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Critical analysis of risk factors and outcome of placenta previa

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Abstract: Placenta previa is the pathology of placenta in which the placenta lies completely or partially within the lower uterine segment. According to its relationship with internal os it is divided into four grades 1, 2, 3, 4. The objective of this study was to explore the risk factors and pregnancy outcome of patient with placenta. A case control study was done on 382 subjects in which 82 were included in the cases, and 300 were included in controls who presented at Obstetrics and Gynecology Department of Tripoli medical center during 2011. Diagnosed patients of placenta previa were included in case group and other healthy subjects were included in the control group and statistical significance was also calculated. In conclusion, previous history of cesarean section, previous history of D + C, previous history of placenta previa is independent risk factors for placenta previa. An increase in the incidence of these risk factors probably contributes to a rise in the number of pregnancies complicated with placenta previa and its association with adverse maternal and prenatal outcome. Carful surveillance of these risk factors is recommended with timely delivery in order to reduce the associated complication.

Keywords: Placenta previa, risk factors, pregnancy outcome, Libya.

Introduction

Placenta previa is a condition which the placenta lays in the lower uterine segment completely or partially obstructing the internal os of the cervix (1). The prevalence of placenta previa is about 0.28 - 1.5% (2-4). Pregnancies complicated with placenta previa are prone for bleeding during the second trimester (5) which increases the risk of adverse maternal and prenatal outcomes as compared to general population (2, 19). These patients are particularly at increased risk of peripartum hysterectomy (6), usually performing due to uncontrolled bleeding; whose obvious result is the loss of future fertility.

Several studies attempted to define risk factors for placenta previa (2, 4) and pointed out an association with advanced maternal age, parity, maternal smoking, infertility treatment, previous cesarean deliveries and recurrent miscarriage. Previous scars, of the fore menti-oned risk factors, have several increased during the past decades including the rate of cesarean sections (7), advanced maternal age (8) and the number of women undergoing fertility treatment. Accordingly, the aim of the current study to evaluate current risk factors and pregnancy outcome of women with placenta previous compared with a general population.

Material and methods

This is a retrospective case control study reviewed data from Tripoli Medical Center during January 1, 2011 until December 31, 2011. Data were collected from medical records. 82 cases of placenta previa were identified; all of them were singleton pregnancies. The diagnosis of placenta previa was identified by trans- abdominal ultrasound. The control group consists of 300 randomly selected singleton pregnancies. Medical records were examined carefully for

variables, which included maternal age, gravidity, gestational age, previous cesarean section, previous miscarriage, uterine abnorm ality (such as myoma), other uterine scar maternal and neonatal complications, all analysis were performed with statistical programs. Differences in the frequencies of events between both groups were analyzed by Chi-square test. Odd ration and their 95% confidence internal were estimated.

Results

During the study period, 82 cases of placenta previa occurred in 6,172 deliveries in 2011 in Obstetrics and Gynecology department of Tripoli medical center which make a percentage 0.01%. Multiple risk factors for placenta previa development in placenta previa group and control group are summarized in Table 1.

Table 1: Multiple risk factors for placenta previa development in placenta previa and control group

	% of the patients, n			
	(n=82) Studygroup	Controlgroup (n=300)	P value	(CI 95%) ratio
Age (years)				
35 >	[15.8]43	[84.2]230	0.000	[0.55-0.20]0.336
35 ≤	[35.8]39	[64.2]70		
Multi-gravidity				
Gravidity<5	[18.0]55	[82.2]261	0.002	[0.69-0.22]0.39
Gravidity≥5	[35.6]27	[64.5]49		
Gestational age (weeks)				
weeks 34>	[40.0]6	[60.0]9	0.10	[7.39-0.88]2.55
Week 34≤	[20.7]76	[79.3]291		
Diabetes mellitus				
yes	[27.3]3	[72.7]8	0.70	[5.34-0.35]1.38
no	[21.3]79	[78.7]292		
Infertility treatment				
Yes	[18.2]2	[81.8]9	1.000	[3.8-0.17]0.80
no	[21.6]80	[78.4]291		
Previous cesarean section				
Yes	[36.5]46	[63.5]80	0.000	[5.82-2.11]3.51
no	[14.1]36	[85.9]220		

History of miscarriage				
Yes	[16.2]12	[83.8]62	0.27	[1.29-0.33]0.65
No	[22.7]70	[77.3]238		
History of placenta previa				
Yes	[54.5]12	[45.5]10	0.000	[11.97-2.06]4.97
no	[19.4]70	[80.6]290		
History of D+c, E+c				
Yes	[29.4]30	[70.6]72	0.025	[3.07-1.08]1.82
no	[18.6]52	[81.4]228		
History of myomectomy				
Yes	[14.3]4	[85.7]24	0.47	[1.75-0.19]0.59
no	[22.0]78	[78.0]276		
Malpresentation				
Yes	[76.0]38	[24.0]12	0.000	[42.6-10.06]20.7
no	[13.3]44	[86.7]288		

The maternal age of the study group was not a significantly associated with the placenta previa development (RR = 0.33). Women with the multi gravidity (gravidity ≥ 5) had a lower risk for placenta previa development but with statistical significant (RR = 0.39, p = 0.002). Variable like diabetes mellitus had more than 1.38 fold higher risk for placenta previa development while infertility treatment no association was found (RR = 0.80).

Regarding cesarean section, there was higher frequency of history of previous cesarean section in placenta previa group with statistical significance (RR = 3.51, p = 0.0001), and tendency of recurrence in study group (RR = 1.82, p = 0.02) in placenta previa group. While history of dilation or evacuation and curettage also show higher significance (RR = 4.97, p = 0.0001). Malpresentation also show strong association with placenta previa development (RR = 20.7, p = 0.0001). No association were found between history of myomectomy and history of miscarriage and placenta previa development (RR = 0.59 and RR = 0.65). Maternal and neonatal complication of placenta previa group and control group were summarized in Table 2.

	% of the patients			
	Study, n = 82	**Control, n = 300**	**P value**	**(CI %95) ratio**
Bloodtransfusion				
Yes	[43.5]37	[56.5]48	0.000	[7.35-2.53] 4.31
no	[15.2]45	[84.8]252		
Postpartumhemorrhage				
Yes	[32.7]34	[67.3]70	0.002	[3.89-1.39]2.32
No	[17.3]48	[82.7]230		
Postpartumhysterectomy				
Yes	[94.4]17	[5.6]1	0.000	[598.1-10.22]78.2
No	[17.9]65	[82.1]299		
Placentaaccreta				
Yes	[100]19	[0]0	0.000	[7.21-4.60]5.76
no	[17.4]63	[82.6]300		
Maternalsepsis				
Yes	[100.0]17	[0]0	0.000	[7.00-4.50]5.61
no	[17.8]65	[82.2]300		
Antepartumhemorrhage				
Yes	[34.8]55	[65.2]103	0.000	[6.54-2.32]3.89
no	[12.1]27	[87.9]197		
Delivery				
Preterm	[18.0]57	[82.0]260	0.001	[0.62-0.19]0.35
term	[38.5]25	[61.5]40		
Sex				
Male	[22.7]50	[77.3]170	0.53	[1.96-0.72]1.19
Female	[19.8]32	[80.2]130		
PMR				
Alive	[22.1]77	[77.9]271	0.38	[4.40-0.61]1.64
IUFD	[14.7]5	[85.3] 29		
IUGR				
Yes	[84.2]16	[15.8]3	0.000	[84.7-6.79]24
no	[18.2]66	[81.8]297		
LowBirthWeight				
Yes	[15.9]21	[84.1]111	0.066	[1.01-0.33]0.58
no	[24.4]61	[75.6]189		

Table 2: Maternal and neonatal complications of placenta previa and control group

Maternal complication that significantly associated with placenta previa were blood transfusion (RR = 4.31) postpartum hemorrhage (RR = 2.32), postpartum hysterectomy (RR = 8.2), placenta accrete (RR = 5.76), maternal sepsis (RR = 5.61), antepartum hemorrhage (RR = 3.89). Neonatal complication that significantly associated with placenta previa was intra uterine growth restriction. (RR = 24) intra uterine fetal death (RR = 1.64), male new born (RR = 1.19). Preterm delivery also complicate cases of placenta previa but with low frequency (RR = 0.35, P = 0.001), while low birth weight was not found significantly associated with placenta previa (RR = 0.58, p = 0.06).

Discussion

During the study period placenta previa complicated 0.01% of all deliveries which was less than the range of 0.3 - 0.8% observed in other studies (2, 9). In the past few decades, a significance of placenta previa was reported in some studies. One of the largest meta-analysis (3), which compared the incidence of placenta prevai in different studies around the world, showed that in studies conducted between 1975 up to 1995 the overall incidence was 0.48%. This study clearly demonstrated that women older than 35 years showed no a significant association with placenta previa development (RR = 0.33, 95%, CI = 0.22 - 0.55), however this result was opposed with other studies (2, 4, 10). Women with multigravidity (gravidity > 5) had lower risk for placenta previa development with statistical significance (RR = 0.39, 95%, CI = 0.22 - 0.69). This result was inconsistent with many studies (4, 11 - 13). According to the other several confounding factors affect test, result deviated.

Regarding infertility treatment, there was no association with placenta previa, although two recent studies showed that the risk of placenta previa increased 3.6- to 6.0-fold following the use of assisted reproductive technology (14, 15). The association between placenta previa and malpresentation as strong as shown in our study (RR = 20, 95%, CI = 10.0 - 42.6). Effect of cesarean section was further studies and it is found that the frequency of previous cesarean section was significantly higher in placenta previa group than in control group, which corresponded to 3-fold higher risk for placenta previa development, several studies conducted around the world confirmed a 2 - 5 fold increased risk for placenta previa in women with history of previous cesarean section (2, 16, 17).While the effect of multiple repeated cesarean sections revealed that the frequency of placenta previa increased more than 7-fold in women with 2 previous cesarean sections. The exact mechanism of previous uterine scar predisposing to low implantation is not well understood, it has been recently shown that uterine scar prevent migration of placenta during course of pregnancy toward the more vascularized uterine fundus (18). In our study shows a strong association of previous history of cesarean section with placenta previa and correlates well with the past literature mentioned above. (RR = 3.5, 95% CI = 2.11 - 5.82).

It has been reported that females who had undergone surgical myomectomy are more likely to develop placenta previa than those without that. Adesiy has noticed an occurrence of 10.3% of development of placenta previa after myomectomy (19), which is approximately 20 times higher than that of general population. Vergani et al. did not found any statistically significant association between uterine leromyoma and placenta previa (20), which mimic a result of our study (RR = 0.59, 95%, CI = 0.19 - 1.75). Previous history of either dilation or evacuation and curettage was significantly higher in placenta previa group than the control group (RR = 1.82, 95%, CI 1.08 - 3.07), this result was similar to other previous studies (2, 4, 17). It may be explained by endometrial damage from miscarriage.
Regarding history of placenta previa, in our study we found 4-fold elevated risk (RR = 4.97, 95%, CI = 2.06 - 11.97) which indicates a strong statistical significance and may implies genetic base for placenta previa,

studies support our result done by Gorodeski et al (21) whose found recurrence risk for placenta previa to be 6 times higher than general population.

Maternal complications that significantly associated with placenta previa were postpartum hemorrhage (RR = 2.32, 95%, CI = 1.39 - 3.89), blood transfusion (RR = 4.32, 95%, CI = 2.53 - 7.35), postpartum hyrectomy (RR = 78, 95%, CI = 10.22 - 598.1), placenta accreta (RR = 5.76, 95%, CI = 4.60 - 7.21), Maternal sepsis (RR = 5.61, 95%, CI = 4.50 - 7.00). These results were similar to other previous studies (2, 22). Neonatal compl-ications that significantly associated with placenta previa were intra uterine growth restriction (RR = 24, 95%, CI = 6.79 - 84.7) and intra-uterine fetal death (RR = 1.64, 95%, CI = 0.61 - 4.40). This result was similar to other studies (2, 24); also Sheiner et al. showed that prenatal mortality was 2.6 times more common among cases with placenta previa. Male newborn had lower risk of placenta previa (RR = 1.19, 95%, CI = 0.72 - 1.96) without statistic significance which remain question in placenta previa (4, 23). No associations were found between preterm delivery and low birth weight in placenta previa group. The drawback of this study is that the design was retrospective study. Some data may have been wrongly recorded, while some may have been lost, some of the useful data are unable to collect. Actual incidence is difficult to calculate here. In the future prospective study should be done so that some variables can be controlled.

In conclusion, the results of this study indicate that knowing obstetric predisposing factors of women for placenta previa development in our population is important for choosing adequate surveillance measures for those women with careful monitoring of this high risk. Pregnancies are importance, especially regarding carful ultra sonographic examination with exact placenta location during second trimester of pregnancy. Early recognition and proper monitoring of placenta previa could minimize the possibility of poor outcome in sudden massive vaginal bleeding.

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