
Maternal Outcome in Conservative Surgery versus Hysterectomy in Placenta Accreta Spectrum

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Statement of prior presentation or publication and/or abstract/poster presentation:

The manuscript has no prior presentation or publication and/or abstract/poster presentation.

Source of funding:

The study has no funding interest

Conflict of interest Statement:

Declarations of interest none

Word count: 4498

IRB (Date & No.):

The study protocol was reviewed and approved by the Mansoura Faculty of Medicine Institutional Research Board (Code number #MS.21.05.1510; Date: 19/06/2021).

Short Running Title

Maternal Outcome in in Placenta Accreta Spectrum.

Abstract

Objective: to determine maternal outcome with conservative surgery versus hysterectomy in pregnant women with placenta accreta spectrum according to operative time, intraoperative blood loss, need for blood transfusion, postoperative complications, and hospital stay.

Design: prospective cross section study.

Setting: Mansoura University Hospitals.

Patients : 100 pregnant women with a diagnosis of placenta accrete spectrum who underwent conservative surgery and hysterectomy in department of obstetrics and gynecology, Mansoura University Hospitals.

Interventions: Patients were divided into two groups; group 1 (n = 50) conservative and group 2 (n =50) hysterectomy at 1:1 ratio.

Measurements and Main Results: There was a high significant difference among both groups as regard operative time, need for blood products transfusion, blood loss, hemoglobin assessment after surgery, and

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postoperative complications. In conservative group, the mean operative time (min) was 140.70 ± 54.986 , packed RBCs units was 2.86 ± 1.750 , plasma units were 1.62 ± 1.510 , blood loss 1580 ± 321 ml, mean hemoglobin before and after surgery was 10.71 ± 0.835 and 10.12 ± 0.779 mg/dl, and none had Bladder injury. In hysterectomy group, the mean operative time (min) was 267.60 ± 48.469 , packed RBCs units was 5.94 ± 2.683 , plasma units were 5.22 ± 2.613 , and blood loss 2343 ± 665.4 ml, mean hemoglobin before and after surgery was 10.66 ± 0.616 and 9.72 ± 0.856 mg/dl, and 10% had Bladder injury.

Conclusions: conservative surgery (preservation of the uterus) is a suitable treatment of placenta accrete spectrum especially in communities like Egypt in which women want to preserve fertility and refuse hysterectomy, but the woman must be diagnosed during pregnancy and admitted before surgery to tertiary care hospital to be operated under care of multidisciplinary team expert in dealing with this condition with possibility of hysterectomy if needed.

Keywords: Placenta Accreta Spectrum (PAS), Hysterectomy, Conservative Surgery, Maternal Outcomes, Risk Factors for PAS, Management of PA.

Introduction

Placenta accreta spectrum disorder (PAS) is described as a clinical situation where the placenta does not detach spontaneously from the myometrium after delivery of the baby and cannot be forcibly removed without causing excessive hemorrhage. The incidence of PAS is increasing worldwide mostly due to the increasing rates of cesarean section, and subsequently repeated cesarean sections (1, 2). PAS is one of the most dangerous conditions of pregnancy as it is significantly associated with maternal morbidity and mortality. Maternal and neonatal outcomes are generally improved when diagnosis is made before delivery, and the woman is

managed by a multidisciplinary team in the tertiary centers (3, 4).

One of the cornerstones during the operation of PAS is to avoid any attempt to detach the placenta, either in the conservative surgery or during hysterectomy as any attempt to remove the placenta will leave some placental tissue within a deficient myometrium leading to uncontrolled severe bleeding. Leaving the placenta without separation from the myometrium is associated with decreased levels of bleeding and need for blood transfusion (4, 5).

There are many challenges facing the obstetrician when dealing with PAS. The first challenge is to define the best time of delivery to ensure maternal and neonatal outcome. Despite earlier elective cesarean section may decrease the risk of bleeding but increase the risk of prematurity and need for intensive neonatal care. Delayed delivery of the baby beyond 38 weeks or emergency delivery is associated with higher maternal complications (6, 7).

Another challenge when dealing with PAS especially in developing countries and nations which prefer large families is a loss of fertility after hysterectomy especially when this is the second pregnancy to the patient who has no living child due to death of the first baby from congenital anomalies or prematurity complications, or the patient refuses hysterectomy despite she has more than 2 children. In these cases, the counselling of the patient to do hysterectomy from the start or after trial of conservative surgery is very difficult.

Materials and Methods

A prospective cross-sectional study was conducted in department of Obstetrics and Gynecology at Mansoura University Hospitals on 108 pregnant women with placenta accrete spectrum who underwent conservative surgery and hysterectomy. The

study was approved by the Mansoura Faculty of Medicine Institutional Research Board (Code number # MS.21.05.1510; Date: 19/06/2021). All pregnant women with PAS with one or more of the following risk factors had been included in this study: Patient age (18-42 years), Pregnancy: Spontaneous, in-vitro fertilization (IVF), gestational age: more than 34 weeks, Previous caesarean section, Previous placenta previa and Past history of prior uterine surgeries or curettage. Pregnant women with PAS with one of the following: vaginal bleeding, rupture uterus, Incomplete data, conversion from conservative treatment to hysterectomy and refused to participate in the study were excluded from this study.

Methods

All pregnant women more than 34 weeks with PAS admitted from outpatient clinic in obstetrics and gynecology center to obstetrics and gynecology department at Mansoura university hospital (main hospital) were subjected to the following:

A. Before admission:

1. Gravidity, parity, previous caesarean delivery, uterine surgery as myomectomy, repeated endometrial curettage and history of placenta accreta in previous pregnancy.
2. General and Abdominal examination were done.
3. Ultrasound was done to confirm abnormally adherent placenta. ultrasound findings were placenta previa, multiple placental lacunae, irregularity of bladder border, decrease myometrial thickness and loss of normal hypoechoic retroplacental space. Color Doppler finding in placenta accreta were turbulent flow in placental lacunae, increase vascularity around placental lacunae and irregular bladder wall with extensive associated vascularity.

B. After admission:

1. Basic investigations including: blood group type, CBC, liver function tests, kidney function tests and preparation for blood transfusion.
2. Informed written consent: Discussion with

the patient and her husband about what is meaning by placenta accreta, management options during the operation, possibility of hysterectomy, intraoperative complications as ureteric and bladder injury, conversion from conservative surgery to hysterectomy due to bleeding and severe accretion.

3. Cross matched blood: at least 5 units RBCs, platelets, and fresh frozen plasma should be available in the blood bank.

C. Before operation:

1. Checklist of the patient file: Check the Hb level, consent either hysterectomy from the start or trial of preservation of uterus and possibility of hysterectomy if needed.
2. check the number of packed RBCs, plasma and platelets unit and availability of blood products from blood bank if needed during operation.
3. Insertion of at least 2 large intravenous lines
4. Give the patient antibiotics ceftriaxone 1gm (ceftriaxone 1000mg, Sandoz, Novartis, Switzerland) and at least 500 ml of normal saline before operation.

D. At the operating room:

1. Anaesthesia: general anesthesia was the most performed, but in some selective cases spinal anesthesia was used.
2. Insertion of urinary catheter and 4 tablets of misoprostol rectally (Misotac, 200 micrograms, Sigma) in conservative group only.
3. Sterilization: Abdomen was cleaned with an antiseptic (uccmadine 10% Povidone-Iodine U.S.P, UCCMA) and was covered with sterile cloths to reduce the risk of infection
4. Abdominal incision: in conservative transverse incision (Pfannenstiel incision) and in hysterectomy group midline incision was preferred.
5. Inspection of uterus after peritoneal entry to determine the level of placental invasion and placental location according FIGO Classification of PAS. **Grade 1:** abnormally adherent placenta (placenta adherent or accreta) - attached directly

to the surface of the middle layer of the uterine wall (myometrium) without invading it. **Grade 2:** abnormally invasive placenta (incretta) - invasion into the myometrium. **Grade 3:** abnormally invasive placenta (percreta) invasion may reach surrounding pelvic tissues, vessels and organs (8).

6. Opening of the uterus: uterus was opened above the site suspected to be placental site. In conservative group, the incision was done in upper transverse away from placenta. In hysterectomy group, vertical incision was done in the uterine fundus then delivery of the baby.

7. If we decided to conserve the uterus:

- a. We approximated the edge of uterine incision by three or four Allis forceps after delivery of the baby without trial of manual separation of the placenta.
- b. Dissection of the bladder from the lower uterine segment.
- c. Bilateral uterine artery ligation
- d. Waiting for spontaneous separation of the placenta: After ligation of uterine arteries, we removed three or four Allis forceps from uterine incision edges then waited for spontaneous placental separation from lower uterine. If the placenta was separated spontaneously, we started to give ecobolic and closure of uterine incision in 2 layers and control bleeding from placental site by hemostatic sutures (simple suture or eight of figure suture). If the placenta was focally adherent with myometrium, we resected the myometrium with adherent placenta then repair of uterus.

8. If we decided to do hysterectomy:

- a. We approximated the edge of uterine incision by three or four Allis forceps or closed the uterine incision.
- b. The uterus was exteriorized and kept under upward traction.
- c. The round ligaments and utero-ovarian ligaments were divided and ligated bilaterally.

- d. Dissection of broad ligament alongside the uterus using monopolar diathermy
- e. The bladder was dissected from lower uterine segment.
- f. Uterine arteries were clamped, ligated, and divided.
- g. Colpotomy was performed and removal of the uterus and the cervix (if the placenta was infiltrating it) or removal of the uterus only.
- h. Closure of vaginal cuff with 2 layers of absorbable suture (1-0 vicryl sutures).

9. Intraoperative data were collected:

- a. Operative time: defined as time starting with induction of anesthesia up to end of the operation.
- b. Amount of blood loss (ml): we used combination of direct and gravimetric methods. We collected blood loss from a suction bottle using a suction apparatus (direct method). we calculated the amount of blood loss in the surgical towels and gauzes by weighing them before and after surgery (gravimetric method). the estimated amount of blood loss was calculated by the following formula (9):-
 - Amount of blood loss in suction apparatus (in ml) = total amount of fluid in suction apparatus - amount of amniotic fluid suctioned during delivery of the baby.
 - Amount of blood loss from surgical field (in ml) = weight of the collected soaked towels, gauzes, and drapes after surgery (in grams) - weight of the dry towels, gauzes, and drapes before surgery. After that, the estimated blood loss equals blood in suction apparatus plus blood in surgical field.
- c. Number of packed RBCs needed during operation.
- d. Intraoperative complications: bladder injury, ureteric injury, intestinal injury, and conversion from conservative management to hysterectomy.

E. At the department:

The patients were assessed after transfer

from operation to department ward:

1. Vital signs: pulse, blood pressure, and temperature every hour after surgery at the first 6 hours then every 6 hours.
2. Uterine contraction: uterine contractility and vaginal bleeding were assessed every half an hour in conservative group.
3. Hemoglobin level and need for blood transfusion.
4. Postoperative antibiotics and ecbolics.
5. Postoperative complications: vaginal bleeding, need for relaparotomy, and paralytic ileus.

Results

As shown in the study flow chart (Figure 1), Three hundred women diagnosed with low lying placenta admitted in Mansoura university hospital from June 2021 to December 2022 were assessed for eligibility to participate in the study; we excluded 192 cases not meeting the inclusion criteria. 108 cases diagnosed with PAS were divided into 2 groups. Group 1 conservative group (58 patients) then 8 patients excluded due to conversion from conservative treatment to hysterectomy. Group 2 hysterectomy group (50 patients). Therefore, data of 50 women in the conservative group and 50 patients in the hysterectomy group were subjected to final analysis.

The mean age in the conservative group was 33.52 ± 5.183 , BMI was 36.69 ± 3.496 , 44% were urban, 56% were rural. In the hysterectomy group, mean age was 33.66 ± 4.104 , BMI was 36.45 ± 1.338 , 50% were urban, 50% were rural. There was insignificant difference between both groups as regard age, BMI or residency (**Table 1**).

In conservative group the mean gestational age was 37.08 ± 0.601 , Gravidity median value was 4 ranged from 3 - 6, parity median value was 3 ranged from 1- 4, abortion median value was 0 ranged from 0 - 3, 6% had previous 1 cs, 46% had previous 2 cs, 36% had previous 3

cs, 12% had previous 4 cs, 16% had D&C, 2% had myomectomy, 0% had hysteroscopy, 2% had PTL, 2% had twins, 2% had stillbirth. In hysterectomy group, mean gestational age was 36.06 ± 2.045 , gravidity median value was 5 ranged from 2 - 9, parity median value was 3 ranged from 1 - 6, abortion median value was 0 ranged from 0 - 9, 4% had previous 1 cs, 26% had previous 2 cs, 44% had previous 3 cs, 26% had previous 4 cs, 18% had D&C, 6% had myomectomy, 4% had hysteroscopy, 2% had PTL, 4% had twins, 4% had stillbirth. There was significant difference among both groups regarding gestational age, history of previous 2 cs. (**Table 2**).

In the conservative group, the mean operative time (min) was 140.70 ± 54.986 , packed RBCs units was 2.86 ± 1.750 , plasma units were 1.62 ± 1.510 , blood loss 1580 ± 321 ml. In the hysterectomy group, the mean operative time (min) was 206.4 ± 25.29 , packed RBCs units was 5.94 ± 2.683 , plasma units were 5.22 ± 2.613 , and blood loss 2343 ± 665.4 ml. The mean hemoglobin in the conservative group, before and after surgery was 11.71 ± 0.835 and 10.12 ± 0.779 respectively. In hysterectomy group, the mean hemoglobin before and after surgery was 11.66 ± 0.580 and 9.72 ± 0.856 respectively. There was a high significant difference among both groups as regard operative time, need for blood products transfusion, blood loss and hemoglobin assessment after surgery (**Table 3**).

In the conservative group, the mean hospital stay (days) was 6.18 ± 0.825 , none had bladder injury, or Paralytic ileus but 2% had post-partum hemorrhage and 2% had Wound sepsis. In hysterectomy group, the mean hospital stay (days) was 10.24 ± 3.25 , 10% had bladder injury, 4% had Paralytic ileus, and 4% had wound sepsis and none had post-partum hemorrhage. There was high significant difference between both groups as regards hospital and postoperative bladder injury (**Table 4**).

Discussion

Despite CS hysterectomy is the most common treatment for PAS, according to the American College of Obstetricians & Gynecologists, it carries the most serious complications as urological injuries (bladder and ureter), pelvic blood vessel injury, and loss of future fertility. Hysterectomy cannot be the first line therapy in young pregnant women with PAS who want to preserve their fertility (10).

The increasing numbers of CS lead to increase rate of PAS from 0.3% after 1 previous cs to 6.74% after five or more cs (11). The increase rates of cs in Egypt especially in last ten years from 52 % in 2014 to 72 % in 2021 according to the Central Agency for Public Mobilization and Statistics (CAPMAS) (12) places a significant burden on young obstetricians to deal with PAS especially on women refusing hysterectomy and wanting to preserve the uterus.

The purpose of this study was to compare maternal outcomes between conservative surgery and hysterectomy for women with placenta accrete spectrum disorders during pregnancy.

Jafari et al., evaluated 68 patients with placenta accreta and compared uterine preservation to hysterectomy. Group I hysterectomy: 24 women and Group II uterine preservation: 44 women. All women 68 between the ages of 24-45 yr. (mean age of 32.88 ± 5.08 years) were multiparous and underwent cesarean section. 28 women (41.2%) had a history of dilatation and curettage. There were no significant differences between both groups regard the need for blood transfusion, operative time, hospital stay, and maternal mortality (13).

Our findings are consistent with those of Alloush et al., who evaluated 50 patients diagnosed with PAS. There was no statistical difference between different management modalities regarding to the parity, gestational age and the placental site but there was significant statistically difference according to the degree of placenta, number of cs, blood transfusion, operative time, visceral injury, and postoperative wound infection (14).

Siraj et al., evaluated 20 patients with PAS.

Group 1 (10 patients): hysterectomy and Group 2 (10 patients): conservative surgery. Similar to our findings, that operative time was significantly higher in the hysterectomy group ($p=0.05$). Conservative group had a decreased risk of complications and estimated blood loss and less blood transfusions. One bladder damage in the hysterectomy group (15).

Wang et al., evaluated 2219 women diagnosed with PAS; 398 (17.9%) had hysterectomy and 1821 (82.1%) had conservative surgery. Conservative group had less blood loss within 24 h of surgery (1518 ± 1275 vs. 4309 ± 2550 ml in hysterectomy group, $p<.001$). There was more received blood transfusions in hysterectomy group ($p=.014$). There was no significant difference between the groups in terms of bladder injury (7).

El Gelany et al. divided 102 women with PAS into 3 groups: Group A : 38 had hysterectomy, Group B: 48 had cs with cervical inversion and ligation of both uterine arteries, and Group C: 16 had the placenta left in place. Estimated blood loss and blood transfusion were significantly higher in group A than other groups. Group C had higher mean hospital stay duration (16).

Our findings are similarly consistent with those of Epstein et al., who examined 77 women with PAS, 43 had hysterectomy, 34 had conservative management. the hysterectomy group had a significantly greater estimated blood loss (2989 ml vs. 1410 ml), greater complications rate and more hospital stays (17).

Pala et al., evaluated 36 cases with PAS: Group 1 (19 patients) had conservative surgery and Group 2 (17 patients) had hysterectomy. There were significant differences in favor of conservative surgery in less blood loss (1794 ± 725 ml vs 2694 ± 893 ml), less Blood transfusion (2.7 ± 2.6 units vs 5.7 ± 2.4 units), and less operative time (64.5 ± 29 min vs 140 ± 51) (18).

Finally, in our study we found that there is significant difference among both groups as regard gestational age, previous 2 CS, placental site, operative time, Blood loss, need for blood products transfusion, hemoglobin level after surgery, hospital stays and postoperative complications.

Limitations of our study are selections of the cases with planned surgery diagnosed with PAS during pregnancy either hysterectomy or conservative surgery and exclude the cases with emergency conditions. We still do not know what is the suitable treatment to the cases with PAS presented in emergency if the patient still wants to preserve the uterus? We need more studies to fill this gap of the research in the future.

Conclusion

conservative surgery (preservation of the uterus) is a suitable treatment of placenta accrete spectrum especially in communities like Egypt in which women want to preserve fertility and refuse hysterectomy, but the woman must be diagnosed during pregnancy and admitted before surgery to tertiary care hospital to be operated under care of multidisciplinary team expert in dealing with this condition with possibility of hysterectomy if needed.

Results

Figure 1: study flowchart

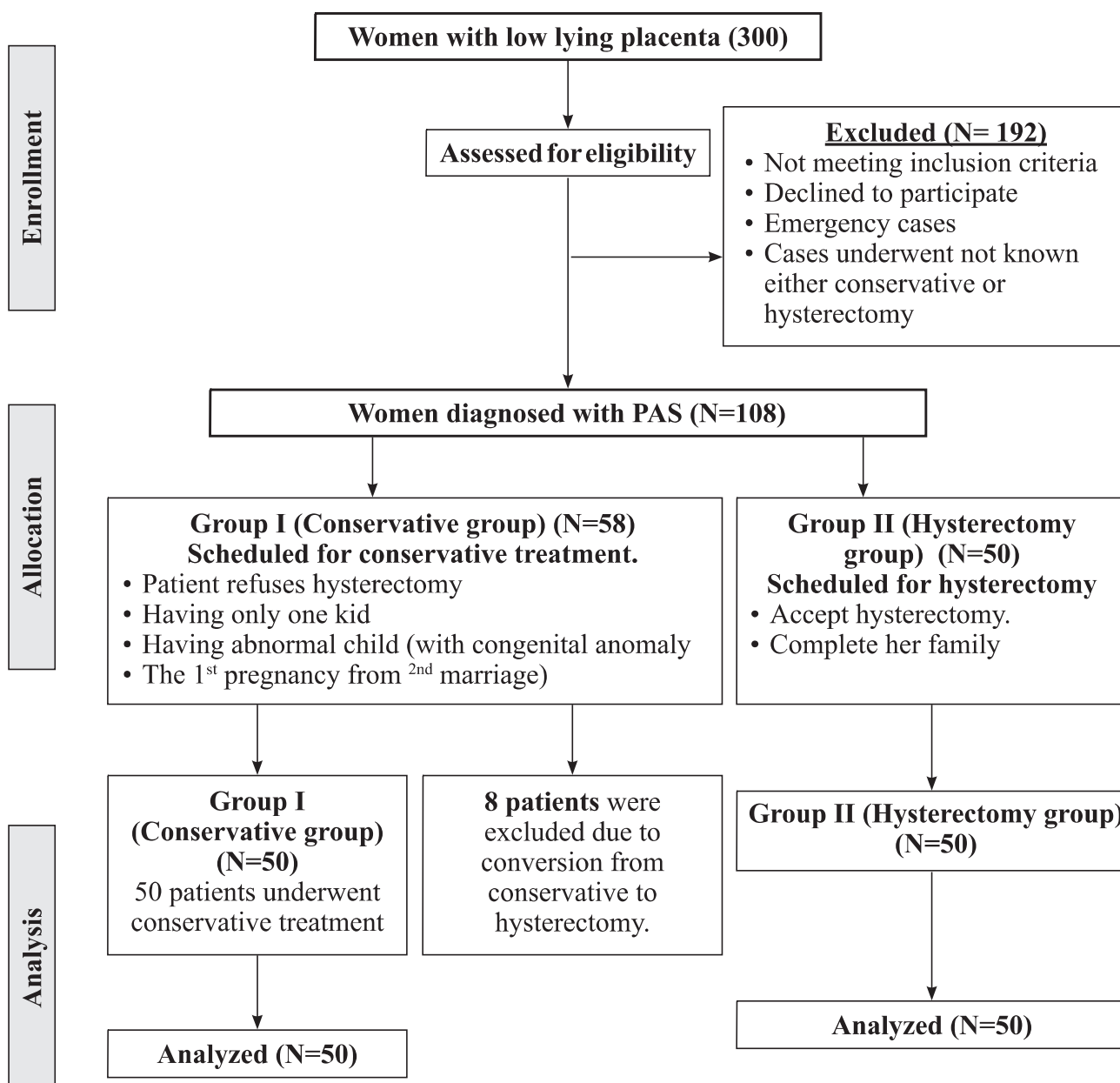


Table 1: Demographic characteristics of the studied groups:

		Conservative group (n= 50)	Hysterectomy group (n= 50)	95% CI	p-value
Age (years)		33.52 ± 5.183	33.66 ± 4.104	-2.00, 1.72	0.881
BMI		36.69 ± 3.496	36.45 ± 1.338	-0.81, 1.29	0.655
Residency	Urban	44.0% (22)	50.0% (25)	-	0.548
	Rural	56.0% (28)	50.0% (25)		
Data is reported as mean, standard deviation, percentage, or frequency. 95% CI: Mean difference between groups. p<0.05 is significant.					

Table 2: obstetric data of the studied patients:

		Conservative group (n= 50)	Hysterectomy group (n= 50)	p-value
Gestational age (mean ± SD)		37.08 ± 0.601	36.06 ± 2.045	0.001
Gravidity	median (range)	4 (3-6)	5 (2-9)	0.088
Parity	median (range)	3 (1-4)	3 (1-6)	0.097
Abortion	median (range)	0 (0-3)	0 (0-9)	0.242
History of previous CS				
Previous 1 CS		6.0% (3)	4.0% (2)	0.315
Previous 2 CS		46.0% (23)	26.0% (13)	0.037
Previous 3 CS		36.0% (18)	44.0% (22)	0.414
Previous 4 CS		12.0% (6)	26.0% (13)	0.074
D&C		16.0% (8)	18.0% (9)	0.790
Myomectomy		2.0% (1)	6.0% (3)	0.307
Hysteroscopy		0.0% (0)	4.0% (2)	0.153
Preterm labor		2.0% (1)	2.0% (1)	1
Twins		2.0% (1)	4.0% (2)	0.558
Stillbirth		2.0% (1)	4.0% (2)	0.558

Table 3: Maternal outcome during operation in the current study:

	Conservative group (n= 50)	Hysterectomy group (n= 50)	95% CI	p-value
Operative time (min)	140.70 ± 54.986	206.60 ± 25.29	-137, -96	< 0.001
Blood loss (ml)	1580 ± 321	2343 ± 665.4	-1903, - 205	< 0.001
Packed RBCs units	2.86 ± 1.750	5.94 ± 2.683	-3.98, -2.18	< 0.001
Plasma units	1.62 ± 1.510	5.22 ± 2.613	-4.45, -2.75	< 0.001
Hb level (gm/dl)				
Before	11.71 ± 0.835	11.66 ± 0.580	-0.24, 0.35	0.714
After	10.12 ± 0.779	9.72 ± 0.856	0.07, 0.72	0.017

Table 4: Postoperative outcome in the studied groups:

	Conservative group (n= 50)	Hysterectomy group (n= 50)	95% CI	p-value
Bladder injury	0.0% (0)	10.0% (5)	5.32	< 0.001
Wound sepsis	2.0% (1)	4.0% (2)	0.344	0.558
Paralytic ileus	0.0% (0)	4.0% (2)	2.041	0.153
Post-partum hemorrhage	2.0% (1)	0.0% (0)	1.010	0.315
Hospital stay (days)	6.18 ± 0.825	10.24 ± 3.25	-6.06, - 4.06	< 0.001

References

1. Jauniaux E, Collins S, Burton GJ. Placenta accreta spectrum: pathophysiology and evidence-based anatomy for prenatal ultrasound imaging. *American journal of obstetrics and gynecology*. 2018;218(1):75-87.
2. Shamshirsaz AA, Fox KA, Salmanian B, Diaz-Arrastia CR, Lee W, Baker BW, et al. Maternal morbidity in patients with morbidly adherent placenta treated with and without a standardized multidisciplinary approach. *American journal of obstetrics and gynecology*. 2015;212(2):218. e1-. e9.
3. Fitzpatrick K, Sellers S, Spark P, Kurinczuk J, Brocklehurst P, Knight M. The Management and Outcomes of Placenta Accreta, Increta, and Percreta in the United Kingdom: A Population-based Descriptive Study. *Obstetric Anesthesia Digest*. 2015;35(1):24-5.
4. Morlando M, Collins S. Placenta accreta spectrum disorders: challenges, risks, and management strategies. *International Journal of Women's Health*. 2020:1033-45.
5. Jauniaux E, Alfirevic Z, Bhide A, Belfort M, Burton G, Collins S, et al. Placenta praevia and placenta accreta: diagnosis and management: green-top guideline no. 27a. *Bjog*. 2018;126(1):e1-e48.
6. Collins SL, Alemdar B, van Beekhuizen HJ, Bertholdt C, Braun T, Calda P, et al. Evidence-based guidelines for the management of abnormally invasive placenta: recommendations from the International Society for Abnormally Invasive Placenta. *American journal of obstetrics and gynecology*. 2019;220(6):511-26.
7. Wang Q, Ma J, Zhang H, Dou R, Huang B, Wang X, et al. Conservative management versus cesarean hysterectomy in patients with placenta increta or percreta. *The Journal of Maternal-Fetal & Neonatal Medicine*. 2022;35(10):1944-50.
8. Jauniaux E, Ayres-de-Campos D, Langhoff-Roos J, Fox KA, Collins S, Diagnosis FPA, et al. FIGO classification for the clinical diagnosis of placenta accreta spectrum disorders. *International Journal of Gynecology & Obstetrics*. 2019;146(1):20-4.
9. Schorn MN. Measurement of blood loss: review of the literature. *Journal of midwifery & women's health*. 2010;55(1):20-7.
10. Cahill AG, Beigi, R., Heine, R.P., Silver, R.M., Wax, J.R. and American College of Obstetricians and Gynecologists. Placenta accreta spectrum. *American journal of obstetrics and gynecology*. 2018;219(6):B2-B16.
11. Marshall NE, Fu R, Guise J-M. Impact of multiple cesarean deliveries on maternal morbidity: a systematic review. *American journal of obstetrics and gynecology*. 2011;205(3):262. e1-. e8.
12. El-Sayed Gamal El-Din , Zeinab El-Gundy. Fertility rate per woman in Egypt declines by 20% since 2014: CAPMAS. *Ahram Online*. Tuesday 30 Aug 2022. Available at: <https://english.ahram.org>.

- eg/News/474171.aspx (Accessed: 30 September 2023).
13. Jafari RM, Najafian M, Barati M, Saadati N, Jalili Z, Poolad A. Comparison of uterine preservation versus hysterectomy in women with placenta accreta: A cross-sectional study. *International Journal of Reproductive Biomedicine*. 2022;20(9):739.
 14. Alloush M, Mohamed M, Idris Y, Hussaein Y. Evaluation of the Role of Planned Conservative Surgery for Management of Morbidly Adherent Placenta. *Benha Journal of Applied Sciences*. 2021;6(6):187-92.
 15. Mohamed Siraj SH, Tan KH, Wright AM. Conservative surgical approach towards placenta accreta spectrum disorders for uterine preservation. *BMC Pregnancy and Childbirth*. 2023;23(1):1-8.
 16. El Gelany S, Mosbeh MH, Ibrahim EM, Mohammed Mm, Khalifa EM, Abdelhakium AK, et al. Placenta Accreta Spectrum (PAS) disorders: incidence, risk factors and outcomes of different management strategies in a tertiary referral hospital in Minia, Egypt: a prospective study. *BMC pregnancy and childbirth*. 2019;19:1-8.
 17. Epstein R, Haas D, Zollinger T. 133: A comparison of maternal outcomes in immediate hysterectomy versus conservative management for placenta accreta. *American Journal of Obstetrics & Gynecology*. 2009;201(6):S64.
 18. Pala Ş, Atilgan R, Başpınar M, Kavak EÇ, Yavuzkır Ş, Akyol A, et al. Comparison of results of Bakri balloon tamponade and caesarean hysterectomy in management of placenta accreta and increta: a retrospective study. *Journal of Obstetrics and Gynaecology*. 2018;38(2):194-9.