

EMERGENCY CESAREAN SECTION COMPLICATED BY INTRAPARTUM HEMORRHAGE: AN OBSTETRICIAN-GYNECOLOGIST'S PERSPECTIVE

Shchedrina Irina Dmitrievna¹; Makhinov Vladimir Alekseevich²

¹*Candidate of Medical Sciences, obstetrician-gynecologist at the gynecological department; e-mail: forgottenz@mail.ru. 8-982-651-42-98;*

²*Candidate of Medical Sciences and a doctor of the highest category at the gynecological department; e-mail: mahinovva@mail.ru. 8-911-986-19-28*

State Budgetary Healthcare Institution "Leningrad Regional Clinical Hospital", Saint Petersburg, Russia

194291, Saint Petersburg, Lunacharsky Avenue, house 45, building 2

DOI: 10.52340/geoanesthesia.2026.09.28

Introduction and relevance

Delivery by cesarean section (CS) is a method of delivery in which the baby is born through surgical intervention involving an incision in the wall of the pregnant uterus, extraction of the fetus and placenta, and subsequent restoration of the uterus's integrity. As of 2024, the cesarean section rate in the Russian Federation was approximately 31.2%. In some regions and large perinatal centers, this figure reached 40–50% [1, 2].

It is important to note that CS is an aggressive method of delivery that carries a risk of complications for the mother (bleeding, infection, damage to adjacent organs, etc.). At the same time, there is no direct correlation between an increase in the frequency of CS and perinatal mortality rates. The optimal frequency of CS remains a subject of debate in obstetric practice [1, 3].

The expediency of expanding indications for CS is justified by three goals: reducing perinatal mortality (PS), childhood, and, according to some obstetricians, maternal injuries. The latter argument is not convincing enough, since considering CS as a gentle method of delivery for the fetus, one must be aware that it is certainly aggressive for the mother. Therefore, in the context of a constant decrease in the population health index, it is a mistake to assume that the expansion of indications for COP is associated with an improvement in the somatic and reproductive health of women [4, 5].

The obvious result of the excessive focus on CS was a decline in the obstetric professionalism and the qualifications of obstetricians in the art of managing childbirth. For most young specialists, applying obstetric forceps, managing childbirth in the case of breech presentation of the fetus, rotating the second fetus in a twin pregnancy to a foot presentation with subsequent extraction, etc., is an insurmountable task.

The purpose of the study

Modern algorithms for managing massive blood loss after childbirth via cesarean section are presented. The main causes of massive blood loss in the postpartum period and the consequences of incorrect treatment tactics are examined (a clinical case is provided).

Results

The prevalence of postpartum bleeding (more than 500 ml) worldwide is approximately 6% of all pregnancies, and the prevalence of severe postpartum bleeding (more than 1000 ml) is 1.96%. All leading global organizations – the World Health Organization, The American Academy of Family Physicians, the Royal College of Obstetricians and Gynaecologists (RCOG), the International Federation of Obstetricians and Gynecologists, the French National College of Obstetricians and Gynecologists, the American College of Obstetricians and Gynecologists, and the Russian Society of Obstetricians and Gynecologists primarily focus their efforts on the prevention and treatment of this complication of pregnancy and childbirth [6,7].

The main reasons for failures in providing medical care for blood loss in obstetrics are delays in stopping bleeding (surgical and conservative hemostasis) and in initiating effective intensive therapy (replenishing the circulating blood volume). To change this situation, it is necessary to implement at all levels the main stages of treatment for blood loss that have proven their effectiveness. These stages are outlined in clinical guidelines (treatment protocols).

Terms and definitions:

- Intraoperative (intrapartum) bleeding during a cesarean section (CS) is blood loss that occurs directly during the operation.
- 1000 ml or more during operative delivery, or any clinically significant volume of blood loss leading to hemodynamic instability.
- The normal blood loss during a cesarean section (CS) is up to 1000 ml. This volume is considered physiological and, in most cases, is tolerated by women without any concomitant pathology without difficulty.
- Physiological blood loss is blood loss of <10% BCC or <0.5-0.7% of body weight, or <5 ml/kg (<500.0 ml).
- Massive blood loss is a simultaneous loss of more than 1,500 ml of blood (25-30% BCC) or 2,500 ml of blood (50% BCC) in 3 hours.

Stages of providing medical care to patients with blood loss in obstetrics

Organization. Identification of risk factors for the development of massive blood loss and routing of patients at risk (abruption and abnormalities of placental attachment, multiple pregnancy, preeclampsia/arterial hypertension during pregnancy, congenital and acquired disorders in the hemostasis system) to a higher (3rd) level of care.

Prevention

In modern obstetrics, effective prevention of massive blood loss includes [1, 2, 8]:

- active management of the third stage of labour (active management of the third stage of labour, AMTSL);
- use of uterotonics (oxytocin, prostaglandins, carbetocin, methylergometrine);
- uterine balloon tamponade.

It should be noted that uterotonics and balloon tamponade of the uterus do not exclude or replace each other and should be used especially in emergency care in conditions of limited resources (low-resource settings). So, In the conditions of the Regional Perinatal Center in Yekaterinburg, the placement of an intrauterine balloon for preventive purposes is carried out up to 170 times a year. During a cesarean section, preventive measures in cases of high risk factors also include ligation of the uterine arteries and, in some situations, the application of compression sutures to the uterus.

- Damage control surgery
- Damage control resuscitation) – a timely and effective technology for maintaining vital functions in conditions of massive blood loss and shock. - - The principle of “hemostasis control” involves the timely detection and correction of acute hemostasis disorders (coagulopathy, DIC syndrome) during delivery and in the postpartum period [9].

Goals: With effective bleeding control and intensive therapy, the criteria for a positive effect in massive blood loss and hemorrhagic shock are achieved

within 3-4 hours.:

- There is no hemorrhagic syndrome of any localization, nature or intensity.
- Systolic blood pressure >90 mmHg without vasopressors.
- The hemoglobin level is more than 70 g/l.
- There are no clinical and laboratory signs

of coagulopathy (fibrinogen more than 2.0 g/l, platelets more than 50×10^9 , international normalized ratio, activated partial thromboplastin time less than 1.5 of the norm, norm on the thromboelastogram).

- The rate of diuresis is more than 0.5 ml/kg per hour.
- Saturation of mixed venous blood is more than 70%.
- Consciousness and adequate spontaneous breathing are restored.
- If the treatment goals for blood loss are not achieved within the next 3–4 hours, and arterial hypotension persists or worsens (vasopressors are used), anemia, or oliguria, then the first priority is to rule out ongoing bleeding [1, 10].

A clinical case of massive postpartum hemorrhage, analysis of clinical and tactical errors

From the medical history: childbirth 3, pregnancy term 41 weeks, transferred for labor stimulation to the maternity department at the hospital at the place of residence. Amniotomy was performed, labor was enhanced with an oxytocin solution according to the protocol.

The childbirth was complicated by signs of fetal distress, and an operative delivery was performed using vacuum extraction of the fetus.

After the delivery of the placenta, 500 ml of blood was released, and bleeding continues.

Manual examination of the uterine cavity was performed under intravenous anesthesia. Total blood loss: 990 ml.

After 6 hours, hemoglobin was 69 g/L, platelet count was 71, blood pressure was 100/70, pulse was 124 per minute, diuresis was significantly reduced, and an ultrasound of the pelvic organs revealed free fluid in the pelvic cavity.

Total blood loss: 2530 ml. Given the massive bleeding, grade 4 hemorrhagic shock, and DIC syndrome, a repeat laparotomy is indicated, with the scope of the operation expanded to include hysterectomy without adnexa.

Infusion and transfusion therapy was carried out according to the massive blood loss protocol. Total blood loss: 4266 ml. Anuria.

Transferred to the Leningrad Regional Clinical Hospital, Intensive Care Unit 1.

Diagnosis: Early postpartum hypotonic bleeding.

Massive blood loss syndrome. Grade 4 hemorrhagic shock. Multiple organ dysfunction syndrome. DIC syndrome. Acute kidney failure. Anuria. Severe anemia.

As a result, the development of hemorrhagic shock of grade 4, acute kidney injury with the development of acute renal failure, DIC syndrome and multiple organ failure, the addition of respiratory failure and pulmonary edema, pulmonary embolism, stroke, and a fatal outcome.

Conclusion

Providing emergency care for massive bleeding in obstetrics is one of the priority tasks for reducing maternal morbidity and mortality. Given the available capabilities for providing conservative and surgical hemostasis, replenishing hypovolemia, and ensuring adequate oxygen transport, it is extremely important to determine not only the list of treatment measures but also the pace at which care is provided.

When determining the pace of assistance, the priorities of each stage become clearer, which makes it possible to plan the necessary stock of both medications and consumables. Currently, it is quite obvious that it is necessary to develop organ-preserving technologies when providing emergency care in cases of obstetric bleeding, which requires appropriate training for obstetricians and gynecologists. Intensive therapy for massive blood loss should also be based on modern medications for infusion therapy, a clear definition of the indications for the use of blood components and isolated coagulation factors, and the use of effective hemostatic medications. Timely control of bleeding, combined with adequate intensive therapy, makes it possible to implement an organ-preserving approach and prevent the development of a critical condition even under conditions of limited resources.

References:

1. Clinical guidelines, postpartum hemorrhage, Ministry of Health of the Russian Federation, 2025
2. Clinical guidelines – Singleton delivery, delivery by cesarean section – 2024–2025–2026 (03.09.2024) – Approved by the Ministry of Health of the Russian Federation.
3. Shmakov RG, Novikova SV, Il'yashenko EN, Logutova LS. Cesarean section in modern obstetrics: problems and ways to overcome them. Russian Bulletin of Obstetrician-Gynecologist. 2025;25(4):5-18. (In Russ.) <https://doi.org/10.17116/rosakush2025250415>.
4. Ulla S., Beisenova A. Factors contributing to an increase in the frequency of cesarean section: a literature review. Reproductive Medicine. 2022;4:53:68-75. <https://doi.org/10.37800/RM.3.2022.68-75>.
5. Krasnopol'sky V.I., Radzinsky V.E., Logutova L.S., Buyanova S.N., Aksenov A.N., Upryamova E.Yu., Melnikov A.P., Puchkova N.V. Cesarean section. Problems of abdominal obstetrics: a guide for doctors. Edited by V.I. Krasnopol'sky. Moscow: SIMK. 2018;224.
6. Riddell NS, Barrett L, Curry N, Mutch NJ, Collis R, Collins PW, Bell SF, de Lloyd L. Coagulopathy in obstetric bleeding: a narrative review and comparison with trauma-induced coagulopathy. Br J Anaesth. 2026 Aug;137(2):545-562. doi: 10.1016/j.bja.2026.05.006. Epub 2026 Jun 12. PMID: 42276949.
7. Giouleka S, Tsakiridis I, Kalogiannidis I, Mamopoulos A, Tentas I, Athanasiadis A, Dagklis T. Postpartum Hemorrhage: A Comprehensive Review of Guidelines. Obstet Gynecol Surv. 2022 Nov;77(11):665-682. doi: 10.1097/OGX.0000000000001061. PMID: 36345105.
8. Baranovskaya E.I. Prevention of massive bleeding in placenta accreta. Russian Bulletin of Obstetrician-Gynecologist. 2021;21(1):84–87. <https://doi.org/10.17116/rosakush20212101184>
9. Chung CY, Scalea TM. Damage control surgery: old concepts and new indications. Curr Opin Crit Care. 2023 Dec 1;29(6):666-673. doi: 10.1097/MCC.0000000000001097. Epub 2023 Sep 26. PMID: 37861194.
10. Hypovolemic shock in adults. Clinical guidelines of the All-Russian Public Organization “Federation of Anesthesiologists and Resuscitators” Published on 27.11.2024.