Subject Area:

Maternal outcomes after different surgical techniques in placenta accreta: a prospective study

Ashraf M. Kansouh  
*Shebin El-Kom Teaching Hospital*

Esmail M. Serag Eldin  
*Shebin El-Kom Teaching Hospital*, enasmaths1974@yahoo.com

Follow this and additional works at: https://jmisr.researchcommons.org/home

Part of the Medical Sciences Commons, and the Medical Specialties Commons

**Recommended Citation**
DOI: https://doi.org/10.4103/JMISR.JMISR_77_18

This Original Study is brought to you for free and open access by Journal of Medicine in Scientific Research. It has been accepted for inclusion in Journal of Medicine in Scientific Research by an authorized editor of Journal of Medicine in Scientific Research. For more information, please contact m_a_b200481@hotmail.com.
Maternal outcomes after different surgical techniques in placenta accreta: a prospective study

Ashraf M. Kansouh, Esmail M. Serag Eldin
Departments of Obstetrics and Gynecology, Vascular Surgery, Shebin El-Kom Teaching Hospital, Shebin El-Kom, Egypt

Abstract

Background
Placenta accreta (PA) is a potentially life-threatening obstetric condition that requires a multidisciplinary approach to management nowadays owing to increased incidence of PA in parallel with the increased cesarean section rates. With the age of the patients with PA getting younger and fertility preservation being required, until now, there is no unique approach to management of PA.

Objective
The purpose of this study was to describe the efficacy and safety of different surgical procedure in conservative treatment of PA to evaluate their role in minimizing major surgical intervention, especially hysterectomy with its comorbidities.

Patients and methods
This prospective, surgical case-series study included 49 consecutive patients with PA who were prenatally diagnosed by ultrasound or MRI at the Department of Gynecology and Obstetrics of Shebin El-Kom Teaching Hospital (Menoufia, Egypt) from August 2012 to July 2017, and informed consent was obtained from all participants before surgery. We recorded demographic profile, obstetric characteristics of patients, operative parameters of patients, and surgical outcomes.

Results
In this 5-year period, among 12,250 deliveries, only 49 patients met the diagnostic criteria of placenta accrete (4/1000). In our study group, the patients’ mean age at delivery was 30.45 (5.5) years, and their mean BMI was 28.5 (2.5). Overall, 33 patients were scheduled for cesarean section and 16 patients were emergency cesarean cases owing to active bleeding or labor. In 12 (24.49%) patients in this study, the attempts of delivery by cesarean plus different surgical techniques failed because of immediate heavy bleeding originating from cervix that necessitated emergent hysterectomy as a life-threatening condition. The rate of successful uterine preservation was high (77.27%) in uterine artery ligation and internal iliac artery ligation, 70% in uterine artery ligation and ovarian artery ligation, and 70% in Shehata’s simple procedure, but low in modified B-lynch suture (40%) and in one-step procedure (50%). Maternal mortality rate was 2.04%, including one maternal death.

Conclusion
Our surgical approaches are effective and successful in minimizing major surgical interventions especially hysterectomy with its comorbidities in PA management. Nevertheless, the best policy remains a matter of debate.

Keywords: Cesarean hysterectomy, maternal outcomes, placenta accreta, surgical techniques

Introduction
Placenta accreta (PA) is a general term that describes abnormal implantation into uterine wall with abnormal adherence of placenta to the underlying myometrium. Depending on the depth of invasion, it is further defined as PA, increta, and percreta. Morbid adherence of the placenta was considered under the umbrella term ‘placenta accreta’. PA is a potentially life-threatening obstetric condition with unacceptable maternal morbidity and mortalities all over the world, and some obstetricians call it ‘Obstetrician’s Nightmare’ [1]. An
increase in the incidence of PA has been reported. Wu et al. [2] reported a rise in incidence from 1: 2510 in 1994 to 1: 533 in 2005, but the incidence has increased around three per 1000 deliveries in the past decade [3,4] and parallels the increasing cesarean delivery rate. Other risk factors associated with PA are multiparity, placenta previa, prior intrauterine infections, and maternal age older than 35 years [2].

The management strategy for PA is a challenging problem in obstetric practice. Prenatal diagnosis of PA and a planned cesarean delivery have been proven to improve maternal outcome [5]. Scheduled preterm delivery is necessary and justified by many obstetricians to avoid bleeding or labor signs that necessitate emergent operation [6]. Cesarean delivery would be done in a tertiary care hospital using a disciplinary team management and possibility of ICU if needed [7,8]. Wright et al. [9] reported that most obstetricians do not deliver patients with PA until 36 weeks or later. At Shebin El-Kom Teaching Hospital, we generally schedule delivery after 36 completed weeks and at full competency to manage them in emergency situations.

Clinically, PA becomes problematic during delivery when placenta does not completely separate from uterus followed by massive obstetrical hemorrhage leading to disseminated intravascular coagulation (DIC) and even deaths have been reported, so the need for cesarean hysterectomy (CH) in this situation is a life-saving procedure, but it has major complications especially with bladder or parametrium invasion and permanent loss of fertility with its psychological insult. PA accounts for 38% of peripartum hysterectomy [10].

Obstetricians have developed many surgical approaches in the management of PA for women with a strong fertility desire, hemodynamic stability at time of surgery, or women with extensive disease that precludes primary hysterectomy owing to surgical difficulty [11]. In this study, we report a different surgical procedure and results regarding interventions to improve maternal outcome in management of PA with 49 cases operated in our clinic.

Patients and methods

Ethical committee permission obtained for all hospitalized cases of PA and written informed consent was obtained from all participants prior to surgery. This prospective, surgical case-series study included 49 patients with PA who were prenatally diagnosed at the Department of Gynecology and Obstetrics of Shebin El-Kom Teaching Hospital (Menoufia, Egypt) from August 2012 to July 2017. All cases of PA were hospitalized, and informed consent was obtained from all participants before surgery.

The diagnosis of PA was made based on findings obtained by gray-scale sonographic characteristics, including loss of continuity of the uterine wall, multiple vascular lacunae within the placenta, lack of hypoechoic border between the placenta and the myometrium, bulging of placental site into the bladder, and increased vasculature evident on color Doppler in placenta. If ultrasound findings are not considered definitive or the placenta is located on the posterior wall, MRI can be performed [12,13]. Maternal data included age and gestation (in completed weeks) at delivery, risk factors for PA (previous cesarean section/s, placenta previa, previous PA and advanced maternal age), and operative parameters of patients, and surgical outcomes were assessed using the following indicators: complications, estimated blood loss, need for blood transfusion and other blood products, and duration of admission to ICU.

Timing of delivery was individualized depending on patient circumstances. We generally schedule cesarean delivery after 36 completed weeks. With different surgical techniques as the first-choice treatment. PA cases especially that suffering from ant partum hemorrhage or preterm labor necessitated urgent cesarean delivery, and late preterm cesarean delivery at 34-35 weeks of gestation is accepted when PA is suspected anteriorly [10,14]. The decision to apply many surgical approaches was made if the patient strongly desired to preserve their future fertility.

According to the placental mapping by ultrasonography, we entered the abdomen by Pfannenstiel incision, or a midline vertical incision. Placental borders have been identified, and uterine incisions were made far away from placenta. J-shaped, vertical and upper transverse incisions were used and allowed delivery of the infant. Total hysterectomy is performed with the placenta left in situ if failed different surgical techniques or patients completed family history because removal of the placenta before hysterectomy is associated with significant hemorrhagic morbidity.

Different surgical techniques in all cases

For pregnant women who have a strong desire to preserve their future fertility as well as hemodynamic stability, normal coagulation status, and are willing to accept the risks involved in this conservative approach like infection and hemorrhage, as well as the need for later hysterectomy, we have offered alternative different surgical techniques for the management of PA. These techniques are based on either resection of placental endometrial implantation site: one-step procedure, Triple-P procedure or compression sutures, modified B-lynch sutures, Shehata’s simple procedure with pelvic devascularization, uterine artery ligation (UAL), UAL and ovarian artery ligation (OAL), internal iliac artery ligation (IIAL) or a combination of UAL and IIAL. Adjuvant procedures such as Foley’s catheter insertion may be required [15].

One-step procedure involves wide mobilization of tissue, local excision, and repair or oversewing of the implantation site [16]. Triple-P procedure involves perioperative placental localization, pelvic devascularization, and placental non-separation with myometrial excision [17]. Modified B-lynch sutures are by making horizontal sutures passed in a vascular area in the broad ligament make more tension around and pressure in the lower segment, so the technique easily applied to placenta...
previa and accreta [18]. Shehata’s simple procedure includes double ligation of uterine artery on both sides before and after placental removal, suturing the placental bed by two quadruple sutures, and the triple-way Foley’s catheter insertion through the cervix and inflation to 50 ml saline to compress lower segment and drain bleeding [19].

The primary outcome for this study was the rate of successful uterine preservation. The secondary outcome was severe maternal morbidity, including sepsis, coagulopathy, immediate or delayed hemorrhage, bladder injury, and fistula.

**Results**

In this 5-year period, among 12 250 deliveries, only 49 patients met the diagnostic criteria of placenta accrete (4/1000). In our study group, the patients mean age at delivery was 30.45 (5.5) years, and their mean BMI was 28.5 (2.5). All cases were multiparous except for three patients. In this study, 30 (61.22%) patients were delivered at 32–36 weeks of gestation. Overall, 26 patients had three or more cesarean sections, 12 patients had two cesarean sections, eight patients had one cesarean section, and six patients had uterine curetage history. The placenta was posteriorly located in five (10.2%) patients and anteriorly localized in 44 (89.8%) patients. Moreover, 24 patients had placenta previa. In addition, 33 patients were scheduled for cesarean section, and 16 patients had emergency cesarean delivery owing to active bleeding or labor (Table 1).

Different surgical techniques for 49 patients were used, including two cases one-step procedure, six cases Triple-P procedure, five cases modified B-lynch sutures, 10 cases Shehata’s simple procedure, 20 cases UAL, 10 cases UAL and OAL, seven cases IIAL, and 22 cases UAL and IIAL. Some patients had more than one such procedure. In 12 (24.49%) patients in this study, the attempts of delivery by cesarean plus different surgical techniques were failed because of immediate heavy bleeding originating from cervix that necessitated emergent hysterectomy (Table 2).

Mean estimated blood loss ranged from 1.2 to 3.4 l in all cases; 2–6 U of packed RBC and 2–8 fresh frozen plasma were transfused intraoperatively and postoperatively. Duration of stay in ICU ranged from 2 to 7 days. Acute pulmonary edema developed in two cases, acute renal failure developed in one case, 10 patients had infection, and two cases presented with sepsis after operation. Bladder perforations were encountered in three patients, vesicouterine fistula occurred in one patient who underwent CH, one case developed uterine necrosis in UAL and IIAL procedure, three cases developed deep vein thrombosis, and one case had pulmonary embolism. In the two cases in CH and UAL and IIAL procedures that presented coagulopathy, one case was treated and other died. Moreover, five cases had delayed vaginal bleeding after operation and treated with antibiotics. The rate of successful uterine preservation was high (77.27%) in UAL and IIAL, 70% in UAL and OAL, and 70% in Shehata’s simple procedure, but low in modified B-lynch suture (40%) and in one-step procedure (50%). Maternal mortality rate was 2.04%, including one maternal death (Table 3).

**Discussion**

In our study, there were 49 confirmed cases of PA in women who delivered at our hospital during the 5-years study period.
Table 3: Maternal outcome for different surgical techniques in placenta accreta cases

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>One-step procedure</th>
<th>Triple-P procedure</th>
<th>Modified B-lynch</th>
<th>Shehata’s procedure</th>
<th>UAL</th>
<th>UAL and OAL</th>
<th>IIAL</th>
<th>UAL and IIAL</th>
<th>CH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated blood loss (L)</td>
<td>1.2 (0.2)</td>
<td>1.8 (0.9)</td>
<td>1.7 (0.2)</td>
<td>2.1 (0.8)</td>
<td>1.9 (0.5)</td>
<td>2.1 (0.8)</td>
<td>2.0 (0.7)</td>
<td>2.0 (0.8)</td>
<td>3.4 (0.9)</td>
</tr>
<tr>
<td>Units of packed RBCs transfused</td>
<td>3 (2)</td>
<td>2 (1)</td>
<td>5 (1.4)</td>
<td>4 (1.3)</td>
<td>5 (1.6)</td>
<td>6 (2)</td>
<td>5 (1.5)</td>
<td>6 (3)</td>
<td>6 (1.5)</td>
</tr>
<tr>
<td>Number of transfused FFP unit</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>ICU admission</td>
<td>1 (50)</td>
<td>3 (50)</td>
<td>3 (50)</td>
<td>5 (50)</td>
<td>6 (30)</td>
<td>3 (30)</td>
<td>2 (28.57)</td>
<td>11 (50)</td>
<td>8 (66.67)</td>
</tr>
<tr>
<td>Duration of stay in ICU unit (days)</td>
<td>4</td>
<td>4 (3-5)</td>
<td>4 (3-5)</td>
<td>3 (2-5)</td>
<td>3 (2-3)</td>
<td>5 (4-6)</td>
<td>2</td>
<td>3 (2-4)</td>
<td>6 (5-7)</td>
</tr>
<tr>
<td>Acute pulmonary edema</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (4.55)</td>
<td>1 (8.33)</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0 (3.33)</td>
</tr>
<tr>
<td>Infection</td>
<td>0</td>
<td>1 (16.67)</td>
<td>1 (20)</td>
<td>1 (10)</td>
<td>4 (20)</td>
<td>0</td>
<td>0</td>
<td>1 (4.55)</td>
<td>2 (16.67)</td>
</tr>
<tr>
<td>Sepsis</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 (16.67)</td>
<td></td>
</tr>
<tr>
<td>Bladder injury</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (4.55)</td>
<td>2 (16.67)</td>
</tr>
<tr>
<td>Vesicouterine fistula</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (8.33)</td>
<td></td>
</tr>
<tr>
<td>Uterine necrosis</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (4.55)</td>
<td>0</td>
</tr>
<tr>
<td>Deep vein thrombophlebitis</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (0.05)</td>
<td>0</td>
<td>0</td>
<td>1 (4.55)</td>
<td>1 (8.33)</td>
</tr>
<tr>
<td>Pulmonary embolism</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (4.55)</td>
<td>1 (8.33)</td>
</tr>
<tr>
<td>Coagulopathy (DIC)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (4.55)</td>
<td>1 (8.33)</td>
</tr>
<tr>
<td>Delayed vaginal bleeding</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (10)</td>
<td>1 (5)</td>
<td>0</td>
<td>0</td>
<td>1 (4.55)</td>
<td>2 (16.67)</td>
</tr>
<tr>
<td>Success of uterine preservation</td>
<td>1 (50)</td>
<td>4 (66.67)</td>
<td>2 (40)</td>
<td>7 (70)</td>
<td>13 (65)</td>
<td>7 (70)</td>
<td>5 (71.43)</td>
<td>17 (77.27)</td>
<td>0</td>
</tr>
<tr>
<td>Maternal mortality</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (8.33)</td>
<td></td>
</tr>
</tbody>
</table>

Data are represented as n (%), mean (SD), or median (range). CH, cesarean hysterectomy; DIC, disseminated intravascular coagulation; FFP, number of transfused fresh frozen plasma units; IIAL, internal iliac artery ligation; RBC, red blood cell; UAL, uterine artery ligation.

giving an incidence of 0.4% of deliveries, which is comparable to the study by Eliza and Adfred [20], with 0.3%. Moreover, the American College of Obstetricians and Gynecologists stated the incidence to be as high as one in 533 deliveries [10]. In this study the patients with PA was conducted to more young age (30.45) due to increasing rates of cesarean delivery (56.52%), and this agreement with Esakoff et al. [21]. Up to 88% of the women with PA have concomitant placenta previa [22]. Only 24 (48.97%) of our patients had placenta previa. In 44 cases, placenta was located anteriorly, and five cases placenta was located posteriorly. PA should be suspected in women who have both a placenta previa, particularly anterior, and a history of cesarean section. Patients at risk of abnormal placentation should be assessed by ultrasonography, with or without adjunct MRI if indicated [23].

Interestingly, in our study, 67.35% of the women for whom cesarean delivery was planned because of prenatal diagnosis of PA anticipated the expected blood loss and other potential surgical complications of delivery. In addition, it gives the opportunity for electively timing the procedure, because the prevention of complications ideally requires the presence of a multidisciplinary surgical team, which is associated with improved maternal outcomes [24]. Recently, surveys indicate that most patients with PA were scheduled delivery at or beyond 36 weeks of gestation in the absence of another indication [9,25]. In our study, we planned delivery after 36 completed weeks and at full competency to manage them in emergency situations.

Many surgical approaches for the management of PA including local resection of placental implantation site, uterine compression sutures, and pelvic devascularization have been described with varying rates of success to reduce the morbidity of peripartum hysterectomy as well as allow for future fertility [15,26]. Some patients had more than one such procedure. The final decision for choice of strategy should always be made in the operative room, according to an actual estimation of the PA invasion, vascular control probabilities, and surgical team expertise to perform safest procedure alternative to hysterectomy with adequate tissue hemostasis.

When we compare the results of this study with Timmermans et al. [27] reviewed the efficacy and safety of conservative management (methotrexate or arterial embolization) of abnormally invasive placentation. Overall, of the 60 women, spontaneous loss of placental tissue was noted in 16 women (26.7%), 11 experienced infection, 21 experienced vaginal bleeding and four suffered disseminated intravascular coagulopathy (DIC). It should only be considered in highly selected cases in which blood loss is minimal and there is desire for fertility preservation, but in our study, 37 of 49 women with PA (75.51%) were successfully treated with different uterine sparing surgery, this is approximately agree with a multicenter French study, 131 of 167 women with PA were successfully with a conservative strategy (78.4%). [28]

Varying success rates were described for different approaches including one-step procedure (50%), Triple-P procedure (66.67%), modified B-lynch (40%), Shehata’s simple procedure (70%), UAL (65%), UAL and OAL (70%), IIAL (71.43%), and UAL and IIAL (77.27%). UAL is a crucial step for success of uterine preservation in many patients with PA. The reported success rate of double UAL in PA varied from 80 to 96% [29] up to 100% in Tanta University Hospital [19], but in our study, the success rate was 65%, rising up to 77.27% if combined with IIAL. The difference in result may be owing to applying a new compression technique.
suture and sewing placental bed in the other study. Our study agreed with El Shazly et al. [30] that compared bilateral uterine artery ligation versus a new compression suture of lower uterine segment with shorter operative time and less blood loss in group of bilateral uterine artery ligation.

Gungor et al. [31] reported a 100% success rate for stepwise procedure with bilateral UAL and OAL, so it is unlike our study with success rate of only 70%.

Shabana et al. [32] advocated its routine ligation IIAL in placenta percreta with successful rate (91.5) in controlling the bleeding and preserving the patient’s uterus. Iwata et al.[33] reported no value for its ligation during cesarean hysterectomy (CH). Our results supported efficacy of IIAL (71.43%) in treatment postpartum hemorrhage with PA but technically more difficult to carry out and reported sever complication such as one case presented DIC as hematuria, diffuse skin bruise, and abnormal coagulation profile, which occurred after operation, one case bladder injury and repaired and also only case uterine necrosis treated by delayed hysterectomy, therefor IIAL with other surgical procedure restricted to selected and assisted with vascular surgery to avoid complications.

All previous surgical methods had low blood loss, reduction in the length of hospital stay, and less complication postoperatively compared with hysterectomy for life saving in selected patients. Generally, maternal outcome is unpredictable in PA. In this study, the estimated blood loss was 1.2–3.4 l and length of ICU stay was 2–7 days in all cases which is similar to Walker et al. [7]. Moreover, 2–6 U of packed red blood cell and two to eight fresh frozen plasma were transfused, which is less than the study of Likis et al. [34] in patients with PA. The variation is owing to scheduled delivery at or beyond 36 weeks of gestation and prenatal diagnosis in our study.

In this study 12 cases (24.51%) had failed to control bleeding in some surgical approaches due to massive hemorrhage (DIC), distorted placenta invasion and any delayed in definitive treatment cesarean hysterectomy (CH) may seriously compromise maternal health. We recommended that CH is the last treatment of choice for PA with its co morbidities such as pulmonary edema (one case), acute renal failure (one case), and infection (two cases), which were treated with proper antibiotics; sepsis (two cases) presented as fever, leukocytosis, and pelvic pain, which developed after operation, bladder injury (two cases), which was treated; vesicouterine fistula (one case) was successfully repaired 8 months later; deep vein thrombosis (one case) and pulmonary embolism (one case), which were improved with medical treatment; and delayed vaginal bleeding (two cases), which were stopped with proper antibiotics and blood transfusion. These complications are more than reported in any different surgical methods. The only one (2.04%) case was maternal death in our study after CH from DIC and multiorgan failure.

In this study, our different surgical procedures were effective and safe in conservative treatment of PA and reducing hysterectomy for these patients. The simple technique should be tried first before other more complex procedures are undertaken; therefore, surgical approaches should be tried for women who have strong desire for preserving their future fertility. Until now, there is no definite approach in management of PA widely accepted.

Limitations of our study must be underlined. First, it is possible that some cases did not have a PA, because pathological confirmation was impossible in cases without a hysterectomy specimen, generally unavailable except when treatment fails. Second, this study includes a small number of cases that had surgical approach of PA; it may lack power to estimate adequately the risks of these cases.

**Conclusion**

Prenatal diagnosis is important in optimizing the counseling, treatment, and outcome of women with PA. Surgical techniques could be used as an alternative hysterectomy to preserve fertility. In this study, we have presented a different surgical procedures as a conservative treatment for PA. Our surgical approaches are effective and successful in minimizing major surgical interventions especially hysterectomy with its comorbidities in PA management. Until now, no proof has been found for a first-choice uterus-preserving techniques.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**References**