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Original Article

Longitudinal parallel compression suture to control postopartum hemorrhage due to placenta previa and accrete

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ABSTRACT

Objective: To assess the efficacy and safety of longitudinal parallel compression suture to control heavy postpartum hemorrhage (PPH) in patients with placenta previa/accreta.
Materials and Methods: Fifteen women received a longitudinal parallel compression suture to stop life-threatening PPH due to placenta previa with or without accreta during cesarean section. The suture apposed the anterior and posterior walls of the lower uterine segment together using an absorbable thread A 70-mm round needle with a Number-1 absorbable thread was used. The point of needle entry was 1 cm above the upper margin of the cervix and 1 cm from the right lateral border of the lower segment of the anterior wall. The suture was threaded through the uterine cavity to the serosa of the posterior wall. Then, it was directed upward and threaded from the posterior to the anterior wall at ~1–2 cm above the upper boundary of the lower uterine segment and 3-cm medial to the right margin of the uterus. Both ends of the suture were tied on the anterior aspect of uterus. The left side was sutured in the same way.
Results: The success rate of the procedure was 86.7% (13/15). Two of 15 cases were concurrently administered gauze packing and achieved satisfactory hemostasis. All patients resumed a normal menstrual flow, and no postoperative anatomical or physiological abnormalities related to the suture were observed. Three women achieved further pregnancies after the procedure.
Conclusion: Longitudinal parallel compression suture is a safe, easy, effective, practical, and conservative surgical technique to stop intractable PPH from the lower uterine segment, particularly in women who have a cesarean scar and placenta previa/accreta.

Introduction

Postpartum hemorrhage (PPH) is a leading cause of maternal mortality worldwide and is responsible for approximately 25% of all maternal deaths [1]. It is estimated that more than 127,000 women worldwide die annually from obstetric hemorrhage [2]; however, 90% of maternal deaths due to PPH are preventable [3].

Placental abnormalities are a major contributor to obstetric hemorrhage. The most common placental abnormalities are placental abruption, placenta previa, and an adherent (accreta, increta, or percreta) and retained placenta. Placenta previa occurs in approximately four of every 1000 pregnancies beyond the 20th week of gestation. Bleeding due to placenta previa can occur throughout the peripartum period (e.g., antepartum hemorrhage, intrapartum hemorrhage, and PPH) and increase the risk for preterm premature rupture of membranes, leading to premature labor. Placenta accreta is one of the most serious complications of placenta previa and is frequently associated with severe obstetric hemorrhage usually necessitating hysterectomy [4,5].

Primary management for PPH involves the use of uterotonic agents, bimanual uterine massage, and laceration suturing. If these approaches are ineffective, other uterine-sparing surgical management procedures, including uterine compression sutures, uterine arterial embolization, and ligation of the uterine or hypogastric artery, are required [6,7].

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However, these methods can be insufficient for some cases of bleeding from the lower uterine segment. Some authors have devised various compression sutures to stop bleeding and achieve hemostasis [8–11]. Of these sutures, the multiple square sutures and the circular isthmic-cervical sutures have the risk of uterine cavity occlusion because bloods clot and debris entrapment are more likely to occur. The parallel vertical penetrating sutures reported in the literature may prevent cervical canal closure, but the suture does not include the whole length and the whole thickness of the lower uterine wall. Therefore, it may not facilitate complete hemostasis. Here, we report a new conservative surgical method, called the longitudinal parallel compression suture, to control bleeding from the lower uterine segment due to uterine atony, cesarean scar, or placenta previa. We sutured the whole length and thickness of the bilateral lower uterine segment, apposed both walls together, and provided an almost immediate hemostatic effect. The efficacy and the safety of the suture were also evaluated retrospectively.

Materials and methods

From January 2003 to December 2012, 15 women with PPH from the lower uterine segment due to placenta previa and accreta received a longitudinal parallel compression suture at China Meitan General Hospital and Beijing Fengtai Hospital in Beijing, China. This study was approved by the Ethics Committees of both hospitals, and a written informed consent form was signed by the women and/or their nearest relatives before the operation.

Conservative treatments such as manual massage, uterotonic agents (oxytocin and/or prostaglandin analogs), pressure with warm gauze packs, and under-sewing the bleeding points with a figure-eight suture were performed when PPH of the lower uterine segment occurred. If these procedures were ineffective, a longitudinal parallel compression suture was added immediately to control bleeding due to uterine atony or diffuse multiple oozing points from the lower uterine segment.

After the placenta was removed, the bladder was separated from the lower uterine segment and cervix and reflected downward behind a retractor to expose the entire uterine lower segment. Vicryl Number 1 absorbable thread (Ethicon Inc., Somerville, NJ, USA) and a 70-mm round needle were used for suturing. To add a longitudinal parallel compression suture, the first puncture point was selected at the ventral uterine wall, which was approximately 1 cm above the upper end of the cervix and 1 cm from the right lateral margin of the lower segment. The needle was inserted vertically from the anterior wall into the uterus and threaded through to the posterior wall serosa of the lower uterine segment. After pulling the needle out from the posterior wall, it was threaded up to the second puncture point approximately 1–2 cm above the upper boundary of the lower uterine segment and 3-cm medial to the right lateral border of the uterus, and the needle was penetrated through the uterine cavity again and out of the anterior wall. Then the needle spanned over the transverse cesarean section incision site at the front of the anterior uterine wall and was tied as tightly as possible as a four-fold flat knot together with the initial end of the thread (Figures 1–3). An identical suture was added on the contralateral side.

In addition to this technique, concurrent therapy, including blood transfusion, plasma expanders, antishock measures, and fibrinogen, were also administered depending on the patient's needs. Postoperative patient management and length of hospital stay were similar to those in patients who underwent ordinary cesarean sections. Antibiotics were administered to all women who underwent a cesarean section and were continued postoperatively for at least 5 days.

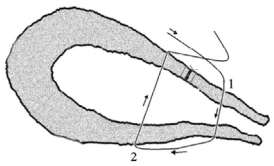

Figure 1. Sagittal section of the longitudinal parallel compression suture. Arrows indicate the direction and line of the suture. Numbers represent the puncture point and the pierce sequence.

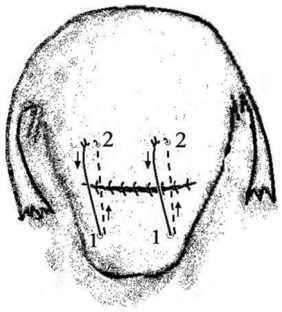

Figure 2. Anterior view of the longitudinal parallel compression suture. Arrows indicate the direction and line of the suture. Numbers represent the puncture point and the pierce sequence.

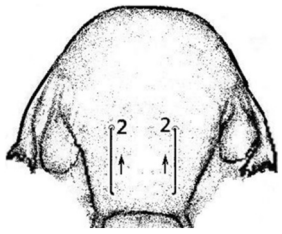

Figure 3. Posterior view of the longitudinal parallel compression suture. Arrows indicate the direction and line of the suture. Numbers represent the puncture point and the pierce sequence.

A 6-week follow-up exam was conducted for all patients. Additional follow-ups were carried out every 3 months for the 1st year and then annually. Each patient's medical records were reviewed to evaluate the effectiveness of the suturing technique. The patients were informed about PPH and advised to have close gynecological follow-up examinations, including ultrasonography and a control hysteroscopy, after 6 months.

Results

The 15 patients who received longitudinal parallel compression suture were followed for age, gravidity number, parturition, gestational age, delivery conditions, reason for cesarean section, cause of PPH, volume of blood loss and blood transfusions, postoperative complications, hospital stay, recovery of normal menstrual flow, imaging, and endoscopy. The data of the 15 patients were analyzed for efficacy and safety of the longitudinal parallel compression suture. The mean follow-up time was 60.2 ± 23.6 months and the patient age range was 23–42 years (median, 29 years).

Nine women were nulliparous, and six women were multiparous. The mean gestational age was 37 weeks. The indication for cesarean section was placenta previa. Bleeding causation of the lower uterine segment included placenta previa in eight patients,