivery. Some of these complications are abdominal or vaginal hemorrhage, wound infection, intra-abdominal infection, and injuries in adjacent organs such as the bladder or bowel.<sup>[2]</sup> Postpartum hemorrhage (PPH) which is the leading cause of serious maternal morbidity and mortality worldwide is defined as the presence of 1000 cc or more bleeding in the first 24 h and 12 weeks, with signs of hypovolemia, regardless of the mode of delivery.<sup>[3]</sup> Early diagnosis and treatment of such complications are essential for eliminating the morbidity and mortality of the mother. In recent years, the complication rates have increased in line with the increase in cesarean section rates.<sup>[4]</sup>

A relaparotomy (RL) is rarely necessary but it is important, yet frustrating, for a patient. The previous studies have revealed that the most common RL indications are abdominal and vaginal bleeding.<sup>[5,6]</sup> Blood transfusion, hospitalization in the intensive care unit, and wound infection are some of the complications of RL.<sup>[7]</sup> However, the number of studies explaining RLs is very limited in the available literature. Moreover, no studies in the literature have evaluated RLs due to vaginal PPH and reported detailed data such as localization of intra-abdominal bleeding areas.

This study aimed to show RL indications due to hemorrhage. Hence, hemorrhage areas were determined, and the need for RL decreased. This study was novel in terms of including patients who had a vaginal delivery.

## MATERIAL AND METHODS

Obstetric patients who underwent an RL due to hemorrhage between January 2007 and May 2020 in Dicle University Hospital were evaluated. Patients with obstetric bleeding were referred to this hospital.

Before the study, approval was obtained from the Dicle University Medical Faculty Ethics Committee (Ethics Committee Decision No: 2020-209). The study was conducted in accordance with the principles of the 2013 Helsinki Declaration.

Patients who underwent an RL due to bleeding after cesarean sections and patients who underwent an RL after vaginal delivery were included in the study. Patients <20 weeks pregnant were excluded from the study. In addition, nine patients were excluded due to abdominal abscess, and one was excluded due to placenta retention. A total of 120 patients were included in the study. Patients who underwent an RL once for the obstetric cause were categorized as primary laparotomy, while ten patients who underwent an operation again after the RL were categorized as secondary RL.

During the study duration, 26,767 births, of which 8727 were normal delivery and 18,040 were cesarean sections, were performed in the hospital. Of the included patients, 14% (n=17) gave birth in the hospital while 86% (n=103) gave birth in the outpatient clinic and were then referred to the hospital.

Data such as age, gravida, parity, first surgery indication, the procedure performed during the first surgery, RL time, procedure performed in an RL, the time between surgeries, complications during the surgery,

**Table 1: Demographic characteristics of the patients**

Demographic characteristics	Mean±SD (min–max)
Age	32.92±5.8 (19–46)
Gravida	4.71±2.9 (1–16)
Parity	4.32±2.82 (1–14)
Hemogram	7.21±2.30 (2.94–14)
Hematocrit	20.99±6.98 (8.56–42)
Amount of used erythrocytes (unit)	8.11±5.35 (1–33)
Time between surgeries (day)	3.85±9.73 (0–40)
Hospitalization (day)	10.72±10.17 (2–74)

SD: Standard deviation.

need for blood transfusion, hospitalization duration, and hemogram and hematocrit values before the RL were obtained from clinical files.

## Statistical Analysis

The results were stated as the mean and standard deviation values. Data were analyzed using the IBM SPSS 22 statistical software package. Descriptive statistics were used in the study.

## RESULTS

A total of 120 patients underwent an RL due to hemorrhage, and the RL incidence was 0.44% (RL incidence after cesarean sections and normal delivery were 0.54% and 0.25%, respectively). The patients' demographic and obstetric values are given in Table 1. The mean age was 32.92±5.8 years, and the mean gravida was found as 4.71±2.9.

Of all RLs, 18.3% (n=22) occurred after vaginal delivery, and 81.7% (n=98) occurred after cesarean sections. Of these patients, 67.5% (n=81) underwent operations under emergency conditions.

The RL indications were intra-abdominal hemorrhage (83.4%, n=100) and atony (16.6%, n=20). Surgical procedures during an RL were hysterectomy (37.5%, n=45), vascular ligation (19.1%, n=23), secondary suturing (24.1%, n=29), rectus muscle repair (13.3%, n=16), and uterine rupture repair (5.8%, n=7). Together with rectus muscle repair, two patients underwent secondary suturing, one patient underwent a hysterectomy, and one patient underwent vascular ligation.

Complications after an RL were as follows: Disseminated intravascular coagulopathy (DIC) (7.5%, n=9), acute kidney failure (5%, n=6), and others (6.6%, n=8) such as pleural effusion, pulmonary edema, pulmonary embolism, deep vein thrombosis, and Sheehan syndrome. Intraoperative complications were bladder injury (2.5%, n=3) and ureter injury (2.5%, n=3).

The most common hemorrhage areas detected during RLs were the uterus (32.5%, n=39), rectus abdominis muscle hemorrhage (16.6%, n=20), uterine atony (16.6%, n=20), vaginal cuff hemorrhage (10.8%, n=13), uterine and ovarian arterial hemorrhage (5%, n=6), and hemorrhage due to DIC (3.3%, n=4) (Table 2).

**Table 2: Hemorrhage areas detected during relaparotomy**

Hemorrhage area	n	%
Uterus	39	32.5
Rectus muscle	20	16.6
Vaginal hemorrhage	20	16.6
No hemorrhage area detected	18	15
Vaginal cuff hemorrhage	13	10.8
Uterine or ovarian artery hemorrhage	6	5
DIC	4	3.3

DIC: Disseminated intravascular coagulopathy.

Ten patients underwent a secondary RL. Two patients underwent a hysterectomy, seven patients underwent secondary suturing, and one patient underwent uterine devascularization. The incidence of secondary RL was 8.3%. Unfortunately, 4 (3.3%) patients died.

## DISCUSSION

Complications during surgical interventions are not entirely preventable. Postpartum complications have also increased with the increase in cesarean delivery rates worldwide. Kuklina et al.<sup>[8]</sup> reported that complications related to pregnancy increased gradually due to the increase in cesarean rates. The mortality rate of hospitalized patients due to pregnancy-related morbidity was between 54 and 100/1000 patients. The high mortality rate showed the importance of early diagnosis and treatment of obstetric complications.

PPH is an obstetric emergency and one of the important causes of maternal morbidity. It is a preventable maternal death with timely diagnosis and appropriate treatment.<sup>[9]</sup> PPH cases occurring during the first 24 h are called primary PPH, while those occurring between 24 h and 6 weeks are called secondary PPH. The most important cause of primary PPH is uterine atony. Among the most common causes of secondary PPH are placenta retention, infection, and coagulation defects. Although medical treatment is a priority in patients with PPH after a vaginal delivery, laparotomy, which is the last step in the treatment, provides the definitive treatment.<sup>[10,11]</sup>

The cesarean rate in Türkiye was reported to be around 56% by the Ministry of Health, which is higher than those in developed countries.<sup>[12]</sup> Reducing high cesarean rates is essential for lowering obstetric complication rates. In the present study, 81.7% of patients who underwent an RL gave birth by cesarean sections. The most common indication among them was the cesarean section (44.2%). It was believed that the high rate of births through cesarean sections in the present study was because the hospital was a tertiary hospital and all complicated cases were referred to it.

Repeated laparotomy due to the original disease is called RL and covers the first 60 days. The RL carried out during the first 21 days is called early RL.<sup>[13,14]</sup> It is challenging for a surgeon to decide to perform an RL for any reason in a patient who has had a laparotomy earlier. The delay in decision-making increases the risk of the mother's mortality and morbidity.

All patients in the present study underwent an RL within 40 days, and of these, 65% underwent operation within 24 h.

In the present study, the RL rate was found to be 0.44%, which was similar to previous findings. The literature revealed that the RL rate varied from 0.07% to 1.04%.<sup>[15–19]</sup> In a study in which 2500 people participated and where all patients had a cesarean section, the most common reason for RL was found to be bleeding (92.3%). In this study, the rate of RL was found to be 1.04%, which was higher than the literature. The study reported insufficient prenatal care as the reason for this.<sup>[16]</sup> In another study conducted in Poland, the rate of RL was found to be 0.57%. In this study, 84% of the patients were reoperated for bleeding.<sup>[7]</sup> In the study of Levitt et al.,<sup>[17]</sup> the rate of RL was reported as 0.3%. Bleeding was found to be the most common indication (62%) also in this study. The most common uterine incision line was found as the bleeding area. In the present study, the most common bleeding site was the uterus. In a study examining patients who underwent RL due to bleeding, the incidence of RL was found to be 0.26%. Similar to our study, the uterus was reported to be the most common bleeding site. No bleeding area was found in 17.3% of the patients.<sup>[18]</sup> In the present study, this rate was 15%.

As mentioned earlier, an RL after vaginal delivery was not evaluated in the previous studies. An RL was generally performed with the indication of abdominal hemorrhage.<sup>[9,16]</sup> Since an RL after vaginal delivery was also examined in the present study, patients with abdominal hemorrhage and atony were included in the study.

In a study comparing the complications of cesarean section and vaginal delivery, it was reported that the risk of RL after the cesarean section was 7 times higher compared to the vaginal delivery.<sup>[20]</sup>

In obstetric emergencies, it is important to perform a cesarean section and quickly remove the fetus. The uterus must be reached quickly and opened without damaging the abdominal layers in such patients, which is not always possible. The removal of the subcutaneous tissue and rectus sheath by blunt dissection can minimize the damage and protect the nerves and veins.<sup>[21]</sup> The risk of rectus sheath hematoma due to the trauma of epigastric arteries during laparotomy is higher in pregnant women.<sup>[22]</sup> This was supported by the present finding that 67.5% of patients who underwent RL were emergency cases. The most common region of hemorrhage in patients who underwent an RL due to bleeding was the uterus (32.5%), which was followed by the rectus muscle (16.6%), uterine atony (16.6%), and vaginal cuff (11.4%). No source of hemorrhage was found in 15% of the patients. Although rectus muscle hemorrhage ranged between 3.6% and 7.4% in RL indications in the previous studies,<sup>[5,6]</sup> the rate was higher in the present study.

## CONCLUSION

In obstetric practice, cesarean section is the most common surgery, besides vaginal delivery. However, considering the results, it is not a simple practice. A surgical procedure for a patient whose anatomical structure has been changed due to pregnancy, especially in emergency cases, is not only a life-saving procedure but can also lead to serious complications. Such patients may need repeated surgeries; hence, hemorrhage control should always be taken care of. The patient should be followed up closely, especially in the first 24 h after delivery. Early diagnosis and treatment are life-saving in PPH.

## Statement

**Ethics Committee Approval:** The Dicle University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee granted approval for this study (date: 04.06.2020, number: 209).

**Informed Consent:** Written informed consent was obtained from patients who participated in this study.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – FMF; Design – FMF, MSİ; Supervision – FMF, MSİ; Resource – FMF, MSİ; Materials – FMF; Data Collection and/or Processing – FMF, MSİ; Analysis and/or Interpretation – FMF; Literature Search – FMF, MSİ; Writing – FMF; Critical Reviews – FMF, MSİ.

**Conflict of Interest:** The authors have no conflict of interest to declare.

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