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ТИББИЁТДА ЯНГИ КУН НОВЫЙ ДЕНЬ В МЕДИЦИНЕ NEW DAY IN MEDICINE

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www.bsmi.uz
https://newdaymedicine.com
E: ndmuz@mail.ru
Тел: +99890 8061882

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PREGNANCY IN A CESAREAN SECTION SCAR: MULTIDISCIPLINARY CHALLENGES AND CLINICAL PERSPECTIVES

Nadirxanova N.S., <https://orcid.org/0009-0002-1887-0752> e-mail: nadirhanova@mail.ru
Abdullajonova K.N., <https://orcid.org/0009-0008-2272-6378> e-mail: kamolani82@mail.ru

Republican Specialized Scientific and Practical Medical Center for Maternal and Child Health,
Uzbekistan, Tashkent: Mirzo-Ulugbek St., 132-a, tel.: +998 (71) 2637818, e-mail: info@uzaig.uz

✓ Resume

Cesarean scar pregnancy is an uncommon yet potentially life-threatening variant of ectopic pregnancy. Accurate diagnosis requires heightened clinical awareness and the application of advanced imaging modalities, particularly transvaginal ultrasonography and magnetic resonance imaging. Optimal management relies on a multidisciplinary approach that includes obstetricians-gynecologists, radiologists, reproductive medicine specialists, and surgeons when necessary. Timely identification of this condition is essential to reduce the risk of serious complications, such as uterine rupture, severe hemorrhage, and irreversible impairment of fertility. Therapeutic strategies are determined by clinical presentation and may involve expectant, medical, or surgical interventions. This review discusses contemporary insights into the pathogenesis, diagnostic algorithms, and treatment options for cesarean scar pregnancy, underscoring the critical role of personalized management.

Keywords: Cesarean scar pregnancy; ectopic gestation; cesarean delivery; implantation of the gestational sac; ultrasound diagnostics.

БЕРЕМЕННОСТЬ В РУБЦЕ ПОСЛЕ КЕСАРЕВА СЕЧЕНИЯ: МЕЖДИСЦИПЛИНАРНЫЕ ПРОБЛЕМЫ И КЛИНИЧЕСКИЕ ПЕРСПЕКТИВЫ

Надырханова Н.С., <https://orcid.org/0009-0002-1887-0752>
Абдуллажонова К.Н. <https://orcid.org/0009-0008-2272-6378>

Республиканский специализированный научно-практический медицинский центр здоровья
матери и ребёнка Узбекистан г. Ташкент Ташкенте: ул. Мирзо-Улугбека, 132-а
тел: +998(71)2637818 e-mail: info@uzaig.uz

✓ Резюме

Беременность, имплантированная в рубец после кесарева сечения, представляет собой редкую и потенциально угрожающую форму эктопической беременности. Диагностика данного состояния требует высокой настороженности и применения современных методов визуализации, включая трансвагинальное ультразвуковое исследование и МРТ. Ведение таких пациенток требует участия мультидисциплинарной команды, включающей акушеров-гинекологов, радиологов, репродуктологов и, при необходимости, хирургов. Ранняя диагностика позволяет избежать тяжелых осложнений, таких как разрыв матки, массивное кровотечение и потеря репродуктивной функции. В зависимости от клинической ситуации применяются консервативные, медикаментозные или хирургические подходы. Статья освещает актуальные аспекты патогенеза, диагностики и тактики ведения беременности в рубце, подчеркивая необходимость индивидуализированного подхода.

Ключевые слова: Беременность в рубце, эктопическая беременность, кесарево сечение, имплантация плодного яйца, ультразвуковое исследование.

KESARCHA KESISHDAN KEYINGI CHANDIQDA HOMILADORLIK: FANLARARO MUAMMOLAR VA KLINIK ISTIQBOLLAR

Nadirxanova N.S., <https://orcid.org/0009-0002-1887-0752>

Abdullajonova K.N., <https://orcid.org/0009-0008-2272-6378>

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O'zbekiston, Toshkent: Mirzo-Ulug'bek ko'chasi, 132-a, tel.: +998 (71) 2637818, e-mail:
info@uzaig.uz

✓ Rezyume

Kesarcha kesishdan keyingi chandiqa joylashgan homiladorlik — bu kam uchraydigan va potentsial xavfli ektopik homiladorlik shaklidir. Ushbu holatni aniqlash klinik hushyorlikni va zamonaviy vizualizatsiya usullarini, jumladan transvaginal ultratovush tekshiruvini hamda MRTni talab qiladi. Bunday bemorlarni boshqarish akusher-ginekologlar, radiologlar, reproduktologlar va zarurat tug'ilganda jarrohlarni o'z ichiga olgan multidisiplinar jamoaning ishtirokini talab qiladi. Vaqtida aniqlash bachadon yorilishi, kuchli qon ketishi va reproduktiv funksiyani yo'qotish kabi og'ir asoratlarning oldini olishga yordam beradi. Klinik holatga qarab konservativ, dori vositalari bilan yoki jarrohlik usullari qo'llaniladi. Ushbu maqolada kesarcha kesishdan keyingi chandiqa homiladorligining patogenezi, diagnostikasi va davolash taktikasining dolzarb jihatlari yoritilib, individual yondashuv zarurligi ta'kidlanadi.

Kalit so'zlar: Kesarcha kesishdan keying chandiqa homiladorligi, ektopik homiladorlik, kesarevo kesish, homila xaltachasi implantatsiyasi, ultratovush tekshiruvi.

Relevance

With the global rise in cesarean section rates, obstetric practice has witnessed a parallel increase in complications associated with postoperative uterine scarring, particularly in the lower uterine segment. Among these, one of the rare yet potentially life-threatening conditions is cesarean scar pregnancy (CSP), characterized by the implantation of the gestational sac directly into the fibrous tissue of a previous cesarean incision.

CSP is classified as a form of ectopic pregnancy due to its abnormal implantation outside the endometrial cavity, specifically within a structurally compromised myometrial zone. This aberrant localization disrupts the integrity of the uterine wall and exposes the patient to serious risks, including uterine rupture, profuse hemorrhage, and in extreme cases, maternal mortality. Epidemiological data suggest that the incidence of cesarean scar pregnancy ranges from 1 in 1,800 to 1 in 2,656 pregnancies, with a trend toward increasing prevalence in correlation with the growing number of cesarean deliveries performed worldwide.

The clinical management of CSP poses significant diagnostic and therapeutic challenges. Early and accurate identification is critical, as delayed recognition may lead to catastrophic outcomes such as uterine wall dehiscence, emergency hysterectomy, or fatal bleeding. Despite the availability of various treatment modalities—ranging from conservative pharmacological interventions to minimally invasive and radical surgical approaches—there remains a lack of standardized, evidence-based protocols for optimal care.

Objective of the Study: To conduct a retrospective analysis of cesarean scar pregnancy localized in the uterine isthmus, with a focus on diagnostic features, treatment modalities, and clinical outcomes. The study also aims to identify key factors influencing the choice of management strategy and prognostic indicators.

Materials and Methods

This study is a retrospective review of medical records of patients admitted to the Gynecology Department of the Republican Specialized Scientific and Practical Medical Center for Obstetrics and Gynecology (RSSPMCOG) between 2023 and 2024, with a confirmed diagnosis of cesarean scar pregnancy localized in the uterine isthmus.

Inclusion criteria: Confirmed diagnosis of cesarean scar pregnancy based on transvaginal ultrasound and/or pelvic MRI; History of at least one prior cesarean section; Gestational age ≤ 12 weeks at the time of diagnosis; Availability of complete medical documentation.

Exclusion criteria: Pregnancy implanted in the cervical canal without involvement of the cesarean scar; Unconfirmed localization of pregnancy; Presence of a surgical scar only on the uterine body or fundus (not in the isthmic region); Coexisting significant gynecological conditions interfering with analysis (e.g., cervical cancer).

Diagnostic approach: In all cases, diagnosis was based on transvaginal ultrasound, including Doppler imaging. Key sonographic features included visualization of the gestational sac within the scar zone, absence of intervening myometrial tissue between the sac and the bladder, and increased vascularization. A myometrial thickness ≤ 2 mm over the scar was considered a high risk for uterine rupture. In selected cases, pelvic MRI was performed to clarify anatomical relationships and assess involvement of adjacent structures. Serum β -hCG levels and clinical symptoms (e.g., vaginal bleeding, pelvic pain) were also evaluated.

Treatment groups: Patients were categorized into four groups based on the treatment strategy:

1. Medical therapy — systemic or local administration of methotrexate (MTX)
2. Surgical management — laparotomy or laparoscopy with excision of the scar and removal of the gestational sac; hysteroscopic intervention in selected cases
3. Combined approach — staged treatment involving both MTX and surgical procedures
4. Conservative observation — applied in strictly defined cases (anembryonic pregnancy, absence of fetal heartbeat, spontaneous regression, or patient's preference to avoid surgery)

Result and discussions

A total of 55 patients diagnosed with cesarean scar pregnancy localized in the uterine isthmus were included in the study. Patient age ranged from 23 to 42 years, with a mean age of 31.7 ± 4.9 years. Among them, 38 women (69.1%) had a history of one prior cesarean section, 13 (23.6%) had undergone two cesarean deliveries, and 4 (7.3%) had three or more. The average gestational age at the time of diagnosis was 7.6 ± 1.2 weeks. Embryonic cardiac activity was visualized via ultrasound in 37 patients (67.3%), while 12 cases (21.8%) were classified as anembryonic pregnancies. Myometrial thickness over the scar ranged from 0.8 to 3.5 mm, with a mean of 1.5 ± 0.6 mm. Upon admission, 18 patients (32.7%) reported symptoms such as vaginal bleeding and/or lower abdominal pain.

Treatment selection was based on gestational age, presence of cardiac activity, myometrial thickness, clinical presentation, reproductive intentions, and the technical capabilities of the institution. The distribution of treatment modalities is presented in Table 1.

Table 1. Treatment modalities

Treatment Method	Number of Patients (n)	%
Medical therapy (Methotrexate)	17	30.9%
Surgical intervention	24	43.6%
Combined approach	9	16.4%
Conservative management	5	9.1%

Surgical procedures included:

- Laparoscopic resection of the scar zone (n = 11)
- Laparotomy with excision and defect repair (n = 9)
- Hysteroscopic evacuation with vascular coagulation (n = 4)

The combined approach was primarily applied in patients with detectable cardiac activity and thin myometrial coverage. In these cases, methotrexate was administered initially, followed by surgical intervention.

Table 2. Complications and adverse outcomes

Complication / Outcome	Number of Patients	%
Severe bleeding (>500 mL)	8	14.5%
Uterine perforation	2	3.6%
Blood transfusion required	5	9.1%
Emergency hysterectomy	1	1.8%
Uterine preservation	54	98.2%

Most complications occurred in the surgical treatment group, particularly among patients diagnosed at later gestational ages (≥ 9 weeks) and with pronounced vascularization of the scar zone. The only emergency hysterectomy was performed due to massive hemorrhage in a patient with undiagnosed cesarean scar pregnancy who was admitted with suspected spontaneous miscarriage.

Table 3. Comparative analysis by gestational age at diagnosis

Parameter	≤ 8 weeks (n=33)	> 8 weeks (n=22)	p-value
Blood loss > 500 mL	1 (3.0%)	7 (31.8%)	< 0.01
Uterine preservation	33 (100%)	21 (95.4%)	> 0.05
Hysterectomy required	0 (0%)	1 (4.5%)	> 0.05

Patients diagnosed before 8 weeks of gestation had significantly more favorable outcomes, with lower rates of surgical intervention and minimal complications.

Of the 55 patients, 39 (70.9%) were followed for ≥ 12 months. Among them, 9 women (23.1%) conceived again: 6 pregnancies resulted in full-term deliveries, 2 were electively terminated, and 1 was an ectopic (tubal) pregnancy occurring 9 months after treatment.

Cesarean scar pregnancy is a rare but highly dangerous condition associated with an elevated risk of uterine rupture, massive hemorrhage, and potential loss of reproductive function. This retrospective study analyzed 55 cases of isthmic pregnancy implanted in a cesarean scar, allowing for a detailed assessment of clinical features, treatment strategies, and outcomes.

Our findings confirm that early diagnosis (prior to 8 weeks gestation) significantly reduces the incidence of complications. Similar conclusions have been reported by international authors. For instance, in a meta-analysis by Timor-Tritsch et al. (2020), early detection before 8–9 weeks was associated with a markedly lower risk of severe bleeding and hysterectomy [9].

Most patients in our cohort exhibited the classical risk triad: one or more uterine scars, thin myometrial coverage (< 2 mm), and ultrasound visualization of the gestational sac within the scar zone. These features are considered diagnostically significant and warrant immediate decision-making regarding management.

Treatment was individualized. Methotrexate therapy proved effective in asymptomatic cases diagnosed early, particularly in the absence of cardiac activity. However, its efficacy diminished in pregnancies beyond 8 weeks, with active cardiac function and thin myometrium—findings consistent with other studies [1].

Surgical treatment demonstrated the highest efficacy in terms of complete evacuation and complication prevention. Laparoscopic scar resection enabled uterine preservation and minimized blood loss in most cases. Combined approaches were reserved for complex scenarios and, in our view, represent the optimal strategy when prognosis is uncertain.

Importantly, reproductive function was preserved in a high proportion of cases: among the monitored group, 6 patients successfully carried and delivered healthy infants, underscoring the importance of organ-preserving management whenever feasible.

Our results align with systematic reviews [2], reinforcing that key factors for successful treatment include early diagnosis, individualized therapeutic selection, and longitudinal patient monitoring.

Conclusions

Cesarean scar pregnancy located in the uterine isthmus represents a significant risk to maternal health, especially when diagnosis is delayed and standardized management guidelines are lacking. An

analysis of 55 clinical cases allows the following conclusions to be drawn. Early detection, particularly before 8 weeks of gestation, plays a decisive role in achieving favorable outcomes. Transvaginal ultrasonography, including evaluation of myometrial thickness and Doppler assessment of vascularity, should be considered mandatory in all cases of suspected abnormal implantation. Conservative medical treatment is effective only in early gestational stages and in the absence of embryonic cardiac activity. Surgical management ensures complete removal of the ectopic gestation and facilitates restoration of uterine scar integrity. In cases characterized by pronounced vascularization and persistent cardiac activity, combined therapeutic approaches are warranted. Preservation of reproductive potential is achievable through organ-sparing techniques and an individualized treatment strategy.

To improve diagnostic accuracy and therapeutic outcomes in cesarean scar pregnancy, the development and implementation of standardized clinical protocols, targeted specialist training, and prospective studies assessing long-term reproductive outcomes are essential.

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