Gynecology & Obstetrics
ISSN: 2161-0932

Ibrahim et al., Gynecol Obstet (Sunnyvale) 2018, 8:8
DOI: 10.4172/2161-0932.1000482

Research Open Access

Evaluation of Pregnancy Outcomes in Relation to Placenta Previa Location

Safaa Abdel Salam Ibrahim and Ahmed Mahmoud Farag*

Department of Obstetrics & Gynecology, Zagazig University, Egypt

***Corresponding author:** Ahmed Mahmoud Farag, Department of Obstetrics and Gynecology, Zagazig University, Egypt, Tel: +201000333162; E-mail: ahmed.farag@zu.edu.eg

Received Date: July 10, 2018; **Accepted Date**: September 22, 2018; **Published Date**: September 28, 2018

Abstract

Aim: To evaluate the effect of the type and site of placenta previa on pregnancy outcomes.

Methods: We studied retrospectively 324 women with singleton pregnancies presented with placenta previa. After diagnosis by trans abdominal U/S, the cases were grouped into complete and incomplete placenta previa, and then each were categorized to posterior and anterior groups. We compared maternal criteria and outcomes of neonates in complete and incomplete placentae previa, and the differences between the two groups were evaluated.

Results: Women with complete placenta previa were more prevalent than those with incomplete placenta previa (59.2% versus 17.5%), with the higher incidence of preterm labor in women with complete than in those with incomplete placenta previa (45.2% versus 8.7%); Incidence of APH in complete placenta previa did not significantly differ between the posterior and the anterior groups. The anterior group was with higher incidence of preterm labor than the posterior group (76.3% versus 31.9%; p=0.002). Gestational age at labor with incomplete placenta previa didn't significantly differ between the posterior and anterior groups.

Conclusion: Awareness should be taken towards the risk of increased maternal and fetal morbidity, especially with anterior placenta previa.

Keywords: Anterior placenta previa; Complete placenta previa; Obstetric outcomes

Introduction

The incidence of placenta previa was reported to be 0.5%-1% from the total number of pregnancies [1]. Placenta previa has been well documented to be associated with adverse maternal outcomes as well as neonatal outcomes [2]. Studies reported that 5% of obstetric hysterectomies were due to placenta previa [3,4]. The need for urgent hysterectomy recently has changed from drawbacks of atony of the uterus to abnormal location of the placenta that has now became a more common indication due to increased number of pregnancies with previous caesarean scar. Placenta previa remains a major risk factor for various maternal complications. There are higher incidence of Postpartum Hemorrhage (PPH) and blood transfusion in women with placenta previa compared to general population [5-7]. Women with placenta previa are more likely to deliver babies before 37 weeks with Apgar score of less than 7 [8]. Studies also showed that there were higher admission to neonatal intensive care unit, stillbirth and death [8,9].

The actual cause of placenta previa is unclear; however, it might be due to scarring of the uterus, which is responsible for this abnormal location. Risk of placenta previa is increased with extreme maternal ages, increased parity, previous curettage, previous caesarean section and history of abnormal implantation [2,10]. In our study, we evaluated the effect of placenta previa of different locations and types on obstetric outcomes.

Methods

Retrospective analysis of the medical files of 329 women with singleton pregnancies presented with placenta previa who delivered at Zagazig university hospital, obstetrics and gynaecology department between August 2015 and August 2017. Data were collected during routine antenatal care. Informed consent was taken from each patient with priority of keeping personal data confidentially. Five cases were excluded due to preterm caesarean section due to antepartum haemorrhage, and finally 324 women were studied.

Maternal age, parity, method of delivery, maternal past history (uterine surgery, miscarriage), pregnancy-associated diseases (endometriosis, myoma), prenatal ultrasonography and the surgery findings were reviewed in all patients.

To assess obstetric outcomes, the haemoglobin level before surgery, 1 day and 3 days after surgery, blood loss during operation, blood transfusion during surgery, placental abruption, placental accreta, emergency cesarean section, need of hysterectomy and DIC were recorded.

Birth weight and Apgar score were also considered. Diagnosis was made on ultrasound and at surgery. Patients were divided in accordance with type of placenta previa into complete and incomplete placenta previa, and they were divided into anterior and posterior in accordance with location of placenta. Comparison was made between complete and incomplete placenta previa groups and evaluation of anterior and posterior group's distinction.

Elective caesarean section was usually performed at 37th weeks of gestation for placenta previa according to our institute protocol and occasionally performed early in the 38th week in stable cases. Emergency caesarean section was performed earlier with sever antepartum haemorrhage (blood loss >200 ml and persistent bleeding without tendency of decrease despite supportive management). Caesareans hysterectomy was done in cases with placenta accreta.

Complete placenta previa was the placenta that completely covering internal os, but if the placental margin more than 2 cm from the os it was known as incomplete placenta previa that comprised into partial and marginal placenta previa [6]. Partial placenta previa was considered when the placenta partially covering internal os and placental margin was situated within 2 cm of it. Marginal placenta previa was considered when the placental not covering the os, with margin of the placenta adjacent to the internal os.

Distinction between marginal and partial placenta previa was somewhat difficult especially without dilatation of the cervix [11], thus the classification of complete and incomplete placenta previa was employed. Women with low-lying placenta were excluded because of their different clinical management. Anterior or posterior Placenta previa was categorized according to placental attachment to the anterior or posterior uterine wall. Diagnosis of placenta accreta was done histologically when trophoblastic cells seen directly invading into the myometrium with confirmation after hysterectomy.

Statistical Analysis

Data were checked and analyzed using SPSS version 20 for data processing. Data were expressed as frequency and percentage for qualitative variables and mean+standard deviation (SD) for quantitative one. Chi square test and t-test were used for comparison between the studied groups. P-value <0.05 was considered statistically significant.

Results

324 pregnant women involved in the study, 142 cases (43.83%) with complete placenta previa and 182 cases (56.17%) with incomplete placenta previa. 62 cases (19.13 %) with anterior and 262 cases (80.87%) with posterior placenta previa. Regarding maternal characteristics, there was no significant difference between complete and incomplete placenta previa groups, except in those with previous caesarean delivery, higher incidence in complete placenta previa group than those with incomplete placenta previa group as shown in Table 1.

	Total	Complete (N=142)	Incomplete	OR	95 % CI	P value
	(N=324)		(N=182)			
Mean age (yrs.)	32.5 ± 4.3	32.5 ± 4.3	32.4 ± 4.3			0.887
Nulligravida	94 (29.01%)	46 (32.39%)	48 (26.37%)	1.33	(0.69-2.63)	0.506
Nulliparous	136 (41.97%)	58 (40.85%)	78 (42.85%)	0.91	(0.48-1.74)	0.922
History of PTL	12 (3.70%)	8 (5.63%)	4 (2.19%)	2.65	(0.46-14.95)	0.465
History of CS	38 (11.72%)	26 (18.30%)	12 (6.59%)	3.17	(1.13-8.85)	0.03
History of D and C	116 (35.80%)	48 (33.80%)	68 (37.36%)	0.85	(0.46-1.63)	0.762
ART	26 (8.02%)	14 (9.85%)	12 (6.95%)	1.54	(0.51-4.82)	0.65
Expression of data as number (percentage), mean ± SD, OR odds ratio and CI confidence						

Table 1: Demographic data of women in complete and incomplete placenta previa groups.

Perinatal outcomes in groups of complete and incomplete placenta previa were shown in Table 2.

	Total	Complete	Incomplete	P value
Admission	140 (43.2%)	88 (62.0%)	72 (28.6%)	<0.001 *
Tocolytics use	86 (26.54%)	62 (43.66%)	24 (l3.18%)	<0.001 *
APH	116 (43.66)	84 (59.19%)	32 (17.58)	<0.001 *
Gestational Age (weeks) at	30.2	3.3	32	0.532
Onset of bleeding	(17.2-38.3)	(17.3-36.8)	(25.5-35.1)	
Gestational Age (weeks) at delivery	37.3	37.1	37.5	<0.001 *
	(25.5-38.3)	(25.7-38.5)	(33.8-38.3)	
Before 34 weeks	28	26	2	<0.001 *
	-8.64%	-18.30%	-1.09%	
Before 37weeks	80	64	16	<0.001 *
	-24.69%	-45.07%	-8.79%	

Birth Weight gm	2672	2609	2769	<0.001 *
	(609-3736)	(611-3741)	(1959-3433)	
Less than 2000 gm	30	24	6	<0.006 *
	-9.25%	-16.90%	-3.29%	
Less than 2500 gm	92	56	36	<0.01 *
	-28.40%	-39.40%	-19.80%	
Apgar score <7 at 1 min	22	16	6	0.081
	-6.79%	-11.26%	-3.29%	
Apgar score <7 at 5 min	6	6	0	0.263
	-1.85%	-4.22%	0.00%	
PH of umblical artery	7.318	7.327	7.316	0.138
	(7.017-7.492)	(7.017-7.492)	(7.056-7.424)	
Placenta accreta	20	16	4	0.033
	-6.17%	-11.26%	-2.19%	
Anterior placenta	62	42	20	0.005 *
	-19.13%	-29.57%	-10.98%	
Cervical Length ≤ 3.5 mm at delivery	138	66	72	0.568
	-42.59%	-46.47%	-39.56%	
Blood loss (ml) during operation	1261	1434	1109	<0.001 *
	(351-12871)	(359-12869)	(349-6119)	
Expression of data are number (percentage), mean± SD, OR odds ratio, NA Not applicable and CI confidence interval.				

Table 2: Perinatal outcomes in incomplete and complete place previa.

Higher incidence of APH was in complete placenta previa group than incomplete placenta previa group (59.2 % versus 17.5%). Preterm birth was more prevalent in women with complete placenta previa than in those with incomplete placenta previa (45.2% versus 8.7%), with increased rate of delivery before 34 weeks in complete placenta previa group (18.4% versus 1.2%). Birth weight <2500 gm and <2000 gm was higher in women with complete placenta previa. There were no significant differences in pH of the umbilical artery the incidence of Apgar scores <7 at 1 min and 5 min and between complete and incomplete placenta previa groups. Anterior position of placenta previa and Placenta accreta were significantly higher in complete placenta previa group than in incomplete placenta previa group, in addition to increased intraoperative blood loss in complete placenta previa group. Short length of the cervix (≤35 mm) did not significantly differ between complete and incomplete placenta previa groups.

Regarding to characteristics of recruited women and treatments like admission and tocolysis, there was no significant differences between the anterior and the posterior groups among women with complete placenta previa Tables 3 and 4.

	Anterior	**Posterior**	**P value**	**Anterior**	**Posterior**	**P value**
	(complete)	**(complete)**		**(incomplete)**	**(incomplete)**	
	N=42	**N=100**		**N=20**	**N=142**	
Maternal age (years) at delivery	33.9 ± 3.8	33.3 ± 4.5	0.477	34.1 ± 4.9	33.4 ± 4.2	0.632
Nulligravida	14 (33.33%)	32	0.765	6	42	0.816
		-32%		-30%	-29.50%	
Nulliparous	14	44	0.768	6	64	0.496

	-33.33%	-44%		-30%	-45.10%	
History of preterm delivery	6	2	0.237	0	4	0.323
	-14.28%	-2%		0%	-2.80%	
History of caesarean delivery	14	12	0.063	2	10%	0.94
	-33.33%	-12%		-10%	-7.04%	
History of	14	34	0.742	4	57	0.491
D and C	-33.33%	-34%		-20%	-39.40%	
ART	2	12	0.718	2	9	0.94
	-4.76%	-12%		-10%	-6.30%	
Expression of data are mean± SD, number (percentage), OR odds ratio and CI confidence interval.						

Table 3: Comparison between maternal characteristics in complete and incomplete placenta previa groups regarding anterior and posterior positions.

	Posterior	**Anterior**		**Posterior**	**Anterior**	
	(incomplete)	**(incomplete)**	**P value**	**(complete)**	**(complete)**	**P value**
	N=142	N=20		N=100	N=42	
Admission	46	6	0.283	56	32	0.891
	-28.40%	-30%		-56%	-76.20%	
Use of tocolytics	20	4	0.322	38	24	0.957
	-12.30%	-20%		-38%	-57.10%	
APH	28	4	0.239	54	32	0.72
	-17.30%	-20%		-54%	-76.20%	
Gestational age (weeks) at onset of bleeding	32.2	32.3	0.015	31.3	26.5	0.094
	(25.5-35.2)	(31.6-33.2)		(18.6-36.5)	(25.5-37.6)	
Gestational	37.6	37.6	< 0.001	37.2	36.6	0.808
age (weeks) at delivery	34.7-38.4	(33.9-38.1)		(28.2-38.5)	(25.5-37.6)	
<34 weeks	0	2	0.014	10	16	0.21
	0%	-10%		-10%	-38.10%	
<37 weeks	12	4	0.003	32	32	0.362
	-7.40%	-20%		-32%	-76.20%	
Birth weight (gm)	2779	2685	0.003	2664	2363	0.236
	(1963-3433)	(1957-3079)		(1291-3741)	(609-3021)	
Less than 2000 gm	4	2	0.005	8	16	0.649
	-2.50%	-10%		-8%	-38.09%	
Less than 2500 gm	30	6	0.025	30	26	0.561
	-18.50%	-30%		-30%	-61.90%	

Apgar score <7 at 1 min	4	2	0.079	6	10	0.849
	-2.80%	-10%		-6%	-23.80%	
Apgar score <7 at 5 min	0	0	0.628	2	4	NA
	0%	0%		-2%	-9.52%	
PH of umblical artery	0	7.317	0.758	7.325	7.331	0.816
	0%	(7.227-7.365)		(7.017-7.412)	(7.119-7.494)	
Placenta accreta		4	0.013	4	12	0.002 *
		-20%		-4%	-28.57%	
Cervical Length ≤ 3.5 mm at delivery	32	8	0.992	46	20	0.955
	-39.5	-40%		-46%	-47.61%	
Blood loss (ml) during operation	1099	1191	0.036	1314	1815	0.718
	(399-3499)	(351-6121)		(359-6719)	(541-12871)	
Expression of data are mean± SD, number (Percentage), OR odds ratio, CI confidence interval and NA Not applicable						

Table 4: Comparison between perinatal outcome in complete and incomplete placenta previa groups regarding anterior and posterior positions.

The incidence of APH in complete placenta previa group didn't significantly differ between the anterior and the posterior placenta previa groups (76.3% versus 54.1%). However, mean gestational age at bleeding onset in the anterior group was lower than in the posterior group (26.3 weeks versus 31.5 weeks). The incidence of preterm birth was higher in the anterior group than in the posterior group (76.3% versus 32.1%), with a higher incidence of preterm birth before 34 weeks gestation (38.2 % versus 10.1%). Birth weight <2500 gm and <2000 gm, both were higher in the anterior than in the posterior placenta previa groups. There was no significant differences in pH of umbilical artery or the incidence of Apgar scores <7 at 1 min and 5 min between the anterior and posterior placenta previa groups. The prevalence of placenta accreta was higher in the anterior group than in the posterior group.

Discussion

Placenta previa has been reported to be associated with serious maternal morbidity and mortality and also adverse neonatal outcomes [2,7]. The exact etiology of placenta previa is still unknown. However, uterine scarring has been speculated as the underlying cause of placenta previa [9]. Wide variation was found with each patient management. Some patients underwent elective caesarean section at term without bleeding hazards, whereas others, urgent preterm caesarean section and hysterectomy was necessary for bleeding that threatened life.

Thirty-three percent of the non-primigravidas had history of caesarean section and 28% had history of dilatation and curettage. Caesarean section and dilation and curettage were both recognized risk factors for PPH [12]. The risk of developing placenta accrete was higher in placenta previa with previous caesarean deliveries. This can be explained by the implantation of the placenta over the scar, supporting the theory that trophoblast adherence or invasion was enhanced by previous myometrial disruption [13].

In our study, preterm caesarean delivery and antepartum haemorrhage were significantly higher in complete placenta previa group. However, the association between type of placenta previa and preterm caesarean delivery remains debated. Dola et al. reported that preterm caesarean delivery was more common in women having complete placenta previa [14]. Bahar et al. reported that preterm delivery was higher with APH in women having placenta previa, especially major type [15].

On the other side, Tuzovic et al., reported that there was no significant difference in the incidence of preterm caesarean delivery between women having complete and incomplete placenta previa [16]. Also Daskalakis et al., reported that there was no significant differences in mean gestational age at delivery between different placenta previa types [17]. This discrepancy between these studies might be due to differences in characteristics of recruited cases, gestational age at time of diagnosis, or different type of management.

In this study, 19.13% women only, presented with anterior position of placenta previa and this low ratio suggested that placental tissue developed mainly on the posterior wall of the uterus in cases of placenta previa. The incidence of migration of the placenta was higher with faster rate in women with anterior position of placenta previa and this was reported in a previous study [14]. Moreover, multiparty and history of caesarean sections especially more than two, was related to the development of anterior placental [18]. However, no significant differences were observed with multiparty and history of previous caesarean delivery between the anterior and posterior groups, irrespective of the type of placenta previa. This may be related to relative low parity in cases: only 8 patients were multiparous, and none underwent to >2 caesarean sections. Nevertheless, the anterior group had a higher significance of increased incidence of placenta accreta, irrespective of the type of placenta previa. 80% of patients with placenta accreta (16 of 20 cases) were in the anterior group and 75% of patients (12 of 16 cases) with anterior placenta accreta had previous caesarean sections history. This was concurrent with the suggestion

that placenta accreta develops through implantation of the placenta over a caesarean scar [19,20].

The present study also revealed that anterior group had higher significance in increased preterm birth and low birth weight. This was attributed to gestational age, which was significantly lower in the anterior group at the time of bleeding in cases with complete placenta previa.

Interestingly, perinatal outcomes did not significantly influenced by anterior placental position in women with incomplete placenta previa, such as bleeding onset and preterm delivery. These results suggest that anterior position of the placenta exhibits a risk of early bleeding and preterm labor only in cases with complete placenta previa [21]. This may be due to that, cases of incomplete placenta previa represented 36% of the analysed women in their study.

Cause of prematurity in anterior placenta still unclear. This may be due to short cervical length, which was reported by older studies to be related to preterm birth in women with normal and abnormal placental implantation [22,23].

In the study, no significant difference of length of the cervix at delivery between the anterior and posterior groups in spite of earlier gestational age at delivery was significantly in the anterior groups in complete placenta previa. Thus, complete placenta previa with anterior placental location may exhibit increased risk of early shortening of the cervix than posterior placental location and incomplete placenta previa.

Frequent stimulation of the anterior wall of the uterus mechanically during daily life was speculated to be direct and more frequent than that of the posterior wall. With anterior placental location, uterine contractions may be enhanced and subsequent undefined changes in the basal layer of decidua. However, data collected from previous study based on electromyographic activity of the uterus, in the mid trimester of pregnancy measured through the abdominal wall, was independent of the site of implantation of the placenta [24]. To identify the pathophysiology of complete placenta previa and the differences in clinical criteria associated with posterior and anterior position, further studies are needed.

In conclusion, anterior placenta previa is more dangerous than posterior placenta previa regarding increased maternal and fetal morbidity and it's more frequent in patients with history of ≥ 2 cesarean section compared to those with no history of caesarean section. Therefore, ultrasound diagnosis of women with anterior placenta previa is very important to predict outcomes in these cases.

Compliance with Ethical Standards

The current study met the international guidelines approved by the Ethics Committee of Institutional Review Board (IRB), Faculty of Medicine, Zagazig University. Informed consent was taken from each patient with priority of keeping personal data confidentially.

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