

## *Research Article*

# **Cesarean scar defects and placental abnormalities; a 3 year survey study**

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### **Abstract**

The placenta is an essential organ for embryonic and fetal development, ensuring nutrient uptake, gas exchange (via the mother's blood supply), waste elimination, thermo-regulation, immunological and hormonal factors, etc. The most common placental abnormalities are represented by placenta previa, and a morbidly adherent placenta (in the form of accreta, increta, and percreta placenta).

This study was performed on a sample of 99 patients diagnosed with abnormalities of placentation who underwent cesarian delivery during a period of 3 years in Bucur Maternity Hospital. Seven patients were diagnosed with morbidly adherent placenta (5 accreta and 2 percreta subtypes), the others having placenta previa (65 with lateral disposition, 18 marginal, and 9 central insertion). All patients had been diagnosed by ultrasound (which was also used for general monitoring), being confirmed during operation and histopathologically. Complications required 4 emergency peripartum hysterectomies, with no maternal mortality but with fetal death in one case.

The research literature shows that about half of women with placenta previa have several episodes of bleeding, being the leading cause of antepartum hemorrhage. For some women with placenta previa/accrete, hemorrhaging is severe and requires hysterectomy as a necessary step to control the life-threatening situation. Thus, such patients should be carefully monitored to avoid as much as possible the medical, social, and psychological implications of this critical therapeutic procedure.

**Keywords:** placenta previa, uterine scar, morbidly adherent placenta, accreta, increta, percreta



## Introduction

The placenta first develops during the blastocyst stage and is expelled with the fetus at birth. The fetus uses the placenta for nutrition and other developmentally essential functions. Therefore, abnormalities (expansion or the site of implantation, structure or placental function, and finally inadequate disposition of the placental cord) may jeopardize embryonic and fetal development. The most frequently encountered abnormalities are represented by placenta previa and morbidly adherent placenta/ (MAP) (in the form of accreta, increta and percreta placenta), being classified by the depth of penetration of the placental villi into the myometrium.

Placenta previa, a condition when the placenta overlies the internal cervical os of the uterus, occurs in approximately 1/ 250 pregnancies. It has major risk factors such as prior cesarean delivery, pregnancy termination, intrauterine surgery, and increasing parity (1). Placenta previa reappears in women with multiple parturitions at a relatively high frequency, representing about 4-8% for their most recent pregnancies (2). In addition, a short interval between gestations is associated with increased risks of previa and abruption (3). A North American study revealed a 47% increased risk of placenta previa after the first cesarian-section (C-section), and a 40% increased risk of placental abruption in the second pregnancy with a singleton (4).

The incidence of placenta accreta has increased by a factor of 13 since the early 1900s, and it is directly correlated with the increasing cesarean birth rate (5). Moreover, the incidence of placenta accreta significantly increases in women with previous cesarean section, compared with those without a prior surgical pregnancy (6, 7). Further study has revealed that the incidence of placenta accreta has increased from 0.12% during the 1970s, to 0.31% during the 2000s. During the same period, cesarean section rates increased from 17% to

64%, making it the most significant predisposing condition for placenta accreta (8).

Recent investigations have proposed to establish a measurement plan able to quantify the frequency of elective cesarean section, along with relevant geographical, social, and economic information. The results have shown that in 2014, the rate reached 36.9 cases for every 100 newborn infants, 2.62% higher than in 2013 (9).

Other health issues are relevant to placental function. For example, the relationship between gestational age and volume of the placenta has been associated with increased risk of cardiovascular disease death in the mother or the children, therefore suggesting that placental function is an important factor regarding the cardiovascular disease at older ages (10, 11). Furthermore, any changes in placental structure and function might significantly increase the risk of stillbirth. Therefore, an important goal towards understanding placental dysfunction is to develop improved procedures for pregnancy monitoring (12).

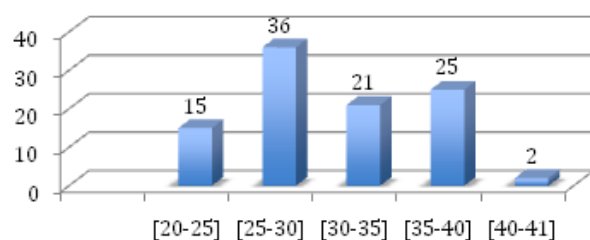
Vaginal bleeding encountered after 20 or more weeks of gestation should raise the suspicion of placenta previa. However, all pregnant women with vaginal bleeding and cytologic suspicion of cervical cancer (excepting squamous atypia or low-grade squamous intraepithelial lesions) should undergo colposcopy, with or without biopsy (13).

## Materials and methods

The study used 99 patients, ages 21 to 42 years, diagnosed with abnormalities of placentation and undergoing cesarean delivery in Bucur Maternity Hospital during a 3 year period from 2014 to 2017. Two additional groups consisting of 92 patients with placenta previa and 7 patients with morbidly adherent placenta were also studied. Gestational age was between 28 and 41 weeks, with 8 premature deliveries.

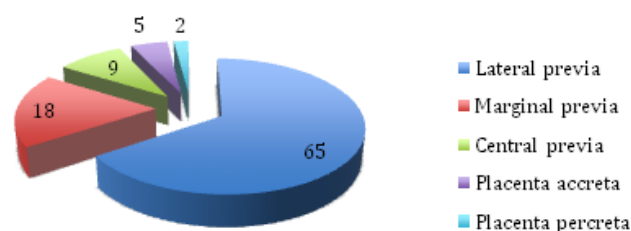
Twelve patients had a medical history of having undergone a C-section, and 28 patients had had two or more deliveries. All patients were diagnosed by ultrasound and monitored during their entire gestational period until delivery.

Relationships were established between mortality, morbidity, days in ICU (intensive care unit), blood transfusion units, obstetrical history and the type of placental abnormality. The majority of the patients were aged 25 to 35, 55% of them belonging to 25-35 years old interval (Figure 1).



**Figure 1.** Distribution according to age intervals

Despite being primiparous, 71 patients developed the same abnormalities of placentation as patients having risk factors. Overall, from 92 patients with placenta previa, 65 had lateral disposition, 18 marginal, and 9 placenta central situation. Seven patients developed MAP, with 5 accreta, and 2 percreta variations (Figure 2).



**Figure 2.** Variations of placenta abnormalities

Complications were related to both fetal and maternal counterparts, with 4 emergency peripartum hysterectomies (EPH), one fetal death, and no maternal mortality.

No admissions to ICU for non-complicated C-sections were registered, but 2-3 days of ICU were registered for EPH cases. Blood transfusion was

necessary only for anemia under 7mg/dl, for a selected group of patients with haemophilia (5 patients), and emergency peripartum hysterectomy (4 patients).

## Results and Discussion

Early detection of abnormalities of placentation is very important for a healthy pregnancy, as it allows appropriate surgical management when necessary. The diagnosis is made mainly using imagistic methods such as ultrasonography and magnetic resonance imaging (MRI).

### Ultrasound

As a reliable method of diagnostic and imagistic follow-up, ultrasound has high sensitivity and specificity for detecting placental abnormalities, being the primary screening technique with a well-established reputation for safety and accuracy. It is useful for a differential diagnosis between placental abnormalities and uterine adhesions, septate uterus, circumvallate placenta, amniotic band or amniotic sheet (14). Early diagnostic signs include the absence of a retroplacental clear zone and the presence of placental lacunae. Ultrasound can also reveal the presence of nuchal cord in the third trimester which should obviate the need for cesarean section delivery, given that data show a lack of association between its presence and poor neonatal outcome (15). Also, in the target group of women with a potential to develop abnormal placental structure, ultrasound scan at 19-23 weeks preceded 15 out of 22 stillbirths (16). Overall, this investigative procedure assists with planning the mode of delivery (17).

In our study ultrasound revealed (from 99 patients) 92 subjects with placenta previa, 65 having lateral disposition, 18 marginal and 9 central placenta disposition. 7 patients developed MAP, with 5 accreta, and 2 percreta variations. All ultrasound determinations were consistent with both intraoperator and histopathological findings.

### *Magnetic resonance imaging (MRI)*

Both ultrasound and MRI can describe abnormal placentation (with specific limitations for each method), the latter being considered when ultrasound results are inconclusive (18) even though MRI is more expensive and has limited availability. MRI is most useful for the diagnosis of complicated placenta previa (such as previa/accreta and previa/percreta), placental and cervical tissues presenting specific/ different characteristics to magnetic resonance (19).

In our study all patients have been early diagnosed by ultrasound, and monitored during gestation for any modification that could lead to unexpected surgical interventions.

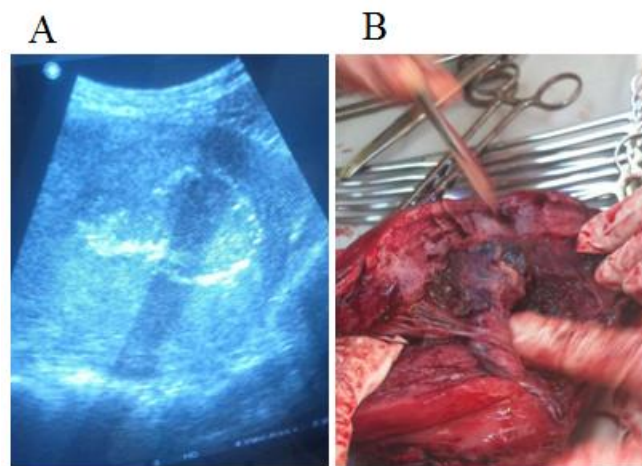
### *Complications*

Major obstetric hemorrhage is the primary cause for maternal morbidity and mortality. An important risk factor for abnormal placental adherence is placenta previa in the presence of a uterine scar. Also, uterine scarring may lead to abnormal trophoblast invasion, and/or to association of cesarean section with placenta accreta and scar pregnancies (20).

Maternal morbidity from placenta previa is primarily related to antepartum and/or postpartum hemorrhage, blood transfusions, and subsequent emergency peripartum hysterectomy (EPH) (Figure 3, a-b). On a sample of 13.162 patients who underwent cesarean or vaginal delivery in Bucur Maternity Hospital over 6 years (from 2010 to 2015), 12 cases were encountered in which one or more of the risk factors that lead to EPH were found (21).

In the current study, complications were related to both fetal and maternal counterparts, with 4 EPH, one fetal death, and no maternal mortality. Three of four EPH were performed for percreta situations and led to 75% morbidity in those cases. We found no usual ICU admission, excepting the C-sections complicated with EPH, when a 2-3 days period of intensive care was

necessary for adequate monitoring. Depending on the hemoglobin value, patients with values between 7 and 9mg/dl were administered ferrous supplements to correct anemia. For all patients with values below 7mg/dl, blood transfusion (1-2 U.I.) was performed. Only one fetal death was registered due to an extreme prematurity associated the Down syndrome.



**Figure 3.** The hysterectomy piece for placenta accreta (A); The ultrasound before the intervention (B)

## **General Discussion and Conclusions**

Placenta percreta significantly increases the risk for both maternal and fetal morbidity and mortality, and invasion of the bladder carries a maternal morbidity of 9.5% and perinatal mortality of 24% (22). Recommendations of The American College of Obstetricians and Gynecologists for the management of suspected placenta accreta include a planned preterm cesarean section, with the placenta left in situ because its removal is associated with significant hemorrhagic morbidity. However, surgical management of placenta accreta may be individualized (23, 24). In systematic reviews, 52 percent of women with placenta previa had antepartum bleeding, and 22 percent had postpartum hemorrhage. The risks of hemorrhage and postpartum hysterectomy are particularly high for women with previa/accreta placenta (25-27).

Following C-section, there is a 0.3% increased risk of a major adverse maternal event during the next pregnancy. In each subsequent pregnancy, the cumulative risk of a major adverse maternal event increases, reaching up to 10% by the fourth C-section delivery (28). Another complication is premature birth, reported for 15% of patients with placenta previa delivered before 34 weeks of gestation (29).

Finally, in stillbirth cases, levels of plasma protein A (PAPP-A) in the lowest 5% and alpha fetoprotein (AFP) in the highest 5% are associated with increased the risk of stillbirth by 50-fold and 2.8-fold respectively (30).

## Conclusions

Any vaginal bleeding encountered at 20 or more weeks of gestation in women should raise the suspicion of placenta previa. In addition, the presence of uterine scar tissue (indicating previous C-section) should alert the physician to the possibility of a placenta previa or accreta/increta/percreta developing during gestation. Arigorous screening test for all such abnormalities of placentation is necessary, especially when ultrasound aspects persist into the third trimester (and extend over the cervical os by  $\geq 25$  mm). Previous cesarean deliveries and increased parity, along with previous abortions and uterine surgical procedures, are major risk factors for placenta previa.

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