OBSTETRICS

Placenta accreta: risk factors, perinatal outcomes, and consequences for subsequent births

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OBJECTIVE: We sought to evaluate risk factors and perinatal outcomes of pregnancies complicated with placenta accreta and to study perinatal outcomes in subsequent pregnancies.

STUDY DESIGN: A retrospective study comparing all singleton cesarean deliveries (CD) of women with and without placenta accreta was conducted. In addition, a retrospective comparison of all subsequent singleton CD of women with a previous placenta accreta, with CD of women with no such history, was performed during the years 1988 through 2011. Stratified analysis using multiple logistic regression models was performed to control for confounders.

RESULTS: During the study period, there were 34,869 CD, of which 0.4% (n = 139) were complicated with placenta accreta. Using a multivariable analysis with backward elimination, year of birth (adjusted odds ratio [aOR], 1.06; 95% confidence interval [CI], 1.03–1.09; $P < .001$), previous CD (aOR, 5.11; 95% CI, 3.42–7.65; $P < .001$), and placenta previa (aOR, 50.75; 95% CI, 35.57–72.45; $P < .001$) were found to be independently associated with placenta accreta. There were 30 subsequent pregnancies of women with placenta accreta. Recurrent accreta occurred in 4 patients (13.3%). Previous placenta accreta was significantly associated with uterine rupture (3.3% vs 0.3%, $P < .01$) peripartum hysterectomy (3.3% vs 0.2%, $P < .001$), and the need for blood transfusions (16.7% vs 4%, $P < .001$). Nevertheless, increased risk for adverse perinatal outcomes such as low Apgar scores at 1 and 5 minutes and perinatal mortality was not found in these patients.

CONCLUSION: Prior CD and placenta previa are independent risk factors for placenta accreta. A pregnancy following a previous placenta accreta is at increased risk for adverse maternal outcomes such as recurrent accreta, uterine rupture, and peripartum hysterectomy. However, adverse perinatal outcomes were not demonstrated.

Key words: cesarean delivery, placenta accreta, placenta previa

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Placenta accreta occurs when the placental implantation is abnormal: the decidua basalis that normally separates the anchoring placental villi and the myometrium is missing.[1] It is divided into 3 grades based on histopathology: placenta accreta where the chorionic villi are in contact with the myometrium, placenta increta where the chorionic villi invade the myometrium, and placenta percreta where the chorionic villi penetrate the uterine serosa.[2]

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The exact pathogenesis is unknown. Possible etiologies include a mechanical factor (ie, primary deficiency of the decidua caused by local trauma to the uterine wall), a biological factor (ie, abnormal maternal response to trophoblast invasion), or a combination of both processes.[1]

Placenta accreta is considered a severe pregnancy complication that may be associated with massive and potentially life-threatening intrapartum and postpartum hemorrhage.[3] It has become a leading cause of emergency hysterectomy, accounting for 51.1% of emergency hysterectomies.[4,5] Maternal morbidity has been reported to occur in up to 60% and mortality in up to 7% of women with placenta accreta. In addition, the incidence of perinatal complications is also increased mainly due to preterm birth and small-for-gestational-age fetuses.[6,7]

The reported incidence of placenta accreta varies widely, mainly as a result of different diagnostic criteria. According to studies from the last 2 decades, the reported incidence has increased 10-fold.[1] Placenta accreta occurs in approximately 1:1000 deliveries with a reported range from 0.04% rising up to 0.9%.[3] The highest incidence (0.9%) was reported in a study based on clinical diagnostic criteria.[8] The increase in placenta accreta in recent years is attributed to the increase in the prevalence of known risk factors, particularly the increased number of caesarean deliveries (CD).[5]

Several risk factors for placenta accreta have been reported. The most common and established being a previous CD. This is emphasized even more so in cases of placenta previa after a prior CD.[1] Increasing numbers of prior CD exponentially increase the risk of placenta accreta.[9,10] Advanced maternal age is another significant independent risk factor.[9] In addition, multiparity, previous uterine curettage, and previous uterine surgery (other than CD) were found to be risk factors in some studies, but not in others.[11-13] Asherman syndrome, smoking, and chronic hypertension have also been implicated to be associated with placenta accreta.[14]

Prior placenta accreta is probably a major risk factor, although scarce infor-

TABLE 1
Clinical characteristics of women with and without placenta accreta

Characteristic	Placenta accreta (n = 139)	No placenta accreta (n = 34,730)	*P* value
Maternal age, y			.032
<20	0.0%	1.0%	
20-29	32.4%	43.0%	
30-34	59.7%	48.3%	
≥35	7.9%	7.7%	
Ethnicity			.132
Bedouins	50.4%	44.0%	
Jews	49.6%	56.0%	
Gestational age, wk			< .001
Mean	35.32 ± 4.1	38.01 ± 2.9	
<27	9.4%	1.2%	
27-34	11.5%	5.2%	
34-37	33.1%	12%	
>37	46%	81.6%	

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mation exists regarding this issue. Alanis et al[15] reviewed 72 cases of placenta accreta that were treated conservatively. Among 15% (n = 11) of women who had a subsequent pregnancy, 18% (n = 2) developed a repeated placenta accreta.

The present study investigated the risk factors and perinatal outcomes of pregnancies complicated with placenta accreta and perinatal outcomes of pregnancies following placenta accreta.

Materials and Methods

A retrospective cohort study comparing pregnancies of women with and without placenta accreta was conducted. The diagnosis was clinical, based on objective difficulties of the physician in charge in removing the placenta during CD. To include only cases of placenta accreta we choose only cases delivered by CD. The definition of placenta accreta included all pregnancies with partially or totally adherent placenta that were diagnosed during CD.

The deliveries occurred from 1988 through 2011 at the Soroka University Medical Center. This is the sole tertiary center in the Negev, the southern region of Israel, and thus provides care for practically all of the region's obstetrical population especially those with complicated pregnancies.

In our center, patients admitted electively with a high risk for placenta accreta, such as patients with placenta previa with a previous CD, are directed to detailed ultrasound for risk assessment. In the ultrasound unit sonographic characteristics include loss of continuity of the uterine wall, multiple vascular lacunae (irregular vascular spaces) within the placenta ("Swiss cheese" appearance adjacent to the placental implantation site), lack of a hypoechoic border (myometrial zone) between the placenta and the myometrium, bulging of the placental/myometrial site into the bladder, and increased vasculature evident on color Doppler sonography as previously described.[3] Whenever there is a sonographic suspicion of placenta accreta, or in patients at significant risk for accreta, specifically with placenta previa in patients post-CD, an elective CD is planned for around 37-38 weeks' gestation. A surgical team is prepared in which the attending is an experienced obstetrician, and a gynecologist capable of uterine artery and internal iliac artery ligation is in the operating room. This protocol was not changed during the study period.

Data were collected from the computerized perinatal database and the hospital's computerized charts. The obstetrical information is entered immediately after birth by an obstetrician, and is routinely checked for inaccuracies. Skilled medical secretaries examine the information before entering it into the database. Coding is done after assessing the medical prenatal care records, as well as the routine hospital documents. These procedures assure maximal completeness and accuracy of the database.

Pregnancies with multiple fetuses were excluded from the study.

The following clinical characteristics were evaluated: maternal age, ethnicity

TABLE 2
Obstetrical risk factors of women with and without placenta accreta

Variable	Accreta (n = 139)	No accreta (n = 34,730)	OR	95% CI	*P* value
Smoking	1.4%	1.6%	0.89	0.22–3.60	.869
Obesity	1.4%	2.5%	0.57	0.14–2.31	.426
Hypertensive disorders	6.5%	11.5%	0.53	0.27–1.05	.065
Diabetes mellitus	8.6%	11.7%	0.71	0.39–1.29	.262
Recurrent abortions	14.4%	7.3%	2.12	1.32–3.41	.002
Infertility treatments	5.8%	4.1%	1.42	0.69–2.90	.336
Prior cesarean delivery	74.8%	43.5%	3.87	2.63–5.67	< .001
Placenta previa	52.5%	2.8%	38.78	27.63–54.43	< .001

CI, confidence interval; *OR*, odds ratio.

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