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Original article

EVALUATION OF PROTOCOL OF MANAGEMENT OF MORBIDLY ADHERENT PLACENTA IN MATERNITY ZAGAZIG UNIVERSITY HOSPITAL

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ABSTRACT

Background: Morbidly adherent placenta (MAP) defines the abnormal adherence of the placenta to the underlying uterine wall. It has a rising incidence world-wide. The risk of placental abnormalities increases in the presence of uterine scars due to cesarean delivery or gynecologic procedures. It may lead to massive obstetric hemorrhage resulting in serious complications such as DIC, transfusion related complications.

Aim: Evaluation of protocol of management of patients with morbidly adherent placenta at Maternity Zagazig University Hospital and its effect on pregnancy outcome to find the best method of management to decrease associated morbidity and mortality.

Patients and methods: This cohort study conducted on 120 patients diagnosed as having morbidly adherent placenta and were admitted to Zagazig University Hospitals.

Results: In our study there were 48 cases (40%) managed by CS only and 72 cases (60%) managed by hysterectomy.

Conclusion: well-planned caesarean hysterectomy with placenta left in situ adopting multidisciplinary approach is the recommended management option for MAP.

Keywords: Accreta, Increta, Percreta.

INTRODUCTION

Morbidly adherent placenta (MAP) is defined as the abnormal adherence of placenta to the underlying uterine wall. It is classified according to the degree of penetration, into 3 types: Placenta accreta- chorionic villi is adherent to superficial myometrium, Placenta increta- chorionic villi extends into the myometrium and Placenta percreta- chorionic villi penetrating full thickness myometrium and involving serosa and may involve adjacent organs like urinary bladder **(1).** The incidence of MAP is rising dramatically as a result of increase in the rate of cesarean delivery, an incidence of approximately 1 per 333-533 deliveries, but as high as 1 in 20 pregnancies in women with both placenta previa and prior cesarean delivery **(2).** The risk of placental abnormalities increases in the presence of uterine scars due to cesarean delivery or gynecologic procedures such as curettage, myomectomy and hysteroplasty, also in advanced maternal age and multiparity **(3).** During pregnancy MAP may be asymptomatic or may present with antepartum hemorrhage, abdominal pain, acute abdomen, shock and hematuria if bladder is involved. While intrapartum it may present as retained placenta, postpartum hemorrhage or uterine rupture **(4).** MAP may lead to massive obstetric hemorrhage resulting in complications such as DIC, transfusion related complications, need for hysterectomy, surgical injury to urinary tract and other viscera, multisystem organ failure and even death **(5).** Actual maternal mortality is unknown but has been reported to be as high as 6-7 **(6).** Accurate prenatal diagnosis is critical to reduce the risk of maternal morbidity and

mortality. Ultrasonography is used routinely for diagnosis of MAP. Magnetic resonance imaging can be helpful when the placenta is difficult to visualize on Ultrasonography. 3D power Doppler U/S could represent a turning point for diagnosis of abnormal placentation **(7).** Optimal management of women with MAP requires early recognition of high risk women based on clinical risk factors, accurate preoperative diagnosis, detailed maternal counselling and planning at the time of delivery. Management should involve multidisciplinary team of gynecologist, urologist and/or gyne-oncologist **(8).** Management options include caesarean hysterectomy without attempts for removal of placenta, extirpative management with trying to remove the placenta manually from the uterus and conservative management entails leaving the placenta in situ which may be followed by medical management with Methotrexate, uterine artery embolization, internal iliac artery ligation, dilatation and curettage or hysteroscopic loop resection **(9).** Management of MAP by caesarean hysterectomy is a difficult task and results in postoperative complications and loss of fertility. However, prompt hysterectomy has led to reduction of maternal mortality to less than 2%. Leaving the placenta undisturbed until completion of the hysterectomy would prevent unnecessary hemorrhage **(10).**

PATIENTS AND METHODS

This prospective cohort study conducted on 120 patients diagnosed as having morbidly adherent placenta and were admitted to Zagazig University Hospitals. Written informed consent was obtained from all participants and the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Inclusion criteria: All cases in the 3rd trimester admitted to Zagazig University Hospital and diagnosed antenatally as having morbidly adherent placenta

Exclusion criteria:

- Presence of major medical disorders e.g. DM, PE, Cardiac lesion, Coagulopathy, liver diseases or kidney diseases
- Multiple pregnancy
- Refusal of the patient

Methods:

All patients were subjected to Informed consent, complete history taking, complete examination and Laboratory investigations.

Ultrasound examination was performed for each patient to confirm viability, gestational age, fetal biometry, and fetal presentation, amount of liquor and detailed assessment of placental site and degree of adhesion of the placenta by 2D ultrasound and Doppler.

Counseling:

Counseling for the severity of the case, management option and about the gestational age of termination and possibility of incubator admission was done.

Preoperative preparation:

- Fasting at least 6 hours preoperative.
- Preservation of adequate amount of blood and plasma from the same ABO group.
- Notification to neonatal team to attend the operation.
- Notification to urology team and vascular surgeons to be available if needed.

Surgical techniques:

All cases were operated by a senior obstetrician with attendance of a senior anesthesiologist.

General anesthesia was given

Prophylactic antibiotic was given before skin incision

Skin incision: midline

Uterine incision: high upper segment

Delivery of the baby

Time was given for placenta to separate.

If placenta separated spontaneously or came with gentle traction, surgeons proceeded the operation as a cesarean delivery.

Decision of hysterectomy was taken by the surgeons if placenta didn't separate.

Once the decision was made to proceed with hysterectomy, cutting the cord short was done, placenta was left in situ and hysterotomy incision was closed expeditiously and the procedure was initiated. The uterus with the placental mass was amputated with suturing the vaginal stump. Then the entire pelvis was re-inspected to ensure hemostasis.

If bladder or ureteric injury was suspected urological consultation was done. Also, vascular surgery consultation was done when needed.

Postoperative care:

The patients were observed for vital signs, urine output, drains filling, bleeding and general conditions.

Complete blood count and packed RBCs transfusion if the patient was anemic.

Early mobilization, good hydration and prophylactic anticoagulant if needed to prevent DVT.

Neonatal care:

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

STATISTICAL ANALYSIS

Data collected throughout history, clinical examination, laboratory investigations and outcome measures were coded, entered and analyzed by Statistical Package for the Social Sciences program.

Data were summarized as Mean ± Standard deviation, percentage, median and range.

Chi square was performed for comparison of qualitative date. Mann Whitney test was performed to compare two groups whose data were non parametric. Cut off level: P≤ 0.05= Significant (S), P≤ 0.001= highly significant (HS).

Administrative design

Written informed consent was obtained from all participants and the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

RESULT

During study period 120 patients were included with mean age of the included patients was 31.73 years, with a median parity of 3 and mean gestational age at delivery was 36.79 (Table 1).

Table (2) shows that most of cases had 3 C.S by a percent of 49.1%, 80% had no history of D&C and there was no other previous intraoperative manipulations for the studied cases.

Table (3) shows that most prevalent morbid adhesion was accrete by a percent of 62.5%

Table (4) shows that most of cases were managed surgically by caesarean hysterectomy by a percent of 60%.

Table (5) shows that the most prevalent intraoperative complication is bladder injury by a percent of 26.7%.

Of the included 120 women, 5% of cases developed DIC, 30% of cases were admitted to ICU postoperatively, 1.7% developed wound infection, 3.3% developed postpartum collapse and 2.5% were re-operated again (2 cases for evacuation of hematoma and one for removal of abdominal packs which was left to control pelvic hemorrhage after hysterectomy) and only 2 (1.7%) cases died due to severe hemorrhage and cardiac arrest. The median hospital stay after delivery was 4 days (table 6).

Table (7) shows that the median estimated intraoperative blood loss was 2 litre. 116 cases needed RBCs (Red blood cells) transfusion with a median of 4 units. The overall rate of FFP (Fresh frozen plasma) transfusion was 86.7% with a median of 2 units. Only 3.3% women received platelet transfusion, 10.0% received whole blood and 5.0% received cryoprecipitate transfusion.

Table (1s) shows that percent of females delivered was 57.5% while male babies were 42.5% of total deliveries. Most of cases were full term by a percent of 73.3%. Good fetal

outcome was noticed in 78.4% of cases. Mean birth weight was 2.87±0.487 kg.

Table 1: Demographic features of the studied population.

Variable	**(N=120)**
Age (yrs.)	
Mean ± SD	31.73 ± 5.19
Range	22 - 44
Gestational Age at delivery(Weeks)	
Mean ± SD	36.79 ± 1.77
Range	31 - 40
Parity	
Median	3
Range	1 - 5

Table 2: Risk factors for MAP in studied cases.

Variable	**(N=120)**	
No. of Previous CS	**No.**	**%**
0	2	1.7
1	11	9.2
2	34	28.3
3	59	49.1
4 or more	14	11.7
No. of previous D&C		
0	96	80.0
1D&C	20	16.7
2D&C	4	3.3
Other previous intraoperative manipulations	0	0.0

Table 3 Degree of morbid placental adherence by preoperative U/S evaluation.

Variable	**(N=120)**	
APH	N	%
Focal	34	
Accrete	75	28.3
Increta	4	62.5
percreta	7	3.4
		5.8

Table 4 Surgical management of the studied cases.

Variable	**(N=120)**	
Surgical Management	N	%
C.S only	48	40.0
Caesarean hysterectomy	72	60.0

Table 5 Intraoperative complications of the studied population.

Variable	(N=120)	
Injury	**N**	**%**
Bladder injury	32	26.7
Ureteric injury	4	3.3
Intestinal injury	1	0.8
Vascular injury	2	1.7

Table 6: Postoperative complications in included women.

Variable	(N=120)	
	N	%
DIC	6	5.0
ICU admission	36	30.0
Reoperation	3	2.5
Wound infection	2	1.7
Postpartum collapse	4	3.3
Mortality	2	1.7
Duration of postoperative hospital stay (days): Range Median	 1 - 23 4	

Table 7 Estimated intraoperative blood loss and blood transfusion in included women.

Variable	(N=120)
Estimated Blood Loss (L) Range Median	0.5-9 L 2 L
RBCs Transfusion Number Range Median	116 (96.7%) 1-14 units 4
Whole blood Transfusion Number Range median	12 (10.0%) 1-6 units 2
FFP Transfusion Number Range Median	 104 (86.7%) 1-15 units 2
Platelet Transfusion	4 (3.3%)
Cryoprecipitate Transfusion	6 (5.0%)

DISCUSSION

Morbidly adherent placenta is the pathological adherence of placenta to uterine wall. The precise etiology of MAP is unknown; however MAP is associated with risk factors which predispose to abnormal myometrial invasion by placental villi**,** such as cesarean delivery, uterine curettage, myomectomy, uterine reconstructive surgery and Asherman's syndrome **(11).**

In this study, the included 120 cases were diagnosed preoperatively as having a degree of morbidly adherent placenta. The mean age of included women was 31.73 ± 5.19 years (range: 22-44 years), the mean gestational age at delivery was 36.79 ± 1.77 weeks (range: 31-40 weeks) and the median parity was 3 (range: 1-5). Nearly similar to a recent study reported the mean age of included women with placentation disorders was 26.7 ± 4.9 years (range: 21-32 years), the mean gestational age at delivery was 33.8 ± 4.6 weeks (range: 29-39 weeks) and the median parity was 3 (range: 1-5) **(12).**

In a study by Walker et al., they reported that (42.4%) of cases had at least one D&C and (6.1%) had history of Asherman's syndrome **(13)**. In the current study (20%) of cases had a history of uterine curettage but no cases had a history of another intrauterine manipulations. In our study all the included cases had at least one previous CS, except for (1.7%) of cases that had no previous CS. Of the remaining patients, percentage of patients with placenta previa and a history of one, two, three and four or more cesarean section delivery were (9.2%), (28.3%), (49.1%) and (11.7%) of cases respectively. While in another study, they reported that (6.1%) of cases had no previous CS, while (33.3%) had one previous CS, (39.4%) had two previous CS and (21.2%) had three or more previous CS **(13)**.

Antenatal diagnosis of MAP is important and helps to reduce perinatal morbidity and mortality. In general, U/S is considered the primary diagnostic tool for abnormal placentation with a sensitivity ranging from 77-87% while the sensitivity is 82.4% for Doppler ultrasound **(14).**

Bailit et al., reviewed a cohort of 115502 women and their neonates born in 25 hospitals in the United States. They reported that only (53%) of MAP were suspected before delivery even at larger tertiary care centers. This may be due to the fact that U/S was dependent mainly on the skills of the sonographer **(15).** In a study by Nasrullah et al., they reported the following incidences of abnormal placentation by U/S: placenta accreta in (69.6%) of women, placenta increta in (13%) and placenta percreta in (17.4%) **(16)**. In the present study the incidences of abnormal placentation was focal accrete: (28.3%), placenta accreta: (62.5%), placenta increta: (3.4%) and placenta percreta (5.8%).

Debate remains over the optimal management of MAP. If the placenta fails to separate after delivery, leaving it in place and proceeding with either a hysterectomy or conservative management, rather than trying to separate it, is currently recommended by RCOG **(17**). But, ACOG recommends planned, preterm caesarean section hysterectomy with the placenta left in situ as removal of a placenta accreta spectrum is associated with significant hemorrhagic morbidity **(18).**

In the current study, 120 cases diagnosed prenatally as MAP, placenta separated spontaneously in (17.5%) of cases, while in (26.7%) - with little degree of adhesion (focal accreta) - trial of placental removal by gentle traction only was done. In those (44.2%), conservatives procedures to control bleeding from the placental bed was done, that succeeded in (40%) of cases, who had CS only and failed in (4.2%) of cases, who were managed by hysterectomy, while placenta was left in situ without attempts of placental removal in (55.8%) and were managed also by hysterectomy. So, in our study there were (40%) of cases managed by C.S only and total cases managed by hysterectomy were (60%). In a prior study, it was reported that (22%) of women had hysterectomy without removal of the placenta, while (78%) were managed conservatively by removing the placenta after delivery. According to the degree of bleeding,

uterine compression sutures, bilateral uterine artery ligation, bilateral hypogastric artery ligation were used and if needed, two or more techniques were performed. Due to hemodynamic instability in conservative management group, (21%) of patients underwent hysterectomy during cesarean section **(19).** While in other study, they reported that majority of patients (74%) underwent caesarean hysterectomy without trial removal of the placenta, Placental removal was performed in (26%) of patients all having focal adherence of placenta **(16).**

MAP is associated with considerable morbidity including cesarean hysterectomy, need for packed RBCs transfusion, intraoperative organ injuries, need for ICU admission, coagulopathy, infection and the need for reoperation. So, these cases present a challenge to obstetrician-gynecologists **(20).** Morbidity from MAP is caused by problems associated with massive bleeding. In the present study, the median estimated intraoperative blood loss was 2 L (range: 0.5 - 9 L). Most patients in this study needed blood transfusion (98.3%). Median packed RBCs transfusion was 4 units (range: 1-14 units), the overall rate of FFP (Fresh frozen plasma) transfusion was (86.7%) with a median of 2 units (range 1-15 units), only (3.3%) women received platelet transfusion, (10.0%) received whole blood and (5.0%) received cryoprecipitate transfusion. The present findings are similar to other reported rates of transfusion, like a recent study reported that the median estimated intraoperative blood loss was 2.5 L (range: 1-5 L). The overall rate of blood transfusion in included women was (79.6%), with a median of 3 units (range: 1-5 units). The overall rate of FFP transfusion was (79.6%), with a median of 3 units (range: 1-5 units). Only (2.3%) of woman received platelet transfusion and only (2.3%) of woman received cryoprecipitate transfusion. Thus, blood transfusion should be anticipated, and massive transfusion is not rare in these obstetric patients **(12).**

Other study reported that (72.2%) required blood transfusion with a mean of 3.5 units of RBCs (range: 0-20 units), (33.3%) required transfusion of FFP, (36.4%) also required transfusion of platelets and (18.2%) required transfusion of cryoprecipitate (**13).**

Other causes of early morbidity (coagulopathy, admission to the intensive care units, bladder injury & early reoperation) are also high in patients with MAP **(12).** In the current study, intraoperative complications occurred in the form of bladder injury in (26.7%), ureteric injury in (3.3%), bowel injury in (0.8%) and vascular injury in (1.7%) of cases. While Eller et al., in their study reported that bladder injury occurred in (33%), ureteric injury occurred in (7%) of women **(21)**. In more recent study, reported that (8.1%) had bladder injury, (2%) had ureteric injury and no cases had bowel or vascular injury (**19)**.

In the current study (6.7%) had DIC, (30.0%) were admitted to ICU postoperative and 3 (2.5%) cases need reoperation [two of them to evacuate hematoma and the other to remove abdominal packs which was left on purpose to control pelvic hemorrhage after hysterectomy]. In another study included 44 women, they reported the following: (6.8%) developed DIC, (27.3%) were admitted to ICU postoperatively, only (2.3%) were readmitted because of developing postoperative collection and 3 (6.8%) were re-operated (2 cases to control bleeding while the third with a missed bladder injury) **(12).** while Eller et al., in their study reported that DIC occurred in (26%), ICU admission in (28 %) and reoperation in (4%) of cases **(21)**.

In the current study, (1.7%) had wound infection and no cases had pulmonary embolism. while Biler et al., reported that (4.1%) of cases suffered from wound infection and (3%) had pulmonary embolism (**19)**.

The median hospital stay in our study was 4 days (range: 1-23 days). While others reported median hospital stay 5 days (range: 2-13 days) (**13)** and 3 days (range: 2-5 days) **(12).**

MAP is associated with significant maternal mortality. Studies have shown mortality rate of 7-10% **(22).** In the current study there was only (1.7%) maternal mortality.

Nasrullah et al., reported a mortality rate of (8.69%) **(16).** In other study there was only one maternal death (2.7%) (**12).**

In cases of MAP the incidence of perinatal complications is also increased mainly due to preterm birth and small for gestational age fetuses **(6).** In this study, we reported that most of cases were full term (73.3%). Good fetal outcome was noticed in (78.4%) of newborn, while (15.8%) needed admission to neonatal ICU. There were (3.3%) IUFD (Intrauterine fetal death) and (2.5%) neonatal death. Mean birth weight was 2.87±0.487 kg.

The sex ratio associated with morbidly adherent placenta favors females **(9).** We reported that females delivered were (57.5%) while male babies were (42.5%) of total deliveries.

In a study included 44 neonates, the median birth weight was 2800 g (range: 700-4500g), (52.3%) were males, while (47.7%) were females. So, the result of this study is opposite to the result of ours. (31.8%) of those infants were admitted to the neonatal ICU (**12).**

CONCLUSION

In conclusion, abnormal placentation and obstetric hemorrhage are leading causes of maternal morbidity and mortality. So, high index of suspicion, early antenatal diagnosis, proper counselling of patients, planned surgery at well-equipped center, anticipation of high volume blood transfusion, delivery of neonate with fundal incision without manipulating placenta are the key steps to reduce morbidity and mortality in morbidly adherent placentas.

Generally, well-planned caesarean hysterectomy with placenta left in situ is the recommended management option for MAP (if placenta doesn't separate spontaneously), as this is associated with less rates of maternal morbidity and mortality.

Declaration of interest
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Table 1s is shown online as supplementary material

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