

## CASE REPORT

# PREGNANCY WITH AN INCREASED OBSTETRICAL RISK. PLACENTA ACCRETA. TRENDS

IULIA-MARIA TÂRCOMNICU<sup>1</sup>, M.C.T. DIMITRIU<sup>1,2</sup>, RAMONA ADELA CĂLIN<sup>1</sup>, DIANA GHEORGHIU<sup>1</sup>, IRINA PACU<sup>1</sup>, F.D. CĂLIN<sup>1</sup>, M. BANACU<sup>1,2</sup>, INA POPESCU<sup>1</sup>, IRINA HANGANU<sup>1</sup>, TEODORA VLĂDESCU<sup>5</sup>, B. SOCEA<sup>3,4</sup>, C.G. FURĂU<sup>6</sup>, G. FURĂU<sup>6</sup>, N. BACALBAȘA<sup>2</sup>, C.R. JITIANU<sup>3</sup>, F. POPA<sup>4</sup>, C.A. IONESCU<sup>1,2</sup>

<sup>1</sup>Clinic of Obstetrics and Gynecology, "St. Pantelimon" Clinical Emergency Hospital, Bucharest, Romania

<sup>2</sup>Department of Obstetrics and Gynecology, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

<sup>3</sup>Clinic of General Surgery, "St. Pantelimon" Clinical Emergency Hospital, Bucharest, Romania

<sup>4</sup>Department of General Surgery, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

<sup>5</sup>Clinic of Pathology, "St. Pantelimon" Clinical Emergency Hospital, Bucharest, Romania

<sup>6</sup>"Vasile Goldiș" Western University of Arad, Romania

### SUMMARY

The chosen case is a particular one through the complexity of the pathology associated to the pregnancy, each of them in a direct way or in terms of the complications can give a major, vital risk maternal and fetal in any moment of the pregnancy, at birth or after birth. I reported the case of a patient with an age of 46 years, caucasian race, from the country, who smokes a lot, pregnant with a twin pregnancy, 26 weeks, obtained through FIV with donor of ovocytes, who is hospitalized in emergency on 1.01.2016 in the Obstretical – Gynaecologic clinic of the Emergency clinical hospital "Saint Pantelimon", Bucharest for high blood pressure and supervising the pregnancy of a highly obstretical risk. After the anamnesis, the clinical exam and of the paraclinical research it is obtained a positive diagnosis and we define this pregnancy as being of a highly obstretical risk through: a pregnancy with twins, pregnancy obtained through FIV, HTA induced by pregnancy, cicatricial uterus after the caesarian operation 2000, placenta praevia half central, acret, thrombophlebitis in treatment, advanced maternal age. Taking into consideration the pathologies associated to pregnancy, it is considered the necessity of a multidisciplinary supervising, of the pregnancy, in conditions of hospitalization. At 33 weeks of pregnancy the condition of the patient and of the foetus regress clinically and paraclinically, showing the syndrome HELLP and preeclamsia, intrauterine growth restriction of both of the foetus, the cerebra-placental index reversing. After an adequate previous preparation, it is decided the delivery through cesarean operation; two alive fetuses are extracted with a good cardio-respiratory accomodation, intraoperatorily there are discovered multiple vessels of neofomation at vessels of

### RÉSUMÉ

*Grossesse à risque obstétrical accru. Placenta accreta. Tendances*

Le cas choisi est particulier par la complexité des pathologies associées à la grossesse, chacune directement ou par les complications, peut conférer un risque vital majeur maternel et fœtal à tout moment (stade) de la grossesse, de l'accouchement et pendant le post-partum. Nous avons signalé le cas d'une patiente âgée de 46 ans, caucasienne, du milieu urbain, grand fumeuse, femme enceinte avec une grossesse gémellaire de 26 semaines, obtenue par fécondation in vitro avec une donneuse d'ovocytes, qui s'est fait internée d'urgence le premier janvier 2016 à la Clinique d'Obstétrique-Gynécologie de l'Hôpital Clinique d'Urgence "Saint Pantelimon" de Bucarest pour hypertension et surveillance de la grossesse, présentant un risque obstétrical élevé. Après l'anamnèse, l'examen clinique et les investigations paracliniques on obtient un diagnostic positif et l'on définit cette grossesse comme ayant un risque obstétrical élevé par: génullarité, grossesse obtenue par fécondation in vitro, hypertension induite par l'état de grossesse, utérus cicatriciel après la césarienne soufferte en 2000, placenta praevia partiellement central, accreta, thrombose sous traitement, l'âge maternel avancé. Tenant compte des pathologies associées à la grossesse, on considère comme nécessaire la surveillance multidisciplinaire, minutieuse de la grossesse, dans des conditions d'hospitalisation. À 33 semaines de grossesse l'état du patient et des fœtus se dégrade du point de vue clinique et paraclinique, manifestant le syndrome de HELLP et Pré-éclampsie, restriction de croissance intra-utérine des deux fœtus, l'inversion du rapport cérébro-placentaire. Après une préparation préopératoire préalable

Correspondence address:

Iulia-Maria Tarcomnicu, MD

Department of Obstetrics and Gynecology, "St. Pantelimon" Clinical Emergency Hospital Pantelimon  
Str. No. 340-342, Sect. 2, Bucharest, Romania

e-mail: july\_iulia28@yahoo.com

neof ormation at the level of the urinary bladder, one suspects the diagnosis of placenta increta in the urinary bladder, one continues the surgical intervention with a total, interaxial hysterectomy together with placenta, in an hemostatic purpose, without tempting previously the moving of the placentae. Although associated to these multiple pathologies in the pregnancy, the birth could be accomplished at cold, with an adequate preoperatorily preparation avoiding in such a way the potential supplementary complications of a surgical intervention in emergency. Cesarean delivery and peripartum hysterectomy have been described as one of the riskiest and most dramatic operations in modern obstetrics [1]. The best management in case of placenta accreta is to not attempt to remove any of the placenta, either in an attempt to conserve the uterus or prior to hysterectomy, is associated with reduced levels of haemorrhage and a reduced need for blood transfusion.

**Key words:** placenta accreta, placenta praevia, cesarean hysterectomy, cesarean section, high obstetrical risk, conservative

## INTRODUCTION

The common goal of modern obstetrics and pediatrics is to optimize the conditions of bringing the world of infants who can benefit from physical abilities, mental and emotional at optimal levels. The most important moment when it can act to prevent the occurrence of disease is the preconceptual time and during fetal development. An abnormality of the placenta insertion is a solid criterion for inclusion of pregnant women in the group of patients with high obstetrical risk. The maternal morbidity in women with placenta accreta is high.

Was defined placenta accreta the placenta that the adheres to the uterine wall without easy separation and includes the spectrum of placenta accreta, increta, and percreta. In placenta accreta placental villi invade the surface of the myometrium, in placenta increta placental villi extend into the myometrium, in placenta percreta the villi penetrate through the myometrium, to the uterine serosa and may invade adjacent organs, such as the bladder [2]. Through deliveries the incidence of placenta accreta is low (0.04%) [3]. Placenta accreta represents 50% of all caesarean hysterectomies [4].

The risk factors of placenta are: placenta praevia, uterine surgery in history (hysteroscopic surgery, myomectomy, endometrial ablation, cornual ectopic pregnancy, curettage,) cesarean scar pregnancy, maternal age greater than 35 years, history of pelvic irradiation, infertility procedures (FIV)[5].

One theory of pathogenesis is that previous surgery or anatomical factors (lower uterine segment, endocervix, uterine anomaly) determine defective decidualization (poorly formed, subtle, or absent decidua) that allows the placenta to attach directly to the myometrium [6].

The suspected diagnosis is made using the following explorations: sonographic examination, color Doppler ultrasonography, Three-dimensional ultrasound, MRI.

adéquate, on décide l'accouchement par césarienne, on extrait les deux foetus vivants, avec une bonne adaptation cardio-respiratoire, on remarque en intra-opératoire plusieurs vaisseaux de néoformation peropératoires au niveau de la vessie urinaire, on soupçonne le diagnostic de placenta increta à l'intérieur de la vessie, on continue l'intervention chirurgicale avec l'hystérectomie totale interannexielle en bloc avec le placenta, à but hémostatique, sans tenter antérieurement la décollement du placenta. Bien que la naissance ait été associée à ces pathologies multiples pendant la grossesse, l'accouchement a été réalisé à froid avec la préparation préopératoire adéquate, dans un temps optimum du point de vue maternel et foetal notamment, en évitant ainsi les potentielles complications supplémentaires d'une intervention chirurgicale d'urgence. L'accouchement par césarienne et l'hystérectomie péripartum ont été décrits comme l'une des opérations les plus risquées et les plus dramatiques de l'obstétrique moderne [1]. La meilleure conduite en cas de placenta accreta est de ne pas tenter d'enlever le placenta dans le but de conserver l'utérus ou avant l'hystérectomie, est associée aux niveaux réduits d'hémorragie et un besoin réduit de transfusion sanguine.

**Mots-cle:** placenta accreta, placenta praevia, hystérectomie, césarienne, risque obstétrical, conservatoire

Suggestive for placenta accreta are next sonographic signs [7]: loss of placental homogeneity (venous lakes or placental lacunae- the most important ultrasound finding), irregularity of the normal hypochoic area behind the placenta (termed the 'clear space'), retroplacental myometrial weakness, curved placenta into the posterior wall of the bladder, bulging mass through the uterine serosa, disappearance or discontinuity of the normally white line representing the bladder wall-uterine serosa interface.

Specific signs on color Doppler ultrasonography for placenta accreta are [8]: vague or focal, intraparenchymal lacunar flow, vascular lakes with turbid flow, serosa-bladder with hypervascularization, bulky subplacental venes.

Diagnostic signs on Three-dimensional (3D) ultrasound are [9]: chaotic intraplacental vascularization with tortuous confluent vesse, hypervascularity of uterine serosa-bladder wall interface.

Also, in placenta accreta the signs on Magnetic Resonance are [10]: uterine curved into the bladder, heterogeneous signal intensity inside the placenta, focal intermission of the myometrium, aberrant placental vascularity

In cases where placenta accreta is suspected, the diagnosis cannot be settled clearly with ultrasound or MRI [11]. The diagnosis can be made only at surgery with pathology examination.

## CASE REPORT

*The patient, aged 46, caucasian, urban, high social-economic level, of normal body weight, ingrained smoker, 26 weeks twin pregnancy, had benefited of regimen from a specialist doctor, was admitted, on the 1st of January 2016, to the Obstetrics and Gynecology Clinic of the Emergency Hospital St. Pantelimon, Bucharest, for hypertension, surveillance of pregnancy with increased obstetrical risk. Aspects from the physiological anamnesis of the patient: the*

menarche at the age of 14, 8 voluntary abortions, c-section birth in the year 2000, made at 36 weeks of pregnancy, due to acute fetal distress, no intraoperative or postoperative complications during pregnancy, lactation for one month after giving birth. After multiple unsuccessful treatments for infertile couple (low ovarian reserve, oligospermia), the patient obtains the current pregnancy by in-vitro fertilization, with oocyte donor (sole procedure). Aspects from the pathological anamnesis of the patient: appendectomy in childhood and meniscus tear, surgical operated in childhood. Besides these, the current pregnancy is considered to be with an increased obstetrical risk due to the following associated pathologies: mild HBP due to the pregnancy, partially central placenta praevia, accreta, thrombophilia in treatment with anticoagulant, (V Lyden factor heterozygous mutation, MTHFR gene homozygous mutation), post-caesarian section uterine scarring, twin pregnancy, cervix cerclage and pessary bearer, advanced maternal age. At the time of admission, the following were administered to the patient as background medication: Clexane 0,4 ml, subcutaneous, 1 vial, initiated before conception, Dopegyt 25 mg capsules, 1 capsule / 6 hours (initiated at 20 weeks of pregnancy) Nifedipin 20 mg capsules, 1 capsule / day, when needed (initiated at 20 weeks of pregnancy), Progesterone (Utrogestan) 200 mg capsules, a capsule / 12 hours (intravaginal), magnesium, pregnancy vitamins. Aspects from the anamnesis of the patient, others than those already mentioned: diagnosis of HBP in 20 weeks pregnancy, maintaining blood pressure within normal limits due to the previously mentioned treatment, the HBP monitoring in clinical and paraclinical outpatient, the current hospitalization being one of the many others (abortion danger, with the need to the need to perform cerclage and the insertion of the pessary in the 19th week of pregnancy). From the general clinical examination of the patient on admission, the following were found: good general condition, the patient conscious and cooperating, BP = 150/100 mmHg, AV = 78 bpm, abdomen distended in volume by the gravid uterus, with the bottom of the uterus midway the xifo-umbilical distance, 2 fetal poles of the same kind are identifiable by palpation, the first fetus' skull at the lower pole and the second at the upper pole, FHR (fetal heart rate) fetus A = 145 bpm, FHR fetus B = 150 bpm, FAM (fetal active movements) identified in both fetuses, uterine tinus normal, painful uterine contractions rare, unsystematized. At the examination with valves, the following were found: pessary device in place, cerclage wire in place, no blood or amniotic fluid loss at the moment of examination. The vaginal examination was not feasible due to the position of the placenta. Paraclinical explorations used on admission: laboratory tests and ultrasound, EKG. At the ultrasound examination, the following were found: the twin pregnancy - diamniotic, bicorial, both fetuses alive; fetus A positioned with skull at the lower pole, biometrically equivalent to 25 weeks and 3 days, approximative weight 700 g +/- 72 g, anterior placenta, 2nd grade, located on the lower segment, partially covering the internal cervical orifice, the placenta insertion suspected to be abnormal, probably placenta accretion; fetus B positioned with skull at the upper pole, biometrically equivalent to 24 weeks and 1 day,

approximative weight 620 g, +/- 53 g, anterior placenta, FAM identified in both fetuses, FHR normal in both fetuses, AL in normal quantity, Doppler velocimetry of maternal uterine artery, normal. The laboratory analysis shows the following deviations from the laboratory reference ranges: proteinuria / 24 hours 348 mg / 24 hours, serum creatinine 0.46 mg / dl, glucose 64 g / dl, magnesium 1.57 mg / dl, serum total protein, 5.77 mg / dl, serum albumin, 3.15 mg / dl. Other conducted analysis (CBC, uric acid, LDH, cholesterol, triglyceride, SGOT, SGPT, fibrinogen, PT -phrotorombin time -, INR, cervical probe, urinalysis, urinary content) showed normal; patient's blood group is OI Rh (+). After corroborating data from the anamnesis, clinical examination and paraclinical explorations, the admission diagnosis is formulated as follows: ten gesta, second para, twin pregnancy of 26 weeks, achieved through IVF, both fetuses alive, thrombophilia in treatment, partially central placenta praevia, accreta, pregnancy-induced hypertension, uterine cesarean section scar after 2000 surgery, cerclage of the cervix, pessary bearer, high maternal age. On admission, it was brought to discussion the differential diagnosis of abdominal distension, of number of fetuses, of pregnancy viability, of chorionicity, of gestational age, of the placenta positioning, of placental insertion, all of this which was certified by anamnesis, clinical examination and ultrasound. Also, the HBP in pregnancy differential diagnosis was made, by using anamnestic, clinical and paraclinical diagnostic criteria and by putting into question the following diagnoses: pregnancy induced HBP complicated by preeclampsia, pregnancy induced HBP complicated by HELLP syndrome, chronic HBP, chronic HBP complicated by preeclampsia. Differential diagnosis of proteinuria was made with other types of proteinuria: transient, orthostatic, persistent (glomerular proteinuria in: vascular; renal and neoplastic glomerulonephritis, drug consumption; tubular proteinuria in: nephritis, pyelonephritis, Fanconi syndrome, Wilson's disease). Given that under antihypertensive therapy, the pressure values increased, the patient was hospitalized for pregnancy-induced HBP and regimen for high obstetrical risk pregnancy. Considering the pathologies associated with the pregnancy, the necessity of a very careful, multidisciplinary (obstetrics, internal medicine, cardiology, ophthalmology), clinical and paraclinical (ultrasound, cardiotocographic, laboratory analyzes) supervision in a hospitalization regime is taken into account. During hospitalization, the patient receives antispasmodic, tocolytic, progesterone, antihypertensive, anticoagulant and antibioprophyllactic medication. At 30 weeks of pregnancy, the patient shows a clinical and biological degradation, with edema, increased BP values despite the regimen, increasing proteinuria / 24 hours (806.40 g / 24 hours), intrauterine condition of fetuses is unchanged. After receiving treatment for lung maturation (Betamethasone F II, 1 F/12 hours) patient's condition improves, clinically and paraclinically, the condition of fetuses is unchanged. Along with the neonatologist, the birth temporization is decided. At 32 weeks gestation, the patient's condition, clinically and biologically, degrades again: malaise, dyspnea with orthopnea, BP values increased, legs and facial edema emphasis, in

terms of obstetrical: uterine tone normal absent painful uterine contractions, fetal active movements present both FCH of fetuses normal, not losing blood or amniotic fluid. Ultrasound dynamics evaluations revealed the following: intrauterine growth restriction in both fetuses (2 weeks and, respectively, 2 weeks and 4 days), slightly decreased amniotic fluid volume in both fetuses, placentas grade II, partially central praevia, placental insertion abnormality (probably percreta), cerebro-placental index equalization. Multidisciplinary assessment of the case is decided, it is given in addition to those mentioned above, 4 g of MgSO<sub>4</sub>, intravenous bolus, unique dose, neuroprotective purposes. At 32 weeks, the patient shows preeclampsia, HELLP syndrome, after an optimal preoperative preparation: multidisciplinary consultation (obstetrics and gynecology, internal medicine, cardiology, ICU, neonatology) complex surgical team preparation (gynecologists, ICU, neonatologists and surgeon and urologist pending), preparation of blood iso-group, iso-Rh, blood products, preoperative preparation of the patient (when signing the informed consent, the patient acknowledges the vital risk of the surgery, the possible intraoperative, immediate or delayed postoperative complications, either maternal or fetal, the possibility of completing the surgery with total hysterectomy with or without bilateral adnexectomy, the damage to the bladder or other intraabdominal organs). On the 22nd of February 2016, at 33 weeks of pregnancy, under spinal anesthesia and, afterwards, general anesthesia with oro-tracheal intubation, Caesarean section was decided, due to: partially central placenta praevia, percreta with mild vaginal bleeding, preeclampsia, HELLP syndrome. The peritoneal cavity was penetrated by median-umbilical laparotomy, gravid uterus is found, multiple vessels of neo-formation at the lower segment and bladder; a possible invasion of the placenta into the bladder. Through the medio-corporeal hysterectomy tranche, two live fetuses were extracted, the first fetus in pelvic emergence, female, weight 1330 g, Apgar score 8, second fetus in skull emergence, male, weighing 1540 g, Apgar score 9. Moderate intraoperative bleeding is found at the lower segment, the placenta was decided not to be removed (fig. 1); the total hemostatic interadnexial intervention is proceeded with, in block with the placenta.

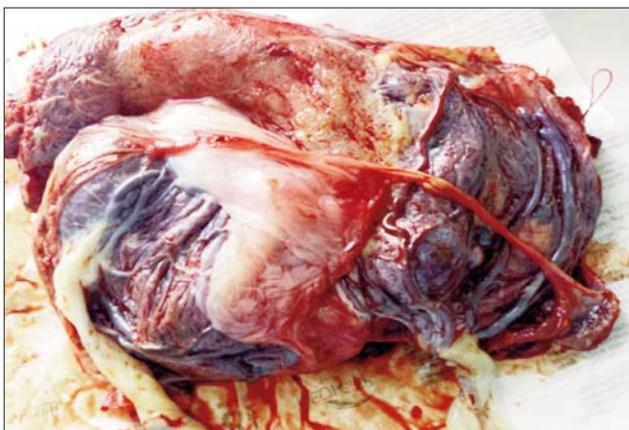


Figure 1

During the intervention, the patient started bleeding abundantly, entered in hemorrhagic shock, measures of ICU altered fluid resuscitation were taken, by intravenous administration of crystalloid, colloid solutions, frozen plasma, coagulation factors, 7 units of red blood cell, iso-group, iso-Rh, with subsequent hemodynamic stabilization of the patient. The intervention ends with the positioning of a drainage tube in the pelvis, anatomical parietoraphy. The extracted parts (uterine corpus, cervix and placenta in block) are sent to histopathology. Postoperatively, the patient is kept in ICU ward for one day and transferred to this department obstetrics and gynecology. The immediate postoperative evolution was favorable; anticoagulant therapy, multiple antibiotic, analgesic, anti-inflammatory medication was administered; gradual weaning. Further postoperative evolution was slowly favorable; on the IIIrd day, the gas transit was normalized, the IVth day the patient became febrile (38 degrees Celsius), multiple watery-diarrheic stools, Clostridium difficile infection was confirmed (toxin A / B + GDH). Therapy with Vancomycin 2.5g / day, Tygacil 50 mg / 12 hr was established. In the sixth postoperative day patient shows malaise, physical asthenial, multiple watery-diarrheic stools, vomiting, loss of appetite, persistent inflammatory syndrome (leukocytosis, thrombocytosis); clinically surgically cured. It is practiced an interdisciplinary consult for infectious diseases at the Victor Babes Hospital, where continuing the targeted therapy the Clostridium Difficile with Tygacil was recommended; antifungal therapy, diet, hydration; slow favorable evolution. The patient was discharged as surgically cured, 17 days after surgery, with the following recommendations: cardiac regimen, respecting the diet, physical and sexual rest. Suture material suppression took place in the 14<sup>th</sup> postoperative day.

The peculiarity of the case is represented by the complexity and extent of complications associated with this pregnancy, which truly defines it as an increased obstetrical risk pregnancy. Each of these pathologies associated with the pregnancy can cause large scale complications that can be a threat for both maternal and fetal lives during pregnancy, intrapartum, intraoperatively or postoperatively [12].

The possible maternal complications potentiated by twin pregnancy that could have occurred in this case are: abortion imminence, anemia, kidney failure, eclampsia, disseminated intravascular coagulation, hyperemesis gravidarum, gestational diabetes, obstetrical haemorrhage, pulmonary thromboembolism. The possible maternal complications potentiated by twin pregnancy that could have occurred in this case are: in-utero fetal death, fetal malformations etc. The possible maternal complications given by the association of arterial hypertension during pregnancy are: acute renal failure, chronic renal failure, hepatic failure, hemorrhagic stroke, blindness, maternal death by: hemorrhagic stroke, heart failure, liver failure, renal failure. The possible fetal complications given by the association of arterial hypertension during pregnancy are: antepartum or postpartum fetal death, complications of prematurity. The possible complications associated with thrombophilia during pregnancy are abortive disease, fetal death in utero, obstetrical hemor-

rhage by anticoagulation therapy, thromboembolic complications: deep vein thrombosis, pulmonary thromboembolism. The possible complications that could occur due to uterine scar are: uterine rupture (associated with maternal death, fetal sequelae of fetal data: prematurity, hypoxia), abnormal insertion of the placenta (adherent placenta, accretion, increta, percreta) syndrome adherents Pelvic, bowel obstruction. Potential complications given by abnormal insertion of the placenta are: intrapartum obstetric hemorrhage, hemorrhagic shock and death intraoperative with mother and baby, disseminated intravascular coagulation, fetal sequelae of prematurity. Potential complications of placenta praevia are: imminent abortion, miscarriage, obstetric hemorrhage, hemorrhagic shock, maternal death, fetal sequelae of prematurity. Pregnancy complications that could have been caused by advanced maternal age are: spontaneous abortion, fetal genetic mutations, fetal malformations, fetal death in utero, kidney disease, other cardio-vascular diseases. Intraoperative complications other than those already happened in this case are: maternal death, fetal death, the need for bilateral ovariectomy, abdominal damage other organs: bladder, ureters, digestive tract, large vessels. Potential immediate postoperative maternal complications: bleeding, infection, dehiscence wound, dehiscence of vaginal tranche [13]. Potential late maternal complications are: eventration, evisceration, static pelvic disorders. Maternal vital prognosis is favorable on short and long term. The risk of developing BP remains after exceeding the period of confinement after birth (6-8 weeks). Concerning fertility of the patient, the prognosis is reserved (possibility of a uterus transplant or surrogate mother are extreme options). The fetal prognosis is reserved considering the possibility of complications and sequelae of prematurity (ophthalmic, neurological). The histopathological outcome at 1 month after surgery revealed the following diagnoses: diffuse uterine leiomyomatosis pregnancy uterus, outbreaks of adenomyosis, focal accretion placenta (fig. 2, 3, 4).

## DISCUSSIONS

Our findings highlight the importance of antenatal diagnosis for abnormalities of placental insertion and the recommendation of suspicion in case of women with any risk factors for this pathology.

Antenatal diagnosis of placenta accreta, increta, or percreta allows for early delivery planning, including the potential of a multi-disciplinary team, discussion of the surgical method to delivery, preparation for invasive surgery, including hysterectomy if necessary, as well as ensuring sufficient blood products and other supporting therapies are readily available.[14]

The trials suggest that maternal morbidity was reduced among women with an antenatal suspicion of accreta who suffered a surgery compared with unprogrammed delivery [15].

Schedule caesarean hysterectomy performed at an earlier gestation to avoid emergency delivery in women with suspected placenta accreta has the potential to reduce maternal morbidity.

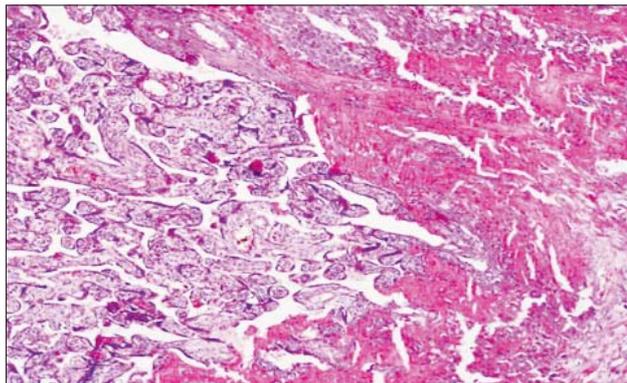


Figure 2 - Chorionic villi adhering in the myometrium, col H.E. Ob. x 20

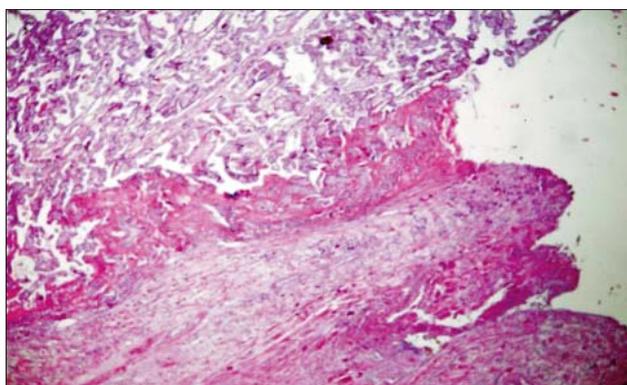


Figure 3 - Chorionic villi anchored directly into the myometrium, decidua absence, col. H.E., ob. x10

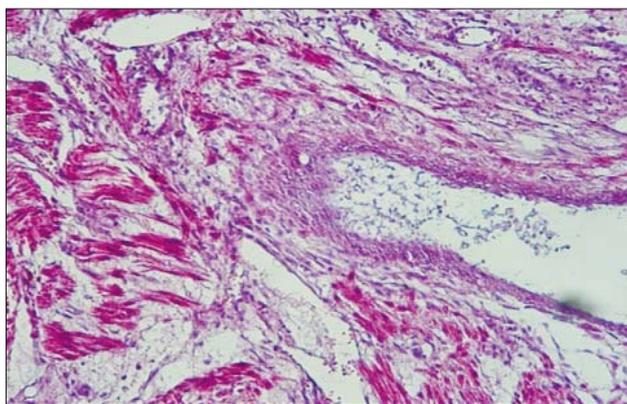


Figure 4 - Adenomyosis in focal placenta accreta, col H.E., ob. x 20

The potential maternal benefits of earlier programmed delivery must be compared against the complications of premature birth and the associated increased risk of neonatal morbidity. More data are needed before recommendations on the optimal timing of delivery in women with placenta accreta.

A pertinent question is how correct and recommended is a conservative treatment method?

There is care for risk of recurrent placenta accreta in women who suffer a conservative management [16].

Methods include next steps: leaving the placenta after

caesarean delivery, surgical uterine devascularisation, embolisation of the uterine vessels, uterine compression sutures and/or over suturing the placental vascular bed [17, 18]. Our data do not support the routine practice of prophylactic hypogastric artery ligation in cases of placenta accreta.

There are several trial and case reports series that support embolisation in cases of placenta accreta [17]. In contrast, other authors reported no benefit from uterine artery embolisation [19].

Some authors also have sustained the use of methotrexate to withhold trophoblast growth and accelerate postpartum involution of the placenta [20]. It is also unclear if this treatment is helpful since most trophoblast cells are not actively dividing in the third trimester.

One of the largest studies has examined maternal consequences after conservative treatment of placenta accreta, increta, and percreta and has suggested that conservative management can preserve the uterus in 78.4% of women, with a severe maternal morbidity rate of 6% [21]. In a recent follow-up study, the same authors concluded that a women's subsequent fertility or obstetric outcome does not appear to be compromised by uterine preservation after placenta accreta, increta, or percreta [22]. However, the authors suggest that women should be advised of the high risk of recurrence of placenta accreta in following pregnancies.

In case of our patient there was not tempted the conservative management, no attempt to remove any of the placenta. Either was not tempted to conserve the uterus because of associated pathologies and patient agreement to divest fertility.

## CONCLUSIONS

Risk factors should prompt clinicians to refer women for evaluation and counselling for possible placenta accreta.

Scheduled caesarean hysterectomy performed under controlled circumstances, without attempting to remove the placenta before hysterectomy was associated with significantly decreased maternal morbidity.

In cases of placenta previa accreta, ligation of the internal iliac artery or uterine artery embolisation did not significantly contribute to hemostasis during cesarean hysterectomy.

Further studies including multiple centres and uniform diagnostic criteria are needed to identify optimal management strategies for this increasingly common, morbid condition.

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