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Original Article

Evaluation of three-step procedure (Shehata's technique) as a conservative management for placenta accreta at a tertiary care hospital in Egypt

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ABSTRACT

Objective. – To evaluate the benefits and risks of three-step technique as a conservative treatment for women with placenta accreta and desiring future fertility.
Study design. – This study is a retrospective study where the files of 91 cases of placenta accreta managed by three-step technique were reviewed. This study was conducted at Tanta University Hospitals in the period from June 1, 2015 to May 31, 2017. All demographic and operative data were extracted and recorded.
Results. – The mean age was 32.44 ± 2.72 years; the mean operative time was 81.65 ± 15.68 min. The mean gestational age at operation was 35.67 ± 1.19 weeks. The technique succeeded to preserve the uterus in 86 cases and failed in 5 cases. There was no cases required ICU admission with mean hospital stay of 3.065 ± 1.04 days. The postoperative morbidities were mild and in the form of fever (n = 9) and wound sepsis (n = 4), pyometra (n = 1) and secondary hemorrhage (n = 1).
Conclusion. – The three-step procedure is effective as a uterine sparing technique in management of placenta accreta with success rate of 94.5%. The operative and postoperative complications were minimal and expected in such case.

Significance

This manuscript evaluates the benefits and risks associated with implications of the Shehata technique in placenta accreta and the associated maternal morbidity. The technique was found to be highly effective in preserving uterus and safe with few complications and no ICU admissions.

What is already known on this subject?

Cesarean hysterectomy is the curative treatment of placenta accreta and has many psychological and maternal morbidity plus loss of fertility.

What this study adds?

This study adds an effective, safe and easily applied technique as a conservative approach for preserving uterus in women suffering from placenta accrete.

Introduction

Placenta accreta (PA) incidence is increasing parallel to the rapidly progressive increase in cesarean section rates. The incidence of PA is approximately 1 in 2500 deliveries. This condition has many risk factors including placenta previa, prior uterine scar, Asherman's syndrome, and advanced maternal age or parity [1].

Most cases (50%) of PA cases are diagnosed in the antepartum period while emergency cases are also encountered in areas with low socioeconomic status and poor antenatal care programs. The accurate method for diagnosis is combination of MRI with ultrasound which has a sensitivity of 100% in identifying placenta accreta [2,3].

Management of placenta accreta requires multidisciplinary team in highly equipped tertiary care hospital with available blood bank services. Hysterectomy is still the gold standard for management of placenta accreta but nowadays, young age patients who desire future fertility should be managed by one of newly emerged uterine sparing techniques [4,5].

Abbreviations: PA, placenta accreta; MRI, magnetic resonance imaging; ICU, intensive care unit.

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The three-step (Shehat's) technique includes 3 crucial steps; the first step is to ligate both uterine arteries before placental separation, the second step is apply 2 four-quadrant suture to lower uterine segment after placenta separation with sewing of placenta bed and the third step is triple way folly's catheter insertion for compression and drainage. This technique was applied at first in 15 cases to test its feasibility and applicability [6,7].

This study was done to determine the efficacy of this technique in minimizing hysterectomies in management of placenta accreta cases at Tanta University hospitals.

Patients and methods

Study design and setting

This retrospective study was conducted at Tanta University Hospitals—a tertiary care hospital at the center of Nile Delta—Tanta, Egypt. The study was conducted in the period from June 1, 2015 to May 31, 2017.

Patients and methods

The files of all patients admitted at Obstetrics Unit, Department of Obstetrics and Gynecology, Tanta University in the relevant study duration were examined. The files of patients diagnosed with placenta accreta were specified to the relevant study. Files of cases managed by the three step technique were examined and data of patients (demographic and operative) were registered. Postoperative complications and follow up were also reviewed.

Selection of patients

Patients were selected according to the following inclusion criteria: (a) prenatally diagnosed placenta accreta (b) intraoperatively diagnosed placenta accreta being partially or totally adherent with no cleavage plane between the placenta and uterus, (c) patients who want to preserve their fertility. The exclusion criteria were: (a) patients who completed her family (b) hemodynamicaly unstable patients, (c) patients managed by other techniques.

Diagnosis of placenta accreta was done prenatally by ultrasound grey scale and MRI. The diagnosis in ultrasound was based on the 2 most accurate signs which are loss of hypoechoic space and bnormalities in uterus-bladder interface. MRI was done in suspicious cases or cases with posterior placenta as shown in Fig. 1.

Operative intervention

The three-step technique entailed 3 steps, the first step is double bilateral ligation of uterine arteries before placental separation at the level of isthmus, the second step is to apply 2 four-quadrant suture to lower uterine segment after placenta separation with sewing of placenta bed and the third step is triple way folly's catheter insertion through the cervix for compression and drainage. The technique is shown in Figs. 1 and 2.

Uterine artery ligation was made at 2 levels and at 2 times. Regarding the level of uterine artery ligation, it was done at lower level at the isthmus and at a higher level above the cesarean incision by 1 cm. Regarding timing of ligation which is the tip and trick in this technique is that we applied the uterine artery ligation before placental separation to minimize blood loss at the attempt of placental separation. Ligation was done using vicryl 1 as shown in Figs. 3 and 4.

Application of quadruple sutures was done at the lower uterine segment to compress and secure the neovascularization in the bed of placenta. These sutures were done by vicrly 0 by going from outside the lower segment then inside and from inside out then repeat the same again and tie the suture transversely. Sewing placental bed also was included in the second step of the procedure as shown in Figs. 3 and 4.

Placenta was separated manually either totally or in piecemeal. If manual separation failed, placenta was removed by scissors.

Insertion of triple was catheter was commenced from inside the uterine incision downwards using long artery forceps or uterine sound and the pulled by the assistant from below. If difficulty was confronted due to rigid or closed cervix it was inserted from below by uterine sound. The catheter balloon was inflated by 50 cc saline to compress the neovascularization in lower uterine segment, drain blood from uterus and help in uterine lavage and antibiotic instillation if required.

Blood loss was estimated by the sum of collected blood in the suction bottle after delivery of baby plus blood in towels by the equation of 1 g weight equal 1 ml blood.

Ethical approval

This study was approved by the local ethical committee of Tanta University on November, 16, 2016. The study was registered by the code of 31188. Privacy and data security were maintained all over the duration of the study.

Statistical methods

The data obtained were analyzed by SPSS version 18 (USA, Chicago). The main tests used were mean, standard deviation and percentage.

Results

The patients admitted to Obstetrics unit in the relevant study duration were 8362 cases. The total number of deliveries was 6491 patients. The patients delivered by cesarean section were 3894 patients with 59.99% cesarean rate incidence. The cases of placenta accreta were 157 cases (2.42%) of all deliveries. The patients fulfilling inclusion criteria were 91 cases. The excluded patients ($n = 66$) either not managed at Tanta University Hospitals ($n = 19$), not fulfilling inclusion criteria ($n = 17$) or managed by hysterectomy ($n = 30$) as shown in Fig. 2.

Patients were diagnosed either preoperative ($n = 77$) or intraoperative in emergency cases ($n = 14$). The mean age of cases was 32.44 ± 2.72 years, the mean gravidity 3.38 ± 0.69, and the mean parity was 2.97 ± 0.77. Most patients ($n = 88$) had previous cesarean delivery in their past obstetric history. The mean duration since last uterine surgery was 2.79 ± 1.25 years. Taking place of previous uterine surgery into consideration, 61 (67.03%) of patients were operated at general hospitals while 30 (32.97%) of cases were operated at private hospitals as shown in Table 1.

Operative details were explained in Table 2, where the gestational age at the time of operation was 34–38 weeks (35.67 ± 1.19), the operative time range was 65–110 min (71.65 ± 15.68 min). The total blood loss intraoperative range was 900–1800 ml (1287.428 ± 308.625 ml). Hemoglobin before and after operation plus units of blood transfused were added in Table 2. The recorded operative complications were hysterectomy ($n = 5$) either due to severe hemorrhage, or uterine atony, bladder injuries ($n = 8$) which was the most frequently met and anticipated complication in those patients. There were no major vascular interventions. Hospital stay was ranged 2–5 days (3.065 ± 1.04 days). No cases required ICU admission.

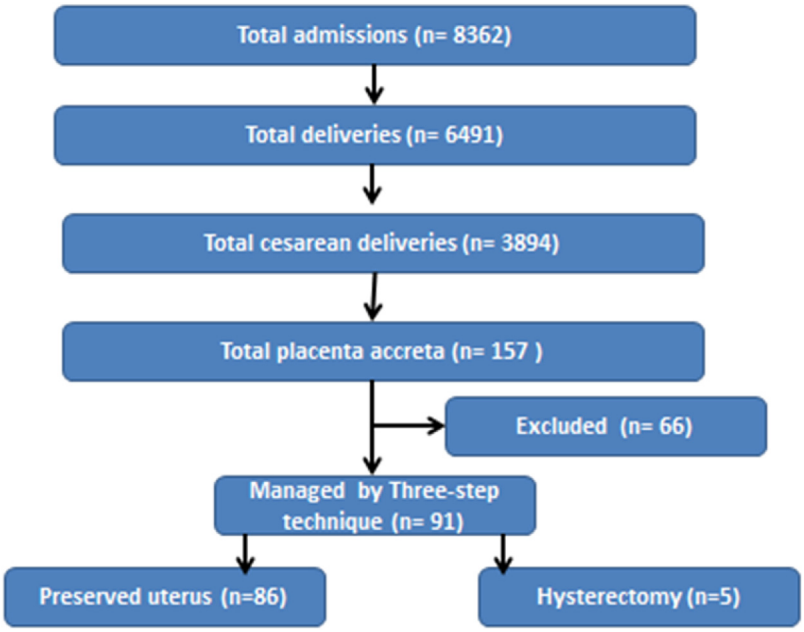

Fig. 1. A = MRI showing placenta accreta, B = Ultrasound showing placenta accreta with evidence of blood flow in Doppler mode.

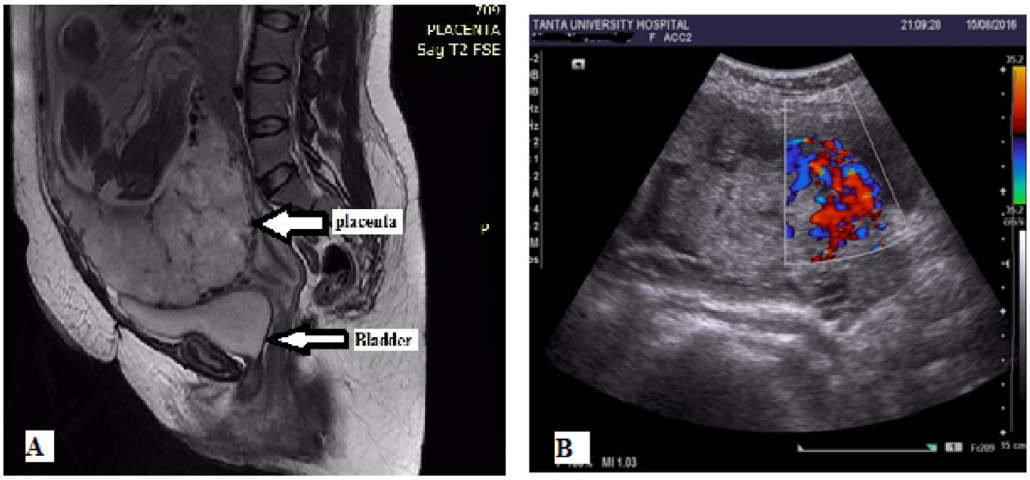

Fig. 2. Selection of patients in the current study.

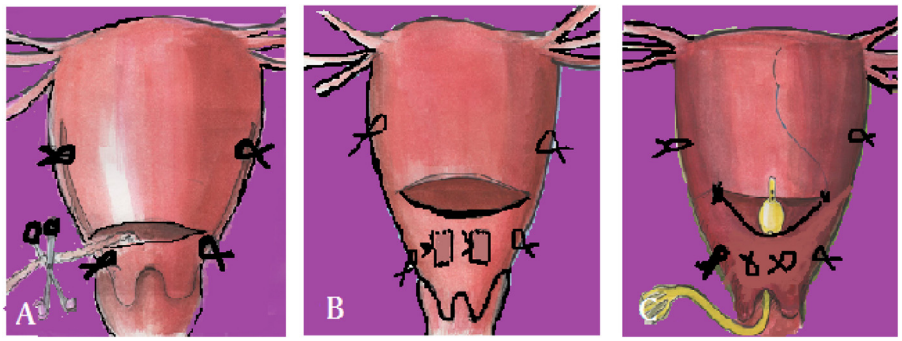

Fig. 3. Shehata's technique: A = Double bilateral ligation of both uterine arteries at 2 different levels, B = 2 quadruple sutures in lower uterine segment, C = Insertion of triple way foly's catheter and inflating it with 50 cc saline.

The postoperative morbidities recorded in the follow up period which was extended up to 6 weeks were noticed in 15 cases. The most frequently recorded complications were: fever which was of low grade 38.4 °C (n = 9), wound sepsis (n = 4), pyometra (n = 1), and secondary hemorrhage (n = 1). Most of these complications were managed on outpatient basis except 2 cases with wound sepsis that required re-admission and daily dressing then required secondary suture after 2 weeks. These morbidities are shown in Fig. 5.

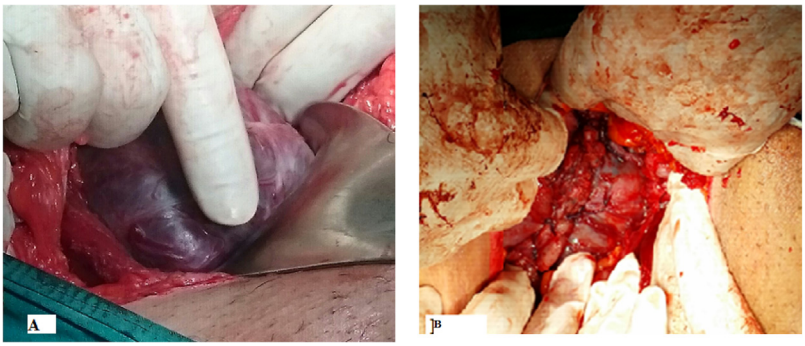

Fig. 4. Placenta accreta managed by Shehata's technique: A = before procedure, B = After procedure with preservation of uterus.

Table 1
Demographic data of study cases.

	Range	Mean ± standard deviation
Age (years)[a]	27–39	32.44 ± 2.72
Gravidity[a]	2–4	3.38 ± 0.69
Parity[a]	2–5	2.97 ± 0.77
Previous uterine surgery[b]		
Previous Cesarean sections		
Previous 1 CS	6	
Previous 2 CS	19	
Previous 3 CS	24	
More than 3 CS	42	
Total number	88 (96.70%)	
Previous Myomectomy	2 (2.27%)	
Previous Hysterotomy	1 (1.14%)	
Place of previous uterine surgery[b]		
General hospital	61 (67.03%)	
Private hospital	30 (32.97%)	
Duration since last uterine surgery (years)[a]	1–5	2.79 ± 1.25
Diagnosis of cases[b]		
Prenatal	83 (91.21%)	
Intra-operative	8 (8.79%)	

[a] Data presents as mean ± SD.
[b] Data presented as number/percentage.

Table 2
Operative details for study cases.

	Range	Mean ± standard deviation
Gestational age at operation (weeks)[a]	34–38	35.67 ± 1.19
Type of morbidly adherent placenta (*n*, %)[b]		
Placenta accreta	54 (59.34%)	
Placenta increta	27 (29.67%)	
Placenta percreta	10 (10.99%)	
Extent of invasion		
Partial	5 (5.49%)	
Total	86 (94.51%)	
Location of placenta		
Anterior	82 (90.11%)	
Posterior	9 (9.89%)	
Operative time (minutes)	65–110	81.65 ± 15.68
Total blood loss (ml)[a]	900–1800	1287.428 ± 308.625
Hemoglobin before operation[a]	10.3–11.2	10.64 ± 0.466
Hemoglobin after operation[a]	8.7–9.1	8.954 ± 0.117
Blood units transfused[a]	2–4	3.00 ± 0.84
Operative complications[b]		
Hysterectomy	5 (5.49%)	
Bladder injuries	8 (8.79%)	
Major vascular interventions	0 (0.00%)	
Hospital stay (days)[a]	2–5	3.065 ± 1.04

[a] Data presents as mean ± SD.
[b] Data presented as number/percentage.

Discussion

Placenta accreta and its variants are associated with major pregnancy complications such as life-threatening maternal hemorrhage, massive blood transfusion, and peripartum hysterectomy. These complications make a real challenge to reach to the real factors enrolled in the etiopathogenesis of such condition; also challenge is running to reach to a modality of management with satisfactory results other than hysterectomy [8].

Many uterine sparing techniques were published in this issue but none of these maneuvers got full safety and efficacy. Most of techniques were depending on ligation of major pelvic vessels or intervention radiological techniques [9–11]. Many compression sutures and compression tamponade balloons were also introduced in this issue with observable success rate in placenta previa but with limited role in placenta accreta [12].

Three-step technique (Shehata's technique) combines three steps all of them are simple procedures which don't entail neither major pelvic vessel ligation nor intervention radiological assistance. The tip and trick in this technique was the double uterine ligation before attempting placenta separation. These simple procedures made wide applicability and feasibility of this technique at Tanta University [6,7].

Conservative management of placenta accreta by leaving the placenta in situ was examined in a large study ($n = 167$). The outcomes were maternal morbidity after this modality of treatment. The authors suggested that conservative management can preserve the uterus in 78.4% of women, with a severe maternal morbidity rate of 6% [13]. Many complications were found to be linked to this kind of management and hysterectomy may be needed sooner or later [14].

The Success rate of Shehata's technique was 94.5% where uterus was preserved in 86 cases and hysterectomy was opted to in 5 cases only. The cases in which the three-step technique failed were those with lateral placental invasion that had non-accessible uterine artery. The technique also proved to be safe as complications and maternal morbidities were minimal and predicted in such cases of placenta accreta.

Many techniques were proposed for conservative management of placenta accreta such as "Triple P Procedure" which proved effective but only 4 women included and entailed major vascular interventions [15]. Palacios et al. included 68 patients with anterior placenta percreta in their technique. The technique involves repair of uterus by myometrial suture, fibrin glue and polyglycolic mesh. The success rate was 73.52% where 18 cases of hysterectomy were done due to severe hemorrhage [16].

A modified minimal invasive technique was applied in 11 cases with placenta accreta in Zeynep Kamil Women and Children's Health Training and Research Hospital. The aim of technique was to preserve uterus for future fertility. The technique involved

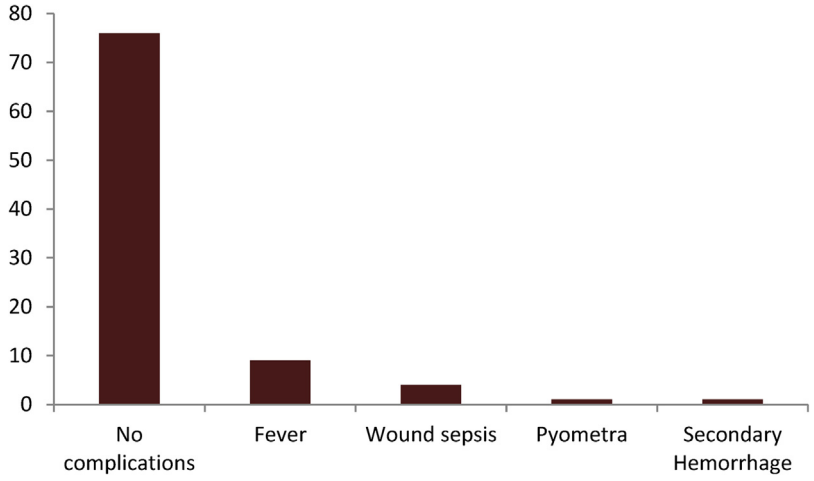

Fig. 5. Post-operative follow up results and complications.

segmental resection of lower uterine segment with placenta in one mass. It was successful in preserving uterus in 9 cases (81.8%) and failed in 2 cases. Authors also stated that there were maternal mortality or other postoperative complications observed in any cases [17].

The outcomes of three-step technique were comparable to other techniques used in tertiary care hospitals especially number of blood transfusion units, hospital stay and readmissions [18–20]. The main differences were short operative time, reduced bladder injuries, and no ICU admissions in our technique.

Finally, continuous research, large randomized, multicenter studies are required to test the efficacy of such techniques. As the rates of cesarean section increase, the rates of placenta accreta increase and the age of patients decrease necessitating urgent and continuous work to reach to an accepted, safe, feasible and easily applicable in management of placenta accreata and its variants.

Conclusion

Three-step technique was proved to be simple, feasible, applicable and safe. The success rate was 94.5%. Recorded complications were comparable to other uterine sparing techniques and being commonly anticipated in such patients. We recommend wide applicability of our technique for placenta accreta cases.

Author contributions

All authors contributed equally in the manuscript from protocol development, data collection, and analysis, manuscript writing and revisions.

Conflict of interest

We declare that we have no conflict of interest.

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