

# Pregnancy Outcomes of Placenta Previa in Primigravidas

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**Objective:** To compare the pregnancy outcomes of placenta previa [PP] between primigravidas and multiparae women.

**Materials and Methods:** A retrospective cohort study was conducted in 335 pregnant women who delivered by cesarean section [CS] due to PP in Rajavithi Hospital between January 2010 and April 2017. The study group (n = 97) were the women with PP in primigravidas while the control group (n = 238) comprised of multiparae. Pregnancy outcomes between the two groups were compared regarding: gestational age [GA] at delivery, antepartum hemorrhage, maternal readmission, CS status, operative blood loss, postpartum hemorrhage [PPH], peripartum hysterectomy, blood transfusion, placenta accreta, preterm delivery, infant birth weight, intrauterine growth restriction [IUGR], Apgar score at 1 and 5 minutes, birth asphyxia, neonatal intensive care unit [NICU] admission, maternal and neonatal mortality.

**Results:** The primigravidas women had significantly less operative blood loss and PPH than the multiparae. The rates of placenta accreta and peripartum hysterectomy were significantly higher in the multiparae than the primigravidas. Neonatal outcomes were not statistically different between the groups.

**Conclusion:** PP in primigravidas have better maternal outcomes in term of operative blood loss and PPH. These findings may assist the clinicians in counselling and managing the pregnant women with PP.

**Keywords:** Primigravida, Placenta previa, Intraoperative blood loss

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Placenta previa [PP], defined as the placenta implants at the lower uterine segment and classifies by location as placenta edge overlies or closed to the internal cervical os, occurs about 0.3% to 0.5% of deliveries<sup>(1)</sup>. This condition is one of the most significant obstetric problems because of its serious complications associated with maternal and neonatal mortality and morbidity. Maternal complications are mainly resulted from hemorrhage occur in antepartum, intrapartum or postpartum period and associated with increasing risk of cesarean section [CS], peripartum hysterectomy, blood transfusion and need for intensive care unit<sup>(2-5)</sup>. Maternal death occurs in 0.03% of cases of PP. This rate is three times higher than all maternal mortality rate<sup>(6,7)</sup>. Major adverse neonatal outcome is preterm birth and other risk factors comprise of low birth weight, respiratory distress, increasing rate of intensive care and neonatal death<sup>(8,9)</sup>.

Although the pathophysiology of PP is still uncertain, several risk factors have been established including previous uterine surgery and CS, pregnancy

termination, prior previa, multiple gestations, increasing maternal parity, increasing maternal age, smoking, and cocaine use<sup>(10-13)</sup>. CS is the factor most related with PP as the rate of previa increases with the number of cesarean delivery<sup>(11,12)</sup>. This relationship also appears between PP and abortion<sup>(14)</sup>. Thus, it seems to be association between endometrial damage and uterine scarring with subsequent previa<sup>(10)</sup>. Accordingly, PP frequently occurs in multigravida pregnancy. However, it can partly occurs in primigravidas without significant risk factor but assisted conception and endometriosis may be the causes<sup>(15,16)</sup>. Besides, pregnancy outcomes of women with PP may differ between primigravidas and multiparae as the findings revealed that multiparae had earlier deliveries and greater blood loss but lower the Apgar score at 1 minute than primigravidas<sup>(16)</sup>. Knowing the pregnancy outcomes of PP associated with gravidas may aid the clinicians in counselling and management. Nevertheless, in the present the data of PP with primigravidas is lacking. Hence, the present study aimed to investigate the outcomes of pregnancy with PP by comparing between primigravidas and multiparae.

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### Materials and Methods

The retrospective cohort study was conducted at Rajavithi Hospital after ethical approval by the

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Rajavithi Institutional Review Board. Inclusion criteria were singleton pregnancy who gave births by CS due to PP between January 2010 and April 2017. The study group were primigravid women whereas the control group were multiparae. Gestational age [GA] was calculated from last menstrual period and confirmed by first or second trimester ultrasonography. PP was diagnosed under transabdominal ultrasonography screening and verified by transvaginal ultrasonography in case of uncertain diagnosis. Placental location was confirmed again by ultrasonography within a week prior to delivery as it still covered or laid close to the internal os. Exclusion criteria were the subjects with incomplete clinical data.

According to the study of Nur Azurah et al<sup>(16)</sup>, pregnancy with PP had statistically different in blood loss between primigravidas and multiparae. Based on the finding, the sample size was then calculated and resulted in 80 subjects per group. However, the study revealed that the ratio of PP between primigravidas and multiparae was 23 per 100 cases. Thus, there should be 348 cases of PP to obtain at least 80 subjects in each group. Then, each group of pregnant women was selected in sequence retrospectively from the hospital's medical records until the sample size was attained.

Data of the present study and control groups were collected from the hospital's computer file and obstetric charts. The data comprised of maternal conditions

including: age, infertility, pelvic endometriosis, history of previous uterine surgery such as prior CS, dilatation and curettage and myomectomy, smoking status, obstetric complications such as gestational diabetes mellitus [GDM] and preeclampsia, and type of PP (totalis or low lying). The following maternal outcomes were evaluated including: GA at delivery, presence or absence of antepartum hemorrhage [APH], maternal readmission, status of CS (elective or emergency), operative blood loss, postpartum hemorrhage [PPH], peripartum hysterectomy, blood transfusion requirement, presence of placenta accreta confirmed by pathological diagnosis, and number of maternal death. Neonatal outcomes composed of: preterm delivery, infant birth weight, presence of intrauterine growth restriction [IUGR], Apgar score at 1 and 5 minutes, birth asphyxia and need for neonatal intensive care unit [NICU] admission or neonatal death.

All data were analyzed with SPSS software package version 17.0. Continuous variables were compared using Student's t-test and presented as mean. Categorical variables were analyzed with Chi-square test or Fisher's exact test as appropriated and presented as percentage. A *p*-value of <0.05 was considered statistically significant.

## Results

There were 41,800 deliveries during the study

**Table 1.** Maternal characteristic of both groups

Maternal characteristics	Primigravida (n = 97)	Multiparae (n = 238)	<i>p</i> -value
Maternal age (years), mean ± SD	31.75±5.8	33.48±5.2	0.013
History of infertile, n (%)	2 (2.1)	3 (1.3)	0.629
History of pelvic endometriosis, n (%)	3 (3.1)	2 (0.8)	0.148
Prior CS, n (%)	0 (0.0)	64 (24.9)	<0.001
1	0 (0.0)	50 (78.1)	
2	0 (0.0)	12 (18.8)	
≥3	0 (0.0)	2 (3.1)	
Prior myomectomy, n (%)	8 (8.2)	1 (0.4)	<0.001
Prior dilatation and curettage, n (%)	0 (0.0)	69 (29.0)	<0.001
Smoking, n (%)	1 (1.0)	4 (1.7)	1.000
GDM, n (%)	12 (12.4)	30 (12.6)	1.000
Preeclampsia, n (%)	6 (6.2)	15 (6.3)	1.000
Type of PP, n (%)			0.008*
Totalis	68 (70.1)	198 (83.2)	
Low lying	29 (29.9)	40 (16.8)	
Placenta location, n (%)			<0.001
Anterior	36 (37.1)	140 (58.8)	
Posterior	61 (62.9)	98 (41.2)	

CS = cesarean section; GDM = gestational diabetes mellitus; PP = placenta previa

\* Fisher's exact test

period. Three hundred and eighty-nine (0.93%) were PP. Eleven subjects were twin pregnancy and then excluded from the present study. The remainders 378 singleton had only 335 medical records available for analyses. Out of these 335 women with PP, 97 (28.96%) were primigravidas and 238 (71.04%) were multiparae.

The demographic data and maternal characteristics of the study and the control groups were compared and presented in Table 1. Both groups had similar features in mean maternal age, GDM and preeclampsia. Prior CS, as well as prior dilatation and curettage, was the most important risk factor for PP found in multiparae and most of them (78.1%) had only one prior CS. Prior myomectomy was significant higher in primigravidas than multiparae group. There was no difference in other risk factors associated with PP regarding infertility, pelvic endometriosis and smoking status between the groups. Most of the women in both groups had PP totalis. More than half of multiparae had placenta implanted anteriorly while most of PP with primigravidas were posteriorly located.

Table 2 compared maternal outcomes of the study and the control groups. The results of GA at delivery, APH, GA at first admission due to APH, rate of readmission or CS and blood transfusion requirement between the groups were insignificant. Operative blood loss and PPH were significantly higher in multiparae. Placenta accreta was found in

19 cases (8%) of multiparae, while it had only one case in primigravidas. Thus, peripartum hysterectomy was performed significantly higher in multiparae than primigravidas. There was no maternal death in the present study.

Table 3 showed the neonatal outcomes of both groups. All of the results including preterm delivery, infant birth weight, IUGR, Apgar score at 1 and 5 minutes, birth asphyxia NICU admission and neonatal death were not statistical different between the 2 groups.

## Discussion

The incidence of PP in the present study was 0.93%, which higher than the 0.3% to 0.5% rate of PP reported in the literature<sup>(1)</sup>. The present finding may be because of the high concentration of cases since Rajavithi Hospital is the tertiary medical center, most of the complicated patients including PP are transferred for special care. Thus, the rate of PP with primigravidas (28.96%) in the present study was higher compared to 23.0% reported in the previous study<sup>(16)</sup>.

The pathophysiology of PP in primigravidas is poorly understood. Several factors have been postulated to be involved in pathogenesis of PP particularly the factors associated with endometrial damage and uterine scarring including previous CS and previous abortion<sup>(10)</sup>. Accordingly, most of PP were

**Table 2.** Maternal outcomes of both groups

Maternal outcomes	Primigravida (n = 97)	Multiparae (n = 238)	p-value
GA at delivery (weeks), mean ± SD	35.81±3.21	35.46±3.43	0.381
Antepartum hemorrhage, n (%)	33 (34.0)	83 (34.9)	0.900
GA at 1 <sup>st</sup> admission due to APH (weeks), mean ± SD	32.14±3.36	30.79±4.18	0.135
Readmission, n (%)	21 (21.6)	72 (30.3)	0.139
Cesarean section, n (%)			0.205
Elective CS	39 (40.2)	77 (32.4)	
Emergency CS	58 (59.8)	161 (67.6)	
• Painless bleeding	44 (75.9)	112 (69.5)	
• Bleeding with labor	4 (6.9)	24 (14.9)	
• Labor or PROM	6 (10.3)	22 (13.7)	
• Others	4 (6.9)	3 (1.9)	
Operative blood loss (ml), mean ± SD	745.88±460.95	1,025.84±857.71	<0.001
Postpartum hemorrhage, n (%)	25 (25.8)	92 (38.7)	0.031*
Blood transfusion, n (%)			
Antepartum	3 (3.1)	21 (8.8)	0.099
Postpartum	18 (18.6)	64 (26.9)	0.104
Peripartum hysterectomy, n (%)	1 (1.0)	22 (9.2)	0.007*
Placenta accrete, n (%)	1 (1.0)	19 (8.0)	0.019*
Maternal death, n (%)	0 (0.0)	0 (0.0)	

GA = gestational age; APH = antepartum hemorrhage; CS = cesarean section; PROM = premature rupture of membrane

\* Fisher's exact test

**Table 3.** Neonatal outcomes of both groups

Neonatal outcomes	Primigravida (n = 97)	Multiparae (n = 238)	p-value
Preterm (GA <37 weeks), n (%)			
Late preterm (GA 34 to 37 weeks)	43 (44.3)	114 (47.9)	0.629
Early preterm (GA <34 weeks)	21 (21.6)	53 (22.3)	1.000
Birth weight (g), mean ± SD	2,632±704	2,582±711	0.554
Low birth weight (<2,500 g), n (%)	35 (36.1)	89 (37.4)	0.901
IUGR, n (%)	3 (3.1)	9 (3.8)	1.000
Apgar score 1 minutes <7, n (%)	22 (22.7)	47 (19.7)	0.554
Apgar score 5 minutes <7, n (%)	7 (7.2)	15 (6.3)	0.809
Birth asphyxia, n (%)	18 (18.6)	44 (18.5)	1.000
NICU admission, n (%)	12 (12.4)	16 (6.7)	0.125
Neonatal death, n (%)	4 (4.1)	10 (4.2)	1.000

GA = gestational age; IUGR = intrauterine growth restriction; NICU = neonatal intensive care unit

multigravidae. However, other conditions including various previous uterine surgery other than CS or dilatation and curettage such as previous myomectomy, increasing maternal age, smoking, and cocaine use can be the risks for developing PP<sup>(10-12)</sup>. These may explain the occurrence of PP in primigravidas. Recently, a study had shown the high incidence of assisted conception and endometriosis in primigravidas with PP<sup>(16)</sup>. Nevertheless, the exact pathophysiology remains unclear. In women who underwent artificial reproductive technologies [ART], transfer of embryos via transcervical has been postulated to be explanation for the higher occurrence of PP, as there has a tendency to place the embryo at the lower uterine cavity, thus resulting in development of PP<sup>(17,18)</sup> while other report had shown the conflicting result<sup>(15)</sup>. The correlation of endometriosis and PP has been explained by reduction of endometrial progesterone responsiveness and uterine dysperistalsis, resulting in abnormal placentation<sup>(19)</sup>. However, in the present study, assisted conception and endometriosis were not the significant risk factors for primigravidas as the history of infertile and pelvic endometriosis in primigravidas were not statistically different from multiparae group. The only significant risk factor of PP found in primigravidas in the present study was prior myomectomy, while prior CS and prior dilatation and curettage were the important factors for multiparae.

The significant impact of PP to pregnancy is maternal and neonatal morbidity and mortality. In the present study, maternal outcomes of primigravidas regarding operative blood loss, PPH, peripartum hysterectomy and placenta accreta were statistically different compared with multiparae. The significant lower rate of operative blood loss in primigravidas could be due to the lower incidence of placenta

accreta, which was the consequence of prior uterine surgery such as prior myomectomy, prior CS or prior dilatation and curettage. In the present study, the multiparae had much higher rate of prior CS (24.9%) and prior dilatation and curettage (29.0%) than the prior myomectomy rate (8.2%) in the primigravidas. These might be the explanation for high prevalence of placenta accreta in multiparae group. In addition, according to the high rate of placenta accreta, the multiparae had tendency to undergo peripartum hysterectomy hence increased the amount of blood loss.

Prior CS and prior dilatation and curettage were also recognized as the risk factors of PPH. This could be explained significant lower rate of PPH in primigravidas. Furthermore, most of the placenta in the multiparae were anteriorly located due to the previous uterine scars resulted from previous CS and previous dilatation and curettage. The placenta was at risk of high amount bleeding during surgery as it located beneath the surgical site<sup>(16)</sup>. The anterior implantation of placenta also influenced the PPH by dysfunction of the uterine contractility<sup>(20)</sup>. Thus, increased the rate of PPH in the multiparae.

Several studies had demonstrated adverse neonatal outcome associated PP including preterm birth, low birth weight, respiratory distress, increasing rate of intensive care and neonatal death<sup>(8,9)</sup>. The recent study by Nur Azurah et al had shown a higher Apgar score at 1 minute in primigravidas than multiparae. Most of primigravidas in that study had posteriorly located placenta, which less likely to be cut through during the surgery, hence reducing the prevalence of fetal hypoxia and anemia<sup>(16)</sup>. In the present study, despite the statistically insignificant of neonatal outcome between the groups, the multiparae had tendency to have unfavorable neonatal outcomes because of the

higher rate of adverse neonatal outcomes compared with the primigravidas. This indicated the need for more sample size to differentiate neonatal outcomes between the 2 groups.

The strength of the present study was that the study had relatively large sample size than the previous study<sup>(16)</sup>. In addition, all of the women underwent repeated ultrasound within a week prior to delivery; therefore, diagnosis of PP was confirmed accurately.

However, the current study had some limitation. The retrospective nature of the present study made the data collected incomplete and because of some rare occurrences in the study such as history of infertile and pelvic endometriosis, maternal mortality, some neonatal outcomes like IUGR and neonatal death; those information were inadequate to determine the pregnancy outcomes.

### Conclusion

The present study indicates that PP in primigravidas have the better maternal outcomes in term of operative blood loss and PPH than the multiparae. The chance of having placenta accreta and being performed peripartum hysterectomy are also lower than multiparae. This may assist the clinicians in counselling and management the pregnant women with PP in both primigravidas and multiparae. Furthermore, prevention of PP by reduction of known risk factors especially cesarean delivery should be encourage in order to decreasing the prevalence of PP and placenta accrete.

### What is already known on this topic?

PP in primigravidas have better pregnancy outcomes than multiparae in term of estimated blood loss and Apgar score at 1 minute. Assisted conception and endometriosis were highly associated with PP in primigravidas.

### What this study adds?

The present study has confirmed that PP in primigravidas have the lower amount of operative blood loss than in multiparae. Nevertheless, the other results are inconsistent with the previous study, as the present study does not found the difference in neonatal outcomes between the groups and the association of PP with assisted conception and endometriosis. These represent the risk factors and pregnancy outcomes associated with PP in primigravidas are still inconclusive. Thus, further study should be encouraged.

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### Potential conflicts of interest

The author declares no conflict of interest.

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