DOI: https://doi.org/10.17816/aog626389

Obstetric and gynecological management in a patient with abnormal invasion of the placenta (placenta percreta)

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ABSTRACT

Pathological placental invasion is a dangerous anomaly during pregnancy, which causes increased maternal morbidity and mortality. Patients with abnormal placental invasion may experience life-threatening uterine bleeding during delivery, particularly in cases of placenta percreta. This often requires surgical intervention, specifically a hysterectomy, which some researchers refer to as the "gold standard" treatment for pathological placental invasion, with rates ranging from 47% to 77.8%. Conversely, other researchers recommend a conservative approach, involving the complete removal of the placenta percreta, excision of damaged areas on the uterine walls and bladder, and metroplasty and restoration of the integrity of the.

This article presents a clinical case of a 40-year-old patient with a complicated obstetric history, including abnormal placental invasion (placenta percreta) involving the anterior wall of the uterus and the bladder.

Delayed diagnosis of such pathology leads to inappropriate treatment and, consequently, acute massive bleeding, posing a risk to the patient's health and life. The applied comprehensive diagnostic and therapeutic measures facilitated the preservation of the pelvic organs and restoration of the patient's reproductive function.

Keywords: placenta percreta; diagnostics; treatment; rehabilitation.

To cite this article:

Ishchenko AI, Gorbenko OYu, Khokhlova ID, Zuev VM, Dzhibladze TA, Baburin DV. Obstetric and gynecological management in a patient with abnormal invasion of the placenta (placenta percreta). *V.F. Snegirev Archives of Obstetrics and Gynecology.* 2024;11(3):350–359. DOI: https://doi.org/10.17816/aog626389

Received: 02.02.2024 **Accepted:** 14.06.2024 **Published online:** 09.09.2024

DOI: https://doi.org/10.17816/aog626389

Акушерско-гинекологическая тактика у пациентки с аномальной инвазией плаценты (placenta percreta)

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АННОТАЦИЯ

Одна из наиболее опасных аномалий во время беременности — патологическая инвазия плаценты, обусловливающая повышение материнской заболеваемости и смертности. Родоразрешение пациенток с аномальной инвазией плаценты, как правило, сопровождается жизнеугрожающим маточным кровотечением, особенно в случаях placenta percreta, что нередко приводит к необходимости оперативного вмешательства — гистерэктомии (47,0–77,8%), которую некоторые авторы называют золотым стандартом лечения патологической инвазии плаценты. Другие исследователи предпочитают органосберегающий подход с полным удалением placenta percreta, иссечением повреждённых областей на стенках матки и мочевом пузыре, последующей метропластикой и восстановлением целостности смежных органов. В статье представлено клиническое наблюдение за пациенткой 40 лет с отягощённым акушерским анамнезом, в том числе аномальной инвазией плаценты (placenta percreta) с вовлечением в патологический процесс не только передней стенки матки, но и мочевого пузыря.

Несвоевременная диагностика подобной патологии влечёт за собой неверную лечебную тактику и, как результат, острое массивное кровотечение, сопряжённое с риском для здоровья и жизни женщины. Проведённые комплексные диагностические и лечебные мероприятия способствовали сохранению органов малого таза и восстановлению репродуктивной функции пациентки.

Ключевые слова: placenta percreta; диагностика; лечение; реабилитация.

Для цитирования:
Ищенко А.И., Горбенко О.Ю., Хохлова И.Д., Зуев В.М., Джибладзе Т.А., Бабурин Д.В. Акушерско-гинекологическая тактика у пациентки с аномальной инвазией плаценты (placenta percreta) // Архив акушерства и гинекологии им. В.Ф. Снегирёва. 2024. Т. 11, № 3. С. 350–359.
DOI: https://doi.org/10.17816/aog626389

Рукопись получена: 02.02.2024 **Рукопись одобрена:** 14.06.2024 **Опубликована online:** 09.09.2024

DOI: https://doi.org/10.17816/aog626389

胎盘异常入侵患者的妇产科策略（placenta percreta）

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摘要

怀孕期间最危险的异常情况之一是胎盘的病理性入侵，这会导致孕产妇发病率和死亡率上升。胎盘异常受侵患者在分娩时通常会出现危及生命的子宫出血，尤其是在 placenta percreta 病例中。这往往导致需要进行手术干预——子宫切除术（47.0%–77.8%），一些学者称其为治疗异常胎盘入侵的金标准。其他研究者则倾向于采用保留器官的方法，即完全切除 placenta percreta，切除子宫壁和膀胱上的受损区域，随后进行创面成形术，并恢复邻近器官的完整性。本文介绍了对一例 40 岁女性患者的临床观察，该患者有严重的产科病史，包括胎盘异常受侵（placenta percreta），病理过程不仅涉及子宫前壁，还涉及膀胱。对这种病症的诊断不及时会导致错误的治疗策略，从而引发急性大出血，对女性的健康和生命构成风险。所采取的综合诊断和治疗措施有助于保护盆腔器官和恢复患者的生殖功能。

关键词：placenta percreta；诊断；治疗；康复。

引用本文：

Ishchenko AI, Gorbenko OYu, Khokhlova ID, Zuev VM, Dzhibladze TA, Baburin DV. 胎盘异常入侵患者的妇产科策略(placenta percreta). *V.F. Snegirev Archives of Obstetrics and Gynecology.* 2024;11(3):350–359. DOI: https://doi.org/10.17816/aog626389

收到: 02.02.2024 **接受:** 14.06.2024 **发布日期:** 09.09.2024

BACKGROUND

Abnormally invasive placenta (AIP) is clinically characterized by its failure to spontaneously detach after childbirth and the inability to remove it without significant hemorrhage. There are three variants of abnormal placental attachment: placenta accreta (creta, vera, or adherenta) is defined by the firm attachment of trophoblasts directly to the myometrium due to a localized absence of the decidualized endometrium; placenta increta is characterized by the penetration of trophoblasts into the myometrium, often reaching the uterine serosal layer; placenta percreta involves the deepest invasion, with chorionic villi penetrating the uterine muscular layers, serosal membrane, and even adjacent organs [1–3].

AIP is one of the most dangerous pregnancy complications, significantly increasing maternal morbidity and mortality. A history of cesarean delivery plays a crucial role in the pathogenesis of abnormal placental attachment, as it often leads to defects in the decidual layer at the site of the postoperative scar. Other risk factors include manual removal of the placenta, chronic endometritis, repeated intrauterine surgical interventions, submucosal uterine fibroids, adenomyosis, myomectomy, uterine artery embolization, high parity, advanced maternal age, Asherman's syndrome, and uterine malformations, all of which disrupt the functional and basal layers of the endometrium [4, 5]. Additionally, several studies identify in vitro fertilization (IVF) as a risk factor. IVF is often associated with elevated serum estradiol levels during embryo implantation, which enhances trophoblastic activity and predisposes to abnormal chorionic villi invasion. According to a multicenter study conducted in the United States, the rate of AIP has significantly increased —from one case per 4,017 deliveries in 1980 to one case per 272 deliveries in 2016. This trend correlates with the rise in cesarean delivery rates over the past four decades, which increased from 10% to 30% [6].

Delivery in women with abnormally invasive placenta is commonly accompanied by uterine and often life-threatening hemorrhage, particularly in cases of placenta percreta. Consequently, it is recommended to avoid prolonging pregnancy beyond 36 weeks in patients with this pathology, as the risk of massive hemorrhage exceeds 50%. Surgical intervention, often in the form of a hysterectomy (47.0%–77.8%), is frequently required and is considered by some authors as the gold standard for treating AIP [7]. However, this radical approach is associated with high maternal morbidity (40%–50%) and mortality rates (up to 7%), primarily due to hemorrhagic syndrome and damage to adjacent organs such as the bladder and ureters [8, 9]. Urinary tract injuries are reported in 29% of cases, with bladder injuries accounting for 76%, ureteral trauma for 17%, and urogenital fistulas for 5% [10]. Some researchers advocate for fertility-sparing approaches, involving the complete removal of placenta percreta, excision of affected areas of the uterine wall and bladder, followed by metroplasty and restoration of adjacent organ integrity [11].

The literature describes various isolated and combined conservative approaches for managing patients with abnormally invasive placenta. These include selective embolization of pelvic arteries, application of uterine compression sutures, administration of methotrexate, *in situ* retention of the placenta following cesarean delivery, and delayed placental expulsion. Several studies report positive outcomes with these methods, enabling most women to avoid hysterectomy. However, other reports emphasize severe complications associated with these treatments, such as delayed postpartum uterine bleeding, endomyometritis, uterine necrosis, pelvic peritonitis, sepsis, and disseminated intravascular coagulation (DIC) syndrome [12–15].

Early diagnosis of abnormally invasive placenta improves pregnancy outcomes by facilitating timely development of appropriate management and delivery strategies. Diagnosis is typically based on instrumental studies, including ultrasound with Doppler imaging and magnetic resonance imaging (MRI). Characteristic ultrasonographic findings include disruption of the vascular architecture at the placental implantation site, thinning of the myometrium, wide gaps in the intervillous space of the chorion, evidence of hypervascularization at the site of placental invasion into the myometrium, and areas of low resistance in abnormal arterial blood flow [16, 17].

Primary MRI features of abnormally invasive placenta include bulging of the placenta or uterus beyond physiological boundaries, the presence of dark intraplacental bands, disorganized placental blood vessels, and disruption of the interface between the uterus and placenta [18, 19].

Rehabilitation for all patients with placenta percreta — regardless of whether bleeding control involved conservative or radical measures — must include a course of iron supplementation [12, 20].

Patients with preserved uteri who wish to continue their reproductive plans often face significant challenges, including iron-deficiency anemia, menstrual dysfunction, endometrial hypoplasia, intrauterine adhesions, pelvic and abdominal adhesion processes, development of urogenital fistulas, uterine scar defects (isthmocele), pregnancy loss, and recurrent abnormal trophoblastic invasion at the scar site in the postoperative uterus [21, 22].

CLINICAL CASE

Patient Z., born in 1983, was admitted to the Pregnancy Pathology Department of the Obstetrics and Gynecology Clinic at the Sechenov Center for Maternal and Child Health with complaints of dull pulling pain in the lower abdomen.

Diagnosis: Pregnancy at 13–14 weeks; threatened miscarriage; cervical insufficiency; recurrent pregnancy loss; uterine scar from a cesarean delivery in 2016. In 2021 the patient experienced premature rupture of membranes

at 18–19 weeks of gestation. Chorioamnionitis. Immediate instrumental removal of the fetal sac. Uterine hemorrhage. A transverse suprapubic laparotomy was performed, including ligation of the internal iliac arteries, application of a compression suture on the uterus, and metroplasty due to placenta percreta (placental invasion). Three months later, the patient developed a vesicouterine fistula, which was surgically repaired in 2021. Chronic endometritis.

Medical History: comorbid conditions: rubella, chronic gastritis, astigmatism, hypothyroidism (managed with levothyroxine at 75 mcg/day). Menstrual history: menarche at the age of 12, regular periods lasting 5 days with a 28-day interval, moderate flow, and painful menstruation.

Reproductive history

2016: first pregnancy ended in a timely cesarean delivery due to clinically diagnosed narrow pelvis. The newborn weighed 3200 g with Apgar score of 7/8.

2018: second pregnancy ended in a missed miscarriage at 8 weeks, requiring instrumental removal of the fetal sac. The postoperative period was complicated by endometritis.

2020: third pregnancy ended in spontaneous miscarriage at 15 weeks due to cervical insufficiency.

2021: fourth pregnancy at 18–19 weeks was complicated by premature rupture of membranes and chorioamnionitis. Attempts at immediate removal of the fetal sac led to uterine hemorrhage during placental separation (placenta percreta). Emergency transverse suprapubic laparotomy was performed, including ligation of the internal iliac arteries, excision of affected areas of placenta percreta on the uterus and bladder, subsequent metroplasty, application of a compression suture on the uterus, and restoration of bladder integrity.

Course of the fourth pregnancy

During the first trimester, the patient exhibited signs of a threatened miscarriage, which required inpatient hormonal and antispasmodic therapy.

At 15–16 weeks of gestation, cervical insufficiency was diagnosed and surgically corrected by placing two U-shaped sutures on the cervix using the Lyubimova-Mamedalieva technique. Postoperatively, the patient received antibacterial, antispasmodic, and hormonal therapy.

At 17–18 weeks of gestation, the patient was re-admitted to the Pregnancy Pathology Department of the Obstetrics and Gynecology Clinic at the Sechenov Center for Maternal and Child Health due to signs of a threatened miscarriage. Treatment with antispasmodics and hormonal therapy was continued. Ultrasound findings revealed a single fetus in cephalic presentation with a fetal heart rate (FHR) of 140 beats per minute, normal myometrium tone, and a normal amniotic fluid index with suspended particles. The placenta measured 20 mm in thickness and was located along the anterior uterine wall, with its lower edge 10 mm above the internal cervical os, where a hematoma measuring 20 × 20 mm was visualized. The uterine scar from the previous cesarean delivery measured 2.5–3 mm in thickness, and sutures were present in the cervical region. Laboratory tests revealed the following: RBC, 3.35×10^{12}/L; HGB, 108 g/L; PLT, 243×10^{9}/L; WBC, 10.4×10^{9}/L; band neutrophils, 3%; segmented neutrophils, 75%; neutrophils, 8.1×10^{9}/L; lymphocytes, 1.2×10^{9}/L; ESR, 31 mm/h. Vaginal swab cultures identified fecal enterococcus (10^{5}), *Escherichia coli* (10^{4}), and *Prevotella* (10^{5}). Given the presence of anaerobic flora in the vaginal secretions, systemic targeted antibiotic therapy was initiated.

Three days after admission, the patient developed spotting. Follow-up ultrasound revealed the development of a sinus along the lower edge of the placenta measuring 10×10 mm and an increase in the hematoma near the internal cervical os to 30×20 mm. Other findings remained unchanged.

To manage the marginal detachment of the low-lying placenta and the hematoma near the internal os, the patient received hemostatic therapy (tranexamic acid 5.0 mg IV infusion), tocolytic therapy (magnesium sulfate 25% solution, 10.0 mg IV infusion twice daily), and hormonal therapy (gestagens), along with ongoing antibiotic treatment. A positive clinical response was noted, with cessation of vaginal spotting.

However, at 18–19 weeks of gestation premature rupture of membranes occurred. Vaginal examination revealed normally developed external genitalia and vagina, a cylindrical cervix with two U-shaped sutures deviated posteriorly, measuring 2 cm in length and moderately edematous. The sutures were removed. The uterine body was enlarged, corresponding to 18–19 weeks of gestation, irritable upon palpation, but painless. Vaginal discharge was watery and moderate in amount. Ultrasound findings showed a single live fetus in cephalic presentation with an FHR of 140 beats per minute. The amount of amniotic fluid was significantly reduced. The placenta was located along the anterior uterine wall, reaching the internal cervical os and overlapping the uterine scar from the previous cesarean delivery. No areas of placental detachment were observed, and the myometrium thickness in the scar region measured 2.5–3 mm. Conclusion: pregnancy at 18–19 weeks; marginal placenta previa; uterine scar from a previous cesarean delivery; oligohydramnios due to premature rupture of membranes.

Comprehensive antibiotic and anti-inflammatory therapy initially provided short-term improvement. However, during follow-up, the patient experienced two episodes of fever up to 39°C, and laboratory tests revealed leukocytosis (15.9×10^{9}/L). Ultrasound findings remained unchanged.

Given the development of chorioamnionitis in the context of premature rupture of membranes at 18–19 weeks of gestation and the patient's complicated obstetric history, the pregnancy was terminated via immediate instrumental removal of the fetal sac.

Procedure protocol

Under aseptic conditions and intravenous anesthesia, the cervix was fixed with bullet forceps. The uterine cavity was measured at 24 cm using a uterine sound. The cervix was dilated with Hegar dilators up to No. 19 without technical difficulties. Using obstetric forceps and a large curette under ultrasound guidance, immediate removal of the fetal sac was initiated. The fetus was removed without complications. However, during attempts to detach the placenta, profuse uterine hemorrhage occurred. Blood loss of 2000 mL.

Intraoperative blood analysis: hemoglobin, 54 g/L. Blood loss was compensated dynamically through two intravenous lines.

Ultrasound: placental tissue identified along the anterior uterine wall in the region of the uterine scar, suggesting placenta accreta.

Diagnosis: suspected placenta accreta; uterine hemorrhage; severe anemia.

Given the suspicion of placenta accreta and massive uterine hemorrhage, an emergency laparotomy was decided upon to clarify the extent of intervention required.

Surgical technique. Under aseptic conditions, a transverse suprapubic incision was made to open the anterior abdominal wall layer by layer. Dense adhesions of the greater omentum to the parietal peritoneum were observed in the surgical field. These adhesions were separated using sharp dissection. The uterus, enlarged to the size corresponding to 12–13 weeks of gestation, was visualized. To achieve hemostasis, the ascending branches of the uterine arteries were ligated. A bulging cyanotic area, measuring 5 × 6 cm, was noted in the lower uterine segment at the site of the previous surgical scar. This extended beyond the serosal layer and infiltrated the posterior wall of the bladder. The adnexa on both sides appeared normal upon inspection. Given the confirmed placenta accreta involving the anterior uterine wall and bladder, with associated tissue friability and high bleeding risk, the internal iliac arteries were ligated. Hemostasis was achieved.

Careful excision of the affected areas of the anterior uterine wall and posterior bladder wall containing the invasive placenta was performed, preserving unaffected tissues. Metroplasty was conducted using a two-layer (myometrial-myometrial and myometrial-serosal) continuous suture with long-absorbing ligatures, applied from the periphery to the center of the wound. For additional hemostasis, a circular compression suture with absorbable ligature was placed 0.5–0.7 cm below the level of the sutures on the anterior uterine wall. Bladder integrity was restored with two layers of continuous absorbable sutures (myometrial-myometrial and myometrial-serosal). To verify the suture integrity, 150 mL of dyed saline was introduced into the bladder. The sutures on the posterior bladder wall were confirmed to be intact. Peritonization was performed using the vesicouterine fold. The uterus contracted and was firm. Complete hemostasis was achieved. Pelvic drainage was established through a counter-incision in the right inguinal-iliac region. The abdominal cavity was irrigated. Closed layer by layer. The edges of the skin wound were approximated with a subcutaneous cosmetic suture. An aseptic dressing was applied.

Intraoperative blood replacement: transfusion of 6 units of packed red blood cells (1600 mL), transfusion of 9 units of fresh frozen plasma (1900 mL).

Intraoperative blood loss: 1000 mL. Total blood loss: 3000 mL.

Postoperative management: the patient received infusion therapy, antibiotics, anticoagulants, iron supplements, analgesics, and symptomatic treatment. The pelvic drain was removed on the second postoperative day.

With the ongoing treatment positive changes in the patient's condition were observed. Laboratory blood tests showed RBC 2.72×10^{12}/L, HGB 77 g/L, HCT 24.2%, leukocytes 9.42×10^{9}/L, and PLT 205×10^{9}/L. According to ultrasound findings, the uterus measured 69×47×58 mm, the uterine cavity was closed, and no free fluid was detected in the pelvic cavity.

The ligature ends at the wound edges were removed on postoperative Day 8, with healing by primary intention.

The results of clinical, laboratory, and instrumental studies allowed for discontinuation of antibacterial therapy. Antifungal therapy was initiated; anticoagulant and anti-anemic therapies were continued.

The patient was discharged on postoperative Day 10 under the supervision of gynecologists at her local women's health clinic and the Obstetrics and Gynecology Clinic of the Sechenov Center for Maternal and Child Health.

Histological findings: placenta percreta; necrotizing chorioamnionitis and placentitis, exudative inflammation at the placental bed on the uterine wall and bladder; signs of inflammation and disorganization in the scar tissue; placental structure consistent with gestational age.

Three months after surgery, the patient reported blood in her urine during menstruation. She was evaluated at the urology department of the Sechenov First Moscow State Medical University. Cystoscopy revealed a vesicouterine fistulous tract on the posterior bladder wall measuring 10×4 mm. MSCT findings confirmed a defect on the posterior bladder wall, through which contrast-enhanced urine flowed into the uterine cavity (defect in the anterior uterine wall at the isthmus). The fistulous tract measured 5–6 mm in width and 12 mm in length, with a blood clot noted within its lumen.

Considering the clinical symptoms and additional diagnostic findings, the patient was recommended for surgical treatment at the Obstetrics and Gynecology Clinic of the Sechenov Center for Maternal and Child Health, with a urologist included in the surgical team.

The patient was hospitalized in the Obstetrics and Gynecology Clinic, where an office hysteroscopy was performed, confirming the diagnosis of a vesicouterine fistula.

Surgical treatment included: cystoscopy, ureteral catheterization; hysteroscopy, laparoscopy, metroplasty, closure of the vesicouterine fistula, sanitation, and drainage of the pelvic cavity.

Surgical steps:

1. Cystoscopy and ureteral catheterization. After sterilizing the external genitalia and vagina, a cystoscope was introduced into the urethra. The bladder walls were inspected, revealing pale pink mucosa and the visualization of the ureteral orifices. Bilateral ureteral catheterization was performed using self-retaining stents. Above the trigone of the bladder (Lieutaud's triangle), a vesicouterine fistula opening was identified, into which a thin urological guidewire ("string") was inserted.

2. Hysteroscopy. After dilating the cervical canal with Hegar dilators up to No. 7.5, hysteroscopy was performed. The uterine cavity was inspected, revealing a thin endometrium. On the right side of the internal cervical os, an opening of the fistulous tract was noted, through which the urological guidewire protruded. The end of the guidewire was grasped and pulled through the vagina. The cervical canal was further dilated to No. 10 with a Hegar dilator, which was left in the cervical canal.

3. Laparoscopy, metroplasty, and bladder repair. Standard entry under ETN (endotracheal anesthesia) was performed, with pneumoperitoneum using 4.5 liters of CO_2. Additional trocars for manipulators were placed at typical points on the right and left sides. Pelvic organ inspection: the uterus was of normal size and pink in color. A retracted scar was observed in the vesicouterine fold area. The adnexa on both sides showed no pathological changes. Loose adhesions between the cecum and the parietal peritoneum were noted on the right pelvic wall and were divided using sharp dissection. The vesicouterine fold was incised, and the bladder was mobilized inferiorly, exposing a defect in the posterior bladder wall measuring 4 mm. The edges of the fistula on the anterior uterine wall were excised using a No. 10 Hegar dilator, followed by defect repair with two layers of long-absorbable sutures (myometrial-myometrial and myometrial-serosal). The posterior bladder wall was sutured longitudinally in two layers (myometrial-myometrial and myometrial-serosal) using continuous absorbable sutures. To verify bladder integrity, 150 mL of saline was introduced into the bladder. The sutures on the bladder wall were confirmed to be intact. The greater omentum was positioned between the anterior uterine wall and the posterior bladder wall. Pelvic cavity sanitation. A drain for active aspiration was placed in the rectouterine pouch.

The postoperative course was uneventful. The patient received antibiotic, anti-inflammatory, and infusion therapy. She was discharged on Day 10 in satisfactory condition under the supervision of gynecologists at her local women's health clinic and the Sechenov Center for Maternal and Child Health.

Following surgery, the patient expressed reproductive plans; however, despite regular unprotected intercourse, pregnancy did not occur within 1.5 years. As a result, optical spectral diagnostics of the endometrium were performed, revealing endometrial dysfunction characterized by hypoxic and proliferative changes. This finding prompted the development and implementation of a program aimed at restoring the morphofunctional state of the endometrium. The first stage involved photodynamic therapy with Fotronik (24 capsules/day for 30 days) followed by intrauterine laser phototherapy (4 sessions). Simultaneously, treatment to improve endometrial vascular rheology and prevent ischemic processes was administered (trimetazidine 35 mg/day, dihydroquercetin 25 mg/day, glutathione), with positive clinical effects. Follow-up spectral diagnostics of the endometrium revealed positive changes, prompting the initiation of hormonal therapy (Utrogestan during the luteal phase of the menstrual cycle). This treatment resulted in a subsequent spontaneous pregnancy.

The current (fifth) pregnancy occurred spontaneously.

Course of the current pregnancy: at 13–14 weeks of gestation, cervical insufficiency was diagnosed. Vaginal examination revealed that the cervix was 1 cm in length, and the external os admitted a fingertip. The uterine cavity contained one fetus corresponding to 13–14 weeks of gestation with a fetal heart rate of 138 beats per minute. The placenta was localized on the posterior uterine wall, with its lower edge positioned 25 mm above the internal os. According to ultrasound findings, the cervix was shortened to 15 mm.

Considering the clinical and ultrasound evidence of cervical insufficiency, surgical correction was performed by applying a circular cervical cerclage using the McDonald technique. The post-operative period was uneventful. The patient received tocolytic and anti-inflammatory therapy.

The patient was discharged with a progressing pregnancy at 15–16 weeks under the supervision of physicians at her local women's health clinic and specialists at the Obstetrics and Gynecology Clinic of the Sechenov Center for Maternal and Child Health.

ADDITIONAL INFO

Authors' contribution. A.I. Ishchenko (20%) — invention and implementation of new surgical treatment methods; O.Y. Gorbenko (20%) — article writing; I.D. Khokhlova (20%) — article writing; V.M. Zuev (15%) — article writing; T.A. Dzhibladze (15%) — article editing; D.V. Baburin (10%) — article editing. All authors confirm that their authorship meets the international ICMJE criteria (all authors have made a significant contribution to the development of the concept, research and preparation of the article, read and approved the final version before publication).

Funding source. This study was not supported by any external sources of funding.

Competing interests. The authors declares that there are no obvious and potential conflicts of interest associated with the publication of this article.

Consent for publication. The patient who participated in the study voluntarily signed an informed consent approved as part of the study protocol by the local ethics committee.

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