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ORIGINAL ARTICLE

Effect of Uterine Artery Ligation Prior to Uterine Incision in Cases of Placenta Previa Complete Centralis

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Abstract

Background: ***A hemorrhage of above 500 mL or a cesarean section with more than 1000 mL within 24 hours of delivering a fetus is considered a postpartum hemorrhage (PPH).***

Aim and objectives: ***To determine whether or not uterine artery ligation reduced blood loss following caesarean surgery.***

Patients and methods: ***This prospective interventional case control research included 60 subjects with Antenatal diagnosis of placenta previa who were selected from attendees of Obstetrics and Gynecology clinics of Al Azhar University Hospitals.***

Results: ***There was no significant variation among the two groups as regards preoperative hemoglobin level, operative time, postoperative, hemoglobin levels, and need for blood transfusion p>0.05, but there was significant variation as regards intraoperative blood loss p= 0.01704.***

Conclusion: ***Ligating the uterine artery before making the uterine incision affects the amount of blood loss after a caesarean section in cases of placenta previa complete centrally. In patients who have central placenta previa and are scheduled to undergo elective CS, ligating the uterine artery before making the uterine incision might be an efficient way to lower the amount of blood lost during surgery.***

Keywords: Uterine Artery; Ligation Placenta Previa; Hemorrhage

1. Introduction

When placental tissue is incorrectly positioned within the lower uterine segment, a condition known as placenta previa can develop. It is unclear what exactly causes this life-threatening illness. Scarring of the uterus, however, raises concerns.[1] In addition to advanced mother age, high parity, a previous history of placenta previa, and congenital uterine anomalies, placenta previa is a risk factor when pregnant. Estimates put the incidence of placenta previa at 5.2 per 1000 births.[2]

Higher rates of postpartum hemorrhage, blood transfusion, and further surgeries, including devascularization and emergency hysterectomy, are all linked to placenta previa. Premature birth, low Apgar scores, admission to the neonatal intensive care unit (NICU), stillbirth, and newborn death are all more common among babies born to mothers with placenta previa.[3]

A hemorrhage of above 500 milliliters or a cesarean section with over 1000 milliliter within 24 hours of delivering a fetus is considered postpartum hemorrhage (PPH). One of the leading causes of maternal mortality, its clinical signs include hypotension, vaginal bleeding, and other symptoms that, in extreme circumstances, can lead to severe anemia and hemorrhagic shock. The primary cause of postpartum hemorrhage (PPH) is uterine contraction weakness, which is followed by coagulation dysfunction, placental factors, rupture of the soft birth canal, as well as other contributing variables.[4]

Types of PPH that were not successfully recovered. However, it can result in people losing their fertility and wreaking havoc on their physical and emotional health.[5]

Hemostasis is achieved through uterine artery ligation, a vascular therapy that cuts off blood flow to the uterus. Although it has its drawbacks, it is an effective treatment for (PPH).[6]

The objective of this research was to determine whether or not uterine artery ligation reduced blood loss following caesarean surgery.

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2. Patients and methods

This prospective interventional case control trail involved 60 subjects with Antenatal diagnosis of placenta previa who were selected from attendees of the Obstetrics and Gynecology clinics of Al Azhar University Hospitals. The duration of the study was from June. 2022 to Jan. 2023.

Cases were divided into two groups: Group A: Thirty individuals were treated with uterine artery ligation, and Group B: Thirty individuals were not treated with uterine artery ligation. And the number of caesarian hysterectomies in both groups was four patients in each group.

Inclusion criteria: Gestational age of 32 weeks or more, Singleton pregnancy, antenatal diagnosis of placenta previa, and elective for cesarean section.

Exclusion criteria: Emergency cesarean section, Cardiovascular diseases, Blood diseases and bleeding disorder, Pre-eclampsia or hypertension.

Methods

All cases were exposed to

Complete history taking: Details about yourself, such as your name, age, marital status, and mailing address; menstrual history: when menstruation first began, if there were any irregularities, if dysmenorrhea or other symptoms were present, etc, History Parity, Chronic diseases and their treatment in modern history, HTN and DM's past is discussed, A history of this disease or diabetes in the family, Drug or drug allergies in the past and Hirsutism laser treatment, laparoscopic surgery, and operation history.

Examination: General examination, Abdominal and local clinical examination: Abdominal inspection, Abdominal palpation: Examine for clinical indications suggestive of gastrointestinal pathology by gently palpating each of the nine abdominal regions, Abdominal percussion and Abdominal auscultation, Vulvar Examination, and Vaginal Examination. The Ultrasound machine used was (Mindray Dp20two prob).

Bimanual Examination

Adnexal masses, uterine size, and uterine type can all be ascertained with the help of a bimanual examination.

Procedure

Ligation was done before the uterine incision as follows:

Separate incisions were made into the skin and the anterior abdominal wall layers using a Pfannenstiel technique. In order to expose the lower uterine segment and mobilize the urinary bladder downward, the loose peritoneum covering the lower uterine segment was dissected. The uterine artery was ligated using No. 1 vicryl suture, which was grasped using the thumb and index finger anteriorly and posteriorly to lift the base below the site of the uterine incision. Myometrium was incorporated into the procedure without causing any harm to the uterine veins. The same steps were taken to complete the opposite side. The standard procedure involved making a curved transverse incision through the lower uterine region. When the usual incision would have passed through the placenta, doctors opted instead to make a larger incision higher in the abdomen. The birth and placenta have been delivered. Two layers of no. 1 vicryl suture are used to close the uterine incision. Anterior abdominal wall layers are closed.

Assessment of intraoperative blood loss

Our work in these circumstances involved the use of the alkaline hematin technique to assess intraoperative blood loss. [7]

Each woman had 4 ml of peripheral venous blood drawn an hour before surgery so that her hemoglobin level could be determined using the cyanmethemoglobin technique. The patient was draped in white linen, and all pads and swabs used during surgery were also made of white linen. The surgical towels, bed sheets, gauze, and blood clots were carefully gathered after the procedure and placed in a cryovac bag. The entire volume of bloody fluid inhaled was noted, and a 2 ml sample was collected for analysis. Each cryovac plastic bag containing blood-stained linen, gauze swabs, and sanitary pads was treated with 2000 ml of a 5% (W/V) sodium hydroxide solution. After 20 minutes of processing at room temperature in the Stomacher Lab Blender, the bag was removed. Simultaneously, 1 ml of the patient's peripheral venous blood was mixed with 100 ml of 5% sodium hydroxide. Following processing, a representative amount of the finished combination from both A and B was filtered, and the absorbance of the resulting clear supernatant was measured using spectrophotometry. Absorbance at 550 nm was measured, and the standard deviation from the blank (Asso) was determined. The following equation was used to determine the volume of blood in the plastic bags, which represented the total volume of blood present in the soiled linen and pads. Preparation C also included adding 100 ml of sodium hydroxide, 5%, to 1 ml of the aspirated fluid. The clear supernatant was collected after processing, and its absorbance at 550 mm was determined. The following equation was used to calculate the amount of blood in the aspirate:

The sum of the blood in each cryovac bag and the amount that was aspirated was the total blood loss that was measured.

Ethical consideration

Institutional Review Board at Al-Azhar University had been submitted the study protocol for approval. The Al-Azhar University School of Medicine Ethical Review Board gave its clearance.

Each person who took part in the study had already given their informed, written consent. All participants' anonymity and confidentiality were protected throughout the study.

3. Results

There was no significant variation among two groups regarding age, height, weight, BMI & GA p= 0.16899, 0.28698, 0.6724, 0.21014, 0.92339 correspondingly. (Table 1)

Table 1. Demographic data

GROUP	GROUP A (N = 30)	GROUP B (N = 30)	P. VALUE
AGE(YEARS)	30.13 ± 4.62	28.2 ± 6.04	0.16899
HEIGHT (CM)	165.8 ± 6.99	163.9 ± 6.7	0.28698
WEIGHT (KG)	75.23 ± 11.93	76.39 ± 9.04	0.6724
BMI(KG/M^2)	27.33 ± 3.72	28.43 ± 2.96	0.21014
GA(WKS)	34.13 ± 1.33	34.17 ± 1.34	0.92339

There was no significant variation in residence type among the 2 groups p= 0.75892. (Table 2)

Table 2. Residence of cases

RESIDENCE	GROUP A (N = 30)	GROUP B (N = 30	P. VALUE
RURAL	23 (76.67%)	24 (80%)	0.75892
URBAN	7 (23.33%)	6 (20%)	0.75892

There was no significant disparity in heart rate, blood pressure, or body temperature among the 2 groups. (Table 3)

Table 3. Clinical parameter

GROUP	GROUP A (N = 30)	GROUP B (N = 30)	P. VALUE
RR(C/MIN)	18.33 ± 3.24	16.27 ± 3.12	0.01462*
HR (BEAT /MIN)	85.5 ± 6.44	85.7 ± 6.55	0.90542
BLOOD PRESSURE (MMHG)			
• SBP	96.73 ± 8.77	96.53 ± 8.79	0.93001
• DBP	63.33 ± 8.31	63.7 ± 8.73	0.86821
TEMPERATURE(C°)	37.8 ± 0.26	37.79 ± 0.29	0.81479

The percentages of occurrence are similar, and the p-values of 0.75892 indicates no significant distinction among the groups for both conditions. (Table 4)

Table 4. placenta ultrasonographic criteria in the case study population

GROUP	GROUP A (N = 30)	GROUP B (N = 30)	P. VALUE
CENTRAL PLACENTA ACCRETE	23 (76.67%)	24 (80%)	0.75892
CENTRAL PLACENTA PREVIA	7 (23.33%)	6 (20%)	0.75892

There was no statistically significant distinction among two groups as regards preoperative hemoglobin level, operative time, post-operative, hemoglobin levels and need for blood transfusion, but there was significant variance as regards intraoperative blood loss. (Table 5)

Table 5. outcome measurements

GROUP	GROUP A (N=30)	GROUP B (N=30)	P. VALUE
PREOPERATIVE HEMOGLOBIN (HB) (G\DL)	9.68±0.54	9.86±0.48	0.18401
INTRAOPERATIVE BLOOD LOSS (ML)	838.77± 92.13	932±188.49	0.01704*
OPERATIVE TIME(MIN)	102.93± 19.91	96.27± 19.83	0.19896
POST-OPERATIVE HEMOGLOBIN (HB)(G\DL)	9.5±0.53	9.66± 0.48	0.23123
NEED FOR BLOOD TRANSFUSION (ML)	2(6.67%)	6(20%)	0.13315

4. Discussion

As regards demographic data, the average age in Group A was 30.13 years with an SD of 4.62, while in Group B, it was 28.2 years with an SD of 6.04. There was no significant variation in age among the two groups. The same was observed for height and weight, with no significant distinction between the two groups. The average BMI in Group A was 27.33, with a standard deviation of 3.72, while in Group B, it was 28.43, with a standard deviation of 2.96. There was no significant distinction in BMI among the two groups. Finally, the average gestational age in both groups was similar, with no significant difference among the two groups.

Sanad et al. provide some background for the current study. We wanted to determine whether or not patients with central placenta previa who underwent uterine artery ligation prior to uterine incision experienced reduced blood loss after caesarean delivery. No statistically significant differences in age, BMI, or gestational age were observed between the study and control groups.[8]

Regarding the Residence of patients in both groups, the majority of participants are from rural areas (76.67% in Group A and 80% in Group B). The p-value of 0.75892 indicates that there is no significant difference in residence type between the two groups.

The current study can be supported by Sanad et al.; They found that there was no significant difference in residence type among the two groups (p=0.6).[8]

Regarding Clinical parameters in our study, Group A had an average respiratory rate of 18.33 breaths per minute with a standard deviation of 3.24, while Group B had an average rate of 16.27 breaths per minute with a standard deviation of 3.12. The p-value of 0.01462* suggests a significant disparity in respiratory rate among the two groups. However, there was no significant disparity in heart rate, blood pressure, or body temperature between the two groups, as indicated by the p-values.

Shady Sallam supports the current study. Who wanted to see how much blood was lost during and after a caesarean operation for placenta previa when standard IV oxytocin was used versus when prophylactic adjunctive IV or topical tranexamic acid (TA) was used. Pre-op measurements of pulse, systolic and diastolic blood pressure, and temperature showed no statistically significant differences.[9]

Our findings are also consistent with Mohamed et al.. The average heart rate, systolic blood pressure (SBP), and diastolic blood pressure (DBP) were recorded as [84.69 ± 6.33, 101.0 ± 6.27, 66.85 ± 5.64, respectively [6]

The occurrence rates of the ultra-sonographic placenta criteria in the study population are

comparable, and the p values of 0.75892 for both circumstances suggest that there is no significant variance among the groups.

According to Evsen et al., the current research has some backing. Patients with placenta accreta in order to assess maternal features, surgical treatment options, and morbidity. There was no statistically significant disparity among the groups for either condition, even though 39 of the patients (or 95.1% of the total) had placenta previa and 32 (or 78%) had undergone at least one previous cesarean delivery.[10]

Group A had a mean preoperative Hb level of 9.68 g/dL, while Group B had a mean preoperative Hb level of 9.86 g/dL; however, the p-value (0.18401) indicates that there was no statistically significant difference between the two groups. Blood loss during surgery was greater in Group B (932.87 mL) than in Group A (838.77 mL), with a p-value of 0.01704* indicating statistical significance. Both groups had similar amounts of time spent operating and

postoperative hemoglobin levels. Group B had a higher percentage of individuals (20%) who needed a blood transfusion than Group A (6.67%). However, the p-value of 0.13315 indicates that this difference is not statistically significant.

Ghaleb et al. provide evidence that gives support to the findings of the present study. Who aimed to assess the safety and effectiveness of a surgical procedure for conservative management of placenta previa accreta in order to prevent uterine damage and postpartum bleeding, including intrapartum hemorrhage. This study was conducted by researchers who also aimed to preserve the uterus. They discovered that the median estimated intraoperative blood loss was 1.7 L, which varied from 1.2 to 2.2 L. The median intraoperative PRBC transfusion was three units, which vary from 2 to 4 units. The median postoperative hemoglobin was 8.5 g/dl, which varies from 7.8 to 9.2 g/dl. There was a median hemoglobin reduction of 1.6 g/dl, varying from 0.8 to 2.4 g/dl. In 50 (80.6% of the total) patients, satisfactory hemostasis was achieved while the uterus was preserved after surgery.[11]

Furthermore, our study's results are consistent with those of W. Liu and Yin. The objective of this research was to investigate the effectiveness of uterine artery ligation (UAL) and uterine artery embolization (UAE) in managing uterine asthenia postpartum hemorrhage (PPH) after cesarean section, in addition to their impact on the blood flow and functionality of the uterine and ovarian arteries. It was shown that the UAL group experienced much less blood loss compared to the UAE group, and the duration of the surgery was significantly longer in the UAL group than in the UAE group. These variations were statistically significant. However, the immediate hemostasis rate and hemostasis efficiency did not significantly differ among the two groups.[12]

In addition, the findings of our study were in agreement with those of Lin et al. Based on our previous work in the field of the therapy of placenta accretion, the researchers wanted to determine whether or not uterine artery ligation before placental abruption was both effective and safe. They discovered that the estimated amount of blood loss in the UALBPD group was 734.2±317.5mL, while the estimate for the control group was 1101.6±442.7mL (P<.0001). In the group that was treated with UALBPD, nine women (31.0%) had a transfusion, while in the control group, 38 women (77.6%) did so (P=.003). The UALBPD group underwent surgery for 1.23±0.24hours, whereas the control group underwent surgery for 1.55±0.82 hours (P=.01). In terms of the total number of days spent in the hospital, there was not a significant distinction among the groups (P =.07).[13]

4. Conclusion

ligating the uterine artery prior to making the uterine incision has on the amount of blood loss that occurs after a caesarean section in cases of placenta previa complete centralis. In patients who have central placenta previa and are scheduled to undergo elective CS, ligating the uterine artery before making the uterine incision might be an efficient way to lower the amount of blood lost during surgery.

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Authorship

All authors have a substantial contribution to the article

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Conflicts of interest

There are no conflicts of interest.

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