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CLINICAL ARTICLE

Bilateral uterine artery ligation plus B-Lynch procedure for atonic postpartum hemorrhage with placenta accreta

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ABSTRACT

Objective: To assess the effectiveness of bilateral uterine artery ligation followed by B-Lynch compression suturing in women with atonic postpartum hemorrhage and placental site bleeding due to adherent placenta accreta. **Method:** This protocol was followed in 26 women undergoing cesarean delivery for placenta accreta. **Results:** Two women died from disseminated intravascular coagulopathy. In the remaining 24 women, placental remnants completely disappeared within 8 months and ovulation resumed after a mean \pm SD of 51.6 ± 3.2 days. Moreover, 18 women (75%) became pregnant within 12 months. **Conclusion:** Atonic postpartum hemorrhage and placental site bleeding due to adherent placenta accreta can be safely controlled by bilateral uterine artery ligation followed by B-Lynch compression suturing in women who desire to remain fertile.

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1. Introduction

Recent reports have suggested that placenta increta occurs because a dehiscence scar allows chorionic villi to penetrate so deeply into the uterine wall that the trophoblast enters the myometrium [1]. The process is categorized as accreta, increta, and percreta according to the level of penetration (in the latter case, placental villous tissue has come through the uterine wall) [2]. During the third stage of labor, the absence of decidua prevents the noncontracting placenta from being separated from the contracting myometrium, causing the adherent placenta to bleed and often necessitating a hysterectomy [1].

Placenta previa, multiparity, advanced maternal age, previous cervical dilation and curettage, and the increasing numbers of cesarean deliveries worldwide are all known to be closely associated with placenta accreta [2,3]. In women who do not wish to have more children, hysterectomy with the placenta left in situ is the safest and therefore the preferred treatment [4]. When the woman wishes to preserve her fertility, however, attempts can be made to control a potentially life-threatening postpartum hemorrhage due to placenta accreta and/or an atonic uterus. In the latter case, leaving the adherent placenta (or adherent portions of the placenta) in situ at the time of the cesarean delivery lowers the risk of hysterectomy from 85% to 15% [4–8] and lessens the need for a blood transfusion should a hysterectomy become necessary [5]. Studies offer a wide range of techniques to perform arterial

occlusion and/or uterine compression sutures for the management of uterine bleeding due to placenta accreta [6,9–11].

Uterine compression sutures have proved to be valuable in the control of massive atonic postpartum hemorrhage as an alternative to hysterectomy. B-Lynch [12], Hayman [13], and Cho [14] developed the most famous techniques combining bilateral uterine artery ligation (UAL) and uterine compression by suturing the anterior and posterior uterine walls together [15]. With only 7 reported failures, which all involved morbid placental adherence or disseminated intravascular coagulopathy, the efficacy of the B-Lynch technique is high [16,17].

Bilateral UAL is the first step of a stepwise uterine devascularization approach that affords good control of postpartum hemorrhage [18,19]. Studies on heavy menstrual bleeding have suggested that the decrease in bleeding following UAL was due to a decrease in blood perfusion (measured as a decrease in blood volume) [20,21]. Performed with or without utero-ovarian ligament ligation, UAL does not appear to affect future fertility or obstetric outcomes [18,22]. Vascular occlusion is only temporary, as recanalization soon ensures normal uterine circulation [18].

The aim of the present study was to evaluate the effectiveness of bilateral UAL followed by B-Lynch compression suturing in controlling atonic postpartum hemorrhage in women in whom complete removal of a placenta accreta was not possible.

2. Patients and methods

This prospective study was approved by the review board of the Department of Obstetrics and Gynecology, Women's Health Centre,

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Assiut University, Assiut, Egypt, and took place from February 2007 through April 2009. All patients had placenta previa, with the placenta implanted on the site of a cesarean scar. The inclusion criteria were a gestation duration of at least 37 weeks and antepartum hemorrhage; intraoperative atonic postpartum hemorrhage and discovery of a placenta accreta; and an adherent placental part after piecemeal removal of the placenta, with bleeding from the placental site. Gestational age was determined on the basis of the last menstrual period confirmed by an ultrasound scan taken between the 14th and 20th week, and calculated in menstrual weeks. The exclusion criteria were posterior placenta previa; placental implantation away from the scar; a plane of easy cleavage between the placenta and the uterine wall; and/or successful piecemeal removal of the placenta.

The participants provided written informed consent to undergo any procedure deemed necessary, including bilateral UAL followed by the B-Lynch procedure, as an attempt to avoid emergency hysterectomy should they experience postpartum hemorrhage. They also provided written informed consent to undergo hysterectomy if all measures attempted to preserve the uterus failed.

All cesarean deliveries were performed by the first author assisted by the second author. A dose of 1 g of first-generation cephalosporin (Cefazolin; Bristol Mayers Squibb, Cairo, Egypt) was administered intravenously 20 minutes prior to skin incision. The surgery was done under general anesthesia, which was delivered by one of 4 anesthesiologists, each of whom had acquired a wide experience of obstetric anesthesia from at least 400 interventions over a minimum of 2 years. General anesthesia was obtained using a modified rapid sequence induction, i.e., the administration of 4 to 6 mg/kg of thiopentone, followed by 1 to 1.5 mg/kg of suxamethonium, followed by endotracheal intubation. A urethral catheter was inserted after anesthesia was obtained. The skin was incised in the midline and the subcutaneous tissues were opened by blunt dissection. The anterior rectus sheath was opened by sharp dissection. After dissecting fascia from rectus muscles, the muscles were separated using the no-cutting technique. After the parietal peritoneum was opened by sharp dissection and blunt expansion, high above the bladder, a bladder flap was made and the bladder was retracted (an assistant held the retractor). A small median transverse hysterotomy incision was done in the lower uterine segment using a scalpel. It was expanded on both sides using scissors, stopping shortly before the uterine arteries. After delivery of the fetus, active delivery of the placenta was attempted by searching manually for a plane of cleavage between the placenta and the uterus. In patients in whom no plane of cleavage could be identified, or in whom adherent parts could not be removed, the study protocol was initiated. This

protocol comprised 2 steps, bilateral UAL and B-Lynch compression suturing.

The technique used for bilateral UAL was the following: The peritoneum over the vesicouterine pouch already being incised horizontally, the peritoneum over the uterine isthmus and cervix was bluntly dissected downwards, and this dissection was then extended laterally. To avoid including the ureter in the ligation of the ascending branch of the uterine artery, the peritoneum was carefully mobilized at the uterine angles to expose both. The uterus was then retracted upwards and laterally by the assistant. The uterine artery pulsations were palpated digitally at the level of the internal os. A 1.0 chromic catgut suture attached to a round-bodied needle was passed posteriorly to anteriorly through the cervical tissues and the ligature consisted of a simple stitch. A second stitch was done below the first, at a distance no greater than 1 cm.

After the B-Lynch compressing sutures were performed as described by B-Lynch et al. [12], a double-layer closure of the hysterotomy was done without exteriorization by the continuous, nonlocking technique. The visceral peritoneum was left open but the parietal peritoneum was closed by the same technique using delayed-absorbable material. No approximation of the rectus muscles was done. Closure of the subcutaneous tissue was done by the interrupted-sutures technique, and closure of the skin by the same technique using absorbable sutures.

Because obstetric hemorrhage is an emergency, blood samples were only drawn for hemoglobin concentration, cross matching, and blood gas analysis. Following delivery, a complete blood count and another blood gas analysis were done, and liver and renal functions were checked.

Before discharge, the patients were prescribed antibiotics for 3 weeks. After discharge, they were followed up for bleeding and infection. Ovarian function and placental resorption were monitored by transvaginal ultrasound using the Sonoline G60-S imaging system (Siemens, Erlangen, Germany). The scans were done at monthly postpartum visits, which began within the first week postpartum, as soon as the patient's condition allowed. The volume of any adherent placental remnant was calculated during the first scan, and these values, in cubic millimeters, served as baseline values. At each visit, the patients were also checked for puerperal fever or sepsis and questioned about passage of tissues through the vagina, irregular bleeding, and resumption of menstruation. Pregnancies were recorded.

3. Results

The patients' exclusion, inclusion, and outcomes are shown in Fig. 1. All had undergone 1 previous cesarean delivery, all had antepartum

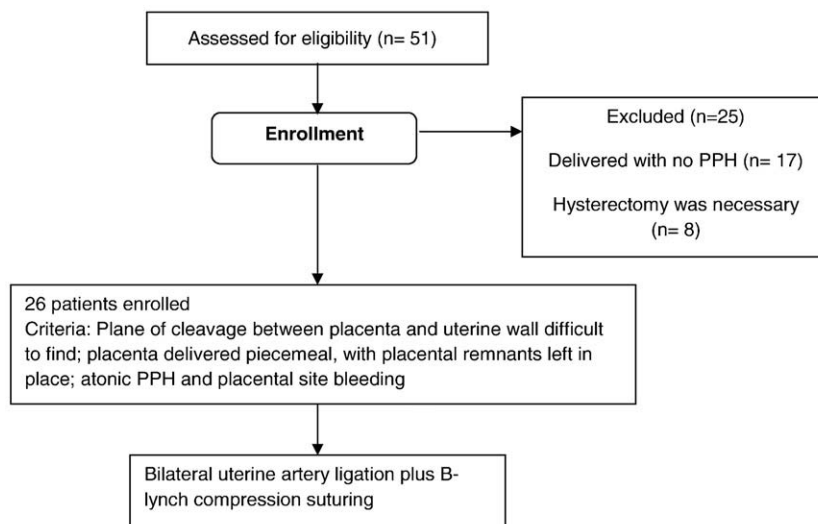


Fig. 1. Participant flow through the study.

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