

Antenatal diagnostic aspects of placenta percreta and its influence on the perinatal outcome: a clinical case and literature review

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Background. Placenta percreta is a very rare, but extremely life-threatening obstetrical pathology for the mother and the child, especially in the cases when it is not diagnosed before the birth and when it results in massive bleeding and a dramatic deterioration of condition. It is extremely important to diagnose this pathology as early as possible and plan further optimal care of patients in order to minimize life-threatening complications.

Case report. The paper presents an illustrated clinical case of placenta percreta determined before the birth. Features of visual diagnostics are discussed.

A 32-year-old pregnant woman with a history of two caesarean deliveries arrived at the tertiary level hospital at 22 weeks of gestation due to abdomen pain. Placenta previa was diagnosed and ultrasound, magnetic resonance imaging suggesting placenta percreta were seen. On the 32nd week, the planned caesarean hysterectomy was performed. The balloon catheters to occlude the internal iliac arteries and minimize bleeding during the surgery were used.

Conclusions. Antenatal diagnosis of placenta percreta is especially important. Methods of visual diagnostics are complementary. The optimal surgical approach during caesarean hysterectomy remains controversial. In the case of the slow oozing without a clearly identified source of bleeding after hysterectomy and internal iliac arteries balloons deflation, ligation of one of the internal iliac arteries can be reasonable to avoid residual haemorrhage and relaparotomy.

Keywords: antenatal diagnostics, visual diagnostics, placenta percreta, placenta previa

BACKGROUND

Invasion of the placenta into the uterine muscle is a dangerous obstetrical complication associated

with high perinatal, prenatal and neonatal morbidity and mortality.

Three forms are identified according to the depth of placenta penetration: placenta accreta, placenta increta, and placenta percreta (1). However, in literature the term placenta accreta is often used to define all these forms.

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This placental pathology was first described in 1930. At that time there were even doubts about its existence as it occurred extremely rarely. However, in recent decades the number of cases of the invasive placenta has increased from 1:4027 pregnancies in 1970 to up to 1:533 pregnancies in 1982–2002 (2). Often there are no symptoms during pregnancy until massive bleeding occurs before or during delivery. Thus it is extremely important to diagnose this pathology as early as possible and to plan further optimal care of the patients in order to minimize life-threatening complications.

In this paper, a clinical case of the pathology diagnosed before delivery is presented and possibilities of visual diagnostics and tactical features are discussed.

CASE REPORT

A 32-year-old pregnant woman with a history of two cesarean deliveries arrived in Vilnius University Hospital Santariškių klinikos (a tertiary level hospital) at 22 weeks of gestation due to the pain of stinging nature in the epigastric area, which spread to the lower part of the abdomen later on. She denied smoking and drinking alcohol and her overall medical history was unremarkable.

Placenta previa was diagnosed as ultrasound findings suggested placenta percreta was present. The sonographic images are presented in Figs. 1–3. The patient was hospitalized. Magnetic resonance imaging (MRI) of pelvic organs and cystoscopy were done for the clarification of the diagnosis. According

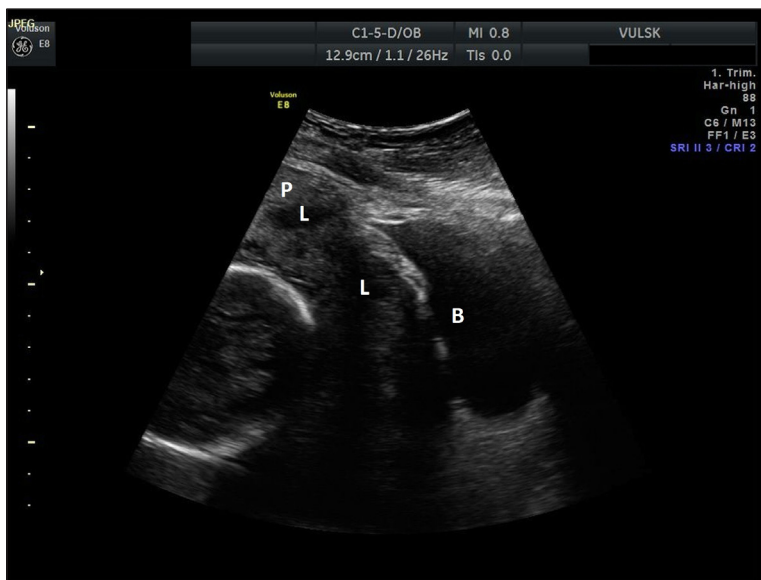


Fig. 1. An ultrasound image in greyscale mode. Abdominal probe. Placenta (P) on the anterior wall covers the uterine scar area and overlies the endocervical os. The boundary between myometrium and the placenta is not clear, the deformation of the uterine wall near the bladder (B) is observed. Lacunar spaces (L) of various size and irregular are present in the placenta

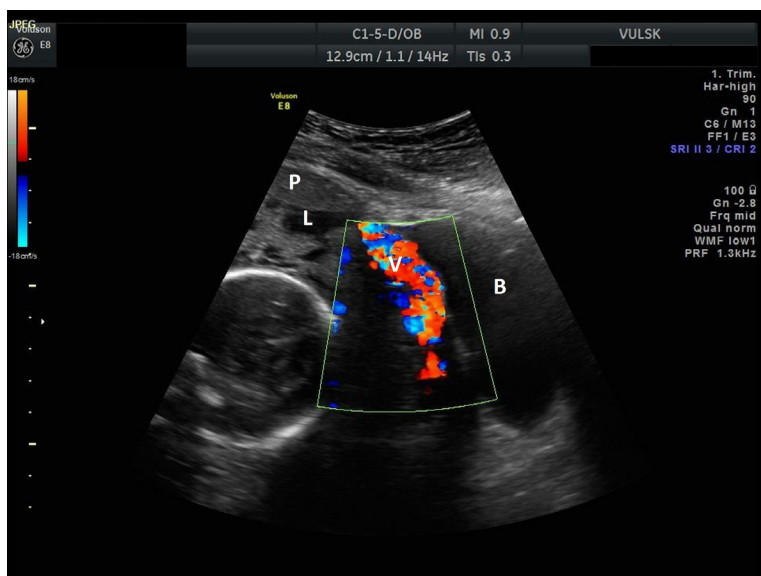


Fig. 2. An ultrasound image in Doppler mode. Abdominal probe. Lacunar spaces (L) of various size and irregular are present in the placenta (P). The posterior wall of the bladder (B) is convex. An active heterogeneous blood flow (V) is observed near the bladder and in the placenta

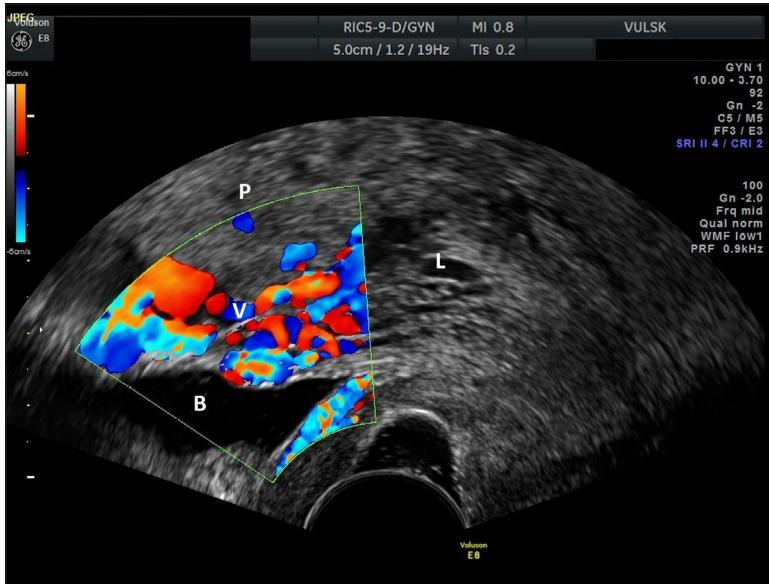


Fig. 3. An ultrasound image in Doppler mode. Transvaginal probe. Lacunar spaces (L) of various size and irregular are present in the placenta (P). The posterior wall of the bladder (B) is convex. An active heterogeneous blood flow (V) is observed near the bladder and in the placenta

to the MRI data, it resembles a placenta fused with the bladder, the area of alteration is a hypervascularity with a differentiated relatively large branch of a. iliaca interna sinistra (Figs. 4, 5). The cystoscopy did not reveal a bladder invasion (Fig. 6).

The management of the patient was discussed by a multidisciplinary team, consisting of specialists in maternal-fetal medicine, gynaecologic surgery, gynaecologic oncology, vascular trauma and urologic surgery, transfusion medicine, intensive

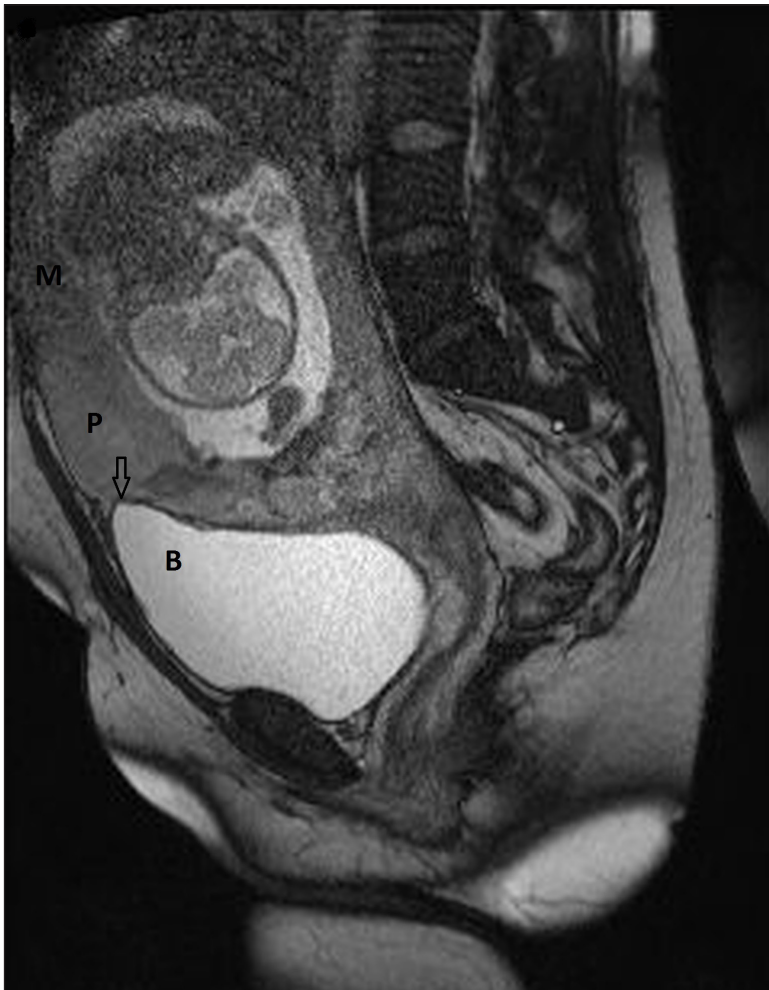


Fig. 4. Sagittal T2-weighted MR images. The upper wall of the bladder (B) is locally deformed from the left to 35 mm in length, contact and pressing (arrow) from the side of the placenta (P) is visible, in some places the wall contour of the bladder of the normal signal is clearly differentiated and hypervascular, inadequate myometrium (M)

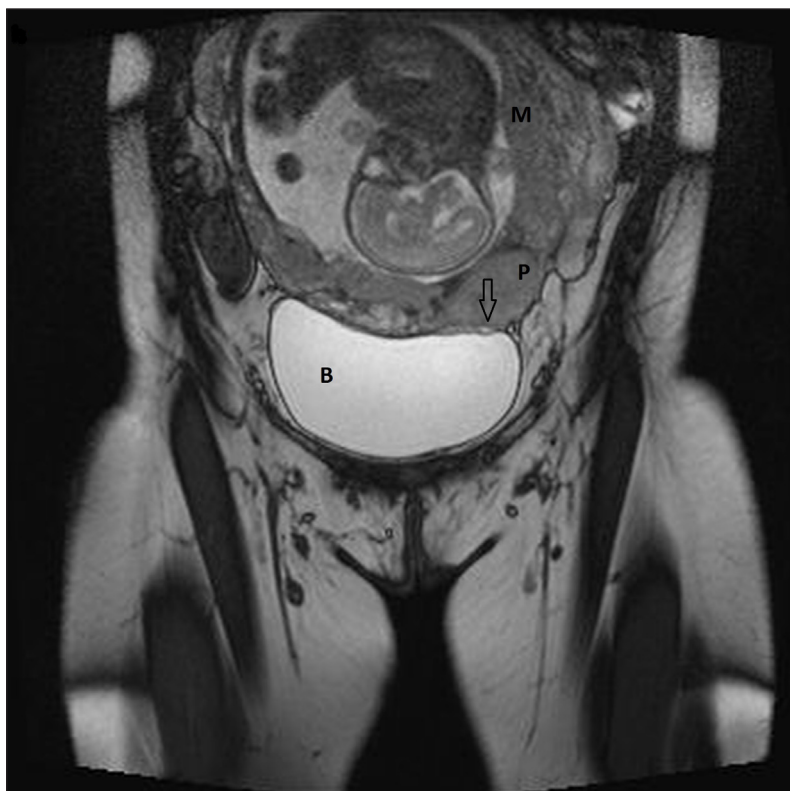


Fig. 5. Coronal T2-weighted MR images. The upper wall of the bladder (B) is locally deformed from the left to 35 mm in length, contact and pressing (arrow) from the side of the placenta (P) is visible, in some places the wall contour of the bladder of the normal signal is clearly differentiated and hypervascular, inadequate myometrium (M)

care, neonatology, interventional radiology, and anesthesiology. The multidisciplinary team suggested conservative care until the 27–28 week of pregnancy because the optimal timing of delivery for placenta percreta remains controversial. On the 28th week, during a repeated discussion, it was decided to extend the pregnancy until the 32nd week and then perform the planned caesarean hysterectomy. The multidisciplinary preoperative consultation was

done before the scheduled operation and a course of antenatal corticosteroids for fetal lung maturation was given.

The multidisciplinary team of specialists in obstetrics, gynaecologic oncology, anesthesiology, neonatology, urology and vascular surgery performed the operation. According to the decision of the multidisciplinary team, the use of pelvic devascularization due to possible intensive bleeding

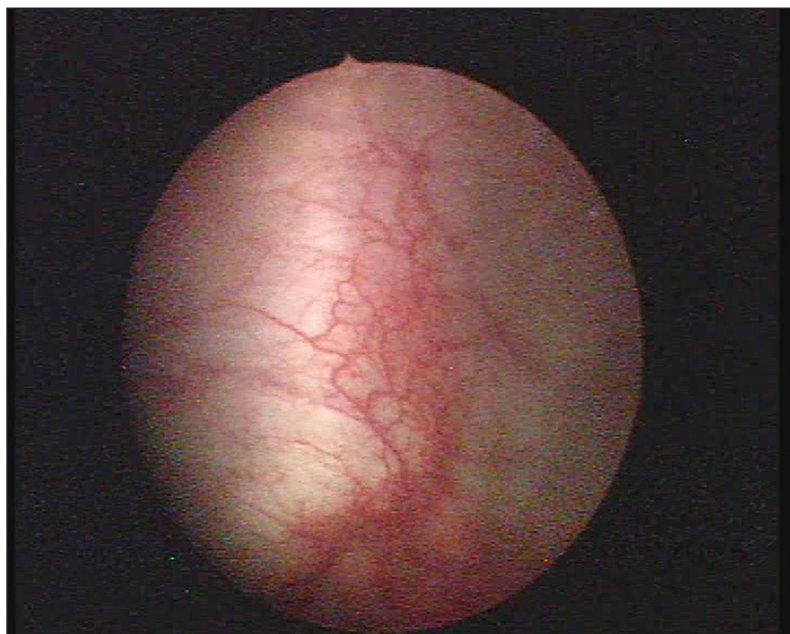


Fig. 6. A cystoscopy image. Local redness of the bladder mucosa

during the surgery was appointed. The balloon catheters to occlude the internal iliac arteries were placed but not inflated before the delivery of the neonate. Blood components were equated and prepared for possible transfusion. Central venous catheter and two peripheral venous catheters were entered before anesthesia. Anesthesia was general with endotracheal intubation.

The midline vertical incision was performed. The placenta was extended through the uterine wall in the place of the prior uterine scar. The vertical corporal uterine incision was performed at the bottom 2 cm above the placental attachment. During the operation, a liveborn 2,000 g, 42 cm male neonate was delivered. According to the Apgar score, he was evaluated by 6 points after 1 minute, and by 8 points after 5 minutes. There was no attempt to extract the placenta: it was left in the uterus with a fragment of the umbilical cord. Due to the occurrence of massive bleeding after the delivery of the newborn, the balloon catheters of internal iliac arteries were inflated; transfusion of blood components was started. Total hysterectomy without the removal of tubes and ovaries was performed (Fig. 7 - Hysterectomy specimen opened). There was urinary bladder serosal involvement, consistent with placenta percreta. The uterus was detached from the urinary

bladder. The total blood loss was 4,000 mL during the surgery. Slow oozing without a clearly identified source of bleeding was seen after the hysterectomy. The balloon catheters were deflated for this reason in one hour after the operation.

Due to massive internal bleeding, relaparotomy was performed four hours after the operation, the abdominal cavity was revised, but a clearly identified source of bleeding was not seen and the left internal iliac artery was additionally ligated.

The patient was cared for in the intensive care for three days. During the period after the operation, the patient was treated with antibiotics and anticoagulants. Total allogeneic red blood cells (16 units), free-frozen plasma (14 units), platelets (12 units) and cryoprecipitate (20 units) were transfused. The patient was discharged on day 7 in a good condition.

The condition of the newborn after the birth was severe due to prematurity, the respiratory distress syndrome, and impaired microcirculation. During the first day, the newborn's health condition was stabilized, the CPAP therapy was completed. The newborn was transferred from the neonatal intensive care unit to the premature neonate department for further examination, treatment, and care. The newborn was released home after four weeks in satisfactory condition.

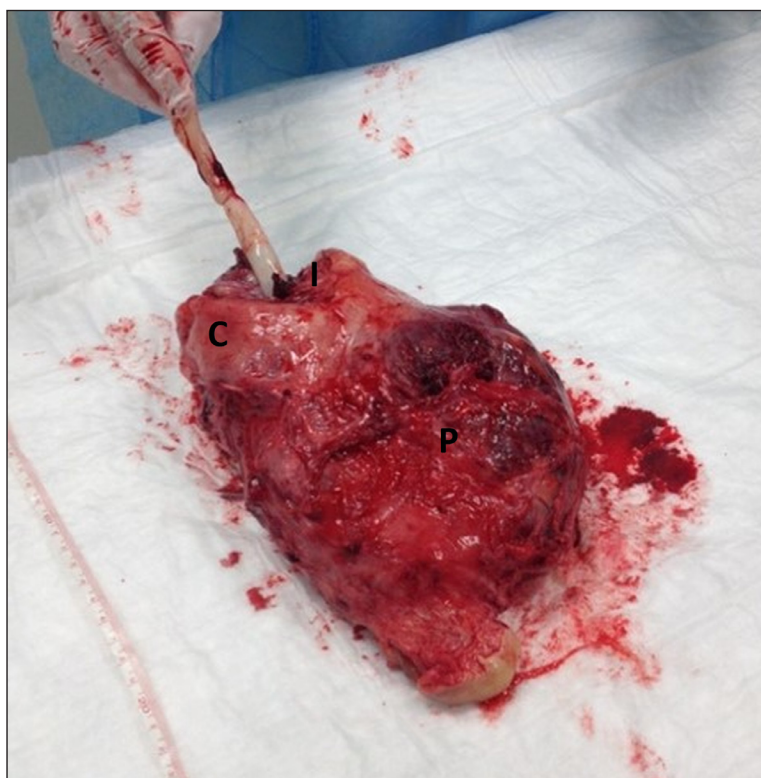


Fig. 7. The uterus with placenta percreta. A longitudinal incision (I) in the corporal area (C). The uterus is deformed due to placenta percreta (P), the walls are thinner and stretched

Histological examination confirmed the diagnosis of placenta percreta: the chorionic villi invade the myometrium and serosa.

DISCUSSION

Placenta percreta is a very rare, but extremely life-threatening obstetrical pathology for the mother and the child, especially in the cases when it is not diagnosed before the birth and when it results in massive bleeding and a dramatic deterioration of the condition (1). Maternal mortality associated with placental invasion reaches 7% (2).

The average blood loss during childbirth in women with placental invasion is 3000–5000 mL (2). More than 90% of these women need a transfusion of blood derivatives, 40% of whom need a transfusion of more than 10 units of red blood cells (2).

Placenta percreta is the most common cause of hysterectomies associated with childbirth (2). If the pathology is determined before birth then the patient's care results significantly improve due to proper management of pregnancy and childbirth care. Since women with placenta previa or placenta accreta have a significant risk of premature birth, it is very important to diagnose it before the 36th week of pregnancy (3).

Each caesarean section increases the risk of the invasive placenta during the next pregnancy. It was found that the frequency of the invasive placenta previa after each repeated caesarean section increases and is 3%, 11%, 40%, 61%, and 67%, respectively, after the first, second, third, fourth and fifth caesarean sections (4). Therefore, these women should pay special attention to the diagnostics of the invasive placenta.

The diagnosis is usually determined by ultrasound and additional MRI, and is confirmed histologically (1). Transvaginal and transabdominal ultrasonography are complimentary to each other diagnostic methods, especially when there is placenta previa.

Findings of ultrasound examination forcing to suspect placental invasion depend on the trimester of pregnancy. In the first trimester of the pregnancy these findings would be the following: implantation of the gestational sac in the lower uterine segment, uterine scar area, multiple irregular vas-

cular spaces noted within the placental bed. It is reasonable to consider follow-up examinations at 28–30 and 32–34 weeks of gestation to confirm the diagnosis, to locate the placenta precisely, and to assess a possible bladder invasion (1, 5, 6).

During the second and third pregnancy trimesters, the placental invasion reflects itself as irregular vascular lacunar spaces in the manifestation of the placenta. During the Doppler scan, a turbulent blood flow in placental lacunar spaces is recorded, thinning of retroplacental hypoechogenic line or its absence, uneven thinning of the myometrium, the intervention of placental tissue into the posterior wall of the bladder with uneven thinning of uterine and bladder gap and bright blood flow (1, 5).

The presence of the lacunar spaces (irregular vascular areas similar to “Swiss cheese” in the placental implantation area) in the placenta and increase in their number during 15–20 weeks of pregnancy mean very important prognostic signs of placenta accreta (sensitivity of 79% and positive predictive value – 92%) (5). The more lacunar spaces are present the more likely the placental invasion into the nearby tissue (7).

The thickness of myometrium below 1 mm is also a negative prognostic indicator (5). According to some authors, usage of this parameter is doubtful because, towards the delivery deadline, the wall of the lower uterine segment gets thinner naturally. However, it has been found that this indicator is characterized by 100% sensitivity and by 72% specificity (8). Bright thinning of the uterine wall may be highly threatening.

In clinical practice, the index of the placenta accreta may be helpful in interpreting various sonographic and anamnestic factors (7). In this particular case evaluation of every risk factor (two prior caesarean deliveries, the placenta is on the anterior wall of the scar area) and ultrasound findings (lacunar spaces all over the placenta, smallest myometrial 1 mm thick and no bridging vessels) as well as calculation of the index of the placenta accreta, which was 8. It shows 91% probability of placental invasion, with sensitivity of 24%, specificity of 100% (7).

The criteria of placental invasion as seen in the Doppler scan indicates abnormal hypervascularization of the tissue (myometrium and the bladder gap), enlarged diffusion lacunar

spaces throughout the area of the placenta, which reaches myometrium and the cervix, low-resistance arterial blood flow, enlarged venous-type flow to blood vessels, and the locally extinct vascular tone in the hypoechoic subplacental gap. It is highly important to identify pathological blood flow between the uterus and the bladder wall. This is one of the best indicators for the invasive placenta diagnostics. The sensitivity of colour Doppler imaging in the diagnosis of placenta previa accreta was 82.4% and the specificity was 96.8%. The positive and negative predictive values were 87.5% and 95.3%, respectively (9).

MRI is not the first choice examination due to its high cost, accessibility, and convenience. It is most commonly used when placenta percreta is suspected, or when failing to confirm or deny this diagnosis by ultrasound examination, as well as before planned surgical treatment. MRI is now described as an examination that better predicts topography and placental tissue invasion. Distinctive MRI signs of the invasive placenta are intensive heterogeneous placental signals, dark intraplacental bands on T2-weighted images, abnormal placental vascularity, local interruptions in the myometrial wall, and directly visible placental tissue invasion into the nearby pelvic tissues, especially into the bladder (1).

This clinical case shows that ultrasound and MRI findings complement each another, allowing the confirmation of the diagnosis of placenta percreta and planning optimal treatment. The optimal surgical approach during caesarean hysterectomy remains controversial. That is why it is believed that using balloon catheters to occlude the uterine, internal iliac arteries, sometimes the common iliac artery (10) decreases blood loss in the case of placenta praevia percreta. In the case of slow oozing without a clearly identified source of bleeding after hysterectomy and internal iliac arteries balloons deflation, ligation of one of the internal iliac artery may be reasonable to avoid relaparotomy. Prolonged occlusion of the internal iliac arteries or common iliac arteries may be associated with a reperfusion injury, thrombosis, and the formation of embolisms in the lower extremities. Therefore the occlusion time should be as short as possible (10). Hence, there is no reported maternal or fetal mortality related to prophylactic balloon occlusion of internal iliac arteries (11).

CONCLUSIONS

Antenatal diagnosis of placenta percreta is especially important. Methods of visual diagnostics are complementary. The optimal surgical approach during caesarean hysterectomy remains controversial. In the case of slow oozing without a clearly identified source of bleeding after hysterectomy and internal iliac arteries balloons deflation, ligation of one of the internal iliac arteries can be reasonable to avoid residual haemorrhage and relaparotomy.

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**ANTENATALINĖ PERAUGUSIOS PLACENTOS
DIAGNOSTIKA IR ĮTAKA PERINATALINIAMS
REZULTATAMS: KLINIKINIO ATVEJO
PRISTATYMAS IR LITERATŪROS APŽVALGA**

Santrauka

Tikslas. Placentos peraugimas yra labai reta, tačiau motinos ir vaiko sveikatai bei gyvybei pavojinga akušerinė patologija, ypač tais atvejais, kai ji nediagnozuota

iki gimdymo ir pasireiškia gausiu kraujavimu bei būklės pablogėjimu. Optimaliai pacientės priežiūrai labai svarbi ankstyva perinatalinė šios patologijos diagnostika.

Klinikinis atvejis. Straipsnyje pristatytas iliustruotas peraugusios placentos, nustatytos iki gimdymo, klinikinis atvejis. Aptarti vaizdinės diagnostikos ypatumai.

32 metų nėščioji atvyko į Vilniaus universiteto ligoninės Santariškių klinikas dėl duriančio pobūdžio skausmo pilve. Nėštumo trukmė – 22 savaitės. Moteriai jau buvo atliktos 2 cezario pjūvio operacijos. Ultragaršiniu tyrimu nustatyta placentos pirmeiga, įtartas jos peraugimas. Diagnozei patikslinti atliktas dubens organų magnetinio rezonanso tyrimas ir cistoskopija. Planinis cezario pjūvis atliktas 32 nėštumo savaitę. Dėl galimo intensyvaus kraujavimo operacijos metu į abi vidines klubines arterijas įvesti preokliuziniai balionėliai, kurie užpildyti po naujagimio gimimo.

Išvados. Antenatalinė peraugusios placentos diagnostika yra ypač svarbi. Vaizdinės diagnostikos metodai gali papildyti vienas kitą. Optimalus operacijos mastas išlieka kontraversiškas.

Raktažodžiai: antenatalinė diagnostika, vaizdinė diagnostika, peraugusi placenta, placentos pirmeiga