

ORIGINAL ARTICLE

Risk Factors and Consequent Outcomes of Placenta Previa: Report From a Referral Center

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Abstract- Because of an unknown factor, the frequency of complicated pregnancy with placenta previa has been raised during past decade. This study was designed to deepen our understanding of risk factors and outcomes of placenta previa in our country. This study investigated 694 cases of placenta previa comparing with 600 healthy pregnant women with not overlie placenta in two referral and tertiary Obstetrics and Gynecological Hospital in Iran on the basis of the clinical and para-clinical analysis, in order to find the probable risk factors for occurrence of placenta previa and its effect on maternal and neonatal complications. The most important risk factor for the occurrence of placenta previa was advanced maternal age ($P<0.001$) and history of stillbirth (OR=117.2, CI=58.3-236.0). In the other hand, the most substantial outcome of this disorder was a reduction of gestational age ($P<0.001$) and low birth weight neonatally ($P<0.001$). The conservative follow-up should be programmed for women with placenta previa based on the type of risk factors which can provide the best possible management to decrease the morbidity and mortality of their related complications.

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Introduction

Placenta praevia, the growth of placenta in the lower uterine segment over or near the internal cervical osseous, is an obstetric complication which usually occurs in the second trimester (1,2). Although this complication is very rare (only <0.5% of all labours), it is proved that placenta praevia correlates with morbidity and mortality of mother and neonate and needs special treatment strategy including restriction of physical activity, ability to get immediate medical care, contraction controlling, preventing infection and hemorrhage as well as timely caesarian section and postpartum management (3,4).

Increasing incidence of placenta praevia during recent years posed this question whether this is because of improvement of diagnosis or results from other modern risk factors (5). Based on newly published reports induced labor, artificial abortion, cesarean section and high aging pregnancy are associated with placenta praevia (6-8).

This study was conducted to investigate both known (e.g. maternal age, the number of gravidity history of stillbirth) and modern (e.g. history of placenta previa, dilatation and evacuation, caesarean section, abortion) risk factors between cases with placenta praevia and healthy controls. Moreover maternal and neonatal outcomes were evaluated based on the type of risk factor.

Materials and Methods

This was a retrospective cohort study of medical records of women who had attended the obstetric ward at one of two major referral centers for obstetrics and gynecology affiliated to Shahid Beheshti and Iran Universities of Medical Sciences providing comprehensive and multidisciplinary health care services for patients. This study was approved by Ethics and Research Committee of Shahid Beheshti University of Medical Sciences.

We recruited all patients with the definitive

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diagnosis of placenta previa (complete or partial covering of the internal cervical os of uterus by placenta tissue confirmed by sonography and during caesarian section), those had single fetus, deliver in gestational age of 24-41 weeks and attend for treatment and follow-up sessions during April 1, 2003 to March 31, 2010 to conduct a nested case-control observation concerning the probable risk factors and outcomes (9).

Moreover, we excluded the patients having incomplete data in their medical files, fetal distress, premature rupture of membranes, preeclampsia, and another chronic disease from the studied cases list. The control group comprised one body mass index (BMI)-matched healthy pregnant individual for each case from same hospital and same year of delivery. Written informed consents were obtained from all patients and controls.

A unique questionnaire was filled for each participant containing the following items: Age, maternal age at delivery, history of substance abuse, previous medical history and especial obstetrical history (parity, caesarean section, placenta previa, and obstetric and postpartum complications). Maternal (time of pregnancy termination hysterectomy, blood transfusion and duration of hospitalization after delivery) and neonatal (fetus presentations, immediate neonatal outcomes, APGAR in the 5-minute score, birth weight, congenital anomaly and respiratory distress syndrome) complications were retrieved from the medical records and also assessed in association with risk factors. Gestational age was based on the last menstrual period

(LMP), first-trimester ultrasound or both. Preterm delivery was defined as delivery before complete 37 weeks of gestational age.

Statistical analysis

Statistical analysis was performed using a commercially available software package (SPSS Statistics 17.0.0, SPSS, Chicago, Illinois). One-sample Kolmogorov-Smirnov test estimated whether data were normally distributed. Parametric and nonparametric analyses were performed base on the finding of this evaluation. A *P*-value of 0.05 or less was considered statistically significant in our study.

Results

During the seven-year study period, 112868 deliveries occurred in the two hospitals. Placenta previa was diagnosed in 771 cases, giving a prevalence of placenta previa 0.7% in our survey. Finally, 694 women with placenta previa who had inclusion criteria and complete medical records were entered into the study as well as 600 healthy controls. Although patients and controls were matched for BMI, we compared studied individuals mean of BMI (24.5±2.8 vs. 23.7±1.9; *P*=0.38) which did not show any significant difference. Demographic data and risk factors of patients with placenta previa were abstracted in (Table 1) in comparison with healthy controls.

Table 1. Risk factor of placenta previa in 694 pregnant women comparing to 600 healthy controls

| Risk factors | Placenta previa N=694 | Controls N=600 | <i>P</i> .value |
|---|--------------------------|-------------------|-----------------|
| Maternal age; years (mean ± SD) | 29.8±6.1 | 26.3±5.7 | <0.001 |
| Body mass index; kg/cm ² (mean ± SD) | 24.5±2.8 | 23.7±1.9 | 0.38 |
| History of multigravidas (%) | 134 (19.3) | 30 (95) | <0.001 |
| History of still birth (%) | 192 (63.9) | 9 (89.8) | <0.001 |
| History of dilatation and evacuation (%) | 249 (35.8) | 61 (10.1) | <0.001 |
| History of placenta previa (%) | 13 (1.8) | 3 (0.5) | 0.041 |
| History of cesarean section (%) | 298 (42.9) | 155 (25.8) | 0.005 |

Maternal ages were significantly higher in a group of placenta previa cases (29.8±6.1 vs. 26.3±5.7; *P*<0.001). (Figure 1) shows the distribution of patients and controls in classified age-groups.

The risk for placenta previa development increased with a history of dilatation and evacuation (OR=4.0, CI=3.4-7.0), multigravidity (OR=4.5, CI=2.8-7.2), history of stillbirth (OR=117.2, CI=58.3-236.0), history

of placenta previa (OR=4.0, CI=1.0-16.3), and history of cesarean section (OR=1.5, CI=1.1-2.0).

Substance abuse was reported only by 4 cases, giving a prevalence of 0.4%. The most common substance abused was opium (n=2), followed by crack (n=1), and methamphetamines (n=1). There was no significant difference between substance abusers and rest patients in the rate of placenta previa (*P*=0.17).

Expectedly, all evaluated maternal and neonatal outcomes of patients with placenta previa were worse than normal controls despite congenital anomaly (OR=1.09, CI= 0.4-2.9, Table 2).

To investigate the correlation between the risk factors of placenta previa and its secondary complication, separate analysis were performed in the case group. Maternal age is correlated with hospitalization duration after delivery ($r=0.63$, $P=0.02$).

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women is associated with a congenital anomaly ($P=0.012$), and history of previous low-lying placentas pregnancy had a greater risk for a decreased APGAR score ($P=0.043$) and respiratory distress syndrome ($P=0.037$). Regarding the history of cesarean section and dilatation and evacuation the risk of adverse outcomes such as hysterectomy ($P=0.0001$, $P=0.002$ respectively) and the requirement to blood transfusion ($P=0.02$ and $P=0.014$ respectively) were increased.

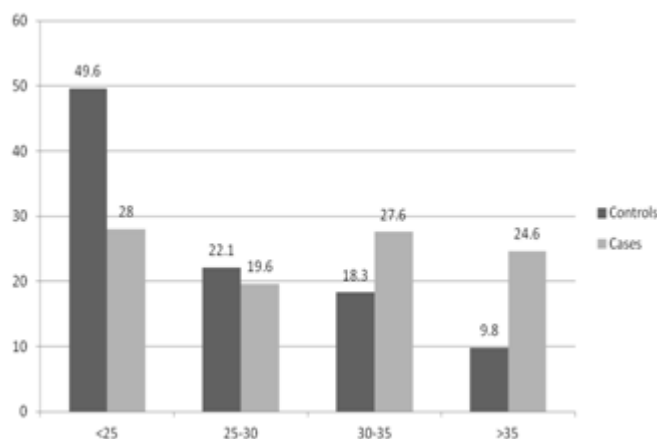


Figure 1. Age distribution of 694 pregnant women with placenta previa comparing to 600 healthy controls

Table 2. Maternal and neonatal outcomes of placenta previa in 694 pregnant women comparing to 600 healthy controls

| Parameters | Placenta previa N=694 | Controls N=600 | P.value |
|--|--------------------------|--------------------|---------|
| Maternal Outcomes | | | |
| Pregnancy termination; weeks (mean \pm SD) | 36.1 \pm 3.4 | 38.7 \pm 2.6 | <0.001 |
| Hysterectomy after delivery (%) | 29 (4.1) | 3(0.5) | <0.001 |
| Blood transfusion after delivery (%) | 83 (11.9) | 21 (3.5) | <0.001 |
| Duration of hospitalization after delivery; days (mean \pm SD) | 2.2 \pm 1.2 | 1.7 \pm 1.4 | <0.001 |
| Birth weight; gram (mean \pm SD) | 2853.3 \pm 757.4 | 3019.2 \pm 668.8 | 0.001 |
| Congenital anomaly (%) | 13 (1.8) | 11(1.8) | 0.52 |
| Neonatal Outcomes | | | |
| APGAR score at 1 minute <9 (%) | 175(25.2) | 47(7.8) | <0.001 |
| Non-cephalic presentations (%) | 92(13.2) | 43 (7.1) | 0.002 |
| Respiratory distress syndrome (%) | 215(30.9) | 82(13.6) | <0.001 |

Discussion

This study investigated the correlation between different risk factors and complication of pregnant cases with placenta previa for the first time in our center; although some of these finding and risk factors have been explained more than 20 years ago, the results of

current study helps to reevaluate data to be applicable to today's conditions. Surprisingly we found the association between the proven risk factors for advanced maternal age and the secondary outcome of admission time after delivery.

Findings these parameters could help pregnant mother with placenta previa through attention to the

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following strategy in obstetric management which may be helpful to prevent preterm delivery and neonatal morbidity: Conservative management of patient after acute bleeding if maternal bleeding is not life threatening (10,11), using standardized charts for assessment of maternal bleeding it seems helpful to determine life-threatening bleeding who needs immediate cesarean delivery (12,13), generously using tocolysis in pregnancies with placenta previa and preterm labor (14,15), and given a course of steroid to symptomatic women (16).

Age of the mothers at the time of pregnancy has been reported as the one of the important potential factors which impact the placenta previa delivery result negatively as well as multiparity, cigarette smoking, male sex of the fetus, previous uterine surgical procedures, cocaine use during pregnancy, and for abnormal placentation in a previous pregnancy (17,18,2). Based on the ethnicity of our cases and the trend of marriage age in the last decade in our region, this factor may be converting to the greatest variable in the occurrence of placenta previa in the near future (19).

However, in recent years several new factors were reported as candidate variable in outcomes of placenta previa. Type of placentation (complete or incomplete) is one of the newly reported factors which may be strongly related to a serious complication. However, its impact on the outcome of pregnancies has not been elucidated completely (20).

According to the result of the current study we found that previous history of cesarean section and dilatation and evacuation is associated directly with the requirement to hysterectomy and blood transfusion. Similar to our findings, Grobman *et al.*, (21) and Yaegashi N *et al.*, (22) presented this association, and they discussed the preventive management for patients with positive history of uterine surgery. It has been hypothesized that patients with complete placenta previa and previous cesarean deliveries are more susceptible to risk of hysterectomy (23). Increased requirement to blood transfusion may be associated with severe postpartum hemorrhage and the concomitant development of placenta accrete (24).

Although placenta previa correlated with reduction of weighing birth of the neonate, we did not record any significant increasing in the congenital anomaly of babies. Dola *et al.*, reported that infants of pregnant cases with complete placenta previa had a lower weight at the time of birth and had earlier terminated delivery (25). Moreover, it should be noticed that prematurity is a consistent complication in studies reporting on all types

of placenta previa as we seen in our survey. But this effect may be due to the age of gestation and premature delivery of the cases which was significantly lower than controls. Therefore deciding the strategy for postponing the time of delivery especially in incomplete type is one the most important of clinical managements (1,26).

The findings of this study suggested that each risk factors of placenta previa as a true obstetric emergency should be investigated in accordance with secondary complications separately. However or results should be interpreted with caution because of that some risk factor including the habitual history of patients and type of placenta previa did not consider in this study. Furthermore, our findings need to be confirmed by another study in other hospitals and centers in our country.

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