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ORIGINAL ARTICLE

Evaluation of pregnancy outcomes and different management options used in Morbid Adherent placenta

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ABSTRACT

Background: Morbidly Adherent Placenta (MAP) is defined as invasion of the placental chorionic villi into the myometrium, either invading myometrium superficially (accreta), or deeply (incretta), or fully and or neighboring organs (percreta). The management of MAP is caesarean hysterectomy. Conservative uterine sparing approaches are performed in patients with strong desire for future fertility and hemodynamic stability. The aim of this work was to evaluate different management options for MAP and its effect on pregnancy outcomes to find the best approach to decrease MAP associated morbidity and mortality.

Methods: Study included 42 MAP Previa patients who underwent history taking, examination, investigations, and different management operative options. Maternal and fetal outcome were recorded.

Results: The postoperative complications are DIC, reoperations, postpartum collapse in 2 patients (4.8%), ICU admission in 5 cases (11.9%), wound infection, retained products of conception, chorioamnionitis and pulmonary embolism in 1 patient (2.4%).

Conclusions: Multidisciplinary approach individualized according to hemodynamic stability; future fertility desire may reduce maternal morbidity and mortality in MAP patients. As CS hysterectomy, should be avoided in women with future fertility desire. Good anticipation and timely decision are the keys to success in this life-threatening condition.

Key words: Placental disorders; Placenta accrete; Morbidly Adherent Placenta; Management of placenta accrete; postoperative complications of placenta accreta

INTRODUCTION

Morbidly adherent placenta (MAP) is defined as placental chorionic villi adherence either whole (total) or part (partial) to the myometrium; superficially (accreta), deeply (incretta) and fully (percreta). While focal adherence (when part of the cotyledon is involved) (1). MAP Previa especially with previous CS Section (CS) is a life-threatening complication of pregnancy, with 10 folds rising rate in the past 50 years because of the increasing (CS) rate worldwide. It's incidence is 1:2500 per delivery. It may be asymptomatic or presented with antepartum (APH) or postpartum

hemorrhage (PPH), abdominal pain, acute abdomen, retained placenta, uterine rupture, DIC or occasionally maternal death (2),(3).

Early antenatal diagnostic criteria of MAP using Doppler U/S and MRI, which can reduce its morbidity and mortality includes: (4) Thinning of anterior Lower uterine segment (LUS) of less than 1mm, Lacunae vascular spaces (Swiss cheese appearance), inter parenchymal placental lacunar flow, extension of placental tissue beyond uterine serosa and bladder uterine serosa hypervascularity and prominence of subplacental venous complexes. MAP management with a

multidisciplinary approach includes hemorrhage anticipation and management, availability of packed cells, platelets, fresh frozen plasma, cryoprecipitate, and activated factor VII. Interventional radiology and cell saver technology are useful (5). Classical, high transverse and fundal transverse uterine incisions with pre-operative and /or intra-operative U/S MAP areas mapping, have been used to avoid the placental hemorrhage and to deliver the fetus (6). Traditional optimum management of MAP is CS hysterectomy, but it is associated with postoperative complications and fertility loss. However, if hysterectomy is done without removal of the placenta, this would prevent unnecessary hemorrhage and reduce maternal mortality. In cases where MAP is associated with placenta previa, total hysterectomy is preferred to a subtotal hysterectomy (7).

Balloon catheter occlusion of the pelvic vessels or Selective Arterial Embolization decreases blood flow to the uterus and makes it possible to perform surgery under controlled circumstances. Balloon occlusion of the internal iliac artery is effective for hemostasis of placenta previa in the absence of invasive placenta. For patients with invasive placenta, especially placenta percreta, a large area of placental invasion or abnormal vascular filling suggests the need for hysterectomy. The risks of the prophylactic use of internal iliac artery balloon occlusion include vascular injury and thrombus formation. Bilateral internal iliac artery ligation is performed prior to peripartum hysterectomy to reduce blood loss especially when interventional radiology is not available (8). Other uterus sparing strategies are described to achieve hemostasis by resecting the area of placental attachment, if it is focal and the majority of the placenta has been removed (9). In conservative approach, once the baby is delivered the placenta is left undisturbed. The cord is cut short and the uterine incision is closed with monitoring for bleeding and sepsis (10). Morbidity was defined as the occurrence of 1 or more of the following (11): maternal admission to the intensive care unit (ICU) for > 24 hours, transfusion of ≥ 4 units of packed red blood cells, coagulopathy (platelets ≤ 100000 / microliter, international normalized ratio ≥ 1.2 , and /or fibrinogen ≤ 200 mg/dl), ureteral injury, bladder injury and reoperation.

METHODS

This is a prospective study that includes 42 hospitalized pregnant women diagnosed with MAP between December 2019 and May 2020 at Zagazig Universities Hospitals. An informed written consent about different management

options including hysterectomy, blood products need during the operation and risk of mortality were taken from all patients and their husband. The privacy of the patient is always respected. IRB approval number 6966 is obtained from- IRB Committee- Faculty of medicine, Zagazig University. Written informed consent was obtained from all participants. The study was done according to The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Inclusion criteria:

All cases of placenta previa in the third trimester admitted to Hospitals and diagnosed antenatally as MAP

Exclusion criteria: Any medical disorder with pregnancy as anemia, hypertension, diabetes, cardiac lesions, liver diseases or kidney diseases.

Steps of performance and techniques that were used:

Each woman was subjected to the following:

Full history taking & Examination

Laboratory investigations

A blood sample was withdrawn to check for complete blood count, coagulation profile, liver function tests, renal function tests and random blood sugar.

A urine sample was taken to check for proteinuria, hematuria and presence of urinary tract infection. Blood group, cross matching for blood and plasma before operation

U/S: U/S was performed for each patient to confirm viability, gestational age, fetal biometry, fetal presentation, amount of liquor and detailed assessment of placental site, degree of adherence by 2D U/S and Doppler

U/S machine: (GE voluson healthcare Austria with 3.5 MHz sector transducer for TAS and 7.5 MHz sector transducer for TVS)

Sonographic features of MAP by 2D U/S:

Deficiency of retroplacental sonolucent zone, Vascular lacunae, Myometrial thinning, Interruption of bladder line and Presence of exophytic masses.

Characteristic findings on color Doppler U/S

include: A diffuse lacunar flow pattern with high-velocity pulsatile venous type flow (peak systolic velocity more than 15cm/s) spread throughout the placenta, myometrium and cervix. A central lacunar flow pattern with turbulent flow distributed regionally or focally in the parenchyma. Bladder-uterine serosal interphase hyper vascularity. Markedly dilated vessels over the peripheral sub placental zone. An absence of sub placental vascular signals in the areas lacking the peripheral sub placental hypo echoic zone. Abnormal vascular channels linking the placenta

to the bladder.

Preoperative preparation:

Fasting at least 6 hours preoperative.

Preservation of adequate amount of blood and plasma from the same ABO group, platelets and recombinant activated factor vii.

Notification to neonatal, gynecological oncologists, urology, interventional radiologists and vascular surgeons' teams to be available if needed.

Surgical techniques:

Different management were performed in MAP patients with placenta previa according to the degree of adhesion, amount of bleeding and the future fertility desire.

All cases with MAP were operated by a senior obstetrician with attendance of a senior anesthesiologist. General anesthesia and Prophylactic antibiotic were given before skin incision.

Skin incision: midline or pfannenstiell incision.

Uterine incision: high transverse or vertical upper segment incision with delivery of the baby.

Hysterectomy without or with placental removal followed by conservatives' procedures were left to the experience of the senior obstetrician.

Bilateral internal iliac balloon was inserted before operation and inflated after delivery of the baby to decrease blood loss during surgery.

If bladder or ureteric injury was suspected urological consultation was done.

Postoperative care:

Close monitoring to vital signs (blood pressure, pulse, temperature and respiratory rate), urine output (color and amount) and drains were done in ICU or in the ward according to patient condition. Complete blood count and packed RBCs transfusion if the patient was anemic (Hemoglobin level less than 8 g/dl).

Early mobilization, good hydration and prophylactic anticoagulant for all patients especially high risk patients especially those with associated coagulopathy and dose (depends on the associated comorbidities) to prevent DVT.

After discharge the patients returned to outpatient clinic to remove stitches and their wounds were examined for infection. Post-operative histopathological assessment of the placental remains.

Estimation of blood loss:

Actual blood loss (ABL) was calculated from a modification of the gross formula (13)

Actual blood loss = $BV \{Hct(i) - Hct(f)\} / Hct(m)$

BV: Blood volume. Blood volume is calculated from the body weight by multiplying the Body weight (in Kg) by $\times 70$

Hct (i): Initial hematocrit

Hct (f): Final hematocrit

Hct (m): Mean hematocrit

Neonatal care:

All neonates were examined by pediatrician with detection of APGAR score, gender and birth weight.

Statistical analysis:

Data collected throughout history, basic clinical examination, laboratory investigations and outcome measures coded, entered and analyzed using Microsoft Excel software. Statistical Package for the Social Sciences (SPSS version 20.0) (Statistical Package for the Social Sciences) software for analysis was used afterwards for further analysis of the data in this study.

RESULTS

All cases had placenta previa and 41 cases had at least one previous CS as in figure (3), 18 of the 42 patients (42.9%) had a history of at least one previous uterine curettage, the mean age of the included women was 32.21 ± 5.28 years (range: 21-43 years), the median parity was 3 (range: 1-5), 20 (47.61%) presented with APH, 14 (33.3%) cases had urgent surgery due to APH or uterine contraction, as listed in tables (1), (2) and (3). Midline incision was done in 13 (31%) cases and pfannenstiell incision was done in 29 (69%) women, there are 20 cases had hysterectomy from the start without trial of placental removal while attempt placental removal was tried in 22 cases that succeeded in 13 cases had CS only and failed in 9 cases had hysterectomy, as mentioned in table (4).

Different uterus sparing methods were tried, as described in table (5) including bilateral uterine artery ligation in 13 (59%) cases, bilateral ovarian artery ligation in 3 (13.6%) cases, bilateral internal iliac artery ligation in 3 (13.6%) cases, intrauterine tamponade in 4 (18.1%) cases and hemostatic sutures in placental bed in 11 (50%) cases, while B-lynch suture was not done, while procedures which were performed to control pelvic hemorrhage after hysterectomy included internal iliac artery ligation in 8 (27.5%) cases, pelvic packing in 5 (17.2%) cases and internal iliac balloon inflation to control hemorrhage in 1 (3.4%) case.

As shown in table (6), Bladder injury occurred in 7 (16.7%) cases and ureteric injury occurred in only 1 (2.4%) case, the median estimated intraoperative blood loss was 2 L (range: 1-8 L), all cases need blood transfusion. The median was 4 units (range: 1-17 units), the overall rate of FFP

transfusion was 39/42 (92.85%). The median was 2 units (range: 1–8 units), only 2 (4.76%) woman received platelet transfusion and only 3 (7.14%) woman received cryoprecipitate transfusion, only 1 (2.4%) woman needed Recombinant activated factor vii. The postoperative complications are as described in table (7), DIC, postpartum collapse, reoperations in (2 cases ;4.8%), ICU admission in (5 cases ,11.9%), Wound infection, decidual cast

as in figure (1), retained products of conception, chorioamnionitis(as shown in figure (2) and pulmonary embolism in (1 case ;2.4%). Median duration of hospital stay was 4 days (range: 2-25). This study, as in table (8) revealed a mean gestational age of 36.61 weeks, the median birth weight of 3400 gm and Apgar score of 7 with uniformly good neonatal outcome.

Table (1): Patient clinical characteristics

Age (Years) Range Mean ± SD	21 – 43 32 .21 ± 5.28
Gestational Age at delivery(Weeks) Range Mean ± SD	33-39 36.61 ± 1.60
Parity Range Median	1 – 5 3

SD standard deviation

Table (2): Risk factors in Women with Morbidly-Adherent Placenta Previa

No. of Previous CS	
0	1 (2.38%)
1	6 (14.28%)
2	13 (30.95%)
3	14 (33.33%)
4	7 (16.66%)
5	1 (2.38%)
No. of previous D & C	18 (42.9%)
Asherman	1 (2.38%)

CS Cesarean section

D&C Dilation &curettage

Data presented as number (percentage)

APH Antepartum Hemorrhage

Data presented as number (percentage)

Table (3): Degree of Morbid Placental Adherence by preoperative U/S evaluation

Degree of Morbid Adherence	
Focal accreta	13(31%)
Accreta	14 (33.4%)
Increta	10 (23.8%)
Percreta	5 (11.9%)

Data presented as number (percentage)

Table (4): Type of surgery

CS only	13(31%)
CS Hysterectomy	29 (69%)
Elective surgery	28(66.7%)
Urgent surgery	14(33.3%)
Midline incision	13(31%)
Pfannenstiel incision	29(69%)

Data presented as number (percentage)

Table (5): Intraoperative procedures performed to conserve the uterus after trial of placental removal

	Total number of cases=22
Bilateral uterine artery ligation	13 (59%)
Bilateral ovarian artery ligation	3 (13.6%)
Uterine tamponade	4 (18.1%)
Internal iliac artery ligation	3 (13.6%)
Hemostatic sutures in placental bed	11 (50%)
B-lynch	0

Data presented as number (percentage)

Table (6): Intraoperative complications and estimated intraoperative blood loss and blood transfusion

	Total number of cases=42
Bladder injury	7 (16.7%)
Ureteric injury	1 (2.4%)
Intestinal injury	0
Vascular injury	0
	Total number of cases= 42
Estimated Blood Loss (L)	
Range	1 – 8
Median	2
Blood Transfusion(RBCs units)	
Range	1 – 17
Median	4
FFP Transfusion	39 (92.85%)
FFP Transfusion(units)	
Range	1 – 8
Median	2
Platelet Transfusion	2 (4.76%)
Cryoprecipitate Transfusion	3 (7.14%)
Recombinant activated factor vii	1 (2.4%)

Table (7): Postoperative complications in included women with morbidly-adherent placenta

	Total number of cases=42
DIC	2 (4.8%)
ICU admission	5 (11.9%)
Reoperation	2 (4.8%)
Wound infection	1 (2.4%)
Postpartum collapse	2 (4.8%)
Pulmonary embolism	1 (2.4%)
Mortality	1 (2.4%)
Retained products of conception	1 (2.4%)
Decidual cast	1 (2.4%)
Chorioamnionitis	1 (2.4%)
Duration of hospital stay (days)	
Range	2 - 25
Median	4

Data presented as number (percentage)

Table (8): Neonatal outcome in included women with morbidly-adherent placenta previa

	Total number of cases= 42
Neonatal Gender	
Male	24 (57.1%)
Female	18 (42.8%)
Birth Weight (Kg)	
Range	1.6 – 3.8
Median	3.1
Apgar Score	
Range	1 – 9
Median	7

Data presented as number (percentage); or range, median

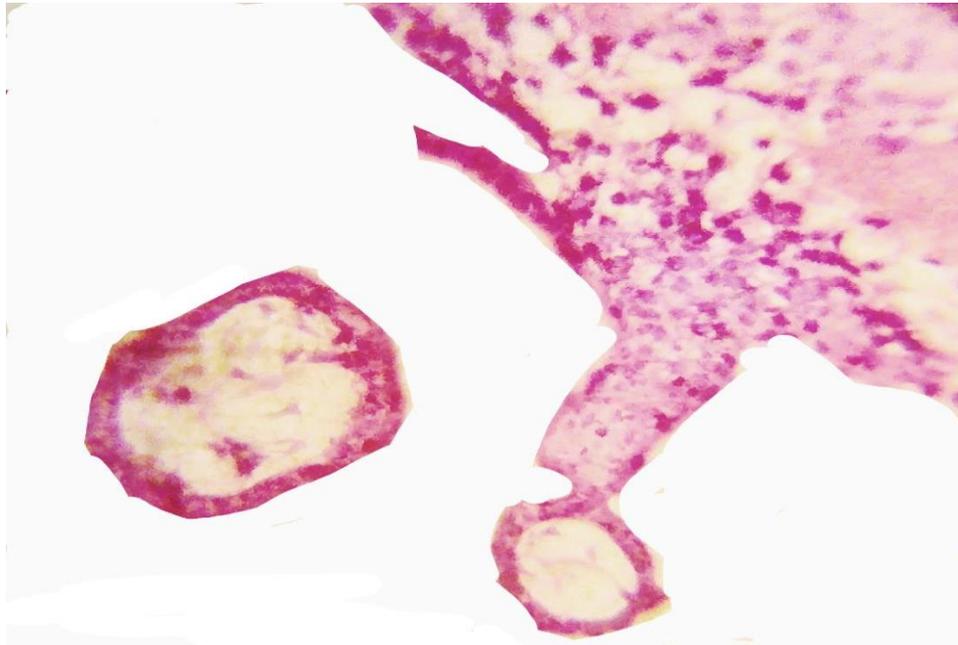


Figure (1): microscopic picture of retained product of conception and atrophic villi lined by syncytiotrophoblast with infiltration of decidua by inflammatory cells (×400,H& E).

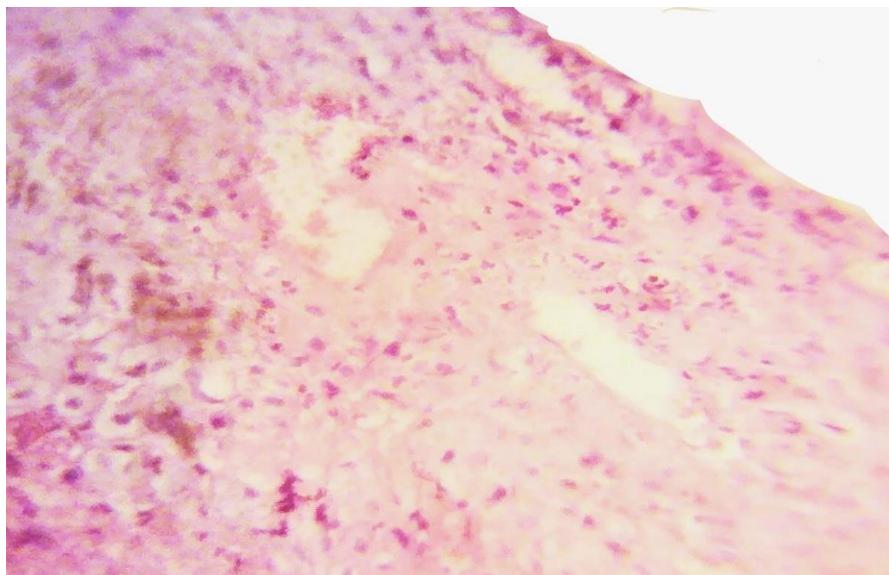


Figure (2): Microscopic picture of chorioamnionitis showing inflamed chorionic membranes and infiltration by inflammatory cells (×400, H&E).

Figure (3): Ultrasonic image of Placenta previa with accreta revealed in Transvaginal image of the lower uterine segment in a patient with placenta previa shows a thin myometrium (arrows) in the



region of prior cesarean delivery scar due to placenta accreta.

DISCUSSION

In our study, all cases had at least 1 previous CS, except for only 1 case that had no previous CS. While Melissa et al., (2013) reported that only 2 (6.1%) cases had no previous CS, while 11 (33.3%) women had 1 previous CS (12). In this study, CS hysterectomy was done without placenta removal in 20 cases (47.6%) and with its removal in 22 cases (52.4%). The decision of placental removal was left to the experience of the senior due to absence of management protocol for MAP in our hospital.

Our results revealed that 20 cases (47.61%) presented with APH, 14 of them (33.3%) had urgent surgery, while Eller et al., 2009 reported APH in 29(62%) cases and urgent surgery in 13(45%) cases (19). Biler A, et al., 2016 agreed with our study that, there is no significant difference (P: 0.64) between elective and urgent surgery as regard blood loss, while Eller et al., 2009 reported that scheduled surgery associated with reduced maternal morbidity in MAP patients. The reason of contradiction may be due to availability of senior obstetrician, anesthesiologists and blood bank in our hospital (19, 20).

In this study midline incision was done in 31% cases and pfannenstiell incision was done in 69% of cases, while Melissa et al., 2013 reported that midline incision was done in 30(90.9%) cases and pfannenstiell incision was done in 3 (9.1%) women (12).

Intraoperative trial of placental removal plus conservative procedures were performed in 22(52.4%) cases that succeeded in 13 (59%) women who had CS only, failed in 9 (40.9%) women who had hysterectomy, while hysterectomy with placenta left in situ was done in 20(47.6%) women.

While Biler A, et al. 2016 reported that 11(22%) women had hysterectomy without removal of the placenta, while 38 (78%) women were managed conservatively. The placenta was removed after delivery in all these patients. (20) .While Deeba F.N et al., (2016) reported that majority of patients 17(74%) undergone CS hysterectomy without removal of the placenta, Placental removal was performed in 6 (26%) patients all having focal adherence of placenta (16).Intraoperatively, many procedures were performed to control pelvic hemorrhage after hysterectomy, internal iliac artery ligation in 8 (27.5%) cases, pelvic packin2009 reported cases and internal iliac balloon was inflated to control hemorrhage in 1 (3.4%) case, Eller et al., 2009 reported that 20 (36%) cases need bilateral internal iliac artery ligation, while Fitzpatrick KE et al., 2014 reported that 11 (8%) women had internal iliac balloon was inflated to control hemorrhage, and 16 (12%) women had intra-abdominal packing. (19, 21)

In this study, the rate of FFP transfusion was 92.85%. Moreover platelets and Recombinant activated factor VII transfusion rate was (7.14%) (2.4%), respectively. While Melissa et

al., 2013 reported transfusion of FFP in 11 cases (33.3%), platelets in 4 cases (36.4%) and cryoprecipitate in 2 cases (18.2%). Fitzpatrick KE et al., 2014 revealed that 5 (4%) cases needed Recombinant activated factor VII (12, 21). Fitzpatrick KE et al., 2014 also reported in agreement with this study that, there is highly significant increase in blood loss in patients undergoing CS hysterectomy with placental removal when compared to those with same procedure but without placental removal. But they disagreed with us, as regard the difference between them in the hospital stay (21).

Biler A et al. 2016 reported in accordance with our study, that intraoperative complications, bladder and ureteric injury occurred, while bowel and vascular injuries have not occurred. However, Eller et al., 2009 revealed that bowel, ureteric and vascular injury occurred. The median hospital stay in this study was 4 days in comparison to 5 days in a study by Melissa et al., 2013 (12). In our study, maternal mortality was reported in only 1 case (2.4%). Morbidity like DIC, postpartum collapse, pulmonary embolism occurred only in cases with hysterectomy and placental removal, due to internal hemorrhage. Deeba F.N et al 2016 reported mortality rate in 2 cases 8.69% (18, 22).

This study, revealed a mean gestational age of 36.61 weeks, the median birth weight of 3400 gm and Apgar score of 7 with uniformly good neonatal outcome. Eller et al., 2009 reported that mean of gestational age at time of delivery was 35.4 weeks (19). A major strength of our study is its prospective population-based design, not relying on routinely coded data to ascertain cases. But the limitations include the sample size. As it was insufficient to identify differences in complications with the use of different management strategies, control of bleeding differed in every patient. Additionally, management decisions were made at the discretion of the responsible clinician, and protocols were not employed.

CONCLUSIONS

Multidisciplinary approach individualized according to hemodynamic stability; future fertility desire may reduce maternal morbidity and mortality in MAP patients. As CS hysterectomy, should be avoided in women with future fertility desire. Good anticipation and timely decision are the keys to success in this life-threatening condition.

Conflict of interest: None

Financial disclosure: None

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