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Fetal and Maternal Outcomes in Cases of Morbidly Adherent Placenta in Sohag University Hospital: Observational Study

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ABSTRACT

Background: Morbidly Adherent Placenta (MAP) is the greatest challenge in modern obstetrics. It is associated with massive obstetrical hemorrhage and high maternal mortality. Antenatal diagnosis and meticulous multidisciplinary planning at delivery is crucial for optimal outcome.

Objective: To study the maternal and fetal outcomes in cases of morbidly adherent placenta for better management of these cases and to know our local practices toward these cases in Sohag University Hospital**.**

Patients and Methods: 132 cases of pregnant women who had placenta previa with previous cesarean section scar were studied. This observational study was conducted at a Tertiary Care Hospital at Sohag University Hospital, Obstetrics & Gynecology Department (Inpatient and Emergency Sectors) from September 2017 to September 2018. All cases were subjected to complete history taking, complete physical examination, complete investigations, obstetric 2D U.S, color Doppler and MRI in some cases. Elective delivery was planned at 37-38 weeks or earlier in case of any complication.

Results: 3664 were delivered, 2138 cesarean deliveries (58.3%) were performed. The percentage of these cases found to be 3.6% of deliveries and 6.17% of cesareans. The frequency of MAP in our study is 1 in 27.8 deliveries. There was one mortality in our study.

Conclusion: High caesarean section (C.S) rate is the leading cause of MAP. Antenatal diagnosis of morbidly adherent placenta through color Doppler and MRI allows for multidisciplinary planning to minimize potential maternal or neonatal morbidity and mortality.

Keywords: Morbidly adherent placenta, Intensive care unit, Cesarean section, Internal iliac artery, Intra-uterine catheter.

INTRODUCTION

Morbidly Adherent Placenta (MAP) is the greatest challenge in modern obstetrics [(1)]. It is a severe pregnancy complication, associated with massive obstetrical hemorrhage and high maternal mortality. Antenatal diagnosis and meticulous multidisciplinary planning at delivery is crucial for optimal outcome [(2)]. It is characterized by the attachment of placental villi directly to the myometrium, sometimes invading deeper into the uterine wall or surrounding organs. It could be placenta accreta (chorionic villi are in contact with the myometrium), placenta increta (chorionic villi invade the myometrium) or placenta percreta (chorionic villi penetrate the uterine serosa). The bladder is the most frequently involved extra uterine organ when there is a placenta percreta. Placenta percreta that invades the urinary bladder is associated with a substantial morbidity and mortality of up to 10 % [(3)].

In Egypt, according to the latest data, more than half of all women give birth by CS without much difference between urban and rural areas [(4)]. It is evident that morbidly adherent placenta usually occurs in subsequent pregnancies, explaining the older age group and higher gravidity of the patients. The most important risk factors are previous caesarean delivery, previous uterine surgeries, placenta previa, multiparity and advanced maternal age [(5)]. Up to 88 % of the women have concomitant placenta previa [(6)].

Ultrasound is highly sensitive and specific in the antenatal diagnosis of MAP when performed by skilled operators [(7)]. 3D U.S has also been used successfully for evaluation of placenta accrete [(8, 9)]. The use of ultrasound together with the color Doppler allowed for better prediction of placental invasion of the myometrium prior to obstetrical intervention to improve the maternal and the fetal outcome. The abnormal Doppler findings are loss of retro placental clear zone, intra placental hypervascularity in uterine bladder interface, and blood vessels invading myometrium [(10)]. MRI accurately predicted placenta accreta with 88% sensitivity and 100% specificity [(11)]. A majority of MAP are diagnosed during the third stage of labour or during C.S, which results in adverse consequences including exsanguinating hemorrhage [(12)]**.**

Transfer of women with suspected placenta accreta to major centers for delivery has been recommended to assure access to large blood banks, prompt availability of subspecialty surgeons, and experienced intensive care units [(5, 13)]. Hysterectomy has traditionally been advised in the management of placenta accreta, but there has been a recent movement towards conservative management and preservation of fertility. Strategies include leaving the placenta after

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caesarean delivery with surgical uterine devascularization, embolization of the uterine vessels, uterine compression sutures and/or over sewing of the placental vascular bed [14].

The Triple- P procedure for percreta is a surgical alternative to peripartum hysterectomy or conservative management of morbidly adherent placenta (placenta percreta) infiltrating the bladder wall [15]. Application of an intrauterine inflated Foleys catheter balloon during C.S in cases of MAP helps to control postpartum hemorrhage (PPH) with preservation of the uterus and decreases the need for the invasive IIA ligation [16]. Transverse B-Lynch first described by Professor Christofer B-Lynch and used since 2006 with successful outcomes to control bleeding in cases of placenta previa [17]. Vertical haemostatic sutures are two parallel vertical compression sutures were placed in the lower segment to compress the anterior and posterior walls of the lower uterine segment [18]. The recommended management of suspected morbidly adherent placenta is planned Caesarean hysterectomy with the placenta left in situ because attempts at removal of the placenta are associated with significant hemorrhagic morbidity [6].

PATIENTS AND METHODS

132 cases of pregnant women who had placenta previa with previous cesarean section scar were studied. This observational study was conducted at a Tertiary Care Hospital at Sohag University Hospital, Obstetrics & Gynecology Department (Inpatient and Emergency Sectors) from September 2017 to March 2018.

All Pregnant females who were suspected to have abnormal placental attachment such as patients with placenta previa overlying site of previous C.S scars were included. All those with normally sited placenta delivering vaginally or by caesarean section, primigravida and multipara with non-scarred uterus were excluded.

All cases were subjected to complete history taking: Name, ID, age, residency and parity (deliveries, preterm births, and abortions). Complaint (Antenatal care or emergency situation (in attack of vaginal bleeding or in labor), menstrual history and past history. Complete physical examination: general and local examination. Obstetric U.S and 2D trans abdominal ultrasonography was prospectively enrolled into this study. Gray-scale transabdominal ultrasound examination was performed by assistant lecturers in Obstetrics and Gynecology Outpatient Clinic (MEDISON CO., LTD, KOREA), Department (HITACHI, 2012, JAPAN) and emergency sectors (FUKUDA DENSHI CO., LTD, Japan) to detect loss of the sub endometrial echo lucent zone and other abnormalities suggestive of placenta accreta.

Transvaginal ultrasonography may be needed to confirm the diagnosis. Color flow Doppler by senior obstetrician (lecturer) by 3D U.S (VOLUSON P8) in our department and residents and assistant lecturers in the radiology department (LOGIQ P9) in Sohag University Hospital. MRI sometimes was indicated if Doppler is inconclusive. It was performed by assistant lecturers in the radiology department.

These patients were admitted at 34 weeks or earlier in case of any complication. They had complete investigations in form of blood grouping, complete blood count, coagulation profile, liver and kidney functions and hepatitis markers. Fetal surveillance carried out by assessing the biophysical profile using ultrasound and Non stress test. Management included achievement of optimal health status and extensive counseling of patient and her husband regarding the condition and its potential intra / post-operative complications.

Patient and her husband were consented in writing for C.S at any time with increased risk of hemorrhage, multiple blood transfusions, bladder/ureteral damage, prolonged catheterization, infections, need for intubation, prolonged hospitalization, ICU care, need for reoperation, thromboembolic events and death. Discussion involved relative likelihood of caesarean hysterectomy and subsequent infertility and additional procedures like internal iliac artery ligation. A multidisciplinary approach involving senior obstetrician, advanced surgical colleagues, urologist, anesthesiologist, consultant hematologist, and pediatrician were adopted. Elective delivery was planned at 37-38 weeks or earlier in case of any complication after prior corticosteroids for lung maturity.

Patients were kept first in the list with four to six units of blood, neonatal fresh frozen plasmas (FFPs) and platelet concentrate in hand along with prophylactic antibiotics. Majority received general anesthesia, in liaison with senior anesthetist. Pfannesteil incision was made in all cases. At the time of cesarean hysterectomy made away from the location of placenta to deliver the baby. Then quickly total hysterectomy with non-separation of placenta was performed in those with no future fertility desire. However, subtotal hysterectomy was performed in cases with extensive adhesions surrounding lower uterine segment. Further procedures like internal iliac artery ligation, ureteric stenting, and bladder repair were undertaken as and when required. In cases with desired fertility and partial placental separation spontaneously, conservative approach with trial hemostasis after removal of placenta completely or partially, bilateral uterine arteries ligation, multiple uterine compression sutures, vertical haemostatic sutures or Transverse B-Lynch were applied. Uterine tamponade in form of balloon or intra-uterine packing

had been used and showed successful results. Some patients were kept in ICU postoperatively. Patients were observed for immediate and delayed complications. Delivered babies were resuscitated by neonatologist and observed for need NICU or not.

Ethical approval:

An approval of the study was obtained from Sohag University Academic and Ethical committee. Every patient signed an informed written consent for acceptance of the operation.

Statistical analysis

Recorded data were analyzed using the statistical package for social sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean ± standard deviation (SD). Qualitative data were expressed as frequency and percentage. Independent-samples t-test of significance was used when comparing between two means. Chi-square (x2) test of significance was used in order to compare proportions between two qualitative parameters. P value ≤ 0.05 was considered significant.

RESULTS

Total 132 cases of pregnant women who have placenta previa with previous cesarean section scar were studied. Total 3664 were delivered, 2138 cesarean deliveries (58.3%) were performed. The percentage of these cases found to be 3.6% of deliveries and 6.17% of cesareans. The frequency of MAP in our study is 1 in 55.6 deliveries.

All cases had history of previous cesarean sections. All of our patients had one or more cesareans with different degrees of placenta previa as well.

Table (1): Patients number of C.S.

Number of cesarean	Number of cases (%)
Previous C.S	24(18%)
Previous 2C.S	40(30.3%)
Previous 3 C.S	34(25.7%)
Previous 4 C.S	24(18%)
Previous 5 C.S	6(4.5%)
Previous 6 C.S	4(3%)

All cases had history of previous cesarean sections. All of our patients had one or more cesareans with different degrees of placenta previa as well. In our study 24 cases (18%) were previous 1 C.S, 40 cases (30.3%) were previous 2 C.S, 34 cases (25.7%) were previous 3 C.S, 24 cases (18%) were previous 4 C.S, 6 cases (4.5%) were previous 5 C.S and 4 cases (3%) were previous 6 C.S (Table 1).

Table (2): Patients demographic characteristics

	Frequency/ Number of cases (%)	Mean ± SD
Maternal age	20-47	30.9±5.6
Occupation	Occupied 46 (34.8%) Housewife 86 (65.2%)	
Residency	Urban 60 (45.4%) Rural 72 (54.6%)	
Education	Highly educated 18 (13.6%) Moderately educated 46 (34.8%)	

Maternal age in our study is from 20 years old to 47 years old. Forty-six cases (34.8%) have occupation and 86 (65.2%) are house wives. Sixty cases (45.4%) came from urban areas and 72 cases (54.6%) came from rural areas. Eighteen cases (13.6%) are highly educated , 46 cases (34.8%) are moderately educated and 68 cases (51%) are not educated (Table 2).

Table (3): Patients' obstetric data in the current pregnancy

	Range/Number of case (%)	Mean ± SD
Gestational age	20-39 weeks	34.55 ± 3.58
Presentation & position	Cephalic 103 (78%) Breech 14 (10.6%) Transverse 16 (12.1%)	
Placental location and degree	Placenta previa (P.P) centralis 96 (72.7%) P.P I anterior 2 (1.5%) P.P II anterior 6 (4.5%) P.P III anterior 13 (9.8%) P.P I posterior 1 (0.75%) P.P II posterior 2 (1.5%) P.P III posterior 12 (9%)	
Estimated fetal weight	300 gm -3800 gm	2471±861

Gestational age of our cases in our study is from 20 weeks gestation to 39 weeks with estimated fetal weight from 300 grams to 3800 grams. The fetuses were presented in one hundred and three cases (78%) by cephalic presentation, in 14 cases (10.6%) by breech presentation and in 16 cases (12%) had transverse lie. Ninety-six cases (72.7%) in our study had placenta previa centralis, 2 cases (1.5%) had P.P I anterior, 6 cases (4.5%) had P.P II anterior, 13 cases (9.8%) had P.P III anterior, only one case (0.75%) had P.P I posterior, 2 cases had P.P II posterior and 12 cases (9%) had P.P III posterior (Table 3).

Table (4): Intra operative complications

Intra-operative complications	Number (%)	Cases in each group Number (%)
Need for Internal iliac artery ligation	3 (2.2%)	CH 3(2.2%) TH 0
Bladder injury	34 (25.7%)	CH 18 (13.6%) TH 16 (12%)
Ureteric injury	1(0.75%)	CH 1 (0.75%) TH 0
Intestinal injury	1 (0.75%)	CH 0 TH 1 (0.75%)

CH: Cesarean Hysterectomy, TH: Trial Hemostasis

Table (4) showed that three cases (2.2%) needed internal iliac artery ligation (IIA ligation) to control bleeding by vascular surgery team. Thirty-four cases (25.7%) had bladder injury and repaired by urology team. One of those cases developed urinoma and conserved in the urology department. One case (0.75%) had bilateral ureteric injury and ureteric stenting was done by urology team. One case (0.75%) had intestinal injury and repair was done by surgical team.

Table (5): Surgical techniques

Technique	Number of cases (%)
Bilateral uterine artery	100 (75.7%)
Transverse B-Lynch	20 (15%)
Vertical compression sutures	70 (53%)
Both of them	6 (4.5%)
Cesarean hysterectomy	36 (27%)

Bilateral uterine artery ligation was done in 100 cases (75.7%). Control of bleeding was done by transverse B-Lynch in 20 cases (15%), by vertical haemostatic sutures in 70 cases (53%) and by both of them in 6 cases (4.5%). Cesarean hysterectomies were performed in 36 cases (27%) as shown in table (5). IUC was left to compress placental bed in 90 cases (68%). Intra uterine packing was done in 4 cases (3%).

DISCUSSION

The incidence of placenta accreta has increased 13-fold since the early 1900s and directly correlates with the increasing cesarean delivery rate [(19)]. In the presence of the risk factors, previous caesarean section and placenta previa, obstetricians must have a high index of suspicion for placenta accreta. **Nisenblat *et al.*** [(20)] reported a risk of 14 % in women of placenta previa with previous caesarean section; the risk is increasing with the number of previous caesarean sections.

The high rate of antenatal diagnosis of morbidly adherent placenta in this study could be because the study was conducted in a tertiary care hospital receiving a large percentage of transferred patients (from peripheral health centers) where diagnostic facilities such as ultrasound with color Doppler as well as MRI are available. We screened the high risk population with placenta previa and previous caesarean sections by color Doppler ultrasonography/MRI and subsequently confirmed it on clinical grounds. The significant morbidity incurred by women with a morbidly adherent placenta suspected prior to delivery (half of the cases) may be due to the fact that these morbidly adherent placentas are more deeply invasive and more evident on prenatal imaging modalities. Regardless of the management option made, prevention of complications ideally requires a multidisciplinary team approach. Early planning of arrangements for antepartum and intra-partum management is preferable to late planning, when emergencies are more likely to occur [(21)].

A classical uterine incision, often transfundal, may be necessary to avoid the placenta and to allow delivery of the fetus. The most influential variable on maternal outcome is not attempting to remove the placenta. A retrospective study by **Shukenami *et al.*** [(22)] and **Yap *et al.*** [(23)] showed placental removal before hysterectomy resulted in increased maternal morbidity. Antenatal diagnosis, adequately planned caesarean hysterectomy without attempts at placental removal, reduce maternal morbidity as seen in our study. Hysterectomy has traditionally been advised in the management of placenta accreta but there has been a recent movement towards conservative management and preservation of fertility. All efforts should be made to control intra/postoperative hemorrhage. Internal iliac artery or uterine artery ligation performed in some cases to control hemorrhage. There was one mortality in our study, although maternal mortality as high as 7–10% in reported cases. The woman morbidity in our study is primarily related to extensive surgery and includes massive blood transfusion, infections and urologic injuries. Manual removal of the placenta increases maternal morbidity 67% vs 36% ($p = 0.04$), ICU admission for > 24hrs, massive transfusion (> 4u PRBCs), coagulopathy, ureteral injury and early re-operative [(24)].

Placenta accreta can lead to hemorrhage, resulting in hysterectomy, blood transfusion, multiple organ failure, and death [(25)]. Particular considerations should be given to the anticipation and management of massive hemorrhage, including availability of packed RBCS (PRBCs), platelets concentrate and fresh frozen plasma. This result emphasizes that these women are at particularly high risk of adverse outcomes and should be managed in centers with capability for massive blood transfusion with experienced intensivists and surgeons [(26)]. All hospitals need to be prepared to handle this emergency. Nevertheless, women who do have morbidly adherent placenta suspected before delivery have worse outcomes, and should be considered at

particularly high risk of morbidity and triaged appropriately [27].

CONCLUSION

High C.S rate is the leading cause of MAP. Antenatal diagnosis of morbidly adherent placenta through color Doppler and MRI allows for multidisciplinary planning to minimize potential maternal or neonatal morbidity and mortality. Considering on the economy, safety, non-invasive and timesaving of U.S, color Doppler is the preferred choice for diagnosis of MAP, while MRI can be complementary to U.S and color Doppler. Hysterectomy has been advised but there has been a recent movement towards conservative management and preservation of fertility. Conservative management of MAP by bilateral uterine artery ligation, uterine vertical haemostatic sutures or transverse B-Lynch is effective in some cases. Delivered babies were resuscitated by neonatologist and evaluated as regard Apgar score at 1& 5 minutes, congenital anomalies and need for NICU.

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