

Evaluation of the Various Risk Factors Associated with Placenta Previa

Development: A Simple Literature Review

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ABSTRACT

Background: Placenta previa is defined as the growth of placenta in the lower uterine segment over or near the internal cervical os, it's an obstetric complication which usually occurs in the second trimester. A lot of literatures have been done to study the risk factors associated with its development. Therefore, assessment of the recent literatures must be done to provide a summarized paper analyzing the various risk factors that stand behind placenta previa development, which will help in prevention and control the increasing in the incidence of the condition. **Objective:** This study aimed to assess the various studies that investigate the risk factors that stand behind the development of placenta previa, and provide a reference paper analyzing the last progression has been reached. **Methods:** PubMed database was used for articles selection, and the following keys used in the mesh ("Placenta Previa/etiology"[Mesh] OR "Placenta Previa/genetics"[Mesh] OR "Placenta Previa/history"[Mesh]). A total of 582 articles were found, with further restriction by PubMed filters, and reviewing the articles titles and abstracts, the final results were 6 articles.

Conclusion: Further studies are still needed to be done to evaluate the modifiable risk factors, and to find a solution for the increase in the number of cesarean because it have a significant impact on placenta previa development.

Keywords: Evaluation, Risk Factors, Placenta Previa, Lower uterine segment.

INTRODUCTION

Placenta previa is a relatively rare pregnancy complication in which the placenta implants low in the uterus, covering a small part or all of the cervix. Placenta previa complicates approximately 1 in 200 deliveries^(1, 2), and is one of the leading causes of vaginal bleeding in the second and third trimesters^(3,4). It is associated with increased risks of maternal and infant morbidity and mortality.

As a results, it 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. However, alert bleeding during pregnancy and massive hemorrhage at cesarean section are not observed in all women with placenta previa. The ability to predict alert bleeding during pregnancy and massive hemorrhage at cesarean delivery is critical in the management of placenta previa prenatally, because prenatal diagnosis allows for a planned approach and more controlled condition with a possible treatment. Increasing incidence of placenta praevia during recent years posed the researchers to investigate more about the etiologies behind it, we therefor will review the literatures done in this field to assess the various risk factors, and provide a review paper that will summarize the recent researches and investigations done to assess the various risk factors of placenta previa.

METHODS & MATERIALS

Sample:

PubMed was chosen as the search database for the articles selection, because it is one of the major research databases within the suite of resources that have been developed by the National Center for Biotechnology Information (NCBI). The following keys used for the Mesh ("Placenta Previa/etiology"[Mesh] OR "Placenta Previa/genetics"[Mesh] OR "Placenta Previa/history"[Mesh]) A total of 582 articles were found, with further restriction by PubMed filters, and reviewing the articles titles and abstracts the final results were 6 articles. **Inclusion criteria,** the articles were selected based on the relevance to the project which should include one of the following topics, **Placenta Previa (PP) Etiologies, Causes of PP, Genetics, associated factors. Exclusion criteria,** all other articles which didn't have one of these topics as their primary end point, or repeated studies.

Analysis

No software was used, the data extracted were based on specific form that contain title of the study, name of the author, objective, summary, results, and outcomes, these data were reviewed by the group members to assess the various risk factors that stand behind placenta previa development. Double revision

of each member's outcomes was applied to ensure the validity and minimize the errors.

RESULTS

We enrolled 6 studies according to our inclusion, and exclusion criteria described above. 3 of them were

retrospective cohort studies, 2 case-control studies, and 1 cross sectional study. All studies wanted to evaluate the various risk factors that stand behind Placenta Previa development. The studies characteristics can be seen in Table 1.

Table 1

Study (Year)	Study Design	Country	Objective	Duration of Study	Outcome	Ref.
S. Saleh Gargari et al. (2015)	Retrospective Case-Control	Iran	Assessment of the risk factors for occurrence of placenta previa and its effect on maternal and neonatal complications	7 Years	Advanced maternal age, and history of stillbirth are the most important risk factors associated with the occurrence of PP. Also, low birth weight, and premature delivery were the most fundamental complications of PP.	8
Raisa nen et al. (2014)	Cross Sectional	Finland	Evaluation the association between placenta previa and delivery of a SGA newborn and to quantify the contribution of individual risk factors for SGA that are associated with placenta previa stratified by maternal parity	10 Years	PP prevalence in nulliparous women was associated with advanced maternal age (40 years or older), nonsmoking status, socioeconomic status, IVF achieved pregnancy, gestational diabetes, and maternal diabetes mellitus. On the other hand, PP in multiparous women was positively associated with advanced maternal age (40 years or older), higher number of prior births, prior cesarean delivery, prior preterm birth, prior SGA newborn, IVF achieved pregnancy, preeclampsia, gestational diabetes, and maternal diabetes mellitus.	9
Katheryne L. Downes et al. (2015)	Retrospective Cohort	USA	Evaluation the association between previous cesarean delivery and subsequent placenta previa	8 Years	Prior prelabor cesarean delivery was associated with a more than two-fold significantly increased risk of PP in the second delivery	10
T. Michikawa et al. (2016)	Retrospective Cohort	Japan	Assess the association between the exposure to Air pollutants and the development of PP.	5 Years	Exposure to air pollutants through to implantation was positively associated with PP and accreta	11
Thu Quach et al. (2014)	Retrospective Cohort	USA	Evaluation the effect of chemical exposure of women working as cosmetologists (providing hair and nail care services) and manicurists (providing only nail care services) on developing adverse pregnancy outcomes.	13 Years	There was slight increase in risk of development adverse pregnancy outcomes and one of these outcomes was PP which was significantly increased among manicurists and cosmetologists	12
Szymusik et al. (2015)	Case-Control	Poland	Assessment the association between first trimester bleeding (FTB) and preterm labor, Placenta previa and accrete	4 Years	FTB has great effect on the pregnancy outcomes and women who experience such events are more prone to deliver preterm and they have higher chances of having PP.	13

Gargari *et al.* ⁽⁸⁾ evaluated the most important risk factors associated with the development of placenta previa. Moreover, he evaluated that the maternal and neonatal outcomes were based on the type of risk factor.

During the seven-year study period, 112,868 deliveries occurred. Placenta previa was diagnosed in 771 cases, giving a prevalence of placenta previa (0.7%). Although patients and controls were matched for BMI, he 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. On the other hand, placenta previa group showed higher maternal ages compared to the healthy group (29.8±6.1 vs. 26.3±5.7; P<0.001), and the same applies for the following, 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), history of cesarean section (OR=1.5, CI=1.1-2.0). Also, patients in placenta previa group had higher rates of all maternal and neonatal complications than the healthy group except for congenital anomaly (OR=1.09, CI=0.4-2.9). The study concluded that advanced maternal age (P<0.001) and history of stillbirth (OR=117.2, CI=58.3-236.0) are the most important risk factors associated with the occurrence of placenta previa. On the other hand, low birth weight (P<0.001) and premature delivery (P<0.001) were the most fundamental complications of placenta previa.

Raisanen *et al.* ⁽¹⁰⁾ evaluated the association between placenta previa and delivery of a small gestational age (SGA) newborn and quantify the contribution of individual risk factors for SGA that are associated with placenta previa stratified by maternal parity. He found that increased prevalence of placenta previa in nulliparous women was associated with advanced maternal age (40 years or older), non-smoking status, socioeconomic status, IVF achieved pregnancy, gestational diabetes, and maternal diabetes mellitus. Similarly, placenta previa in multiparous women was positively associated with advanced maternal age (40 years or older), higher number of prior births, prior caesarean delivery, prior preterm birth, prior SGA newborn, IVF achieved pregnancy, preeclampsia, gestational diabetes, and maternal diabetes mellitus (P, .05).

Newborns affected by placenta previa during pregnancy were more likely to be delivered by caesarean at a lower gestational age and with a lower mean birth weight compared with newborns not affected by placenta previa. On the other hand, multiparous women with PP had an increase in the prevalence of having a newborn with SGA compared to the nulliparous women with PP.

Downes *et al.* ⁽⁹⁾ evaluated the association between previous cesarean delivery and subsequent placenta

previa while distinguishing cesarean delivery prior to onset of labor from intrapartum cesarean delivery.

During 8 years study period retrospectively investigated the records of women first mood of delivery, and record the incidence of subsequent placenta previa development. It was found that there is two-fold increase in the incidence of PP in women with first pregnancy prelabor cesarean delivery.

Michikawa *et al.* ⁽¹¹⁾ evaluated the association between the exposure to air pollutants and the development of placenta previa. The study retrospectively analyzed the data from 40,573 singleton pregnancies obtained from the Japan Perinatal Registry Network database, the exposure to suspended particulate matter [SPM], ozone, nitrogen dioxide [NO₂], and sulphur dioxide [SO₂] was measured by the data collected from the Japan National Institute for Environmental Studies' atmospheric environment database. He found that there was significant association between the SPM exposure in the first 4 weeks and development of placenta previa, and placenta accrete, (ORs) 1.12 (95% confidence interval (CI) = 1.01–1.23), (OR=1.33, 95% CI=1.07–1.66) and 1.08 (1.00–1.16) for ozone. The association between exposure to NO₂ and SO₂, and praevia, was in the direction of increased risk.

Quach *et al.* ⁽¹²⁾ evaluate the effect of chemical exposure of women working as cosmetologists (providing hair and nail care services) and manicurists (providing only nail care services) on developing adverse pregnancy outcomes. The study concluded that, placenta previa which was significantly increased among manicurists (OR 1.46, 95 % CI 1.08, 1.97) and cosmetologists (OR 1.22, 95 % CI 1.02, 1.46) compared with the general population.

Szymusik *et al.* ⁽¹³⁾ evaluated the association between first trimesters bleeding (FTB), preterm labor, placenta previa and accrete. During the 4 years study period, retrospectively evaluated 497 pregnant women with history of FTB, and compared them with 500 pregnant women who had no history of FTB. The study concluded that FTB increase the risk of placenta previa development (OR= 4.81; 95% CI 1.29 – 20.53; P= 0.007). Also, there was increases in the incidence of having preterm labor (OR= 2.11; 95% CI 1.43 – 3.10).

DISCUSSION

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 ^(6,7). Placenta previa is one of the major causes of maternal morbidity and mortality. However, alert bleeding during pregnancy and massive hemorrhage at cesarean section are not observed in all women with placenta previa. This article is conducted to assess, and evaluate the various risk factors that stands behind its

development. A comprehensive search in PubMed was done as described above to find the articles that evaluate the numerous risk factors associated with placenta previa emergence. Looking at the included studies, there were a significant association between higher maternal ages (above 40 Years), history of stillbirth, and previous cesarean section with placenta previa development. Also, placenta previa emergence were linked in least parentage to history of dilatation & evacuation, multiparous women, previous history of placenta previa, non-smoking status, low socioeconomic status, in vitro fertilization achieved pregnancy, gestational diabetes, and maternal diabetes mellitus, and preeclampsia^(8, 9, 10). Patients who had placenta previa during pregnancy, they significantly had increase in the incidence of having a premature birth, and low birth weight infant^(8, 10). As a result, we advise that pregnant women with one of these risk factors needs to have more follow up session with her physician, to avoid unwanted impact on the mother, and infant. 2 studies relate the development of placenta previa to the environment that surround the mother. They found that pregnant women exposed to air pollutants (SPM, NO₂, SO₂), or working as cosmetologists, and manicurists had increase in the incidence of placenta previa^(11, 12). Currently, the literatures is still lacking such articles that clarify the association between placenta previa, and environmental factors. Clarifying the role of environmental factors can have fundamental role in reducing the escalating number in the incidence of placenta previa, because it is considered as modifiable type of risk factors. One study linked first trimester (FTB) bleeding with the development of placenta previa, and preterm labor⁽¹³⁾, according to the study the mechanism of this relation and contribution is still unclear. This study can be promising, in which the physician can predict the emergence of placenta previa, and provide the pregnant women with a picture about the situation that might occur. We advise to do further studies about first trimester bleeding and its relation with placenta previa development.

Strength & Limitations

The strength of this study were in, all studies enrolled were done in the last 5 years, all of them included a large number of sample, and conducted over a long period in different countries. Also, during the selection, we double-reviewed the studies, and their results to assure that we enroll the studies related to our aim, and to avoid any error in the results. We acknowledge the limitations we had in this study. We could not find more articles with the outcome criteria for inclusion into our review. We only used the search engine of PubMed. Therefore, we may missed other

studies relevant to our review holding additional data that may widen our gaze while analyzing and comparing the results.

CONCLUSION

Placenta previa emergence mostly associated with history of stillbirth, cesarean section, and higher maternal age. Also, it can cause unwanted maternal and neonatal complication such as, third trimester bleeding, low birth weight, and premature birth. Still further studies needed to be done about the modifiable risk factors.

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