

MEDICINE AND PHARMACY

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Modern management of pregnancy and childbirth with placental attachment disorder

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Abstract.

One of the main causes of maternal mortality in the 21st century is postpartum uterine hemorrhage. The period of euphoria in the obstetric community associated with successes in the treatment of hypotonic and coagulopathic hemorrhages ended with the emergence of a new problem - placental invasion into the uterus in the postoperative scar. Placenta increta is the result of abnormal implantation into the decidua or myometrium. This condition is rarely diagnosed in obstetric practice, but it is associated with about 7% of maternal mortality. With the increase in the number of cesarean section surgeries, the incidence of placenta increta is increasing. Diagnosis and treatment are important clinical issues. Since there is no standard clinical treatment protocol, the choice of tactics should be carefully and individually considered.

Keywords:

*placenta increta
diagnosis
treatment
hysterectomy
hemorrhage
pregnancy*

MEDICINE AND PHARMACY

Placental attachment pathology holds a special place among the causes of obstetric bleeding leading to maternal mortality, both intraoperatively and in the early postpartum period. Placental previa is an obstetric pathology, the relevance of which is determined by severe consequences for both the fetus and the mother. Every fifth obstetric hemorrhage is caused by placental previa, accompanied by a high level of perinatal (22%) and maternal mortality (2-10%) [2].

Abnormal placental invasion takes the first place in maternal mortality from hemorrhage. The frequency of abnormal placental adherence has increased 50 times over the past decade (1 case per 25-50 thousand births in the mid-20th century and 1 case per 500-1000 births in the 21st century).

According to the increase in the rate of cesarean section and the increase of high-aged pregnancy, we started to encounter placenta previa and placenta previa accrete spectrum cases more often. There are concerns about these cases, such as difficulty in controlling bleeding from the separation surface of placenta previa, the need for hysterectomy as a life-saving procedure, systemic management and hemostasis during massive hemorrhage, and treatment of disseminated intravascular coagulation (DIC). These cases are most frequently associated with cesarean hysterectomy [4].

A clear dependence between placental invasion and the presence of a scar on the uterus after a cesarean section and placental previa has been proven, as the villous ingrowth zone is most often located on the anterior wall in the lower segment of the uterus, i.e., at the site of its typical incision. Unjustified enthusiasm for birth delivery by cesarean section has led to an increase in the proportion of uterine hemorrhages associated with placental attachment pathology. When placentation occurs into the scar area after a previous cesarean section, in 10-60% of cases, it ingrowth not only into the uterine wall but also into adjacent organs.

The most common causes of this pathology are past inflammatory processes (metroendometritis), postoperative scars on the uterine wall, submucosal myomatous nodes, and uterus developmental defects. The connection of the placenta to the uterus in these cases can be too firm, leading to a

MEDICINE AND PHARMACY

pathological course of the third stage of labor. Usually, chorionic villi penetrate the basal layer. If the villi penetrate the basal layer but do not go beyond its boundaries, it is called dense placental attachment (placenta adhaerens). Penetration of the villi beyond the boundaries of the basal layer is called placenta accreta. Deeper ingrowth of villi into the muscular layer is called placenta increta. Ingrows of placenta through all layers of the uterus is called placental percreta.

It is necessary to note that bleeding associated with abnormally invasive placenta in women with a scar on the uterus often does not accompany bloody discharge during pregnancy due to true placental accretion but occurs intraoperatively when attempting to separate the placenta. This quickly leads to the development of massive obstetric hemorrhage and is often complicated by coagulopathic disorder.

It is necessary to exclude this pathology for patients with a history of cesarean section. For this purpose, screening for placental attachment pathology is carried out:

1. Ultrasound
2. MRI
3. Alpha-fetoprotein blood analysis (AFT).

Prenatal diagnosis of placental attachment disorders complicated by placenta previa can help to minimize complications and aid in establishing surgical strategies for cesarean section, including obstetric anesthesia, clear surgical tactics, the availability of blood products, and the presence of endovascular surgery department. Therefore, clear prenatal prediction of placenta accreta and placenta previa is very significant and consists of two categories:

1. Anamnesis: surgical abortions and/or surgical interventions on the uterus
2. Ultrasound or MRI signs

For this purpose, a modern scale for assessing placenta previa with placenta accreta has been proposed [1] Table 1.

Each category is assessed on a scale of 0, 1, 2, 3, 4 points, with a total score ranging from 0 to 24. Pregnant women with placenta previa who score more than 8 points are at high risk of placenta accreta [1].

MEDICINE AND PHARMACY

Table 1

Assessment scale for placenta previa with placenta accrete

Signs		Number of signs	Points	
Anamnesis	Number of previous cesarean section	0	0	
		1	2	
		More than 2	4	
	Number of surgical abortions	Less than 3	0	
		More than 3	2	
	Other surgeries on the uterus	0	0	
		Available	2	
Placenta located on the rumen		4		
Examination	Ultrasound	Placental lacunae, degree	0	0
			1	2
			More than 2	4
		Loss of clear zone	Absent	0
			Ambiguous	2
			Available	4
		Turbulent blood flows	Absent	0
			Ambiguous	1
			Available	2
	"Uneven signs"	Absent	0	
		Ambiguous	2	
	MRI	Suspicion of placenta accreta	There is none	0
			Available	2

Specific questions regarding the ultrasound staff's awareness of screening for placenta accreta should also be considered at the local level, including organising policies/guidelines for identifying women at risk and organising their visits to a consultant after the 32-week scan [3].

Various approaches to the treatment and prevention of hemorrhagic complications against the background of abnormally attached placenta are currently insufficiently developed and require improvement with the prognosis of their development and the introduction of a step-by-step algorithm in case of this pathology. Therefore, prenatal diagnosis of

MEDICINE AND PHARMACY

abnormal placental attachment and determination of the delivery algorithm for such pregnant women depending on the depth of placental tissue invasion [1] are of great practical importance.

However, there is one challenge remains: what to do in case of placenta percreta, when the trophoblast penetrates not only through the myometrium and visceral peritoneum but also into the urinary bladder?

Currently, the following organ-preserving methods of step-by-step surgical hemostasis are applied during cesarean section in pregnant women with placental penetration:

- Controlled uterine balloon tamponade.
- Ligation of uterine vessels.
- Uterine artery embolization (UAE).
- Temporary balloon occlusion of uterine arteries.
- Ligation of internal iliac arteries.
- Temporary clamping or ligation of major uterine vessels.
- "Triple-P" method.

The "Triple-P" technique involves three stages:

- The first P - perioperative identification of placental localization and delivery of the fetus through a transverse incision in the uterus above the upper border of the placenta.
- The second P - pelvic devascularization by inflating air into balloons previously placed under angio-radiological control in both internal iliac arteries.
- The third P - placental non-separation with myometrial excision and reconstruction of the uterine wall-as.

There are six elements that should be considered as standard of care:

- Obstetrician who planning and directly overseeing childbirth.
- Anesthesiologist planning and directly overseeing anesthesia during childbirth.
- Availability of blood and blood products.
- Multidisciplinary involvement in preoperative planning.
- Discussions including possible interventions (such as hysterectomy, leaving the placenta in place, cell preservation, and interventional radiology).
- Local availability of a level 2 intensive care unit

MEDICINE AND PHARMACY

bed.

The purpose of this study was to analyze the management of pregnancy and childbirth with placental ingrowth. During the period from 2020 to 2022 at the Regional Medical Center for Family Health in Dnipro, Ukraine, the algorithm was applied in 11 clinical cases associated with the management of pregnancy and childbirth with placental ingrowth, posing a high risk of developing obstetric hemorrhage. As a result, an algorithm for managing pregnancy and childbirth with placental ingrowth was developed. Among 11 women with a standard average blood loss, 5 women had damaged bladder wall which was observed during the surgery, so the average blood loss in case of damaged bladder wall was 6450 ± 1060 ml, without damaged bladder wall - 2110 ± 980 ml.

Algorithm for managing pregnancy and childbirth with placental ingrowth.

Organization of medical care. Outpatient stage.

Risk group: Women with placenta previa and a history of cesarean section.

Diagnosis (mandatory methods):

- Abdominal ultrasound at 18-20 weeks of pregnancy should reveal the localization of the placenta and true placental ingrowth.

- Ultrasound and dopplerography at 26-28 weeks of pregnancy. With a confirmed diagnosis of placenta previa, even in the absence of bleeding, hospitalization in a level 3 hospital is required until delivery.

Diagnosis (additional methods):

- MRI at 30-34 weeks of pregnancy to confirm the degree of placental invasion and assess the size of the uterine "aneurysm."

Organizing medical care. Inpatient care. Hospitalization in Level III hospitals.

Level III hospitals with an endovascular surgery department. Treatment: cesarean section at 36-37 weeks of pregnancy.

C-section technique:

1. Lower midline or midline laparotomy.
2. Transverse or vertical incision in the uterine fundus.
3. Extraction of the baby.

MEDICINE AND PHARMACY

4. Application of a double-layer suture to the incision in the uterine fundus.

The second stage of the operation:

1. Temporary balloon occlusion of the common iliac arteries is auxiliary to reduce intraoperative blood loss only in cases of placental ingrowth without bladder damage.

2. In case of bladder damage, only occlusive balloon catheterization of the abdominal aorta can reduce intraoperative blood loss.

3. Uterine artery embolization.

The third stage of the operation:

1. Excision of the uterine hernia.

2. Removal of the placenta.

3. Metroplasty: excision of altered areas of the uterine wall with suspected placental ingrowth within intact myometrium, application of a double-layer suture to the incision in the lower uterine segment, or hysterectomy.

Blood loss control:

1. Intraoperative hardware autologous blood reinfusion.

2. Introduction of a protocol for monitoring blood loss.

Level III hospitals without the possibility of using endovascular methods to control blood loss. Treatment: cesarean section at 36-37 weeks of pregnancy.

C-section technique:

1. Lower midline or midline laparotomy.

2. Transverse or vertical incision in the uterine fundus.

3. Extraction of the baby.

4. Application of a double-layer suture to the incision in the uterine fundus.

The second stage of the operation: ligation of internal iliac arteries or uterine and ovarian arteries.

The third stage of the operation:

1. Excision of the uterine hernia.

2. Removal of the placenta.

3. Metroplasty: excision of altered areas of the uterine wall with suspected placental ingrowth within intact myometrium, application of a double-layer suture to the incision in the lower uterine segment, or hysterectomy.

Blood loss control:

1. Intraoperative hardware autologous blood reinfusion.

MEDICINE AND PHARMACY

2. Keeping a protocol for monitoring blood loss.

Level II hospitals (in case of undiagnosed placental ingrowth).

C-section technique:

1. Lower midline or midline laparotomy.

2. Transverse or vertical incision in the uterine fundus.

3. Extraction of the baby.

4. Application of a double-layer suture to the incision in the uterine fundus.

5. Placenta remains in the uterus.

6. The woman may be transferred to a Level III hospital.

Conclusions:

- Prenatal diagnosis of abnormally invasive placenta in the second and third trimesters is crucial for developing a delivery algorithm using organ-preserving or radical techniques, depending on the depth of placental tissue invasion into the myometrium or beyond.

- A multidisciplinary approach in diagnosed placenta percreta with signs of placental tissue invasion into adjacent organs and the pelvic peritoneum, involving vascular surgeons, urologists, blood transfusion specialist, anesthesiologists, and having an endovascular surgery department (in case of bladder damage, only occlusive balloon catheterization of the abdominal aorta can reduce intraoperative blood loss), is considered the most optimal for minimizing possible complications from a modern standpoint.

- Further clinical research is needed to develop the most effective delivery algorithms for pregnant women with abnormally invasive placenta, depending on the depth of placental tissue invasion into the myometrium or beyond, to reduce blood loss and the likelihood of severe intra- and postoperative complications.

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MEDICINE AND PHARMACY

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