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# Spontaneous uterine rupture in a multiparous woman without uterus scar

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## Abstract

Spontaneous uterine rupture during pregnancy is a life-threatening complication that predominantly occurs in the third trimester. A scar resulting from a prior cesarean section represents the primary risk factor for uterine rupture. It is one of the most severe complications in obstetrics, accompanied by bleeding, severe traumatic and hemorrhagic shock, and high perinatal mortality for both the fetus and the woman. Cases of uterine rupture without commonly accepted risk factors, regardless of parity or gestational age, have been described in the literature. Here, we present a clinical case of a complete uterine rupture occurred outside a medical facility at gestational age of 25 weeks in a multiparous woman with a complicated obstetric-gynecological history, lacking uterine scar. This was accompanied by severe hemorrhagic shock, cardiac arrest, and antenatal fetal demise. High-quality specialized care resulted in a favorable outcome for the mother.

**Keywords:** pregnancy, multiparous, uterine rupture, bleeding, placenta percreta

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## Спонтанный разрыв матки у многорожавшей женщины без рубца на матке

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## Резюме

Спонтанный разрыв матки во время беременности является угрожающим для жизни осложнением, которое возникает преимущественно в III триместре, основным фактором риска разрыва матки является наличие рубца после кесарева сечения. Это одно из самых тяжелых осложнений в акушерстве, сопровождающееся кровотечением, тяжелым травматическим и геморрагическим шоком, с высокой перинатальной смертностью плода и женщины. В литературе описаны случаи разрыва матки при отсутствии общепринятых факторов риска, независимо от паритета родов и срока гестации. В данной



статье описан клинический случай полного разрыва матки вне стационара в сроке беременности 25 недель у многорожавшей с отягощенным акушерско-гинекологическим анамнезом, без рубца на матке, сопровождавшийся развитием тяжелого геморрагического шока, остановкой сердечной деятельности и антенатальной гибелью плода. Высококвалифицированная специализированная помощь определила благоприятный исход для матери.

**Ключевые слова:** беременность, многорожавшая, разрыв матки, кровотечение, вращение плаценты

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### Highlights

#### What is already known about this subject?

- Uterine rupture is a critical obstetric complication occurring during pregnancy or childbirth, characterized by high maternal and perinatal morbidity and mortality rates, primarily due to internal bleeding, antenatal/intrapartum fetal demise, hemorrhagic/pain shock, cardiac arrest, and disseminated intravascular coagulation.
- In recent decades, due to expanded indications for operative delivery, a uterine scar has become a primary risk factor for uterine rupture. Cases of spontaneous rupture at the scar site, in association with placenta accreta spectrum, significantly increase adverse outcomes for both mother and fetus.
- Rupture of the unoperated uterus during pregnancy is quite rare. The risk group includes multiparous women and those with a history of intrauterine manipulations such as dilatation and curettage (D&C) or uterine septum resection.

#### What are the new findings?

- It challenges the standard notion that uterine scarring is the primary risk factor for uterine rupture during pregnancy. While collecting histories from unoperated pregnant women, special attention should be paid to risk factors that may lead to spontaneous uterine rupture.
- Spontaneous uterine rupture can occur at any point in pregnancy without traumatic or violent factors, even in the absence of the known risk factors. Timely diagnostics and emergency assistance can reduce maternal and perinatal morbidity and mortality.

#### How might it impact on clinical practice in the foreseeable future?

- Increased attention and vigilance towards multiparous women with complicated obstetric histories as a risk group for spontaneous uterine rupture during pregnancy is required. Primary health care providers should educate women about family planning and contraception to maintain an optimal interpregnancy interval.
- Pregnant women in the risk group for spontaneous uterine rupture are advised to undergo placental vessel ultrasound Doppler examination and, if necessary, magnetic resonance imaging to rule out placenta accreta spectrum.

### Основные моменты

#### Что уже известно об этой теме?

- Разрыв матки – критическое акушерское осложнение беременности или родов, характеризующееся высоким уровнем материнской и перинатальной заболеваемости и смертности, в первую очередь из-за внутреннего кровотечения, антенатальной/интранатальной гибели плода, геморрагического/болевого шока, остановки сердца и диссеминированного внутрисосудистого свертывания крови.
- В последние десятилетия в связи с расширением показаний к оперативному родоразрешению рубец на матке стал основным фактором риска разрыва матки. Случаи спонтанного разрыва матки по рубцу в сочетании с вращением плаценты в область рубца значительно увеличивают неблагоприятный исход как для матери, так и для плода.
- Разрыв неоперированной матки во время беременности встречается довольно редко. Группу риска по спонтанному разрыву матки составляют многократно рожавшие женщины и женщины, имеющие в анамнезе внутриматочные манипуляции: выскабливание стенок, рассечение перегородки в полости матки.

#### Что нового дает статья?

- Убирает шаблон об основной группе риска по разрыву матки во время беременности – рубец на матке. При сборе анамнеза у неоперированных беременных особое внимание необходимо уделять факторам риска, которые в дальнейшем, по мере прогрессирования беременности, могут быть причиной спонтанного разрыва матки.
- Спонтанный разрыв матки может произойти в любом сроке беременности, без травматического/насильного воздействия, даже при отсутствии факторов риска разрыва матки. Своевременная диагностика и оказание неотложной помощи позволит снизить материнскую и перинатальную заболеваемость и смертность.

#### Как это может повлиять на клиническую практику в обозримом будущем?

- Требуется повышенное внимание и настороженность в отношении многорожавших женщин с отягощенным акушерским анамнезом как группе риска по спонтанному разрыву матки во время беременности. Врачи первичного звена должны просвещать женщин по вопросам планирования семьи и контрацепции для поддержания оптимального интервала между родами.
- Беременным группы риска по спонтанному разрыву матки рекомендуется проводить ультразвуковую доплерографию сосудов плаценты, а при необходимости и магнитно-резонансную томографию для исключения вращающегося ворсин хориона в миометрий.

## Introduction / Введение

One of the severe complications in obstetrics is presented by uterine rupture resulting in disruption of the uterine wall integrity. According to the criteria for near miss events, this pathology is classified as a critical complication of pregnancy and childbirth because it is always accompanied by massive bleeding that leads to hemorrhagic shock, requiring immediate emergency intervention [1].

In recent years, due to the expanded indications for operative delivery, the primary risk group for uterine rupture during pregnancy has consisted of women with uterine scar due to previous cesarean section (78–84 %), so that the risk increases with each subsequent scar. Women undergone conservative myomectomy, especially those who experienced a rupture of the uterine cavity during myoma removal, as well as those with intrauterine manipulations and post-laparoscopic surgeries due to ectopic pregnancies, are also at risk [2, 3].

Uterine ruptures during pregnancy are characterized by high perinatal mortality rates, with antenatal fetal loss being reported in as high as 70–92 % cases. Even with medical assistance, maternal mortality remains high (1–2 deaths per 100 uterine ruptures), reaching sometimes 60–70 % among women who are hospitalized late [4]. Hemorrhage, septic complications, and thromboembolic complications are the main causes of maternal mortality during uterine rupture [5, 6].

In cases without history of surgical interventions on the uterus, the risk group for spontaneous uterine rupture during pregnancy includes multiparous women with a complicated obstetric history (repeated instrumental curettage of the uterine cavity) [7]. Nonetheless, it is reported about cases of uterine rupture during pregnancy in the absence of overt risk factors, such as spontaneous atypical rupture along the posterior uterine wall with an existing scar on the anterior wall [8], in primiparous women [9, 10], in pregnant women with connective tissue disease [11], as well as at gestational age of 17 and 26 weeks without risk factors [12, 13]. It is noted, however, that spontaneous uterine rupture without risk factors in history occurs quite rarely [14, 15]. An additional risk factor for uterine rupture during pregnancy is placental attachment anomaly which significantly increases the risk of adverse outcomes for both the mother and the fetus. In 2019, the clinical case was described involving a uterine rupture at 33–34 weeks of pregnancy in a woman with placental invasion along the anterior uterine wall [16]. According to V.E. Radzinsky (2017), the primary cause of uterine ruptures is the morphological structural inadequacy in the myometrium, mainly resulting from damaging factors such as hypoxia, reduced blood supply to the myometrium (ischemia), and inflammation [17].

The absence of overt risk factors for uterine rupture during pregnancy in a woman, along with the rare incidence rate of this pathology, do not facilitate prompt diagnostics; rather, timely detection of uterine rupture and immediate surgical treatment are crucial in preventing maternal and perinatal mortality.

## Clinical case / Клинический случай

Patient A., a 32-year-old woman, was transported on September 29, 2024, at 02:20, by an ambulance team on a stretcher in a severely critical condition.

According to her accompanying husband, she began to experience pulling pains in the lower abdomen on September 28, 2024, at 16:00. On September 28, 2024, at 23:00, there was a single episode of vomiting during ongoing lower abdominal pain; she did not seek medical help and fell asleep. On September 29, 2024, at 02:00, the pregnant woman woke up from a sharp stabbing pain in her abdomen and lost consciousness; she was transported by the ambulance team to the emergency room of the city perinatal center. Medical personnel was mobilized, and a 0.9% sodium chloride infusion was administered intravenously. Oxygen was provided through binasal cannulas.

From the patient history, chronic pyelonephritis diagnosed since 2017, exacerbated in 2020.

## Obstetric history / Акушерский анамнез

Since 2015, the patient had four term deliveries (2015, 2017, 2021, 2023) and two spontaneous abortions (2019, 2022) at gestational age of 8 weeks, which required curettage. Current pregnancy was the seventh, registered at the women's consultation since gestational age of 12 weeks; patient A. visited the attending physician five times. The multiparous woman, with a complicated obstetric history, excess body weight (body mass index = 29.4) and iron deficiency anemia, was in the high-risk group for developing obstetric complications such as preeclampsia, premature labor, and bleeding during pregnancy/labor/postpartum period. According to the clinical diagnostics and treatment protocol of the Ministry of Health of the Republic of Kazakhstan [18], preventive measures were implemented, including the prescription of combination of acetylsalicylic acid (75 mg) and magnesium hydroxide (15.2 mg) 1 tablet per day, and calcium supplements – calcemin 1000 mg/day starting from gestational age of 14 and 16 weeks, respectively. The last visit to a women's consultation occurred at gestational age of 24 weeks and 3 days, being administered anti-anemia therapy for iron deficiency anemia (hemoglobin = 85 g/L).

## Upon admission / При поступлении

The pregnant patient's condition was extremely critical; she was agitated and disoriented with a confused

consciousness, unable to accurately respond to questions. The pupils were of medium size, with a lively consensual photoreaction. Tendon and periosteal reflexes, and muscle tone were preserved. No signs of meningeal irritation were present. Skin was pale, with a cold, sweaty, sticky surface, and pointed facial features. The tongue was dry with a white coating. Lung examination revealed diminished breath sounds without wheezing, respiratory rate – 35 breaths per minute. Muffled heart tones, heart rate – 145 beats per minute; blood pressure – 60/35–50/30 mm Hg, and oxygen saturation ( $\text{SpO}_2$ ) – 75 %. The shock index – 2.4. Due to severe tension and tenderness of the anterior abdominal wall muscles, upon palpation of the abdomen it was impossible to palpate the uterus. No pathological discharge from the genital tract. No urine output was recorded via catheter.

*Diagnosis upon admission:* Gestational age – 25 weeks and 1 day. Complete premature placental abruption. Uterine rupture? Hemorrhage. Severe hemorrhagic shock. Antenatal fetal demise. Multiparous. Moderate anemia. Complicated obstetric history.

Emergency laparotomy was indicated, and the extent of the operation was to be determined upon opening the abdominal cavity. The patient was transported on a stretcher accompanied by an obstetrician-gynecologist and a resuscitator to the operating room. Blood group was redefined as B (III), Rh(+) positive. Blood transfusion including 1000.0 ml of thawed fresh frozen plasma was prepared.

At 02:25. A second peripheral vein was catheterized in operating room followed by blood sampling to assess complete blood count, coagulation profile, and biochemical analysis.

At 02:27, cardiac arrest presented as asystole occurred on operating table; no pulse detected in the major arteries. Immediate cardiopulmonary resuscitation was initiated: external cardiac compression, intubation performed, and connected to a mechanical ventilation apparatus. Epinephrine 1 mg was administered intravenously, along with atropine 0.1 % 1.0 ml intravenously. Resuscitation efforts were carried out for 8 minutes, spontaneous circulation was restored: blood pressure was 70/43 mm Hg, heart rate – 120 beats per minute,  $\text{SpO}_2$  – 95 %. Norepinephrine was administered at a rate of 0.3  $\mu\text{g/kg/min}$ , and the jugular vein was catheterized.

### Surgery / Операция

Upon opening the abdominal cavity, a complete fundal uterine rupture sized 7 cm was identified. A deceased preterm female fetus weighing 720 g, with 2500 ml of hemorrhagic fluid were present among the intestinal loops. The placenta was located at the fundus of the uterus at the rupture site, sized 14.0×9.0×5.0 cm, with signs of invasion into the uterine wall. A total hysterectomy without appendages was performed, with ligation of

the internal iliac arteries, abdominal cavity was drained. Clear urine output via catheter, with a volume of 500.0 ml. Total blood loss was 4000.0 ml. Hemodynamics during the operation was stable: blood pressure – 124/74 mm Hg, heart rate – 82 beats per minute,  $\text{SpO}_2$  – 99 %.

Clinical-laboratory findings indicated a maximum decrease in hemoglobin levels to 49 g/L, a decrease in platelet count to  $46.0 \times 10^9/\text{L}$ ; signs of hypocoagulation noted: fibrinogen level declined to 1.7 g/L, international normalized ratio (INR) – 1.54, prothrombin time – no coagulation, and prothrombin index – 59.7 %, with activated partial thromboplastin time (APTT) at 45.0 seconds.

Total infusion volume constituted of fresh frozen plasma – 1700.0 ml, red blood cell suspension – 2320.0 ml; Hextend – 500.0 ml, cryoprecipitate – 400.0 ml, platelet mass – 870.0 ml, 0.9 % sodium chloride solution – 2500.0 ml. The total infusion volume reached 8290.0 ml.

At the end of the operation, laboratory data showed: hemoglobin level – 89 g/L, platelet count –  $168 \times 10^9/\text{L}$ , fibrinogen level – 4.18 g/L, INR – 1.48, prothrombin time – 32.7 seconds, and prothrombin index – 58.4 %.

The gross specimen revealed an enlarged uterus corresponding to gestational age of 14 weeks. The uterus appeared pale, flaccid, and showed a complete rupture. The placenta was positioned at the fundal area, at the rupture site. The specimen was sent for histological examination.

*Diagnosis post-operation.* Complete uterine rupture at gestational age of 25 weeks and 1 day. Placenta percreta. Hemorrhage. Severe hemorrhagic shock. DIC syndrome. Cardiac arrest. Antenatal fetal demise. Severe post-hemorrhagic anemia. Multiparous. Complicated obstetric history.

*Surgery.* Laparotomy. Total hysterectomy without appendages. Ligation of internal iliac arteries. Plasma transfusion. Cryoprecipitate transfusion. Abdominal drainage. Successful cardiopulmonary resuscitation.

29.09.2024 At 4–5 hours post-hysterectomy, increased hemorrhagic discharge from the abdominal cavity via drain, reaching 1000.0 ml and continuing. Clinical-laboratory investigations indicated a further decrease in hemoglobin level to 58 g/L, platelet count down to  $87.0 \times 10^9/\text{L}$ , signs of hypocoagulation showed a decline in fibrinogen content to 1.32 g/L; INR – 1.77; APTT – 85.0 seconds.

Taking into consideration development of intra-abdominal bleeding along with DIC syndrome, a multidisciplinary consultation decided to perform relaparotomy, abdominoscopy, and plasma transfusion.

### Relaparotomy / Операция релапаротомии

Relaparotomy was performed, and review of the abdominal cavity and pelvis found that the sutures were intact without bleeding; hemostasis of the retroperitoneal space was executed and abdominal drainage was estab-



lished. Autologous blood was returned using a CellSaver apparatus. Hematoplasma transfusion was conducted, with total blood loss noted at 3500.0 ml.

Intra-surgery hemodynamics: blood pressure – 134/92 mm Hg, heart rate – 119 beats/min, SpO<sub>2</sub> – 100 %. Infusion volumes: fresh frozen plasma – 1200.0 ml, red blood cell suspension – 1320.0 ml, Hextend – 500.0 ml, cryoprecipitate – 280.0 ml, platelet mass – 650.0 ml, re-infusion – 1223.0 ml; and 0.9 % sodium chloride solution – 1500.0 ml, Ringer’s solution – 1000.0 ml. The total infusion volume accounted for 7673.0 ml.

Postoperative period / Послеоперационный период

During the postoperative period, the patient was in the Intensive Care Unit (ICU) on extended mechanical ventilation, extubated on day 3. Several examinations were carried out: ECG – sinus rhythm at 80 beats/min; normal cardiac electrical axis position was reported.

Echocardiography revealed no zones of local hypokinesis; the left ventricular contractile function was preserved; no signs of pulmonary hypertension, mean pressure in the pulmonary artery – 27 mm Hg.

Cardiology examination: no signs of coronary pathology at examination.

Doppler ultrasound of the lower extremity veins indicated preserved patency of both deep and superficial veins, with no signs of deep or superficial vein thrombosis identified.

Ultrasound examination of the thoracic cavity, abdominal cavity, and pelvis revealed 130 ml free fluid in the right pleural cavity; traces of free fluid in the abdominal cavity; renal calyces and pelvis not dilated; and intestinal loops not distended.

Notably, acute kidney injury was observed, presented as a prerenal type, and acute hepatitis of ischemic origin along with severe hemorrhagic shock. The patient was repeatedly consulted by nephrologists, hepatologists, and cardiologists, with therapy adjustments. Owing to a multidisciplinary approach, complications during the postoperative period were managed conservatively.

A comprehensive treatment plan involving antibacterial, anti-inflammatory, anemia-correcting, general strengthening, detoxifying therapies was implemented, alongside the management of acute kidney and liver injuries, and prophylaxis of thromboembolic complications, resulting in effective outcomes. The patient was transferred from the ICU to the postpartum department on day 9 post-surgery and was discharged home on day 13.

The report from the pathology examination of the surgical material indicated an enlarged uterus sized 13.0×10.5×6.5 cm, with deformed fundus and disrupted integrity, irregular edges. From an extended defect of irregular shape, the placenta with ruptures sized 14.0×9.0×5.0 cm was extruded and was partially implanted – placenta percreta.

Conclusion / Заключение

Thus, the high parity of pregnancies and childbirths (4 term deliveries and 2 spontaneous abortions), neglected inter-conception interval, and incongruence of the uterine muscle apparatus (twice curettage of the uterine cavity) led to placental attachment anomaly (placenta percreta) and collectively caused uterine rupture in a multiparous woman without a uterine scar, as confirmed by histological examination data.

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