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ORIGINAL

Evaluation of 10-year anesthesia management in patients diagnosed with placenta accreata spectrum and placenta previa: A comparative study

Evaluación del manejo anestésico a 10 años en pacientes diagnosticadas de placenta accreata spectrum y placenta previa: Un estudio comparativo

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Summary

Objective: In this study, we aimed to evaluate anesthesia management of placenta accreta spectrum disorder and placenta previa who had undergone cesarean section.

Materials and methods: The patients were allocated into 2 groups: group 1: general anesthesia, and group 2: spinal anesthesia. Age, gestational age, gravida, parity, previous cesarean section number, anesthesia method applied, preoperative hemoglobin, platelet counts, and postoperative hemoglobin values were recorded. Transfusion applications (erythrocyte suspension, fresh frozen plasma), use of colloid, tranexamic acid, and fibrinogen concentrate were recorded.

Results: The mean age of the patients was 32.53±5.35 years. However, the mean number of gravida was 5.20±2.33 and the mean parity number was 3.50±1.92. The preoperative mean hemoglobin value of the pregnant women was 11.28±1.62 g/dL, and the mean postoperative hemoglobin value was 9.62±1.43 g/dL. The mean number of previous cesarean sections of the pregnant women was found to be 2.31±1.03. Patients who underwent spinal anesthesia required less erythrocyte suspension transfusion (80.2% vs 38.9%) (p<0.001). While the rate of hysterectomy in group 2 was 3.7%, hysterectomy had to be performed in 20.6% of the patients in group 1 (p<0.001). There was no statistical difference between the groups in terms of DIC development and acute renal failure (p>0.05). Intraoperative total complications were found to be lower in the spinal anesthesia group (OR: 5.7) (p<0.001). The need for tertiary intensive care was found to be lower in the spinal anesthesia group (p<0.001). No statistically significant difference in terms of mortality.

Conclusions: Regardless of which anesthesia technique is used in pregnant women with placenta previa or placenta accreta spectrum diagnosis, it should be kept in mind that serious bleeding may occur during or after cesarean section and that a team should be able to reach the necessary blood and blood products for this.

Key words: Spectrum Disorder of Placenta Accreta, Placenta Previa, Anesthesia management, Transfusion of blood products, Need for intensive care.

Resumen

Objetivo: En este estudio, nos propusimos evaluar el manejo anestésico del trastorno del espectro de la placenta acreta y la placenta previa sometidas a cesárea.

Materiales y métodos: Las pacientes fueron asignadas a 2 grupos: grupo 1: anestesia general, y grupo 2: anestesia raquídea. Se registraron la edad, la edad gestacional, la gravidez, la paridad, el número de cesáreas previas, el método de anestesia aplicado, la hemoglobina preoperatoria, el recuento de plaquetas y los valores de hemoglobina postoperatoria. Se registraron las aplicaciones de transfusiones (suspensión eritrocitaria, plasma fresco congelado), el uso de coloide, ácido tranexámico y concentrado de fibrinógeno.

Resultados: La edad media de las pacientes fue de 32,53±5,35 años. Sin embargo, el número medio de grávidas fue de 5,20±2,33 y el número medio de partos fue de 3,50±1,92. El valor medio de hemoglobina preoperatoria de las embarazadas fue de 11,28±1,62 g/dL, y el valor medio de hemoglobina postoperatoria fue de 9,62±1,43 g/dL. El número medio de cesáreas previas de las embarazadas fue de 2,31±1,03. Las pacientes sometidas a anestesia raquídea necesitaron menos transfusiones de suspensión eritrocitaria (80,2% frente a 38,9%) (p<0,001). Mientras que la tasa de histerectomía en el grupo 2 fue del 3,7%, hubo que realizar una histerectomía en el 20,6% de las pacientes del grupo 1 (p<0,001). No hubo diferencias estadísticas entre los grupos en cuanto al desarrollo de CID e insuficiencia renal aguda (p>0,05). Las complicaciones intraoperatorias totales fueron menores en el grupo de anestesia raquídea (OR: 5,7) (p<0,001). La necesidad de cuidados intensivos terciarios fue menor en el grupo de anestesia raquídea (p<0,001). No hubo diferencias estadísticamente significativas en términos de mortalidad.

Conclusiones: Independientemente de la técnica anestésica que se utilice en gestantes con diagnóstico de placenta previa o placenta accreta spectrum, debe tenerse en cuenta que puede producirse una hemorragia grave durante o después de la cesárea y que un equipo debe ser capaz de alcanzar la sangre y hemoderivados necesarios para ello.

Palabras clave: Trastorno del espectro de la placenta acreta, Placenta previa, Manejo anestésico, Transfusión de hemoderivados, Necesidad de cuidados intensivos.

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Introduction

According to the quantity of prior cesarean sections, the prevalence of placental adhesion and localization anomalies rose in subsequent pregnancies. Previously uncommon, this pathological condition is now seen frequently by obstetricians and gynecologists. The proper clinical management, medical, and particularly surgical treatment approaches for placental adhesion and location anomalies that raise maternal and fetal morbidity and mortality are crucial to know[1,2].

Anesthesia management of patients with placental invasion anomalies is specific. Prolonged surgical time due to placental anomaly, surgical complications, and deterioration of hemodynamic balance as a result of massive bleeding bring anesthesia management to the fore. Placenta previa is defined as the placement of the placenta in the lower segment of the uterus. As we mentioned above, the prevalence of placenta previa has increased in parallel with the recent increase in cesarean section surgery and constitutes approximately 0.5% of all pregnancies. Placental invasion anomalies can occur in three ways[3].

In their subsequent pregnancies, women who have previously delivered by cesarean section (C/S) should be evaluated for placenta previa and placenta attachment anomalies. It is crucial that women who have suspected placentation anomalies give birth in facilities where obstetric hemorrhage can be properly managed and under the care of clinicians who are knowledgeable about the surgical treatment options for obstetric hemorrhage[4].

In this study, we aimed to retrospectively evaluate the anesthesia management of cases diagnosed with preoperative or intraoperative placenta previa and placenta accreta spectrum (PAS) disorder anomaly, who had undergone cesarean section in our hospital.

Materials and methods

Study design

This study was designed retrospectively. Ethical approval was obtained from Dicle University. A total of 631 patients with a prediagnosis of placenta previa totalis and placenta accreta spectrum disorder in elective or emergency cesarean sections performed in the operating room of Dicle University Medical Faculty Hospital between January 2010 and December 2020 were included in our study. Patients who underwent general anesthesia were Group 1 (n=253); patients who underwent spinal anesthesia were defined as Group 2 (378). Observation files and electronic data of the patients were scanned retrospectively through the hospital computer system.

The patients' age, gravida, parity, gestational age, number of previous cesarean sections, the anesthesia method applied, and whether they were emergency/elective were reported. Preoperative hemoglobin, platelet, and postoperative hemoglobin values of the patients were recorded. The amount of erythrocyte suspension and fresh frozen plasma (FFP) used was recorded. In addition, the use of colloid, tranexamic acid, and fibrinogen applications were reported. Complications that developed in the perioperative period, length of stay in the tertiary intensive care unit, and whether mortality developed or not were determined. The mean weight and mean week of the birth of the babies were recorded.

Inclusion criteria

Patients who were diagnosed with previa/accreta, aged 16-55, delivered by cesarean section, and had a single or twin pregnancy were included in the study.

Exclusion criteria

Patients with a lack of data in their observation files or hospital information system were excluded from the study.

Statistical analysis

SPSS (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) program was used for statistical analysis, and type I error level was accepted as 5% in statistical analysis. The conformity of continuous variables to the normal distribution was examined using the Shapiro-Wilk test. Continuous variables using mean ± standard deviation (min - max) values; Categorical variables were expressed as n (%). In comparisons between groups according to the results of the normality test; Normally distributed data were analyzed using Student's t-test and non-normally distributed data were analyzed using Mann Whitney U test. Categorical variables were analyzed using the chi-square test and Fisher's exact chi-square test. The relationship between the number of cesarean sections and blood transfusion was examined by correlation analysis, and the Spearman correlation coefficient was calculated.

Results

The mean age of the patients was 32.53±5.35 years. However, the mean number of gravida was 5.20±2.33 and the mean parity number was 3.50±1.92 in the patients included in our study. The mean weight of the babies born was 2566.65±658.65 g and the mean week of delivery was 34.85±3.12. The preoperative mean hemoglobin value of the pregnant women was 11.28±1.62 g/dL, and the mean postoperative hemoglobin value was 9.62±1.43 g/dL. The mean number of previous cesarean sections of the pregnant women was found to be 2.31±1.03. It is seen that 55.50% of 631 patients received a blood transfusion. It was determined that fibrinogen concentrate was used in 5.90% of the patients included in the study, and tranexamic acid was used in 5.10%.

Among 631 patients diagnosed with placenta previa and accreta spectrum disorder, 28 patients in need of 3rd-level intensive care were seen, and the average intensive care unit stay of these patients was 4.5 days. When examined in terms of hysterectomy, it was seen that 10.50% of the patients had hysterectomies. In terms of complications, 4.80% had bladder rupture, 0.30% hypogastric artery injury, 0.30% bladder and ureter injury, 0.20% bladder, and bowel injury, and Ureteral injury was observed in 0.20%. It was determined that 4.40% of the patients needed tertiary intensive care. It was observed that 0.80% of the patients participating in the study had DIC and 0.50% had ARF 26. In addition, the incidence of DIC was 3.20% and the rate of ARF was 1.10% in patients with 4 or more blood transfusions (**Table I**).

Patients who underwent spinal anesthesia required less erythrocyte suspension transfusion (80.2% vs 38.9%) (p<0.001). While the rate of hysterectomy in group 2 was 3.7%, hysterectomy had to be performed in 20.6% of the patients in group 1 (p<0.001). There was no statistical difference between the groups in terms of DIC development and acute renal failure (p>0.05). Intraoperative total complications were found to be lower in the spinal anesthesia group (OR: 5.7) (p<0.001). The need for tertiary intensive care was found to be lower in the spinal anesthesia group (p<0.001). No statistically significant difference in terms of mortality. The relevant data was summarized in **table II**.

Discussion

This study was carried out by retrospectively screening 631 patients with a prediagnosis of placenta previa and placenta accreta spectrum disorder as the elective or emergency cesarean section between 2010 and 2020. Demographic data of patients, cesarean section numbers, gestational age, parity, gravida, anesthesia method applied, preoperative/postoperative hemoglobin and preoperative platelet values, transfusion applications (erythrocyte suspension, fresh frozen plasma), fluid management, tranexamic acid, fibrinogen concentrate applications, the length of stay in the intensive care unit and the complications that developed in the perioperative period were investigated.

In the literature, studies on placenta previa and placenta accreta spectrum disorders indicate that age is an important risk factor. In the study of Karapınar et al, the mean age of patients with placenta previa was found to be 31.4±5.3[5]. Taşgöz et al. found the mean age of

Table I: Patients characteristics.

	n=631 (%)
Age (year)	32,5±5,3 (16-49)
Gravida	5,2±2,3 (1-6)
Parity	3,5±1,9 (0-12)
Preoperative hemoglobin (g/dl)	11,2±1,62 (5,5-15,3)
Postoperative hemoglobin (g/dl)	9,6±1,4 (7-21,40)
Number of Cesarian section	2,3±1,0 (0-6)
Cesarian history	628 (99.5%)
Cesarian status *Emergency* *Elective*	 311 (49.3%) 320 (50.7%)
Birth weight (gram)	2566,6±658,6 (200-4110)
Birth week	34,8±3,1 (19-40)
Blood transfused patients	350 (55,5)
Those given fibrinogen concentrate	37 (5,9)
Those given tranexamic acid	32 (5,1)
Blood transfusion (unite)	1,6±2,0 (0-12)
Colloid	0,5±0,8 (0-5)
Fresh frozen plasma	0,7±1,6 (0-11)
Hysterectomy	66 (10,5)
Complications *Bladder rupture* *Hypogastric artery injury* *Bladder and ureter injury* *Bladder and bowel injury* *Ureteral injury*	 30 (4,8) 2 (0,3) 2 (0,3) 1 (0,2) 1 (0,2)
DIC	5 (0,8)
Acute renal failure (ARF)	3 (0,5)
Need for intensive care (n)	28 (4,4)
Number of intensive care hospitalization days	6,9±5,9 (2-24)

** The data was given n(%) or mean±SD (range)

patients diagnosed with placenta previa as 31.7±5.34 in another study[6]. Seyhan et al. found the mean age of the patients as 32.5±4.20 in their study[7]. In our study, the mean age was found to be 32.5±5.3. The data in our study support previous studies.

Placenta previa and placenta accreta spectrum (PAS) disorder are the most important causes of massive obstetric hemorrhage, maternal and fetal mortality, and morbidity; It is seen at a rate of 0.48% and is fatal at a rate of 0.03%[8]. No mortality was detected in our study. It is stated that the incidence of placental adhesion anomaly increases in pregnant women with a history of previous cesarean section and diagnosed with placenta previa. In this study, it was determined that 628 (99.5%) of 631 women with a diagnosis of placenta previa and invasion had undergone previous cesarean sections.

In a study by Panigrahi et al; 89% of pregnant women with PAS disorder and placenta previa had a postpartum hysterectomy[9]. In our study, a hysterectomy (10.5%) was performed in 66 of 631 patients with a prediagnosis of PAS disorder and placenta previa. The low rate of hysterectomy was attributed to the surgical team's preference for fertility-preserving surgery and the experience of the team.

In the study by Panigrahi et al., 62 (46%) of 136 women were given erythrocyte suspension and 23 fresh frozen plasma among patients with placenta accreta spectrum disorder and placenta previa[9]. In another study by Seyhan et al. including 61 patients, erythrocyte suspension was given to 13 patients[7]. Erythrocyte suspension and 173 fresh frozen plasma were given to 350 patients (50.5%) out of 631 patients included in our study. The proportional blood donation rate is in line with the literature.

In a study by Binici et al., the incidence of erythrocyte transfusion and administration of tranexamic acid and human fibrinogen concentrate in patients who underwent general anesthesia was found to be significantly higher than in other patients[10]. In our study, it was observed that more erythrocyte suspension and more fibrinogen concentrate were given to patients who were administered general anesthesia compared to regional anesthesia.

Tranexamic acid has been shown to be effective in reducing the incidence of blood loss greater than 1000 ml in 1534 women who have had a previous cesarean section. The authors of the Cochrane review on the use of tranexamic acid in the prevention of postpartum hemorrhage concluded that further studies are needed to investigate the risk of serious adverse events. One study concluded that high-dose tranexamic acid may reduce blood loss, decrease Hgb, and the need for blood transfusion[11]. Ducloy et al. conducted the first study showing that the use of tranexamic acid reduces post-partum bleeding[12]. In our study, it was observed that the use of tranexamic acid did not reduce blood transfusion. This was attributed to the use of tranexamic acid after blood replacement.

Table II: Comparison of the groups.

	Group 1 (n=253)	Group 2 (n=378)	P-value
Age (year)	32,3±5,3 (17-49)	32,6±5,3 (16-45)	0,343
Gravida	5,2±2,1 (1-14)	5,14±2,41 (1-16)	0.053
Parity	3,5±1,8 (0-9)	3,49±1,96 (0-12)	0.421
Preoperative hemoglobin (g/dl)	10,8±1,7 (5,5-15,1)	11,57±1,49 (7-15,3)	**<0.001**
Postoperative hemoglobin (g/dl)	9,3±1,4 (7-21,4)	9,7±1,3 (7-14,1)	**<0.001**
Number of Cesarian section	2,3±1,1 (0-5)	2,2±0.9 (0-6)	0.472
Cesarian status *Emergency* *Elective*	 149 (58,9) 104 (41,1)	 162 (42,9) 216 (57,10)	**<0.001**
Birth weight (gram)	2464±737 (200-4110)	2634±591 (400-3900)	**0.006**
Birth week	34,2±3,6 (19-40)	35,2±2,6 (20-40)	**<0.001**
Blood transfused patients	203 (80,2)	147 (38,9)	**<0.001**
Those given fibrinogen concentrate	28 (11,1)	9 (2,4)	**<0.001**
Those given tranexamic acid	11 (4,3)	21 (5,6)	0.498
Blood transfusion (unite)	2,6±2,1 (0-12)	0,9±1,5 (0-12)	**<0.001**
Colloid	0,5±0,9 (0-5)	0,4±0,7 (0-4)	0.602
Fresh frozen plasma	1,3±1,8 (0-9)	0,4±1,3 (0-11)	**<0.001**
Hysterectomy	52 (20,6)	14 (3,7)	**<0.001**
Complications	28 (11,1)	8 (2,1)	**<0.001**
DIC	4 (1,6)	1 (0,3)	0.163
Acute renal failure (ARF)	4 (1,6)	0	0.064
Need for intensive care (n)	25 (9,9)	3 (0,8)	**<0.001**
Number of intensive care hospitalization days	6 (2-24)	3 (3-5)	0.391
Mortalite	0	0	1.000

** The data was given n(%) or mean±SD (range)

In the anesthesia management of pregnant with placenta previa and placenta accreta spectrum disorder, including 92 patients, Binici et al. 61 (66%) of 92 patients were administered general anesthesia and 31 (34%) spinal anesthesia[10]. In our study, placenta previa and placenta accreta spectrum disorder were administered. General anesthesia was applied to 253 (40.1%) patients and spinal anesthesia was applied to 378 (59.9%) patients under anesthesia management. However, regional techniques are being used more and more[13,14]. However, patients undergoing regional anesthesia should be warned that it may require a transition to general anesthesia depending on the severity of bleeding and the course of the operation in the intraoperative period[15,16].

The literature shows that regional anesthesia may be a better option than general anesthesia, as inhaled anesthetics used in the induction of general anesthesia in patients undergoing surgery for placenta previa cause relaxation in the uterus, thus causing more blood loss and the need for more blood and blood products[17-19]. In the study conducted by Binici et al., they found that intraoperative blood loss, the need for hospitalization in the postoperative intensive care unit, and the length of stay in the postoperative intensive care unit were significantly higher in patients who underwent general anesthesia compared to those who received other regional anesthesia[10]. In another study, a total of 122 patients with placental invasion and localization anomalies were evaluated retrospectively over a period of 18 years, and it was suggested that regional block could be successfully applied in these patients[20]. In our study, it was found that patients who underwent spinal anesthesia had less use of blood products. Additionally, we found fewer complications in the spinal anesthesia group.

Conclusions

Better outcomes were found in the spinal anesthesia group. Regardless of which anesthesia technique is used in pregnant women with placenta previa or placenta accreta spectrum diagnosis, it should be kept in mind that serious bleeding may occur during or after cesarean section and that a team should be able to reach the necessary blood and blood products for this.

Conflict of Interest

The authors declared that there is no conflict of interest.

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