

## Case Report

**Placenta previa percreta following caesarean delivery: two case reports**Nikolina Penava<sup>1,\*</sup>, Dejan Tirić<sup>1,\*</sup>, Dragan Soldo<sup>1</sup>, Ivona Šutalo Alilović<sup>2</sup>, Vajdana Tomić<sup>1,3</sup>, Jelena Sulić<sup>4</sup><sup>1</sup>Department of Obstetrics and Gynecology, School of Medicine, University of Mostar, 88000 Mostar, Bosnia and Herzegovina<sup>2</sup>Department of Obstetrics and Gynecology, University Clinical Hospital Mostar, 88000 Mostar, Bosnia and Herzegovina<sup>3</sup>Faculty of Health Studies, University of Mostar, 88000 Mostar, Bosnia and Herzegovina<sup>4</sup>Department of Internal Medicine, School of Medicine, University of Mostar, 88000 Mostar, Bosnia and Herzegovina\*Correspondence: [npenava@yahoo.com](mailto:npenava@yahoo.com) (Nikolina Penava); [dejan.tiric@gmail.com](mailto:dejan.tiric@gmail.com) (Dejan Tirić)

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**Abstract**

**Background:** Placenta accreta spectrum (PAS) is a clinical term used to describe the abnormal trophoblast invasion into the myometrium of the uterine wall and may enter into the serosa or even into adjacent organs. It is associated with severe obstetric haemorrhage and often requires emergency hysterectomy, which is one of the foremost causes of maternal morbidity and mortality. The vast of these conditions are seen in women with a history of previous caesarean section and placenta previa. **Cases:** In this study we present two cases of a rare type of PAS, placenta percreta, in women with a history of previous caesarean section (CS). Both instances were diagnosed prenatally, using the method of ultrasound and magnetic resonance imaging. They were scheduled for deliveries by CS, and both were hysterectomized. These diagnoses were confirmed in histopathological findings. **Conclusion:** Considering sparse published data and absence of well conducted studies, optimal management is still undefined. Caesarean hysterectomy is still the gold standard treatment for placenta accreta spectrum proposed by many societies as an absolute and final treatment.

**Keywords:** Placenta accreta spectrum; Placenta percreta; Caesarean section; Total hysterectomy**1. Introduction**

Placenta accreta spectrum (PAS) is a clinically important clinicopathological condition when placenta fails to be detached, either partially or totally from the uterine wall after delivery of the foetus. This typically provokes heavy bleeding, which can be life-threatening and usually necessitates massive blood transfusion, admission to the intensive care unit, infection, prolonged hospitalization and very often leads to the loss of fertility due to hysterectomy [1]. There are three main entities of PAS according to the degree of placental invasiveness, both in depth and lateral extension: accreta, increta and percreta. The aetiology of abnormal placental invasion has been presumed due to abnormal deep placental adhering villi and trophoblast infiltration in the area of defective decidualization caused by pre-existing damage to endometrial-myometrial interface [2]. In a 2019 systematic review, that included 7001 cases of PAS among nearly 5.8 million births, the overall pooled prevalence was 0.17 percent 0.01 to 1.1 percent range [3]. The most common type is placenta accreta and the most severe kind is placenta percreta, where placenta penetrates within the full depth of the myometrium to the uterine serosa or to the neighbouring organs. The occurrence of abnormal placental invasion has been rising in correspondence to the increasing CS (caesarean section) rates in recent decades [4]. The leading risk factor occurring is placenta previa after previous caesarean delivery. The risk of abnormal placenta-

tion in consequent pregnancies increases with the number of preceding CS [5]. The ideal management of this condition remains undefined. Both methods—surgical and conservative, are linked to various short- and long-term complications. This study presents two cases of placenta percreta in women with a placenta previa and previous CS. A total hysterectomy was performed in both cases due to the high risk of bleeding and wishes of patients who did not want to preserve the uterus.

**2. Case report 1**

Woman, 29 years old (gravida 2) was referred to our clinical hospital centre due to the high-risk pregnancy. During a routine second-trimester examination, she was diagnosed with placenta previa and concomitant PAS disorder. Due to breech presentation, 18 months earlier, she had CS. Her medical history showed anaemia and she was a heavy smoker (20 cigarettes a day). On the day when she was admitted, she was in her 35th week. 2D transvaginal and transabdominal ultrasound showed the presence of irregularity of the hypoechoic plane in the myometrium under the placenta, multiple placental lacunae, loss in the retroplacental area, placental tissue was broken through the uterine serosa and was expanding to the posterior surface of the bladder. Colour Doppler showed tortuous vessels in the area of lower uterine segment and vessels spreading from the placenta over the myometrium and beyond the serosa



into the bladder. Patient's haemoglobin value was 98 and erythrocyte 2.98. Three days prior to the surgery, she received 600 mL allogeneic red blood cells, and she also antenatally received betamethasone for foetal lung maturation. Preoperative magnetic resonance imaging (MRI) confirmed placenta previa and percreta on the anterior wall of the uterus with specific features: loss of retroplacental "clear space", a bulging of the placenta on the myometrium with its interruption and superficial invasion of the placental tissue into the bladder (Fig. 1). Cystoscopy was negative for infiltration. Both she and her husband were informed about the possible obstetric complications and the high probability of performing hysterectomy after delivering the baby. An elective caesarean section was performed in the 35th week of pregnancy. After the abdominal wall was opened by a median incision under the umbilicus, the inspection showed many pelvic adhesences, the presence of multiple outsized vessels at the level of the lower uterine segment and in the area of the bladder (Fig. 1). The placenta was bulky, reaching throughout the myometrium and extending to the posterior surface of the bladder. A transverse corporal hysterotomy was performed over the lower uterine segment with the purpose of avoiding placenta, and a healthy premature neonate weighing 2060 g was delivered. With the intention of reducing uterine bleeding during the surgery, the patient received tranexamic acid. Total hysterectomy and bilateral salpingectomy with the placenta *in situ* were done. The posterior wall of bladder was attached to the uterus; yet there was no deep invasion of placental tissue. After placing haemostatic sutures on the defect of bladder, the abdomen was inspected for bleeding; the operation was completed by placing the abdominal drain. In the course of the surgery, allogeneic red blood cells (800 mL) and fresh frozen plasma (890 mL) were transfused. The puerpera was admitted to the intensive care unit and received additional 600 mL allogeneic red blood cells and 600 mL fresh frozen plasma. The patient's recovery was successful and she was discharged on the 7th postoperative day. The histopathological examination confirmed a placenta percreta.

### 3. Case report 2

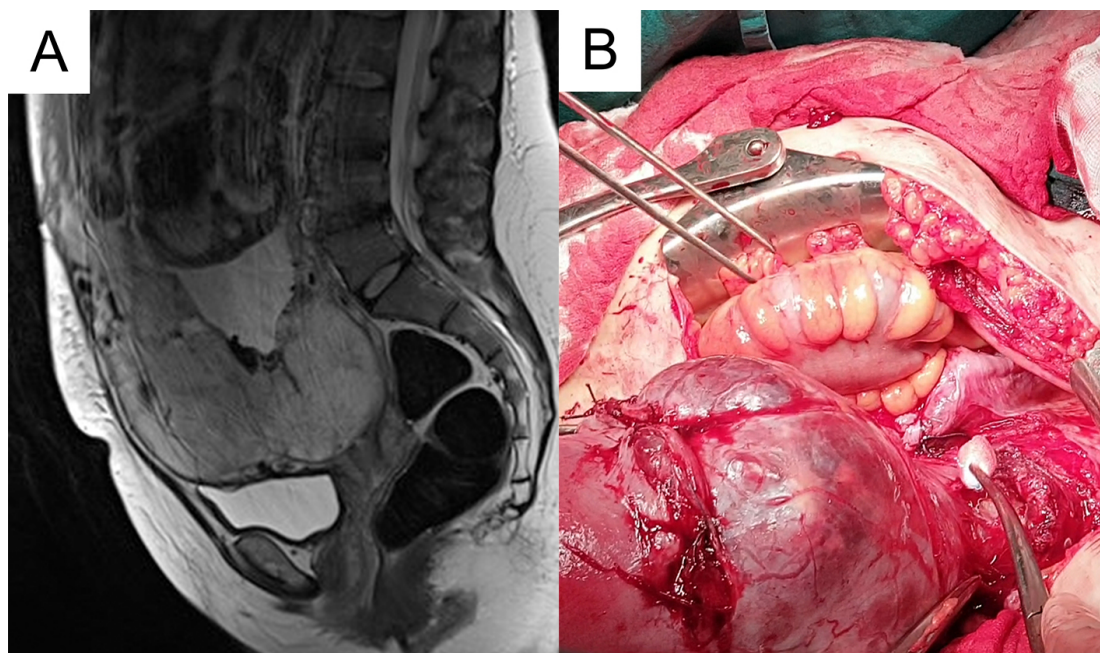
The second case included another woman, 41 years old (gravida 3). The patient's first pregnancy finished with vacuum-assisted vaginal delivery; this child has severe mental disorders while the second child was delivered by planned CS. She was also a heavy smoker, and her pregnancy was additionally complicated by gestational diabetes mellitus, well-regulated with a diet. At 22 weeks of gestation, she was hospitalized due to the painless bleeding, placenta previa and placenta percreta were diagnosed by ultrasound and confirmed by MRI (Fig. 2). The ultrasound examination was obtained carefully due to the high risk of PAS. Imaging showed placenta previa completely covering the cervix and extending to the anterior wall of the uterus,

there was presence of multiple vascular lacunae (a Swiss cheese appearance) irregular in shape, also the absence of the clear space between the placenta and the myometrium, existence of irregularity of the uterine serosa—bladder interface. The colour Doppler showed turbulent flow through the lacunae and outsized vessels.

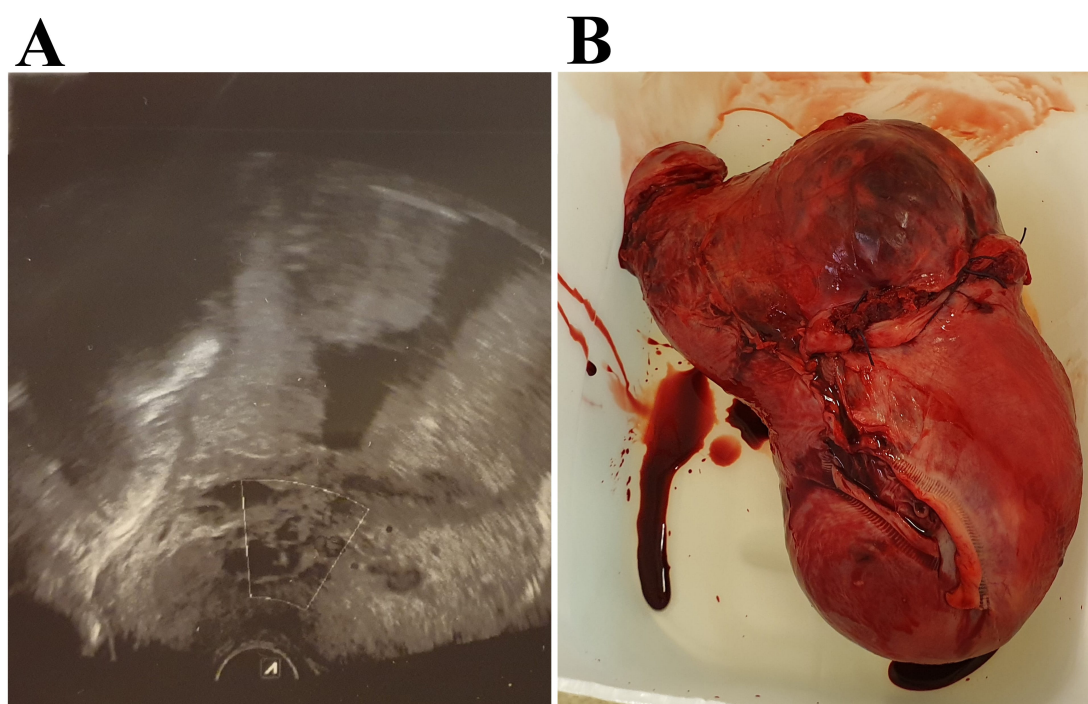
Few days later, the bleeding has stopped, and she was discharged. The second time, she was hospitalized due to preparation for planned caesarean delivery in 34 weeks of gestation. Corticosteroid therapy was administrated for foetal lung maturation. Both she and her husband were informed about the possible outcomes such as obstetric complications and they agreed to hysterectomy after baby was delivered. An elective CS was performed in the 35th week of pregnancy. After opening the abdominal wall by a Pfannenstiel relaparotomy, the inspection showed deep pelvis neovascularization with abnormal invasion of placenta tissue at the anterior uterine wall and rupturing of placental tissue throughout serosa, but there was no invasion to the adjacent organs. The transverse corporal hysterotomy was performed above the lower uterine segment and a healthy premature neonate weighing 2500 g was delivered. Also, in this case, the patient received tranexamic acid to minimize uterine bleeding during the surgery, total hysterectomy and bilateral salpingectomy with the placenta *in situ* was performed. The abdomen was inspected for haemorrhage; the surgery was finished by placing abdominal drain. Intraoperative allogeneic red blood cells (500 mL) and fresh frozen plasma (500 mL) were transfused. The puerpera was transferred to the intensive care unit and received additional 500 mL allogeneic red blood cells and 450 mL fresh frozen plasma. The patient was discharged on the 5th postoperative day. Intraoperative and histopathological findings confirmed the antenatal diagnosis of placenta percreta (Fig. 2). Both cases had a total hysterectomy; women refused to preserve fertility due to the high risk of complications. We did not use any adjunctive methods described in the literature, due to inability to perform those in our hospital.

### 4. Discussion

Risk factors for abnormal placental invasion include placenta previa, previous CS, maternal smoking and mothers aged over 35 [5]. In these cases, both women had all these factors, except one of them was under 35. The single most important risk factor, reported in about half of all cases of PAS disorders, is placenta previa [5]. The risk of previa grows with higher numbers of prior caesarean deliveries [6]. Generally, subsequent to a single caesarean, there is a 50% upsurge in the risk of placenta previa, and after two caesareans there is a double upsurge in risk compared to women with a record of two vaginal deliveries [7]. Early diagnosis and prediction of PAS in antenatal period is crucial for reducing the mortality and morbidity associated to this pathology. The multidisciplinary team with the adequate care can be prepared beforehand, enabling good



**Fig. 1. Preoperative magnetic resonance imaging and intraoperative findings.** In the sagittal plane, sequence MR FIESTA T2 is visible placenta previa and superficial invasion in the bladder (A). The placenta was reaching throughout the myometrium and extending the posterior surface of the bladder (B).



**Fig. 2. Preoperative 2D transvaginal ultrasound image and the uterus after a total hysterectomy.** 2D transvaginal ultrasound showed the absence of placental-myometrial interface and the existence of multiple vascular intraplacental lacunae (A). Uterus with the placenta *in situ* after a total hysterectomy (B).

surgery planning. The evidence showed that peripartum blood loss and transfusion amount are considerably lower in planned caesarean hysterectomy, rather than in emergency operations [8]. Furthermore, counselling and preparation of

the patient and her family is crucial in the case of potential obstetric complications.

Ultrasound imaging is the first-line technique for the screening and diagnosis of PAS. It holds many advantages:



simple usage, its accessibility and low costs of this method. Anatomical or physiological conditions like placental location or high body mass index result in the diagnostic limitations of ultrasound. Accordingly, there is no 100% sensitivity and specificity for prenatal detection of PAS disorder. Unfortunately, the diagnosis is still subjective, with accuracy correlating to the operator's experience, type of the machine and weeks of the pregnancy [9]. The European Working Group on Abnormally Invasive Placenta (EW-AIP) and AIP International Expert Group, published a standardized ultrasound description of all the signs that allow precise diagnosis of these disorders, with the aim of improving diagnostic capabilities, minimising inaccuracy due to subjectivity and thus providing better treatment (Table 1) [10]. These standardised protocols have facilitated the work of operators and enabled more precise future studies research. Contrary to the ultrasound, the imaging of MRI is not limited by the depth of examination and provides a better evaluation of abdominal and pelvic organs and their relations. Usually, it is performed as an adjunct to ultrasound, so the results of prenatal imaging would be improved, especially in cases where there is a high suspicion of deep placental invasion, like placenta percreta or in cases of posterior placenta previa. The negative side of the MRI technique is high cost and deficit of experts in this area [11]. Despite all these facts, we performed MRI imaging on women due to the high suspicion of placenta percreta, and our hospital has expert radiologists, particularly in this field. However, the imperative is on the ultrasound assessment; but the nonappearance of ultrasound features does not exclude the diagnosis of PAS. Therefore, the clinical risk factors remain strong predictors of this disorder [12].

The management of patients with this condition can be carried out in two ways. One is expectant (conservative) management with uterine preservation, and the other one is surgical (non-conservative). Optimal timing of delivery for stable (no bleeding or preterm labour) patients is between 34 and 36 weeks of pregnancy, women with active bleeding should be delivered without delay and no antenatal administration of corticosteroids [11]. Antifibrinolytic therapy is additional adjunctive therapy that is used in both types of management and prevents severe haemorrhage caused by PAS disorder. The benefit of tranexamic acid given prophylactically at the time of caesarean delivery was proven by meta-analysis [13].

Uterine preservation in expectant management defines all procedures that intend to escape hysterectomy. Women who wish to preserve their fertility should be offered an option of a conservative approach, while acknowledging that this approach is associated to many complications. Conservative management is associated with a 15% transfusion of more than 4 packed red blood cells, 26% admissions in intensive care, 11% of hysterectomies, 4% of sepsis and 2% of uterine necrosis [14]. In the retrospective study by Sentilhes *et al.* [15], success rate of preserving the uterus was

78%, and major complications were: sepsis, septic shock, peritonitis, necrosis of uterus, rupture of uterus, fistulas, injury of neighbouring organs, pulmonary oedema, acute renal failure, thromboembolic events and maternal death was reported in 6% cases, while the postponed secondary hysterectomy was necessary in more than half of patients [16]. In the literature, successful uterus preservation carries successful pregnancy rate between 86% and 89%, with a high risk of PAS recurrence between 22 and 29%. Contrary to surgical approach along with hysterectomy, this option preserves women's societal status and does not have a negative impact on their self-esteem [17]. For the time being, there are four different methods described, that include removal of placenta or uteroplacental tissue without performing hysterectomy or leaving the placenta either partially or completely *in situ*, with or without partial resection of the uterus. In addition, researchers have used adjunctive measures to diminish blood loss and to facilitate placental reabsorption. Successful techniques include uterine devascularization with uterine artery balloon placement, embolization or ligation and insertion of a Bakri balloon after placental removal [15]. For patients in expectant management with retained placental tissue, hysteroscopic resection is one of the options as an adjunctive treatment. Delayed interval hysterectomy is a variation of the expectant approach, mostly in patients with placenta percreta with an aim of avoiding excessive peripartum bleeding and tissue damage [12]. Respectively, this aspect of treatment is still under investigation with no clear benefit and potential harm. Conservative or expectant approaches are still the methods being considered and should be carefully suggested in rare cases of PAS, along with good patient informed on all risks and benefits. In patients with more expanded placental tissue, the expectant management still remains an investigational approach. The success rate of this management of PAS seems to be strongly linked to the degree of placental invasion. It is still unclear whether these women truly had PAS, because positive cases had no histologic confirmation.

The most generally accepted approach to placenta accreta spectrum is caesarean hysterectomy with the placenta left *in situ* after delivery of the neonate. Despite all preparations and planned caesarean delivery, the obstetric complications are often. Expectant management reports the following complications: 44% of transfusions of more than 4 packed red blood cells, 28% of coagulopathy, 49% admissions in intensive care, 5.7% of intestinal injury and 9.3% of reoperations [14]. Considering sparse published data and absence of well conducted studies, optimal management is still undefined. With regard to the great risks and high rates (40%–50%) of severe maternal morbidity, especially in cases of placenta percreta, where the mortality rates can be around 7%, caesarean hysterectomy is still the gold standard treatment for PAS proposed by many societies as an absolute and final treatment [18].

**Table 1. Unified descriptors (EW-AIP suggestions) for ultrasound findings in placenta accreta spectrum (PAS) disorders.**

Descriptor	Finding
2D grey-scale	
Loss of the “clear zone”	Loss or irregularity of the hypoechoic plane in the myometrium underneath the placental bed (the “clear zone”)
Abnormal placental lacunae	Presence of numerous lacunae including some that are large and irregular (Finberg grade 3) often containing turbulent flow visible in grey-scale imaging
Bladder wall interruption	Loss or interruption of the bright bladder wall (the hyperechoic band or “line” between the uterine serosa and the bladder lumen)
Myometrial thinning	Thinning of the myometrium overlying the placenta to <1 mm or undetectable
Placental bulge	Deviation of the uterine serosa away from the expected plane, caused by an abnormal bulge of placental tissue into a neighbouring organ, typically the bladder. The uterine serosa appears intact but the outline shape is distorted
Focal exophytic mass	Placental tissue seen breaking through the uterine serosa and extending beyond it. Most often seen inside a filled urinary bladder
Colour Doppler imaging	
Uterovesical hypervascularity	Striking amount of colour Doppler signal seen between the myometrium and the posterior wall of the bladder. This sign probably indicates numerous, closely packed, tortuous vessels in that region (demonstrating multi-directional flow and aliasing artifact)
Subplacental hypervascularity	Striking amount of colour Doppler signal seen in the placental bed. This sign probably indicates numerous, closely packed, tortuous vessels in that region (demonstrating multidirectional flow and aliasing artifact)
Bridging vessels	Vessels appearing to extend from the placenta across the myometrium and beyond the serosa into the bladder or other organs. Often running perpendicular to the myometrium
Placental lacunae feeder vessels	Vessels with high velocity blood flow leading from the myometrium into the placental lacunae, causing turbulence upon entry
3D intraplacental hypervascularity	Complex, irregular arrangement of numerous placental vessels, exhibiting tortuous courses and varying calibres

Modified from Collins *et al.* [10].

It is uncertain, and there is no clear evidence proving that routine subtotal hysterectomy in all cases of PAS disorder minimises major maternal complications compared to total hysterectomy, actually current evidence does not support its performance in cases of placenta increta and percreta with cervical involvement [17,19].

## 5. Conclusions

For the time being, there are no randomized studies that explore the best management of pregnancies complicated by PAS disorder. Consequently, the recommendations are based on studies that were not well conducted. Disparity in the definition of PAS brings additional difficulties and causes variability in the prevalence of this condition. The use of the standardized protocol and nomenclature is essential for both the prenatal diagnosis and histopathological affirmation of PAS disorders, so as to provide more precise epidemiological data. In prevention, women should be informed that requested elective caesarean delivery increases the risk of developing PAS disorders and such risks are greater than after the emergency caesarean delivery. Therefore, we can say that the risk is associated to each caesarean section, but not in the same amount.

## Abbreviations

CS, caesarean section; MRI, magnetic resonance imaging; PAS, placenta accreta spectrum.

## Author contributions

NP and DT wrote the manuscript with input from all authors. DT, DS, NP, IŠA and VT were operators in these described cases. JS collected and analysed the data. All authors were involved in presented cases and contributed to the final report.

## Ethics approval and consent to participate

The Hospital Ethics Committee approved the study (approval number: 516/20). All participants have given their consent for use of the medical data.

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## Conflict of interest

The authors declare no conflict of interest.

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