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ORIGINAL ARTICLE

Incidence, Risk factors and Outcome of Morbidly Adherent Placenta at A Maternity Hospital

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ABSTRACT

Background: Morbidly adherent placenta is a dangerous pregnancy syndrome that is becoming more well acknowledged as a cause in rising incidence of maternal morbidity and mortality. In an effort to improve the mother's and the fetus's health. This study amid to determine risk factors, incidence and maternal outcome of morbidly adherent placenta at Zagazig maternity hospital to improve quality of health of mother and fetus. **Methods:** This recorded Interventional cohort study was conducted at attending antenatal care unit or emergency department of Zagazig Maternity Hospital. included pregnant Women with suspected or accidently diagnosed intraoperative with MAP. Total number of deliveries was 7761 While number of caesarian sections was 3586 & vaginal deliveries was 4175. All women were subjected to complete history-taking, clinical assessment and ultrasonography assessment. **Results:** Management strategies varied, with 50% undergoing caesarian hysterectomy, 50% conservative management. Pfannenstiel incision was used in 67.24% of cases, while midline incision was more common in hysterectomies (84.2%). Uterine artery ligation was performed in 93.10% of cases & internal iliac artery ligation in 12.07%, highlighting efforts to control bleeding and manage MAP effectively. Complications included urinary tract injuries in 31.03% of cases and ICU admissions for 10.34% of patients. Mortality recorded in one case(1.72%) . Fetal outcomes varied 56.90% of newborns required NICU admission, due to prematurity was 21%. **Conclusion**: Management strategies varied, with half of the cases undergoing hysterectomy, emphasizing the severity of the condition, while efforts were made to preserve fertility through conservative cesarean sections in a significant portion of patients.

Keywords: Morbidly adherent placenta; Previous cesarean section; Incidence; Risk factors.

INTRODUCTION

Formerly known as Morbidly Adherent Placenta (MAP), placenta accreta spectrum (PAS) denoted aberrant placental adhesion, either in whole or in part, to the uterine wall beneath. Three types of placenta accrete (chorionic villi adherent to the superficial myometrium), placenta increta (chorionic villi involving the myometrium), and placenta percreta (chorionic villi penetrating the full thickness of the myometrium and involving serosa) are distinguished based on the degree of adherence and the amount of placental involvement [1].

The risk for the first, second, third, fourth, and fifth or more cesarean deliveries with previa was reported to be 3.3%, 11%, 40%, 61%, and 67% in cases of repeated cesarean deliveries. In the absence of a placenta previa, the risk of MAP persists and increases when more cesarean sections are performed: 0.2% for the first, 2.1% for the fourth, and 6.7% for the sixth or more [2].The incidence of subsequent accreta is increased by any procedure that destroys the endometrium, in addition to repeated cesarean deliveries. Uterine curettage, myomectomy, pelvic radiotherapy, and endometrial ablation are a few

examples of these procedures. Women who have already undergone endometrial ablation are most vulnerable to developing accreta. The risk for MAP increases with each year above 20, particularly for women who are older mothers [3]. Mother age, smoking, and a short interpregnancy period after cesarean birth are other variables linked to MAP *Kapoor et al* [4] found that women who had in vitro fertilization (IVF) had a 13-fold higher risk of placental invasion (0.167%) than women who became pregnant naturally (0.012%). Among IVF patients, cryopreserved embryo transfer is a significant independent risk factor for placenta accreta. Various explanations have been suggested, such as variations in the endometrial milieu among infertile or subfertile women or modifications to the endometrium as a consequence of IVF procedures. Local organ damage, postoperative bleeding, amniotic fluid embolism, consumptive coagulopathy, transfusion-related complications, acute respiratory distress syndrome, postoperative thromboembolism, infectious morbidities, multisystem organ failure, and maternal death are just a few of the numerous complications associated with (MAP). The most frequent ureteral consequences are those related to the genitalia, which include ureteral damage in 2% of cases and cystotomy in 15% of cases [4].

The primary cause of neonatal problems resulting from MAP is premature delivery. When women with MAP give birth, the average gestational age is usually between 34 and 36 weeks, usually due to medically advised preterm birth **[5].** Due to bleeding or contractions, up to 50% of women may give birth unexpectedly or urgently even before 34–35 weeks of pregnancy. Uterine rupture secondary to placenta percreta is extremely uncommon, however it has been documented. Patients may present with substantial intraperitoneal or vaginal bleeding that requires removal before fetal viability (23 weeks gestation) in order to preserve the mother's life.

AIM OF THE WORK

This study aimed to determine risk factors, incidence and maternal outcome of morbidly adherent placenta at Zagazig maternity hospital to improve quality of health of mother and fetus.

METHODS

This recorded Interventional cohort study was conducted at attending antenatal care unit or emergency department of Zagazig Maternity Hospital in period from between July 2022 to July 2023 at Maternity hospital of Zagazig university. Inclusion Criteria were all cases suspected or diagnosed antenatally by US or MRI and confirmed intraoperatively with (MAP), accidently discovered intraoperatively with (MAP) at maternity hospital of Zagazig university and gestational age from 28 week (last menstrual period and/ or Ultrasound confirmation of gestational age).

Ethical approval

The study was approved from the Institutional Ethics of the faculty of medicine. Zagazig University (ZU- IRB# 9443-10-5-2022), Written informed consent was obtained from all the participants after explaining the details and benefits as well as risks to them. The study follows the Helsinki Declaration (1975), which is the World Medical Association's guideline of ethics for research involving human subjects.

The entire medical history of every woman was obtained, covering factors such as multiple parity, prior cesarean sections, uterine scars, history of placenta previa in prior pregnancies, maternal age, placental anomalies, and multiple pregnancies. smoking and ART). Comprehensive inspection of the abdomen and general areas to assess fundal level, presentation, position, soreness in the uterus, prescence or lack of uterine contraction, painful scar, and fetal heart rate (FHR). Studies involving blood types, Rh types, and full blood counts (including hemoglobin level, hematocrit, and platelet count) are among them.

Ultrasonography assessment:

Ultrasonography during pregnancy (abdominal US & trans vaginal US). Placental position, anomalies, AFI, age, maturity, and fetal viability.

Sonographic findings of morbidly adherent placenta:

Morbidly adherent placenta diagnosis is based on two or more of these findings [6]. Any portion of the echolucent region between the placenta and the uterus that is obliterated is referred to as obliteration of the clear space. visualization of the placental lacunae, which are described as the placenta's many, asymmetrical, and linear vascular gaps. The term "abnormal serosa" refers to a disruption of the normal continuous echo lucent line, which would otherwise appear as a series of dashes, at the posterior bladder wall-uterine contact. localized exophytic tumors encroaching into the bladder.

Myometrial thickness less than 1mm.

The existence of two or more of these features is necessary for the diagnosis of MAP Farquhar et al. [7], blood flow that is turbulent and extends outside of the placenta; diffuse or focal intraparenchymal placental lacunae flow. hypervascularity during the vesico-uterine serosal interphase. prominent venous complex retroplacental [8]. Doppler vascular signal loss in the retroplacenta (Figures 1) [9].

Preoperative preparation:

A minimum of six hours' fast before surgery. preservation of a sufficient quantity of plasma and blood belonging to the same ABO group. Notification of the procedure for the vascular, urology, and neonatology teams.

Surgical techniques:

A senior obstetrician operated on each case under the supervision of a senior anesthesiologist. All patients received general anesthesia. A prophylactic antibiotic was administered prior to midline or posterior skin incisions. Uterine incisions were made in either the upper or lower segment, depending on the location of the placenta. Fertilized embryo delivery. The diagnosis of placenta accreta (attached to the superficial myometrium), placenta increta (attached deeper in the myometrium), and placenta percreta (attached to the full thickness of the myometrium, involving the serosa and possibly extending to surrounding organs such as the bladder) were made during the intraoperative procedure. It is not regarded as (MAP) if the placenta detached on its own or with mild traction. The choice was between hysterectomy and cautious care if the placenta was attached.

Conservative care involves cutting the uterine margins. Hemostatic stitches in the placenta. the uterine ligation caused by the adherent placenta remaining inside the uterus or by pelvic devascularization. internal iliac and ovarian arteries. Cesarian hysterectomy is the last resort if conservative therapy is unable to stop the bleeding. Urologists were consulted if there was a suspicion of bladder or ureteric damage. When necessary, consultations for vascular surgery were also conducted.

Postoperative care:

Normal post-operative care includes monitoring vital signs (BP, pulse, RR, and temperature), urine output (quantity and color), filling drains, treating general ailments, and bleeding. Prevent DVT with early mobilization, adequate hydration, and prophylactic anticoagulation if necessary.

Statistical analysis

Data were entered checked and analyzed using Epi-Info version 6 and SPP for Windows version 8 (Dean, 2006). Quantitative data were expressed as mean ± SD (Standard deviation) for parametric and median and range for non-parametric data. Spearman's correlation was used to evaluate the association of the variables. When the P value was less than 0.05, the significance was established.

RESULTS

Table (1) showed Demographic data & risk factors among the study population. Age in this study population ranged from 21 to 42 with mean ± SD = 31.17 ± 5.36. The main age group of our study was between 30-39 years was 34 (58.6%). Patients with Previous CS in the study population ranged from 1 to 5 with mean ± SD = 2.71 ± 1.03. So, p2cs & p3cs were the majority of cases in this study. Number of mothers with uterine surgery was 18 (31%) while 2 mothers had placenta previa in previous pregnancy.

Table (2) showed management among the study population. Number of mothers who had conservative management 29 (50%). Number of emergency intervention was 28 (48%). The majority due to severe vaginal bleeding 13 (22.4%). 29 case (50%) managed with Cesarian hysterectomy**.**

Table (3) showed types of morbidly adherent placenta among this study population. 50% of cases were focal accreta.

Table (4) showed Blood transfusion units among the study population. Number of used units of RBCS in the study population is 56 (96.5%). ranged from 0 to 24 .the majority of cases received > 4 packs was 31 (55.4 %).

Table (5) showed maternal complications incidence among the study population. Number of mothers had bladder injury in the study population was 17 (29.3%). Number of mothers who was ICU admitted in the study population was 6 (10.34%). Number of mothers who died in the study population was 1 (1.72%).

Table (6) showed fetal complications incidence among the study population. Number of preterm baby's was26 (45%) while mortility was 7 cases (21.2%).

Table (7) showed there is negative Correlation between age and parity with incidence of MAP while there is strong positive Correlation between Previous CS and uterine surgery with incidence of MAP.

Table (1): Demographic data and risk factors among the study population

	Study population (n = 58)
Age	
Mean ± SD.	31.17 ± 5.36
Range (Min-Max)	21 (21 - 42)
Age distribution	
20 - 29 years	20 (34.48%)
30 - 39 years	34 (58.62%)
40 - 49 years	4 (6.90%)
Parity	
Mean ± SD.	1.7 ± 0.8
Range (Min-Max)	2 (1-3)
Para 1	4 (50 %)
Para 2	2 (25%)
Para ≥ 3 or more	2 (25%)
Number of previous CS	
Mean ± SD.	2.57 ± 1.04
Range (Min-Max)	4 (1 - 5)
P1cs	8 (13.7%)
P2cs	21 (36.2%)
P3cs	21 (36.2%)
P4cs	4(6.8%)
p5cs	4 (6.8%)
Uterine surgery	
E&C	18 (31.03%)
Other uterine surgery	zero
History of placenta previa in previous pregnancy	2(3.4 %)
Multiple pregnancy	1(1.7%)

SD: *standard deviation* ,**E&C:** evacuation and curettage

Table (2): Management data amoung study population

	Study population (n = 58)
Elective Management	30 (51.7%)
EmergencyIndications	28 (48.3%)
Severe Bleeding	13 (22.4%)
Labor pain	6(10.3%)
PPROM	3(5.1%)
other causes	6(10.3%)
Type of skin incision	
Mid line	19(32.7%)
pfannenstiel incision	39(67.2%)
Type of uterine incision	
LSCS	50 (86.3%)
USCS	8 (13.7%)
Conservative management	29 (50%)
Placental resection	9 (15.5%)
Trimming of edges & suturing	20(34.4%)
Keep placenta in space	Zero
Vascular ligation	54 (93.10%)
Uterine artery ligation	7 (12.07%)
Internal iliac artery ligation	8 (13.79%)
Ovarian artery ligation	
Cesarian Hystrectomy	**29 (50%)**

PPROM *: Preterm prelabour rupture of membranes* ,**LSCS:** Lower segment caesarean section ,**USCS:** Upper segment Cesarian section

Table (3): Types of morbidly adherent placenta in study population

Types of placenta	No (%)
Accreta	39 (67%)
Focal	29 (50%)
Total	10 (26%)
Increta	12 (20.6%)
Percreta	7(12%)

Table (4): Blood transfusion units among the study population

	Study population (n = 58)
Cases received blood &blood products	56 (96.5%)
Mean ± SD.	3.62 ± 3.3
Range (Min-Max)	24 (0 - 24)
Packed RBCs	
Total Number	56 (96.5%)
<4 packs	31 (55.3%)
4 – < 12 packs	22 (39.2 %)
>12 packs	3 (3.5 %)
FFP	
Total Number	50 (86%)
Mean ± SD.	2.69 ± 2.4
Range (Min-Max)	14 (0 - 14)
Platelet & Cryo	
Total Number	5 (8.9%)
Mean ± SD.	0.38 ± 1.41
Range (Min-Max)	6 (0 - 6)

SD: *standard deviation,****RBCs*** *:Packed red blood cells ,****FFP****: fresh frozen plasma*

Table (5): Maternal complications incidence among the study population

	Study population (n = 58)
Bladder injury	17 (29.3%)
Ureteric injury	1 (1.72%)
Post-partum age after conservative management	1 (1.7%)
Blood transfusion related complications	5 (8.6%)
Anaphylaxis	1 (1.7%)
RDS	3 (5.1%)
DIC	1 (1.7%)
ICU admission	6 (10.34%)
Death	1 (1.72%)

RDS: *Respiratory distress syndrome* ,**DIC:** Disseminated intravascular coagulation ,**ICU:** Intensive care unit

Table (6): Fetal outcome among the study population

	Study population (n = 58)
Fetal outcomes	
Preterm	26 (45%)
NICU	25 (43.1%)
Mortality	7 (21.2%)

NICU: Neonatal Intensive Care Unit

Table (7): Correlation between MAP & risk factors in study population

Risk factors	Incidence of MAP	
	r	P value
Age	0.04	0.8
Parity	0.102	0.7
Previous CS	0.588	0.007*
Uterine surgery	0.442	0.002*

MAP: Morbidly Adherent Placenta ,**CS**: Cesarean Sections

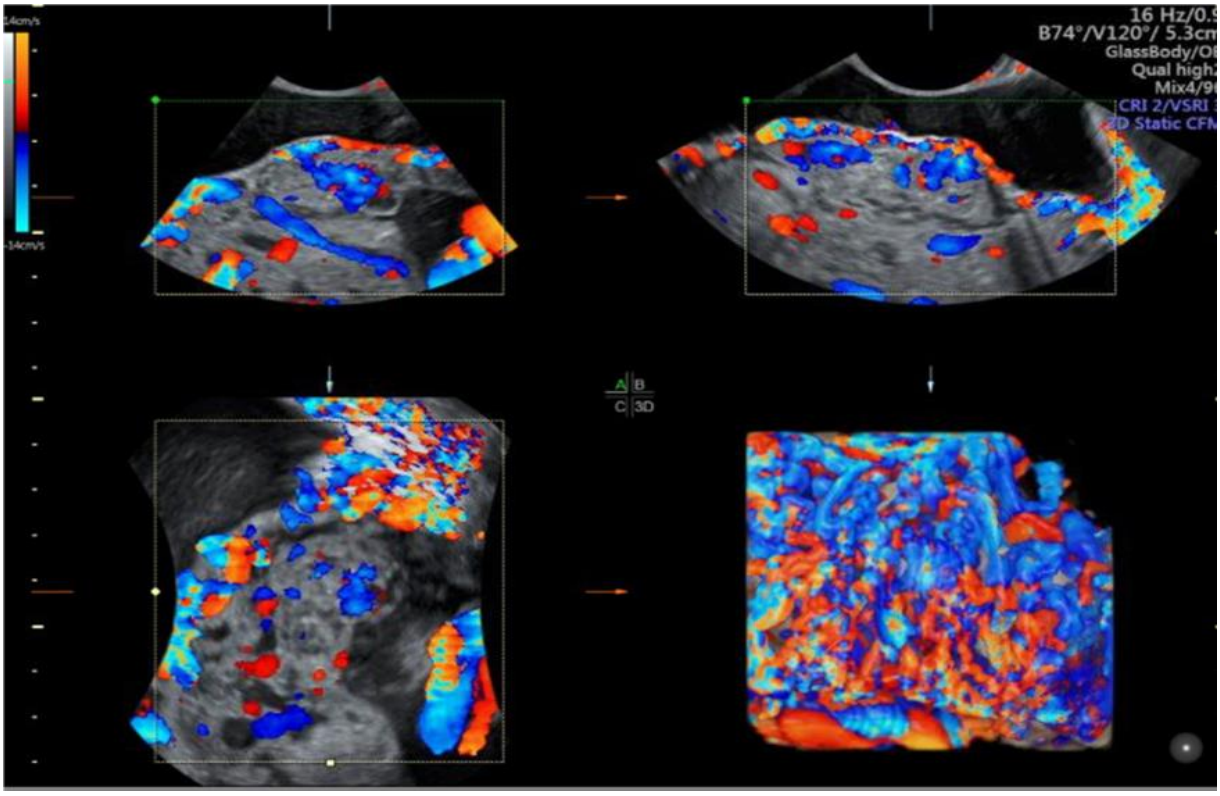

Figure (1): 3D Color Doppler of the uteroplacental interface. In the 2D images, marked vascularity and bulging can be seen. Upon 3D rendering, these vascular areas appear markedly confluent, suggestive of placenta percreta **[9].**

DISCUSSION

The participants' ages ranged from 21 to 42 years old, with a mean age of 31.17 years, according to the results of the current study. The patients who were between the ages of 30 and 39 made up the largest group of patients (58.62%), followed by those who were between the ages of 20 and 29 (34.48%) and 40 to 49 (6.90%). Our results show that women between the ages of 30 and 39 account for the majority of cases, underscoring the significance of early identification and treatment of (MAP) in this age range to reduce related risks to the health of both the mother and the fetus.

There was a range of 1 to 5 with an average parity of 2.71. In a similar vein, there had been 2.57 cesarean sections (CS) on average, with a range of 1 to 5. The analysis of the distribution of prior cesarean sections (CS) showed that 36.2% of participants had had two or three CS. Given the high percentage of patients who have had repeated cesarean sections in the past, it is crucial to

provide this population with watchful antenatal care and cautious management in order to reduce the risk of (MAP) and its related problems.

In agreement with current study results Vijayasree [10] and Muhammad [11] a cross-sectional investigation was carried out. 38 pregnant women with (MAP) >20 weeks' gestation were included between May 2018 and May 2019, with the age group of 36 to 40 having the highest prevalence 36.8%.

In accordance Muhammad [11] showed how the patients with (MAP) distributed in terms of the number of prior cesarean sections (C/S), with the majority having had three C/S: 17 instances (25.0%) matched the findings of the current investigation.

The patients' surgical uterine history was one of the risk factors displayed in the current investigation. A history of evacuation and curettage (E&C) was reported by 31.03% of the patients regarding prior uterine procedures. Whereas 1(1.7%) patient had several pregnancies and 2(3.4%) patients had a history of placenta previa from a prior pregnancy. Furthermore, a significant proportion of the participants (32.76%) disclosed a history of prenatal vaginal bleeding, suggesting a possible risk factor or complication linked to MAP.

In the same line Vijayasree [10] and Muhammad [11] revealed that 36.8% of the patients had a history of prior surgical evacuation. None of the patients had a history of abnormal invasive placenta in the past. 3.2% of people were pregnant more than once.

The results of the current study demonstrated the variety of management techniques used. Since most of the cases involved severe vaginal bleeding, 48.3% of them were handled as emergency cases due to labor pain, PPROM, sever vaginal bleeding or fetal cause. A considerable proportion of patients (50%) received conservative care in an effort to maintain their fertility and, whenever feasible, avoid having their uterus removed entirely. Placental excision, uterine edge trimming, and hemostatic sutures at the placental bed are among the measures used; leaving the placenta in situ is not used in any situations. Given the severity of the illness and the requirement for a final surgical intervention to assure maternal safety, half of the cases (50%) underwent hysterectomy.

Although there were differences in the kind of skin incisions made, most people (67.24%) chose to have Pfannenstiel incisions, which are known to heal more quickly than midline incisions. On the other hand, midline incision was more prevalent (84.2%) in hysterectomy cases, probably because a greater surgical field and access were required.

The results of the current study demonstrated the use of a variety of artery ligation procedures as a component of the management plan to reduce blood loss. With uterine artery ligation accounting for 93.10% of cases, this surgery was the most often carried out. By lowering blood flow to the placenta, this method seeks to both facilitate surgical manipulation and lower the risk of bleeding. In 12.07% of cases, internal iliac artery ligation was also carried out, which is probably going to significantly reduce the blood flow to the placenta and uterus.

In consistent with current study Vyas *et al* [12] showed that 22 cases of (MAP) diagnosed antenatally were managed 77.2% of cases underwent subtotal hysterectomy, while 22.8% underwent total hysterectomy. *Khalek et al* [13] additionally employed a variety of management techniques, with cesarean hysterectomy used in 62.9% of cases and conservative approaches used in 37.1% of cases. Conservative techniques included resection of the lower uterine segment with bilateral uterine artery ligation in 21.4% of cases and compression sutures combined with bilateral uterine artery ligation in 15.7% of cases.

Muhammad **[11]** employed a variety of surgical techniques, such as cesarean hysterectomy, B-Lynch sutures with intrauterine balloon, and combinations thereof, to treat (MAP). In order to successfully control bleeding and guarantee maternal well-being, the most prevalent procedure was cesarean hysterectomy with internal iliac ligation (43.8%), followed by B-Lynch sutures with intrauterine balloon (31.3%). In conformity to current study results Wajid *et al* [14] stated that 27 (43%), had uterine artery ligation, while the remaining 27 had used hemostatic sutures in the placental bed. In 64 cases (50.3%), the placenta was not separated and a direct cesarean hysterectomy was performed; in 30 cases (23%), internal iliac ligation was performed.

According to the current investigation, focal accreta 29 cases (50%), the most common type of MAP among the population, was found. Increta and Percreta accounted for 19 cases (33%). In agreement with Wajid et al [14] and Muhammad [11]. A majority of the cases (55%) involved accreta. Increta and Percreta made up 45%.

According to the current study, transfusions of blood and blood products were necessary in the majority of instances (96.5%). Packed red blood cells (RBCs) were the most often given transfusion product; they were given in all 56 cases. 55.3% of the packaged RBC units were distributed in packs of one to four. Between 0 and

24 packed RBC packs were transfused, with a mean of 3.62 packs transfused. Eighty-six percent of instances involved the administration of blood products as (FFP), platelets, and cryo, with a mean of 2.69 units and a range from 0 to 14 units. These results emphasize the substantial blood loss and coagulopathy linked to (MAP) and stress the significance of timely and sufficient transfusion therapy in the management of hemorrhagic complications and the improvement of maternal outcomes.

In agreement Muhammad [11] showed that the number of blood transfusion units given to patients with (MAP) varied, with most receiving one or two units. Furthermore, a lower percentage of patients received more units. In harmony Chaudhari *et al* [1] caused the management of (MAP) to frequently necessitate large blood transfusions due to considerable blood loss of 1000–2000 mL.

The results of the current investigation indicated a variety of problems and outcomes. The most frequent consequence, occurring in 31.03% of patients, is urinary tract damage, which emphasizes the susceptibility of nearby structures to surgical treatments for MAP. Complications from blood transfusions were also found in 5 patients (8.6%). 10.34% of patients required admission to the intensive care unit (ICU), indicating the severity of the ailment and the necessity of close observation and postoperative care. Sadly, one patient (1.72%) passed away from MAP-related complications, demonstrating the possibility of severe negative consequences even in the face of vigorous treatment approaches. These results highlight how crucial early detection, meticulous surgical technique, and thorough postoperative care are to lowering complications and enhancing outcomes in MAP cases.

In consistent with current study results Nieto-Calvache et al [15] examined the management of urinary tract injuries (UTIs) in Morbidly Adherent Placenta. Data from 2011 to 2019 were analyzed, and it was discovered that in 27.7% of instances, UTIs were associated with more problems. According to Bailit *et al* [5] revealed that the ICU admission rate for the given data was 31.0%, indicating a significant percentage of cases needing critical care management. Desai *et al* [16] conducted a study examined cases of MAP, only one maternal death occurred.

Fetal outcomes varied in this study with 58 pregnant women with MAP identified as part of an interventional cohort. A significant percentage of babies (56.90%) needed to be admitted to the neonatal intensive care unit (NICU), indicating that they may have needed specialist treatment because of difficulties from preterm or other variables connected to the mother's health. Most of the babies (78.7%) that were admitted to the NICU were prematurely born. While seven babies (12% of the total) died. These results highlight how MAP affects prenatal outcomes and how crucial multidisciplinary care strategies are to maximizing outcomes for both mother and child. In accordance Khalek *et al* [13] and Bailit *et al* [5] the results of a retrospective randomized study that was conducted at Menoufia Teaching Hospital over a four-year period, focusing on 70 cases of MAP, show the wider impact of this condition on both maternal and neonatal outcomes. The study found that the median hospital stay duration was five days, and 15.7% of infants were admitted to the neonatal ICU.

Correlationally, the study indicates that the probability of a hysterectomy or conservative management is not significantly impacted by the number of previous cesarean sections.

Regarding hysterectomy and conservative therapy, the results between patients who had prior uterine surgery (Positive) and those who had not (Negative) were not statistically significant (P = 0.329).

Age and parity have a negative correlation with the frequency of MAP, although previous CS and uterine surgery have a high positive correlation with the risk of MAP.

Conclusions:

An incidence rate of 1.6/100 cases of MAP among CS was found in the study, underscoring the significance of comprehending and successfully treating this condition. The incidence of MAP was found to be significantly influenced prior cesarean sections & previous uterine surgeries like E&C. This highlights the importance of thorough antenatal examination and monitoring in high-risk patients. Various management options were employed; 50% of patients underwent conservative cesarean sections in an attempt to maintain fertility, and 50% the cases underwent cesarian hysterectomy, highlighting the seriousness of the disorder. The management plan to address hemorrhagic problems and improve maternal outcomes included blood transfusions and careful postoperative care. A considerable percentage of cases had complications, such as urinary tract injuries, while morbidity was recorded in just one case due to DIC which emphasizes the importance of meticulous surgical technique and thorough postoperative care.

Conflict of interest:

The authors declare no conflict of interest.

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