

Research

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Outcome of Stepwise Uterine Sparing Approach as a Conservative Surgical Management of Placenta Accreta

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ABSTRACT

Introduction: The incidence of placenta accreta is rising as a consequence of increased rate of cesarean sections and placenta previa which is the strongest risk factor. Intractable postpartum hemorrhage associated with placenta accrete is a leading direct cause of maternal morbidity and mortality. Major surgical modalities were described for management of placenta accreta like hysterectomy, systemic pelvic devascularization, stepwise surgical measures, intervention radiology methods and massive blood transfusions, all were recommended to be used for successful management and saving the maternal life.

Patients and Methods: Fifty cases of placenta accrete were included in our study. They were selected from Obstetrics and Gynecology Department at Tanta University Hospital diagnosed by ultrasound (US) and magnetic resonance imaging (MRI). Pre-operative evaluation, laboratory investigations, and cross matched blood were done. Stepwise uterine sparing technique included simply: double ligation of uterine artery at two different levels on both sides before and after placental removal, lower at level of uterine isthmus and higher for utero-ovarian vessels ligation. Hemostatic quadruple sutures with sewing the placental bed were applied for control bleeding at the placental site attachment. Finally insertion of triple way Foley's catheter through the cervix and inflation to 50 cc saline to compress lower uterine segment and drain bleeding.

Results: The stepwise uterine sparing procedure achieved a high success rate 96%. From a total 50 cases with placenta accrete, 41 cases (82%) passed their major surgery and recovery period without any reported complications. There were some common complications between the same cases. There was 14% (7 cases) complicated with bladder injury, 8% (4 cases) with fever, also 8% (4 cases) with UTI, 12% (6 cases) wound infection and 10% (5 cases) needed post-operative maternal ICU admission. Neither maternal death, DIC, readmission for any cause nor relaparotomy was reported for any case.

Conclusion: The stepwise uterine sparing procedure was successful as a conservative form of surgical management of placenta accrete with preserving the uterus and fertility, saving patient's life and minimizing major surgical interventions in all patients.

KEY WORDS: Placenta accrete; Uterine sparing technique.

ABBREVIATIONS: MRI: Magnetic Resonance Imaging; UTI: Urinary Tract Infection; DUAL: Double Uterine Artery Ligation on both sides; RBCs: Red Blood Cells.

INTRODUCTION

Placenta accrete is a life-threatening obstetric condition which requires multidisciplinary team for management. It is an abnormal firm attachment of placenta into the uterine wall. It is a high risk pregnancy condition, in which blood vessels and other parts of the placenta grow too deep into the uterine wall. It occurs when a defect in the decidua basalis allows chorionic villi to invade the myometrium and the normal decidua fails to develop. It is associated with the highly invasive and penetrating power of the developing trophoblast.¹

Placenta accreta may lead to massive obstetric hemorrhage with attempt to remove the placenta leading to several complications such as disseminated intravascular coagulopathy, cesarean hysterectomy, multiple surgical injuries to the ureters, bladder, and other viscera, adult respiratory distress syndrome, renal failure, hypovolemic shock, circulatory collapse and need for post-operative intensive care unit (ICU) or death. The average amount of blood loss at delivery in a case of placenta accreta is 3,000-5,000 ml.²

Diagnosis of placenta accreta can be done by different modalities such as Ultrasound Grey scale, color Doppler (CD) and Magnetic Resonance Imaging (MRI). Ultrasonography is usually employed as the primary modality for antenatal diagnosis of invasive placentation. MRI is reported to be complementary to the ultrasound, as it may help in diagnosing of invasive placentation, especially in those cases in which ultrasound (US) is not conclusive as posterior placenta previa.³

Prenatal diagnosis of invasive placentation is associated with a reduced risk of maternal complications by enabling the surgeon to plan for the type of resources needed at the time of delivery as management is a team work. These resources include two seniors obstetrician staff, anesthesia team, neonatologists, available blood products, possible intervention radiology for uterine artery embolization or internal iliac artery occlusion, urologists if surgery associated with bladder or ureteric injury, vascular surgery for internal iliac artery ligation and need for maternal post-operative ICU admission.⁴

Till now, it has been found that there is no definite planned management of placenta accreta as it depends upon personal expertise and hemodynamics of patient. In the past, it was generally accepted that placenta accreta was well and ideally treated by total abdominal hysterectomy. Hysterectomy is a lifesaving measure to manage uncontrolled uterine hemorrhage.⁵

Recently, obstetricians searched for new different modalities for removal of the placenta with less blood loss and fewer complications with repair of the uterus at the time of the delivery to preserve the female fertility. This study was conducted to evaluate the stepwise uterine sparing technique as a conservative management of placenta accrete for preserving the uterus and fertility of the female with minimizing surgical complications.

PATIENTS AND METHODS

Study Setting and Design

Prospective, single armed clinical trial study conducted at Obstetrics and Gynecology Department of Tanta University, Tanta, Egypt in the period from April 2016 till September 2016.

Patient Selection

A total of fifty pregnant women with placenta accreta after 32 weeks of gestation diagnosed by Doppler Ultrasonography and MRI or discovered intra-operatively on surgical table in emer-

gent cases. False diagnosed placenta accreta or managed cases with severe destruction of lower uterine segment and non-separable placenta which needed hysterectomy were excluded from the study.

Elective termination of pregnancy was conducted at completed 36 weeks of gestation. While in emergent cases, termination mediated regardless of the gestational age. Preparation of cross matched packed red blood cells (RBCs) and four units of fresh frozen plasma was a routine practice before the beginning of surgery.

Surgical Technique

- Under general anesthesia all patients were operated. The following steps were done in all cases by the same surgeon:
- Dissection of the urinary bladder from anterior wall of lower uterine segment as much as possible for good exposure, with cauterization or ligation of the newly formed utero-vesical anastomotic branches.
- High transverse incision of the uterus at upper border of placenta to avoid trans-placental incision which provoked severe bleeding then extraction of the baby with ecbolics administration.
- *Double uterine artery ligation on both sides (DUAL)*. First ligature was done before separation of the placenta lower at the level of the uterine isthmus. Second ligature was done after separation of the placenta higher at the level of utero-ovarian anastomosis.
- *Removal of placenta*. Either the total placenta or piece meal was removed according to the degree of placental invasion.
- Hemostatic “square” quadruple sutures at lower uterine segment at the bleeding points or even sewing the placental bed. If there were destructive edges of lower uterine segment, local resection of the invaded part of the uterus with the placenta and trimming the edges was done to provide healthy edges for sutures and repair.
- Insertion of triple way Foley catheter size 24 F inflated by 50 cc saline to compress the bleeding points on the lower uterine segment. It was inserted by assistant or straight artery forceps from the uterine cavity descending to the cervix and caught by another assistant from the vagina. It was preferred to be done from above to avoid upward ascending vaginal infection and keep the intra cervical portion aseptic. This triple way catheter aided additional benefits in irrigation and drainage the uterine cavity from any retained blood.
- Closure of uterine incision wall in continuous double layers, the first layer was associated with significant reductions of blood loss, second layer for tightness of the sutures.
- If the procedure associated with bladder injury (from placental invasion to the serosal covering of the bladder as in the case of placenta percreta), urologists were asked to repair. Also if there was invasion or penetration of the urinary bladder, partial cystectomy and repair were done.
- Insertion of wide pore pelvic intra-peritoneal drains to drain any blood or retained fluid also for early and meticulous follow-up for any complications.

Methods

All demographic data, pre-operative findings, operative data, complications, and post-operative recording of vital signs, drains, urinary output, bleeding, fever and number of transfused blood units if needed also hemoglobin level checked 6 hours post-operatively.

Ethical Approval

This study was approved by local ethical committee of Tanta University before start of this study. All patients were informed about procedure, its risks/benefits and all signed a written consent.

Statistical Methods

The results were analyzed by SPSS, version 18, USA. The tests used were mean, standard deviation, and percentage.

RESULTS

In this study, the enrolled patients (n=50) with placenta accrete were diagnosed prenatally with Ultrasound and MRI. The de-

mographic data of the patients were presented in Tables 1 and 2.

The surprising finding in this study was that patients were so younger due to increasing rate of cesarean sections and encouraging preservation of uterus.

Hemoglobin level was significantly dropped after the procedure which was corrected later by cross-matched blood transfusion.

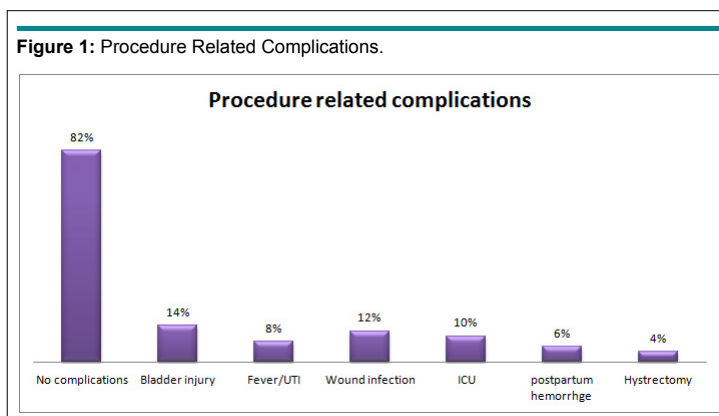
This study showed a high success rate of the stepwise uterine sparing technique in preserving the uterus. The success rate was 96%, included 48 cases from total 50 ones successfully preserved the uterus and only 2 cases who required hysterectomy representing 4%. But there were some related complications in the form of 14% (7 cases) complicated with bladder injury, 8% (4 cases) with post-operative fever, also 8% (4 cases) with urinary tract infection (UTI), 12% (6 cases) wound infection and 10% (5 cases) needed post-operative maternal ICU admission. Postpartum hemorrhage was detected in 6% (3 cases) which was controlled by uterine massage and strong ecbolic. There was no need for vascular surgery during operation, also no need for re-operation or readmission for any case. No visceral or ureteric injuries were reported. Complications are illustrated in Figure 1.

Table 1: Demographic Data of the Patients.

	Range	Mean±SD
Age	24-39	31.78±3.89
Number of previous CS	0-4	3.12±1.68
Parity	0-6	3.38±1.64
Gestational age at delivery (weeks)	Preterm	34-35.6
	Full-term	35.3±0.8
	36-39	37.10±1.40
Duration since last CS	1-6 years	3.24±1.74

Table 2: Operative Findings of This Study.

	Range	Mean±SD
Type of morbidly adherent placenta (n, %)		
Placenta accreta	30 (60.00%)	
Placenta increta	15 (30.00%)	
Placenta percreta	5 (10.00%)	
Operative time (minutes)	75-140	105.65±27.93
Intraoperative blood transfusion units)	2-5	3.80±1.64
Hospital stay (days)	Non complicated	2-3
	Complicated cases	7-11
		9.27±2.34
Intraoperative blood loss (mL)	1000-2500	1750±1060.66
Postoperative blood transfusion (units)	2-5	3.24±1.05
Postoperative blood loss (mL)	400-1100	745.65±238.96
Hemoglobin level (gm/dl)	Pre-operative	8-11.4
	Post-operative	6.7-10.6
		9.62±1.21
		8.22±1.08



DISCUSSION

The results of this study were encouraging to use the stepwise uterine sparing technique in preservation of uterus in morbidly adherent placenta cases. Previous studies conducted to assess the outcome of uterine sparing techniques, were found to be different in the techniques used and results obtained. The results of this study are in agreement with Walker et al in the pre-operative preparations for management of cases with placenta accreta. The main difference was that Walker et al used prophylactic occlusion of the anterior division of the internal iliac artery which is an invasive procedure. Our study achieved a high success rate with uterine artery ligation alone. Comparing the results of both studies, operative time (107 minutes) similar to our study (105 minutes), also the hospital stay was (5 days), our only (3-11 days) but it had more bladder injury (30%) than our study (14%).⁶

Shahin et al conducted a similar study depending on bilateral uterine artery ligation for control bleeding. Also the idea of using B-Lynch suturing as compression sutures is similar to the quadruple local hemostatic ones used to control bleeding. The differences were that in Shahin et al, two cases needed internal iliac artery ligation, needed post-operative ICU admission and complicated with disseminated intravascular coagulation (DIC) and maternal death. Shahin et al was associated with the need for (2-5 units) units of fresh blood transfused intra-operatively which were less than our study where (1-4) units of blood transfusion were needed. The total hospital stay in Shahin et al was (17 days) which was longer than hospital stay in our study (11 days).⁷

El Shazly et al used bilateral uterine artery ligation as primary step with 8-suture compression procedure as a second step for control bleeding associated with placenta accreta when uterine artery ligation failed to stop bleeding. The difference was that the average time of this procedure which was relatively short (142 seconds). The total intra-operative time of our surgical procedure was (75-140 minutes). The mean estimated amount of intra-operative blood loss was (2830 mL) during this procedure and (2375 mL) in women managed with bilateral uterine artery ligation alone in Elshazly et al study while in our study, the total

amount of intraoperative blood loss was (1750 mL).⁸

Shabana et al reported a modified approach of some surgical steps similar to our study but the only difference was that Shabana et al depended on bilateral ligation of the anterior division of internal iliac artery to control bleeding. The operative time in Shabana et al study was (70-140 minutes), similar to our study (75-140 minutes) and number of blood transfusion units was (2-6 units), similar to our study (2-5 units). The associated complications were (8.5%) rate of cesarean hysterectomy, comparing to our study which was (4%) only. As regard complications 10 patients (14.1%) had urinary tract complications similar to our study, nine (90%) were managed during cesarean section and one case presented later in the form of vesico-uterine fistula. No evidence of later complications as vesico-uterine fistula or later repair in our procedure.⁹

Kelekci et al achieved a successful technique in management of placenta accrete using the same our surgical steps including suturing the placental bed with squarely shaped sutures for hemostasis, ligation of utero-ovarian anastomosis branches and finally insertion of a balloon of 3-ways 20 F Foley catheter which was inflated by 80 cc saline and placed into the intrauterine cavity. The study of Kelekci et al differed mainly in internal iliac artery ligation for control bleeding and leaving placenta in situ in some cases. Also there were some different results, such as the units of blood transfusion (2-7) units while in our study (2-5) units. The operative time was (110±20) minutes, while in our study was (75-140) minutes and the mean hospital stay was (4.2±0.4) days, while in our study was (3-11) days. Comparing rates of associated complications, one patient had post-operative wound infection while in our study, 6 cases (12%). The post-operative febrile reactions developed in 2 patients in Kelekci et al study while in our study 4 cases (8%) developed post-operative febrile reaction.¹⁰

Shehata et al reported a study with 100% success rate. It completely agreed with our surgical technique. Both depended on bilateral ligation of uterine artery, higher incision of uterus and insertion of Foley catheter for compressing lower uterine segment. There were some different results. The operative time was (60-100 minutes), while our study (75-140 minutes) and

blood transfusion (2-4 units) and our study (2-5 units). The complications were presented in 6 cases from the all 15 cases represents (40%), while (82%) of cases in our study passed their surgery without any complications. Two cases (13.3%) had bladder injury, our study (14%), 2 cases (13.3%) had pyrexia, compared to our study (8%), 1 case (6.66%) had pyometria and 1 case (6.66%) of wound disruption. There was readmission for two cases but no need for ICU admission for any case. While in our study, 5 cases needed post-operative ICU admission represented (10%) but there was no need for readmission for any case.¹¹

Palacios-Jaraquemada et al conducted a study with nearly similar surgical procedure which included removal of destructed part of lower uterine segment invaded by the placenta and trimming the uterine edges with repair the defect then insertion of a Foley's balloon catheter, three-way 22 F, in the lower uterine segment as in our study. The differences were that higher success rates were observed without the need for uterine artery ligation rather than in our study which depended mainly on uterine artery ligation. Also repair of the uterine edges in our study was mediated by healthy uterine tissue with usual sutures without need for using any mesh or other foreign bodies. Comparing rate of CS hysterectomy, 18 of total 68 cases needed cesarean hysterectomy while in our study included 2 from total 50 cases. There were some different surgical complications, 1 case had pelvic hemorrhage, 2 cases had coagulopathies, 3 cases with uterine infection, 2 ureteral ligations, 2 iatrogenic foreign bodies reaction, 3 post-operative collections, rupture of an epigastric artery in 1 case and vesical fistula in another case. In our study, these complications never had been reported in any case.¹²

CONCLUSIONS

Successful management of the potentially catastrophic conditions associated with abnormal placental adhesion requires early antenatal diagnosis with well preparation of the selected cases. Early and proper management of cases of placenta accreta can preserve life of both mother and her fetus with preserving her uterus well-functioning for further pregnancy. In this study, we have presented a simple approach as a conservative treatment for placenta accreta cases. Our surgical procedure was effective and safe in the conservative management of patients with placenta accreta.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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