

Training and congress

Obstetric medicine

Relaparotomy after caesarean section: risks, indications and treatment options

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■ **Caesarean section is the most common obstetric surgeries (1) and can cause a variety of postoperative complications, such as postoperative bleeding or organ injuries. The low number of relaparotomies after caesarean section in our clinic is comparable with the relaparotomy rates, which are described in studies as 0.12–0.23% (2,3). A re-intervention exposes the patient to an additional surgical and anesthesiologic risk, as well as an increased risk for blood transfusions, the need for intensive care monitoring and treatment, an increased risk for infections and a longer hospital stay. The overall situation also has an impact on the mother's physical, emotional and mental well-being.**

Relaparotomy is defined as a planned or unplanned surgery carried out inside 60 days after the first operation for the primary disorder (4). A relaparotomy after caesarean section is almost

always an emergency with a high risk of significant blood loss and is therefore associated with high mortality and morbidity. The number of caesarean sections is increasing from year to year (3,5). According to the WHO, more than 216.000 people are born worldwide every day, i.e. 80 million a year. As the birth rate by caesarean section is 18% worldwide, this means that over 16 million sections are performed worldwide every year. Both planned and unplanned sections contribute to this rising number. Also at our clinic the section rate was 28.8% in 2023.

Although surgical safety has increased significantly in recent years, there are still some risks and complications associated with a caesarean section. Relaparotomy is one of the rarest interventions after a previous caesarean section. The aim of this article is to identify risk factors and causes of relaparotomy after caesarean section trying to avoid this rare complication.

Indications, clinical procedure, treatment options and results

Caesarean section is predisposed to more risks and complications compared to spontaneous delivery. The most common indications for relaparotomy are shown in Table 1 (1). Relaparotomy carries an even higher risk. The risk of relaparotomy is 16 times higher in women who have given birth by caesarean section than in women who have given vaginal birth (6).

The most common indications for relaparotomy after caesarean section

Intraabdominal postoperative bleeding	44.4%
Postpartum hemorrhage (atonic + traumatic)	40.7%
Abdominal wall hematoma, wound dehiscence	11.1%
Ileus (adhesions with subsequent intestinal obstruction), peritonitis	3.7%

Table 1: The most common indications for a relaparotomy after caesarean

An acute abdomen after caesarean section is always an absolute indication for relaparotomy, which should be performed via the existing transverse section, whereby a longitudinal laparotomy with umbilical circumcission and full-size exposure of the uterus should be performed in cases of poor overview, lack of bowel mobility and inadequate hemostasis. The greatest risk of postoperative bleeding occurs within 24 hours of the initial procedure. In most cases, there are already intraoperative problems with hemostasis (impaired, insufficient hemostasis) with or without accompanying laboratory and clinical coagulation abnormalities, or the intraoperative blood loss is above average and there is a significant hemoglobin drop postoperatively. Alternatively, the increased flow rate of drainages or continuous blood leakage is noticeable postoperatively from the tension-filled wound. The development of an abdominal wall hematoma is attributed to inadequate hemostasis or a sharp, digital expansion of the space between the two parts of the rectus and damage to the epigastric vessels or a direct muscle tear. Hemorrhage after section can occur intraabdominally and retroperitoneally (uterine artery or iliac vein area, alternatively the area of the cardinal and vesico-uterine ligaments) (7) and can be arterial, venous or due to a coagulation problem, for example dilutional coagulopathy as a result of loss of

Indication for primary surgery	
Obstetric arrest	29.6%
Pathological CTG	22.2%
Condition after caesarean section	22.2%
PAS + placenta	14.8%
Macrosomia of the child	7.0%
Severe preeclampsia	4.1%

Table 2: Indication for primary surgery

Time interval	Number of relaparotomies	Percentage
<24 h	18	85.2%
24–72 h	3	10.0%
>72 h	9	4.8%

Table 3: Time interval between caesarean section and relaparotomy

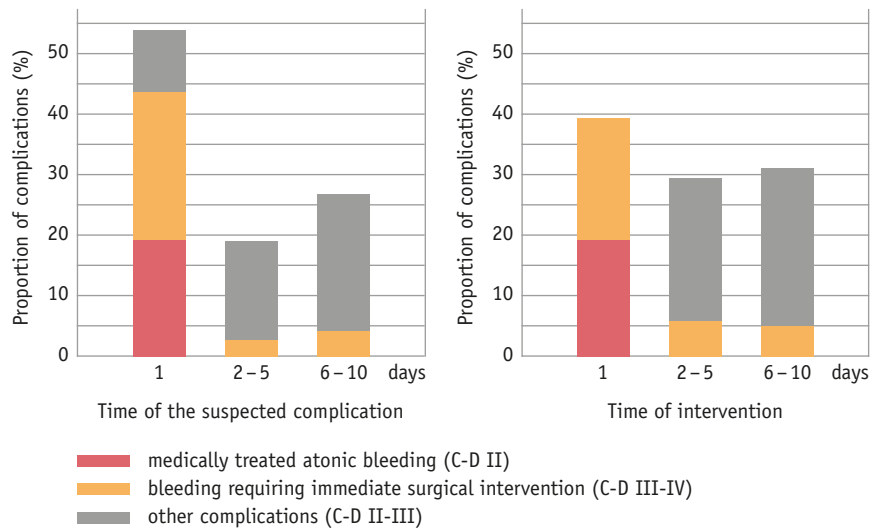


Fig. 1: Time of postoperative complication and surgical intervention during the first 10 postoperative days after caesarean section (8). Other complications are: Endometritis and fever during puerperium, blood transfusion, complications after spinal anesthesia, unrecognized bladder lesion, wound dehiscence

coagulation factors. During relaparotomy, dehiscence of the uterine scar near the uterotomy angle can also be the source of intra-abdominal bleeding.

Most of the sections (75.2%) after which a surgical revision was necessary were performed for acute indications (emergency section or urgent section), only 24.8% followed an elective section (1).

Possible significant risk factors for relaparotomy after caesarean section: Placenta praevia, placenta accreta spectrum (PAS), emergency caesarean section, condition after caesarean section, uterine rupture with further tearing in the direction of the parametrium or corpus with subsequent bleeding, premature placental abruption, macrosomia of the child and severe preeclampsia. A prolonged procedure duration also increases the risk of relaparotomy, for example caused by a required adhesiolysis or untypical anatomy with the risk of injury to neighboring organs. In addition, there is a risk of an increased blood loss of 1.5–2 ltr and persistent bleeding with the possibility of developing consumption coagulopathy (Fig. 1) (8).

The risk of maternal complications also increases with the number of repeat sections. The most common indication for caesarean section is the obstetric arrest (29.6%), followed by pathological cardiotocography (CTG) (22.2%) (Table 2) (1).

The time interval between the caesarean section and the relaparotomy is usually less than 24 hours (85.2%). 4.8% of the patients (9 cases) had the laparotomy after 72 hours, with 3 cases (10.0%) being operated on within 24–72 hours (Table 3) (1).

At this point, more than half of the patients already exhibit hemodynamic instability with a drop in pressure, hypotension, tachycardia and oliguria (66% of cases) combined with intraabdominal or vaginal bleeding with a relevant drop in hemoglobin requiring transfusion. Severe postpartum hemorrhage (PPH) is defined as postpartum hemorrhage with increased blood loss of more than 0.5 ltr after vaginal delivery and more than

Intervention during relaparotomy	
Total hysterectomy/supracervical hysterectomy	46.9%
Hematoma evacuation, wound revision, hemostasis, if applicable with ligation of the internal iliac artery shortly below the outlet from the common iliac artery, drainage, tamponade, TachoSil®* (fibrinogen + thrombin)	38.3%
B-Lynch suture	11.1%
Adhesiolysis and bowel resection, abscess cleavage	3.7%

* no paid advertising

Table 4: Intervention during the relaparotomy

Cardinal management problems of relaparotomy after caesarean section	Optimal procedure based on PPH guidelines
Coagulation box not on site / not available, delay in the provision of blood and coagulation products	Coagulation box with uterotonics (oxytocin, misoprostol, sulprostone), tranexamic acid, fibrinogen, fibrinogen + thrombin (TachoSil®), PPSB, calcium gluconate, desmopressin, FFP, timely and efficient communication with laboratory, Provision of fresh frozen plasma (FFP), red cells concentrates (RCC) and platelet concentrates (PC) from blood volume (BV) of > 1000 ml
Misjudgment of blood loss, delayed administration of blood and blood products (FFP, fibrinogen and platelet concentrates, recombinant factor VIIa)	Measurement of blood loss Adjusted volume and blood product administration from BV > 1000 ml
Late indication and performance of the required hysterectomy	Timely hysterectomy from BV >2000 ml and exhaustion of conservative/organ-preserving measures
Insufficient or ineffective communication in the interdisciplinary team, lack of adequate further education and training, possibly no prior information of all specialist departments involved in the treatment	Regular training and simulation of bleeding situations in an interdisciplinary team
Delayed diagnosis of postpartum hemorrhage from the atonic uterus after caesarean section	Careful postoperative monitoring of vital, circulatory and laboratory parameters
Late diagnosis and no prevention of consumption coagulopathy	Timely administration of antifibrinolytics (tranexamic acid, fibrinogen and other coagulation factors) in case of increased fibrinolytic activity and persistent bleeding
Lack of thrombosis prophylaxis after bleeding arrest	Consider thrombosis prophylaxis within 24 hours after bleeding arrest

Table 5: Cardinal management problems of relaparotomy after caesarean section and optimal procedure based on PPH guidelines (9)

1.0 ltr after caesarean section within the first 24 hours after delivery.

The indication for a relaparotomy is usually given within the first 4 - 6 hours after the first procedure. Due to the pregnancy-induced increase in blood volume (approx. 10 % of a pregnant woman's body weight), a previously healthy, normovolemic pregnant woman can tolerate a blood loss of up to 1.5 ltr which corresponds to up to 25 % of the blood volume, without signs of hemodynamic instability. This does not apply to pregnant women with anemia. Underestimation of blood loss, lack of or late prevention and treatment of coagulopathy can result in massive blood transfusions, hypovolemic shock with coagulopathy and even organ failure. Also, the surgeon's experience is a decisive factor with regard to postoperative blood loss.

Summary

Relaparotomy after caesarean section, which is considered a diagnostic and lifesaving procedure, is one of the rarest postoperative complications but it carries a very high risk of maternal mortality and morbidity. The incidence rate reported in the literature is 0.2 – 1.04 % (1). Placenta previa with or without PAS, fetal macrosomia, emergency caesarean section, preeclampsia, complicated hemostasis and intraoperative blood loss of more than 1.5 ltr increases the risk of relaparotomy. The most common indication for a relaparotomy is suspected intraperitoneal rebleeding, possibly combined with PPH and hemodynamic instability with a significant drop in hemoglobin. The most important surgical measure during relaparotomy (Table 4) is peripartum hysterectomy in combination with hematoma evacuation and securing of blood dryness,

which is usually performed within twelve hours of the first operation. This often difficult decision requires good clinical judgment. Timely diagnosis and surgical treatment are extremely important when conservative management is no longer possible (Table 5).

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Conflict of interest

Ch. Stauffenberg states that there are no conflicts of interest.

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