ORIGINAL RESEARCH

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Effects of Timing of Delivery on Maternal and Neonatal Outcomes in Pregnant Women with Placenta Previa: A Single Tertiary Center Experience: Case Control Research

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ABSTRACT Objective: This study aimed to examine the maternal and newborn outcomes of pregnant women with placenta previa who gave birth at 36, 37, or 38 weeks. **Material and Methods:** We retrospectively examined the Gynecology and Obstetrics Clinic of Necmettin Erbakan University Faculty of Medicine Hospital between January 2015 and June 2024. We evaluated the patient's demographic and clinical data and compared their perinatal outcomes. **Results:** The study included 431 women with placenta previa and divided into three delivery timing groups: 36 weeks (n=127), 37 weeks (n=201), and 38 weeks (n=103). The median age of the patients was 36 years, the median number of pregnancies was 3, and the parity was 1. Preoperative and postoperative hemoglobin levels were 11.7±1.44 g/dL and 11.03±1.56 g/dL, respectively. Emergency hemorrhage necessitated cesarean delivery in 11.8% of cases. Spinal anesthesia was used in 52% of patients, while general anesthesia was used in 48%. The mean duration of surgery was 59.6 minutes, and 16.9% of patients received blood transfusions. The mean maternal hospital stay was 2 days, and 17.9% of neonates were admitted to the neonatal intensive care unit (NICU). No significant differences in maternal outcomes were found between time-of-birth groups. However, birth weights ($p<0.001$) and NICU admissions were significantly different between groups ($p<0.001$). When patients requiring blood transfusion were evaluated according to their gestational weeks, no statistically significant difference was found between the groups in terms of preoperative hemoglobin, postoperative hemoglobin, and red blood cell transfusion requirements ($p>0.05$). **Conclusion:** This study has shown that delivery can be safely delayed until the 38th week of pregnancy in placenta previa patients, except in significant vaginal bleeding.

Keywords: Delivery time; maternal outcomes; neonatal outcome; placenta previa

Placenta previa (PP) is characterized by placental tissue that extends across and completely covers the internal cervical os.[1] PP's pathogenesis is not entirely known. One theory is that regions of the upper uterine cavity with less vascularized decidua than ideal, which can happen after surgery or having multiple children, help trophoblasts to attach or grow in a single direction in the lower uterine cavity.[2-4] The prevalence of PP varies worldwide, with an incidence of 4 to 5 per 1,000 births.[2,5] PP is predominantly identified during the second trimester, with 90-95% of instances resolving before delivery.[1] Two theories have been put forward to explain this situation, the first is that the lower uterine segment increases from 5 mm in the 20th week of pregnancy to over 50 mm at term.[6] The fixed lower edge of the placenta is positioned away from the internal os as a result of the development of this lower uterine segment. An alternative explanation is that the placenta preferentially develops in a more cephalad position due to the lower uterine segment being comparatively less vascular than the remainder of the myometrium. This causes trophoblastic tissue to grow in one direction, towards the fundus. This causes the placenta to "migrate" up-

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wards from the cervix. This is known as "trophotropism". In both cases, atrophy of the placental cells lining the cervix contributes to this apparent positional change.

Various risk factors for PP have been identified, including previous cesarean delivery, previous history of PP, multiple pregnancies, previous uterine surgery, smoking, increasing maternal age, and multiparity.[6-10] Patients diagnosed with PP commonly experience repeated episodes of painless vaginal bleeding in the second or third trimester of pregnancy.[11] A higher likelihood of mother morbidity-which includes the need for more drugs and treatments-blood transfusion, vasa previa, postpartum hemorrhage, sepsis, and longer hospital stays-is connected to maternal hemorrhage.[12,13] PP increases the likelihood of requiring postpartum hysterectomy due to bleeding during delivery.[12] Additionally, the need for further surgical interventions raises the risk of damage to pelvic organs such as the bladder and intestines.[14] Moreover, neonates delivered by mothers with PP face an elevated risk of fetal and neonatal complications. Complications encompass diminished Apgar scores, low birth weight, respiratory distress syndrome requiring neonatal intensive care unit (NICU) admission, and issues related to preterm birth and intrauterine growth restriction (FGR), including fetal and neonatal mortality.[15]

Since the risk of spontaneous hemorrhage rises with increasing gestational age in pregnancies involving PP, the American College of Obstetricians and Gynecologists (ACOG) and the Society for Maternal-Fetal Medicine (SMFM) advise cesarean delivery between 36+0 and 37+6 weeks' gestation in cases of uncomplicated PP.[16,17] However, the literature has not sufficiently studied the optimal delivery timing in PP. As a result, an increase in PP rates is expected with increasing cesarean section rates.[7,8]

This study aims to comprehensively evaluate the perinatal and neonatal outcomes of women diagnosed with PP in our clinic and scheduled for cesarean delivery at 36-37-38 weeks. The study will analyze the results obtained at different cesarean weeks and evaluate the effectiveness of different treatment strategies in preventing complications in both mothers and newborns. This study will contribute to filling the current knowledge gaps in PP management and developing evidence-based guidelines to stop PP.

MATERIAL AND METHODS

The study was authorized by the Ethics Committee of Necmettin Erbakan University Faculty of Medicine under decision number 2024/5075 (date: July 5, 2024) and was done in compliance with national regulations, institutional rules, and the Declaration of Helsinki. We retrospectively reviewed the medical records of pregnant women and their newborns diagnosed with PP who received follow-up care at the Gynecology and Obstetrics Clinic of Necmettin Erbakan University Faculty of Medicine Hospital between January 2015 and June 2024. We included patients who matched the specific criteria for our study.

Throughout their pregnancies, all pregnant women who were part of the study were monitored in the obstetrics and gynecology department for any signs of PP. After birth, neonatology followed up on the newborns.

The study included pregnant women between the ages of 18 and 45; singleton and live births; confirmed PP cases at birth; and births at 36, 37, or 38 weeks. Exclusion criteria for the study included cases of PP unconfirmed at birth, cases with placenta accreta spectrum (PAS) observed, multiple births, intrauterine fetal death, delivery before 36 weeks, and those lost to follow-up after diagnosis.

PP was first identified by finding echogenic, homogeneous placental tissue reaching the internal os of the uterus during a transabdominal ultrasound study in the second or third trimester. This was then confirmed by a transvaginal ultrasound examination. As recommended by the Eunice Kennedy Shriver National Institute of Child Health and Human Development, we always consider the location of the placental tip when preparing the ultrasound report.[18] We performed a follow-up transvaginal ultrasonography at the 32nd week of pregnancy in cases where the second-trimester examination revealed PP. If the PP persisted at the 32nd week of the follow-up examination, we performed a follow-up transvaginal ul-

trasound at the 36th week. If the placental margin covered the internal os at the 36th week of follow-up examination, a cesarean section was planned, as previa was likely to continue until delivery.

We divided PP cases into three groups based on delivery time: those delivered at 36, 37, and 38 weeks. After these three groups were evaluated, the cases that were given a cesarean day in these weeks but applied to our clinic due to vaginal bleeding were kept separate, and the elective cesarean groups were re-evaluated.

We recorded the cases' age, gravida, parity, preoperative hemoglobin (Hgb), postoperative Hgb, operation time, blood transfusion, maternal hospitalization time, birth weight, 5th-minute APGAR score, and NICU admission parameters.

We investigated the data's normality using Kolmogorov-Smirnov, Shapiro-Wilks, and histograms. Based on the distribution's normality, we performed a one-way ANOVA test for continuous variables based on the normality of the distribution, presenting the scale data as median (minimum-maximum) and mean. Upon discovering a substantial difference between the groups, we conducted a post-hoc Tukey test. We used the Kruskal-Wallis test for scale data that did not show a normal distribution and gave the values as medians (minimum-maximum). We used the Kruskal-Wallis test for scale data that exhibited a non-normal distribution and gave the values as medians (minimum-maximum). We used appropriate chi-square tests or Fisher's exact tests to ascertain significant differences for categorical variables. We conducted all statistical tests using a two-sided approach, determining statistical significance at the $p<0.05$ significance level to determine statistical significance. We performed statistical analyses using SPSS version 20.0 (IBM Corp., Armonk, NY, USA).

RESULTS

This retrospective study included 431 pregnant women with PP. We divided pregnant women with PP into three groups: those who delivered at 36 weeks (n=127), those who delivered at 37 weeks (n=201), and those who delivered at 38 weeks (n=103). The study evaluated all cases with PP and found that the median age of the patients, ranging from 21 to 45 years, was 36 years. The number of pregnancies was 3 (1-11), and the parity was 1 (0-9). 0.5% (n=2) of the patients had a history of PP from a previous pregnancy. The preoperative Hgb of the patients was found to be 11.7±1.44, and postoperative Hgb was found to be 11.03±1.56. Emergency bleeding led to the surgery of 11.8% (n=51) of the patients (emergency cesarean section). During the cesarean section, 224 (52%) received spinal anesthesia and 207 (48%) received general anesthesia. The mean duration of surgery was 59.6 (25-240) minutes. We performed transfusions on 73 (16.9%) patients. The mean duration of maternal hospitalization was 2 (1-14) days. 77 (17.9%) of the newborns received admission to the NICU (Table 1).

The patients who underwent cesarean section at different weeks showed no significant differences in maternal outcomes (age, gravida, parity, maternal diabetes mellitus (DM), maternal hypertension (HT), preop Hgb, postop Hgb, duration of surgery, need for transfusion, and duration of maternal hospitalization). After comparing newborn outcomes across the groups, we found no significant difference between those with a 5-minute newborn Apgar score below 7. However, there was a significant difference between the birth weight groups (2819±32.5 vs. 3052±27.6 vs. 3310±36.4) ($p<0.001$) (Table 2). Post hoc Tukey test

TABLE 1: Demographic and clinical characteristics in patients with PP.

		Median (minimum-maximum)
Age		36 (21-45)
Gravida		3 (1-11)
Parity		1 (0-9)
Duration of surgery (min)		59.6 (25-240)
Maternal hospitalization (days)		2 (1-14)
		$\bar{X}$±SD
Preop Hgb (g/dL)		11.7±1.44
Postop Hgb (g/dL)		11.03±1.56
		n (%)
Previous PP history		2 (0.5)
Significant vaginal bleeding		51 (11.8)
Anesthesia type	Spinal anesthesia	224 (52)
	General anesthesia	207 (48)
Transfusion		73 (16.9)
Neonatal intensive care unit admission rate		77 (17.9)

PP: Placenta previa; Hgb: Hemoglobin; SD: Standard deviation.

TABLE 2: Demographic and clinical characteristics of placenta previa patients according to different birth weeks.

Parameters	36 (n=127)	37 (n=201)	38 (n=103)	p-value $\bar{X}$±SD
Age	35±5	36±4	34±5	0.387[α]
Preop Hgb (g/dL)	11.6±0.13	11.8±0.09	11.9±0.13	0.228[α]
Postpartum Hgb (g/dL)	11±0.13	11.1±0.11	11±0.14	0.797[α]
Duration of surgery (min)	62±25	59±16	56±13	0.060[α]
Birth weight	2819±32.5	3052±27.6	3310±36.4	<0.001[α]
Z score (fetal growth restriction)	0.13±0.09	0.20±0.07	0.38±0.09	0.207[α]
				Mean (minimum-maximum)
Gravida	3 (1-11)	3 (1-9)	3 (1-10)	0.162[α]
Parity	1 (0-9)	1 (0-6)	1 (0-4)	0.324[α]
Maternal hospitalization (days)	2 (1-10)	2 (1-14)	2 (1-10)	0.687[α]
				n (%)
Maternal diabetes mellitus	9 (7.1%)	12 (6%)	3 (2.9%)	0.368[γ]
Maternal hypertension	2 (1.6%)	1 (0.5%)	0	0.324[γ]
Transfusion	27 (21.3%)	30 (14.9%)	16 (15.5%)	0.300[γ]
5 min APGAR <7	19 (15%)	23 (11.4%)	8 (7.8%)	0.237[γ]
Neonatal intensive care unit admission rate	37 (29.1%)	35 (17.4%)	5 (4.9%)	<0.001[γ]

[α]ANOVA test median (min-max), mean (±); [γ]Chi-square; Hgb: Hemoglobin; The Z score is a parameter used to objectively determine how much the fetus's development deviates from the expected norms for the given gestational age. APGAR: Activity and muscle tone Pulse (heart rate) Grimace response (medically known as "reflex irritability") Appearance (skin coloration) Respiration; SD: Standard deviation.

showed big differences in all pairs between 36, 37, and 38 weeks of pregnancy (p<0.001 between 36 and 37 weeks, p<0.001 between 36 and 38 weeks, and p<0.001 between 37 and 38 weeks). There was a significant difference between the groups in NICU hospitalizations at 36 weeks (29.1%) versus 37 weeks (17.4%) and 38 weeks (5.9%) (p<0.001) (Table 2). Post hoc Tukey test results showed significant differences in all couples between 36, 37, and 38 weeks of gestation (p: 0.016 between 36 and 37 weeks, p<0.001 between 36 and 38 weeks, and p=0.016 between 37 and 38 weeks). During the study period, no cesarean hysterectomy, maternal intensive care admission, relaparotomy, or maternal death due to PP was observed.

After excluding cases with significant vaginal bleeding and evaluating only the groups undergoing elective cesarean sections, we found that 105 patients underwent cesarean sections at 36 weeks, 177 at 37 weeks, and 98 at 38 weeks. There was no significant difference between the groups in terms of maternal age, gravida, parity, maternal DM, maternal HT, preoperative Hgb, postoperative Hgb, operative time, and transfusion requirement. However, postoperative maternal hospitalization of the patients was significantly different between the groups (p<0.001). As a result of the Mann-Whitney U test performed to determine the difference between the groups, it was observed that there was no difference between the hospitalization periods of mothers who gave birth in the 36th and 37th weeks (p=0.128), while the hospitalization periods of mothers who gave birth in the 38th weeks were shorter than both mothers who gave birth in the 36th (p<0.001) and 37th weeks (p=0.008). Upon comparing the neonatal outcomes between the groups, we found no significant difference among those with 5-minute neonatal Apgar scores below 7. However, a significant difference was observed between the groups regarding birth weight and NICU admissions (p<0.001). After the post-hoc Tukey test performed after the birth weight difference, there were large differences in all couples between 36, 37, and 38 weeks of gestation [p<0.001 between 36-37 weeks, p<0.001 between 36-38 weeks, and p<0.001 between 37-38 weeks. In the post-hoc Tukey analysis performed due to the difference between NICU admissions, there was a significant difference between 36, 37, and 38 weeks of gestation in all couples (p=0.002 between 36-37 weeks, p<0.001 between 36-38 weeks, and p=0.029 between 37-38 weeks)] (Table 3).

TABLE 3: Demographic and clinical characteristics of placenta previa patients, excluding patients with significant vaginal bleeding, based on different weeks of delivery.

Parameters	36 (n=105)	37 (n=177)	38 (n=98)	p-value X̄±SD
Age	36±5	36±5	35±6	0.263[α]
Preop Hgb (g /dL)	11.6±0.15	11.8±0.10	11.9±0.14	0.361[α]
Postpartum Hgb (g /dL)	11±0.14	11.1±0.11	10.9±0.15	0.797[α]
Duration of surgery (min)	60±25	60±17	60±14	0.151[β]
Birth weight	2830±35.4	3060±28.8	3330±37.7	<0.001[α]
Z score (fetal growth restriction)	0.17±0.10	0.22±0.08	0.40±0.09	0.257[α]
				Mean (minimum-maximum)
Gravida	3 (1-11)	3 (1-7)	3 (1-10)	0.115[β]
Parity	1 (0-9)	1 (0-6)	1 (0-4)	0.450[β]
Maternal hospitalization (days)	2 (1-10)	2 (1-14)	2 (1-10)	<0.001[α]
				n (%)
Maternal diabetes mellitus	9 (8.6%)	10 (5.6%)	3 (3.1%)	0.242[γ]
Maternal hypertension	2 (1.9%)	1 (0.6%)	0	0.278[γ]
Transfusion	20 (19%)	27 (15.3%)	15 (15.3%)	0.673[γ]
5 min APGAR <7	17 (16.2%)	18 (10.2%)	8 (8.2%)	0.158[γ]
Neonatal intensive care unit admission rate	33 (31.4%)	28 (15.8%)	4 (4.1%)	<0.001[γ]

[α]ANOVA test median (min-max), mean (±), [β]Kruskal-Wallis test median (min-max); [γ]Chi-square; Hgb: Hemoglobin; The Z score is a parameter used to objectively determine how much the fetus's development deviates from the expected norms for the given gestational age. APGAR: Activity and muscle tone Pulse (heart rate) Grimace response (medically known as "reflex irritability") Appearance (skin coloration) Respiration; SD: Standard deviation.

Demographic and clinical characteristics of PP patients with significant vaginal bleeding were compared according to different gestational weeks (36, 37, and 38 weeks).there was no statistically significant difference between the groups in terms of age, preoperative Hgb, postoperative Hgb, duration of surgery, gravida, parity, and maternal hospitalization time (all p>0.05). However, a significant difference was observed in terms of birth weight (p=0.032); birth weight was higher in the 38th week group than in the other groups. The rates of maternal DM and maternal HT were low, and no significant difference was observed between the groups (p=0.310 and p=1.000, respectively). Similarly, no significant difference was observed between the groups in terms of transfusion rates (p=0.281), 5-minute Apgar <7 (p=0.336), and NICU admission rates (p=0.668) (Table 4).

When evaluating patients requiring blood transfusion based on gestational weeks, no statistically significant difference was observed between the groups in terms of preoperative Hgb, postoperative Hgb, and red blood cell transfusion requirements (p>0.05) (Table 5).

DISCUSSION

This study demonstrated that, except in significant vaginal bleeding, patients with PP can safely postpone birth until the 38th week of pregnancy without compromising maternal or neonatal outcomes.

No official standarts exist about the ideal delivery timing in PP. The 2019 SMFM and 2021 ACOG recommendations are for cesarean delivery at 36+0 to 37+6 weeks' gestation for pregnancies with uncomplicated PP.[16,19] Therefore, when assessing the delivery timing for patients with PP, the current evidence should be reviewed, and the maternal-fetal risks linked to prolonging the pregnancy (such as severe hemorrhage and emergency unplanned delivery) should be weighed against the neonatal risks associated with preterm birth within this gestational age range.[20]

Pregnancies complicated by PP are linked to maternal and perinatal morbidity. Maternal morbidity associated with PP primarily involves complications connected to prepartum and/or postpartum bleeding.[21]

TABLE 4: Demographic and clinical characteristics of placenta previa patients, with significant vaginal bleeding, based on different weeks of delivery.

Parameters	36 (n=22)	37 (n=24)	38 (n=5)	p-value X̄±SD
Age	34±8	35±6	35±6	0.525[β]
Preop Hgb (g /dL)	11.4±1.50	11.8±1.42	10.8±1.98	0.902[β]
Postpartum Hgb (g /dL)	11.05±1.43	11.4±1. 38	10.9±1.57	0.631[β]
Duration of surgery (min)	60±26	55±13	54±13	0.126[β]
Birth weight	2825±386	3045±454	3150±202	0.032[β]
Z score (fetal growth restriction)	0.22±1.16	0.25±1.28	0.17±0.55	0.914[β]
				Mean (minimum-maximum)
Gravida	3 (1-5)	3 (1-9)	2 (1-3)	0.365[β]
Parity	1 (0-4)	2 (0-4)	1 (1-3)	0.342[β]
Maternal hospitalization (days)	2 (1-5)	2 (1-6)	2 (1-3)	0.213[β]
				N (%)
Maternal diabetes mellitus	0	2 (8.3%)	0	0.310[γ]
Maternal hypertension	0	0	0	
Transfusion	7 (31.8%)	3 (12.5%)	1 (9.1%)	0.281[γ]
5 min APGAR <7	12 (54.4%)	10 (41.7%)	1 (20%)	0.336[γ]
Neonatal intensive care unit admission rate	4 (18.2%)	7 (29.2%)	1 (20%)	0.668[γ]

[β]Kruskal-Wallis test median (min-max), mean (±); [γ]Chi-square; Hgb: Hemoglobin; The Z score is a parameter used to objectively determine how much the fetus's development deviates from the expected norms for the given gestational age. APGAR: Activity and muscle tone Pulse (heart rate) Grimace response (medically known as "reflex irritability") Appearance (skin coloration) Respiration; SD: Standard deviation.

TABLE 5: Preoperative and postoperative hemoglobin levels and transfusion amounts of patients who received red blood cell transfusion: Comparison of 36, 37, 38 weeks' gestation groups.

Parameters	36 (n=27)	37 (n=30)	38 (n=16)	p-value X̄±SD
Preop Hgb (g/dL)	9.6±1.1	10.4±2.2	9.2±1.2	0.224[β]
Postpartum Hgb (g/dL)	8.6±1.6	11.9±0.2	8.7±1	0.364[β]
Red blood cell transfusion (unit)	2±1	2±1	2±1	0.786[β]

[β]Kruskal-Wallis test median (min-max), Hgb: Hemoglobin; SD: Standard deviation.

Due to their propensity to experience bleeding, individuals with PP have a higher likelihood of receiving blood transfusions and undergoing postpartum hysterectomy. During a study on primary cesarean section births for PP (excluding PAS), it was shown that the likelihood of requiring a red blood cell transfusion was nearly four times higher, and the likelihood of needing a hysterectomy was more than five times higher, compared to cases without previa.[11,22] The incidence of maternal death related to PP is significantly reduced in nations with abundant resources.[23] Nevertheless, in economically disadvantaged nations, maternal death rates continue to be elevated due to prevalent factors such as maternal anemia, limited access to medical resources, and a higher prevalence of home births.[24] Pregnants with PP frequently experience severe complications and death due to a rapid and substantial loss of blood volume within the blood vessels. This leads to instability in the body's circulation, low levels of oxygen in the blood, inadequate oxygen supply to tissues and organs, organ damage, and ultimately, death. None of the cases in our study groups had a hysterectomy or a maternal death.

In the study conducted by Erfani et al., which included 140 patients diagnosed with PP and undergoing emergency and planned cesarean delivery (between 32-37 weeks), maternal outcomes such as blood transfusion, additional surgical intervention, and composite maternal morbidity were found to be similar between the groups.[25] One arm of the study

by Durukan et al. looked at 135 women who underwent Caesarean sections for PP, both in emergency and elective settings. They found that women who had surgery in an emergency situation had significantly lower Hgb levels before surgery, needed more blood transfusions, and were hospitalized for longer.[26] Zlatnik et al. used a decision analysis model to compare different delivery strategies between 34 and 38 weeks for women with PP and PP accreta, considering both maternal and neonatal outcomes. In this model, adverse maternal outcomes such as postpartum hemorrhage, the need for hysterectomy and blood transfusion, and maternal death increased with increasing gestational age. They concluded that in pregnancies complicated by PP, delivery at 36 weeks before by steroid administration was the best strategy that generally optimized both maternal and fetal health. However, this statistical model had a certainty level of roughly 78% in determining that delivery before 37 weeks was ideal.[27] In our study, it was concluded that patients diagnosed with PP can wait until the 38th week of pregnancy unless an emergency situation such as vaginal bleeding occurs. This may be due to the fact that, unlike the studies of Zlatnik et al., placenta accreta cases with PP were not included in our study. In addition, since PP cases were managed similarly by the same team as emergency and planned, no difference may have been observed between the groups in terms of preoperative and postoperative Hgb levels, blood transfusion, and surgery duration.[27] Schwartz et al. conducted a study involving 251 patients diagnosed with PP, assessing maternal and neonatal outcomes by comparing planned cesarean delivery with expectant management at gestational weeks 36 to 38. The study concluded that the optimal delivery time for uncomplicated PP is between 38 and 39 weeks.[28] In our study, no significant difference was found in maternal outcomes between births at different weeks. This finding is consistent with the results of the study by Schwartz et al. and shows that maternal complications can be kept under control regardless of the week of birth. Since PP birth planning in our clinic is planned between 36 and 38 weeks except for emergencies and it is a retrospective study, unlike Schwartz et al., it was concluded that waiting until 38 weeks is safe.[28]

In our study, when the group undergoing cesarean section due to vaginal bleeding was included or excluded, there were differences between the groups in terms of neonatal birth weights and NICU admission rates. As Lal and Hibbard stated, the reason for this increased neonatal morbidity may be related to the gestational age and birth weight of the newborn rather than the maternal condition of PP.[15] It is in the result, we observed that the rates of admission to the NICU were higher in those who gave birth at 36 weeks compared to those who gave birth at 37 and 38 weeks. Balayla et al. also found that, outside of maternal indications, delivering a baby at 37 or 38 weeks in cases of PP resulted in less difficulties for the newborn compared to delivering at 35 or 36 weeks.[29] This can be explained by the fact that the morbidity rate is higher in babies born in the late preterm period compared to babies born at full term (37 weeks and above) due to the relative lack of physiological and metabolic maturation.[30-33]

It is mentioned in the literature that immediate delivery should be preferred in cases of PP that develop vaginal bleeding at or after 34 weeks because unpredictable catastrophic bleeding may occur based on clinical factors.[34] When we included all groups in our study, bleeding led to the cesarean section of 51 (11.8%) patients. Among these case groups, the rate of cesarean section due to vaginal bleeding was higher at 36 weeks compared to 38 weeks. Our findings, as in the previous study, support the idea that vaginal bleeding may be an effective factor that may cause preterm birth in pregnancies complicated by PP.[35]

We acknowledge several limitations and potential biases in our retrospective study. We selected the patients, despite their diverse demographic backgrounds, from a tertiary hospital in a specific geographic area. Furthermore, because a team of experts in this field managed the PP cases, we cannot generalize the results to the entire population.

CONCLUSION

This study has shown that delivery can be safely delayed until the 38th week of pregnancy in PP patients, except in significant vaginal bleeding. The findings

support the feasibility of more flexible and safer approaches to pregnancy management and delivery timing in experienced centers specializing in PP management. Since our study was conducted in a tertiary university hospital receiving referrals, the history and frequency of antepartum hemorrhage, which may lead to missing data, could not be reported because some of the patients were not followed up in our hospital. However, considering the limited sample size, single-center design, and scale of the current study, larger, more comprehensive studies are needed to confirm our findings.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Huriye Ezveci, Şükran Doğru;* ***Design:*** *Huriye Ezveci, Ali Acar;* ***Control/Supervision:*** *Ali Acar;* ***Data Collection and/or Processing:*** *Huriye Ezveci, Fikriye Karanfil Yaman;* ***Analysis and/or Interpretation:*** *Huriye Ezveci, Şükran Doğru;* ***Literature Review:*** *Huriye Ezveci, Şükran Doğru, Fikriye Karanfil Yaman;* ***Writing the Article:*** *Huriye Ezveci;* ***Critical Review:*** *Şükran Doğru;* ***References and Fundings:*** *Huriye Ezveci, Şükran Doğru, Fikriye Karanfil Yaman;* ***Materials:*** *Huriye Ezveci, Şükran Doğru, Fikriye Karanfil Yaman.*

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