

Vaginal bilateral cervical lips suture in combination with intrauterine Foley catheter to arrest postpartum hemorrhage

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Summary

Vaginal bilateral cervical lips suture allows retention of intrauterine Foley catheter in women with a dilated cervix. This novel indication for vaginal bilateral cervix suture may be a useful adjunct to intrauterine balloon tamponade in the management of postpartum hemorrhage. **Objective:** To describe an effective, minimally invasive surgical technique for avoiding intrauterine balloon tamponade prolapse. **Materials and Methods:** This procedure was performed in the delivery room with or without bladder retraction. The cervix was grasped with two ring forceps and firmly pulled outward, two cm horizontal suture of the cervical lips was made at both the three and nine o'clock positions, which were placed two cm as close to the cervix external os, without transversing the cervicovesical reflection anteriorly and the pouch of Douglas posteriorly, then one or more Foley catheters were inserted through the cervix and inflated with saline 60-80 ml each. **Results:** The balloons remained in place and hemorrhage abated in all nine cases. **Conclusion:** vaginal bilateral cervical lips suture can prevent intrauterine balloon prolapse, which may be a useful adjunct to intrauterine balloon tamponade in management of postpartum hemorrhage.

Key words: Intrauterine balloon tamponade; Postpartum hemorrhage; Prolapse, cervix.

Introduction

In case of postpartum hemorrhage, first-line treatment includes uterotonic agents with or without procedures aimed at achieving uterine tamponade. However, a problem often encountered is prolapse of the balloon through a dilated cervix [1-3]. Thus, there is a need to establish an adjunct to intrauterine balloon to control postpartum uterine hemorrhage.

Materials and Methods

DaLian Maternity Hospital is a very busy maternity unit where about 13,000 deliveries are held annually. The intrauterine Foley balloon tamponade was used in 56 cases from August 2003 to April 2013. However, in nine cases the balloon prolapsed and the present team adopted the vaginal bilateral cervical lips suture combined with balloon replacement through the cervix and controlled the bleeding. In three cases this technique was not applied and resulted in hysterectomy as the only way to control bleeding. Therefore the current authors presented all the cases where the technique was successfully used.

Once consent had been obtained, the procedure was performed without delay after the prolapse of Foley balloon catheter. Transfer to an operating room was unnecessary and took time, regional anesthesia or pudendal or cervical block could be administered. The patient was placed in the lithotomy position, with or without bladder retraction. Visualisation of the full circumference of cervix was accomplished by application of firm upward pressure on vaginal anterior wall while the operator firmly exerted an outward traction on the lips of the cervix with two ring forceps. A 2-0 delayed absorbable Vicryl suture was selected as suture material.

The needles were passed from posterior to anterior at both the three and nine o'clock positions of the cervix with transversing the cervical lips (including myometrium) two cm horizontally, two cm to the external os, and the sutures were securely tied laterally. Additional one or two ligatures, depending on the length of the cervix, were applied cephalad to secure the ligation, using the same technique. Attention was paid to avoid damaging the bladder anteriorly, the rectum posteriorly, or major vessels laterally by straying outside of limits of the cervical stroma (Figures 1 and 2).

One or more 24 Foley catheters were inserted through the cervix and carefully pulled from the vagina by an assistant; each balloon was infused with 60-80 ml saline, a plastic bag was tied to the distal end of each catheter, and hung over the patients bed in order to observe the drainage.

Postoperatively, oxytocin infusion was continued for 12 hours and a single dose of a second generation cephalosporin was administered for 24 hours. The balloon was left in situ, usually for 18-24 hours, and withdrawn gradually if haemostasis was achieved.

Patients admitted to the present unit provided written consent to use their clinical data for research purpose, provided that anonymity was maintained.

Results

The first patient in whom this technique was used was a 32-year old woman, gravida 3, para 1. At 38 weeks gestation, she underwent emergency cesarean section and diagnosed with "dystocia and intrapartum fever" at the second stage of labor. The operation processed smoothly, but when the operators prepared to send her back, they found heavy

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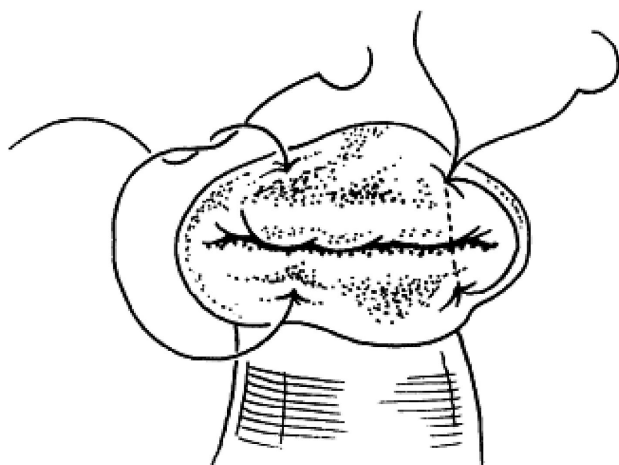


Figure 1. — Start of cervical suture with a suture being placed horizontally through the lips, 2 cm to the external os.

and continuous uterine bleeding. The uterus was well contracted using uterotonic agents, including oxytocin, prostaglandin F2 alpha, there was no retained placental tissue left in the uterus, no vaginal or cervix laceration inspected, and the estimated blood loss was 1,500 ml. Two 24 Foley balloon catheters were inserted through the cervix into the uterine cavity under ultrasonographic guidance, each catheter was distended with 80 ml saline. The balloons temporarily stopped the bleeding, but the balloons prolapsed through the dilated cervix shortly. Because the likely cause of failure of the balloon catheter was the dilated cervix, the bilateral cervical lips was sutured at three and nine o'clock positions, two Foley balloons were gradually replaced into the uterine cavity, inflated with 80 ml of saline each. The balloons remained in place and the hemorrhage abated.

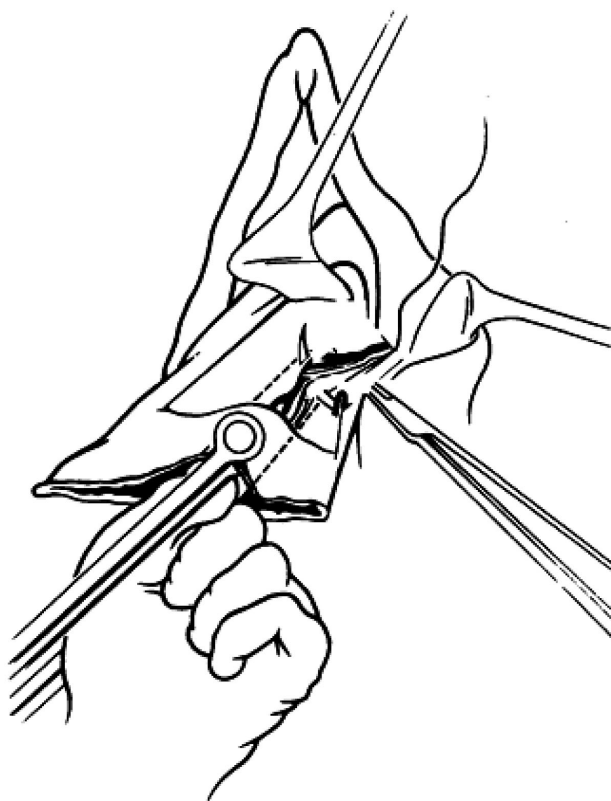


Figure 2. — Use an index finger in the vagina and lower uterine segment to palpate the vessel pulsation to avoid vessel damage.

The same technique was used for another eight patients with the same history with Foley balloon that had fallen off, whose clinical characteristics are included in Table 1.

Table 1. — *Clinical data and variables of the patients.*

Case	Age	Parity	Gestational weeks	Delivery mode	Foley number	Suture number	Total transfusion	Risk factors	Hb (g/dl)	Blood loss (ml)
1	28	1	38+3	Cesarean delivery	1	2	6 PRBC 5 FFP	Intrapartum sepsis	4.9	3600
2	27	1	38+1	Cesarean delivery	2	2	4 PRBC 3 FFP	Twins, placenta low lying	5.2	2000
3	32	1	41+5	Cesarean delivery	2	2	6 PRBC 5 FFP	—	5.0	3000
4	32	1	39+2	Vaginal delivery	4	4	3 PRBC 3 FFP	Placenta previa	6.1	1500
5	35	1	37+5	Vaginal delivery	3	4	2 PRBC	Placenta low lying	7.2	1200
6	34	1	40+6	Vaginal delivery	3	4		Macrosomia	8.0	1200
7	22	1	36+1	Vaginal delivery	2	2	4 PRBC 2 FFP	twins	6.0	1800
8	30	2	40+5	Vaginal delivery	3	4		Placenta residue	8.3	1200
9	34	2	26+3	Top	1	2	6 PRBC 4 FFP	Placenta previa Previous cesarean	3.5	3500

Top: termination of pregnancy; Hb: hemoglobin; PRBC: packed red blood cells; FFP: fresh frozen plasma.

The mean gestational age was 37 weeks and the mean age was 30.4 years. Estimated blood loss ranged from 1,200-3,600 ml (mean 2,100 ml) and patients received mean 3.6 units of packed red blood cells and mean 1.5 unit of frozen plasma. The mean hemoglobin level before transfusion was 6.1 mg/dl. The mean Foley catheter number placed into the uterus was two and the mean suture number of the cervix lips was two.

Three of the patients had a cesarean delivery, two of them after a trial of labor, four of the patients after a vaginal delivery, and one of the patients after the second trimester termination of pregnancy because of trisomy 21. No medical complications occurred in the study group. Five patients were admitted to the intensive care unit for postoperative surveillance.

In five cases, there was bleeding from what was described as the previous placental site (two cases with placenta previa, one with placenta increta, one with a low lying placenta, and one with placenta bipartite). In three cases, postpartum hemorrhage was due to uterine atony, which was unresponsive to oxytocin or analogs of prostaglandin E1 or E2.

Bilateral cervix lips suture combined Foley catheter was effective in all cases. Furthermore, it was successful after a combination with square sutures in one case after cesarean section. In the overall group, the present authors did not observe surgical complications directly related to the technique. All patients were discharged five days after surgery, and none presented with further bleeding. At the routine six-week follow up no abnormality was detected on transvaginal ultrasound scanning of the pelvis. After completion of breastfeeding, all women resumed their normal amount of menstrual flow.

Discussion

Postpartum hemorrhage is the leading cause of maternal deaths worldwide [4]. If management with uterotonics fails to control the hemorrhage, intrauterine balloon tamponade can be an appropriate first line intervention for most women with postpartum hemorrhage [5]. There is ample evidence that balloon tamponade is highly effective for postpartum hemorrhage using various types of balloon catheters, such as Foley catheters, Bakri balloon, Rusch balloon, and condom catheters [5,6]. The main advantage of the Foley catheter is its availability and cheapness, it can be introduced easily with minimal skill and without any anaesthesia or sophisticated equipment [7]. The present authors usually use 24 Foley balloon catheters.

Although balloon tamponade is successful for postpartum hemorrhage in most cases, failures sometimes occur primarily due to displacement of balloon into the vagina through a dilated cervix [6-8]. The use of a vaginal pack has been described elsewhere, but often fails to maintain the balloon within the uterine cavity [6]. To the authors' knowledge, there are few reports that present unique methods to keep a balloon

within the uterus. Jain used a cervical cerclage [9], Khalil *et al.* made a traction stitch of a balloon through the uterine cavity and the abdominal wall during cesarean section [10], Kawamura *et al.* used forceps to clamp the cervix, but the safety are needed to elucidate [8]. Unlike their methods, the present authors employed bilateral cervix suture to prevent the balloons' prolapse. Their approach is quick, safe, and readily available in cases where a balloon protrudes through the cervix. The threads need not be removed, so this was a successful maneuver in maintaining the intrauterine placement of the balloon and there was ultimate success in managing the postpartum hemorrhage.

The haemostasis mechanism of the present authors' technique is unclear. Perhaps the suture ligated some descending branches or vaginal branches of the uterine artery, made the uterus ischemic to increase uterine contraction, contract the cervix thereby closing the cervical os and retaining the catheter balloon. Or during the process, holding the cervix stimulated the contraction of the uterus [11, 12], but when the balloon is expelled repeatedly despite the technique presented here, obstetricians should not persist in the use of balloon.

The suture of the cervix may raise a concern regarding the potential ischemic changes or ultimate necrosis with substantial cervical damage [11]. In the current case, the suture remained in place without any complications, because the hemodynamic circulation and collateral pathway of the cervix. The duration of balloon tamponade varies considerably (range one to 82 hours) and there has been no consensus on how long intrauterine balloon should be kept in place.

In conclusion, the use of bilateral cervix suture to retain the balloon may be a worthwhile, readily available approach to consider when an intrauterine balloon is likely to be extruded through the cervix.

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