

Condom Balloon Tamponade for Postpartum Hemorrhage in Developing Countries: Cost-effective Boon for Saving Mothers

Ruchika Garg¹, Abhilasha Yadav²

ABSTRACT

Condom uterine balloon tamponade (UBT) has the advantage of being cheap and easily available for the control of postpartum hemorrhage (PPH) in cases where preliminary methods to control PPH fail. This study was conducted to study the efficacy of condom (Chhattisgarh balloon/CJ balloon) and its indications in a tertiary care center for the management of massive obstetric hemorrhage.

Materials and methods: Women who were refractory to first-line management with uterine massage and uterotonics in cases of atonic uterus or failed attempt at surgical repair in lower genital tract tears were introduced indigenous made condom catheter as balloon tamponade because Bakri balloon, etc., are not a cost-effective option in developing countries.

Results: Condom balloon tamponade is highly effective in managing postpartum hemorrhage.

The mean volume of fluid used to create tamponade and stop bleeding was about 381.06 mL. The mean time taken to arrest bleeding after the application of balloon tamponade was 6.66 minutes. Only one patient needed hysterectomy.

Conclusion: Modified condom UBT is a minimally invasive, easy to perform, cheap, and fertility-sparing treatment option and it has shown an excellent hemostatic effect even in the setting of DIC.

Keywords: Atonic postpartum hemorrhage, Balloon tamponade and postpartum hemorrhage, Catheter, Chhattisgarh balloon, Condom, Condom catheter and postpartum hemorrhage.

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INTRODUCTION

Postpartum hemorrhage is a leading cause of maternal death all over the world. The most common cause of PPH is uterine atony. The death due to PPH is preventable and the active management of the third stage of labor has the main role in the prevention of death due to PPH.

Uterotonics drugs such as oxytocin, prostaglandin F₂ alpha, and ergometrine are the first resort in its management and if medical treatment fails then other measures such as bimanual compression, uterine packing, uterine balloon tamponade, and surgical interventions such as B-Lynch suture, ligation of uterine artery, ovarian artery, internal iliac artery, and embolization of the arteries are the effective methods for controlling intractable hemorrhage. World Health Organization, the International Federation of Gynecology and Obstetrics, and the Royal College of Obstetricians and Gynaecologists all recommend a UBT to control PPH if uterotonics and uterine massage fail to control bleeding. Condom UBT also has the advantage of being cheap and easily available. This study was conducted to study the efficacy of condom uterine balloon tamponade (Chhattisgarh balloon/CJ balloon) and its indications in a tertiary care center. Because the placenta is a low-pressure system, it is likely that when the placenta is the source of hemorrhage, the direct pressure of the balloon will stop bleeding, even if it is considerably below systemic pressure. When the hemorrhage is caused by an arterial source in the endometrium, the balloon's exerted pressure may be greater than the artery pressure, promoting clot formation. A third theory is that the balloon causes the atonic uterus to contract when it is inserted.¹ More research is needed to determine the mechanism

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of action, which will aid in the proper installation and monitoring of the device.

The purpose of this study is to evaluate the effectiveness of condom balloon tamponade in the management of massive obstetric hemorrhage.

MATERIALS AND METHODS

A prospective study was done in the Obstetrics and Gynecology Department of SN Medical College Agra, India, between July 2018 and October 2021.

The study included women having PPH (defined as loss of >500 mL, >1 L in vaginal delivery or cesarean section, respectively, and/or deteriorating hemodynamic changes owing to bleeding) refractory to first-line management, namely, uterine massage and uterotonics in cases of atonic uterus or a failed attempt at surgical

repair in lower genital tract tears. During the study period, 180 cases of nontraumatic PPH were identified; 38 were managed medically, 19 were managed using compression sutures during cesarean section, 24 by uterine artery ligation during cesarean section, 1 by internal artery ligation, 4 cases required both uterine artery ligation and compression sutures while the remaining 94 were managed using the condom uterine balloon tamponade and 1 case required hysterectomy.

Preparation of CJ Balloon

- Cut two rings from the drainage tube of Foley’s catheter for the CG balloon.
- After inflating the catheter with 2–5 mL of air, remove or puncture the bulb.
- Wrap the condom around the catheter.
- Secure the condom to the catheter by wrapping the rings twice around both ends of the condom, leaving 1.5–2 cm of condom on each end.
- Cut the Foley’s tip and the condom’s blind end together 0.5 cm away from the knotted ring. CG balloon is used to leave both circles. Connect it to the urobag.

After draining the bladder, the patient was placed in lithotomy posture. The cervix’s anterior lip was held in place with sponge holding forceps, and the posterior vaginal wall was retracted. Condom balloon tamponade assembly inserted into the uterine cavity and inflated with appropriate volume of normal saline using a 10 mL syringe till bleeding stops and uterus becomes palpable (Fig. 1). The maximum volume of normal saline used was 500 mL, but in most cases, 350 mL was enough to establish hemostasis. Intrauterine bleeding, if present, will be collected in the urinary sac. Bleeding observed for 15 minutes. If bleeding continues, normal saline will swell and observe for bleeding. If the bleeding has stopped, the condom tampon is left in place for 12–24 hours. Broad-spectrum prophylactic antibiotics are mainly administered intravenously. Simultaneous oxytocin infusion was initiated and

continued for approximately hours. After 12–24 hours, if uterine contractions are good, vital signs are stable and there is no more bleeding in the urethral sac. The balloon slowly deflates at a rate of 5 mL per minute. Bleeding observed for 30 minutes. If there was no bleeding, the condom was gauze and the patient monitored for 2 hours.

RESULTS

Table 1: Mode of delivery

PPH	
• Primary	156
• Secondary	24
Mode of delivery	
• Spontaneous vaginal	96
• Instrumental vaginal	12
• cesarean section	72

Table 2: Interval between delivery and catheter insertion in hours

Interval between delivery and catheter insertion in hours	
0–4 hours	53
4–24 hours	23
>24 hours	18

Table 3: Time required to control postpartum hemorrhage (in minutes)

Time required to control postpartum hemorrhage (in minutes)	
• 0–10 minutes	89
• 10–20 minutes	05
Condom catheter insertion and removal interval (in hours)	
• 24 hours	61
• 25–36 hours	21
• >48 hours	12
Indication of insertion of condom catheter	
• Lower segment bleeding in placenta previa (not controlled with stiches on the uterine bed and all uterotonics)	16
• Secondary PPH in cases of Dengue they had associated thrombocytopenia and atonic uterus too	8
• Atonic PPH	58
• Placental bits not able to be removed	12

Table 4: Distribution of patients according to the other methods of management

Medical management + bimanual uterine massage	38
Uterine artery ligation	24
Internal artery ligation	01
Compression sutures or compression sutures combined with uterine artery ligation	19
Hysterectomy	1



Fig. 1: How to make condom catheter?

Table 5: Vital and intervention parameters

Parameter	Median value	Interquartile range
Systolic blood pressure (mm Hg)	90	52.5, 105
Diastolic blood pressure (mm Hg)	60	32.5, 70
Volume of normal saline required (in mL)	350	225, 400
PPH to tamponade (in minutes)	20	12.5, 43.75

DISCUSSION

Primary postpartum hemorrhage is defined as more than 500 mL of bleeding within the first 24 hours after a vaginal birth and more than 1000 mL of bleeding after cesarean section.¹ Uterine tamponade methods are used for a long time to control severe uterine bleedings. Sengstaken–Blakemore tube, Rusch balloon, Foley catheter, and condom catheters have been adapted for similar clinical studies.^{2–4} The most common cause of PPH is uterine atony. Despite the original Bakri balloon has used for cases with placenta previa, it has been used effectively for other cases with PPH caused by uterine atonia.^{5–7} Dabelea et al. applied intrauterine balloon tamponade to 23 patients with PPH who were unresponsive to medical therapy and they reported a 100% success rate in cases with hemorrhage due to uterine atony. Also, they reported an 80% success rate for bleeding due to retained placenta. Kucukbas et al. used balloon tamponade in four cases diagnosed with PPH (one placental abruption, two atonia, and one placenta previa) that were unresponsive to the medical treatment and they reported successful hemostasis in all cases. Consistent with these results, we treated 94 cases were diagnosed with PPH unresponsive to medical treatment by balloon tamponade and we reported an 84% successful hemostasis rate in these patients. The Bakri balloon is complex to use and expensive (approx. Rs.1,452). The Rusch urologic hydrostatic balloon catheter, although simple and effective, is also expensive (approx. Rs. 1,958) and not easily available in India. But, the use of a condom catheter tamponade costs to around Rs. 200 only (Tables 1 to 5). This makes it the most cost-effective method.

In the present study the mean volume of fluid used to create tamponade and stop bleeding was about 381.06 mL which was comparable to the studies by Akhtar et al.⁸ (mean reported fluid volume was 336.4 mL) and Rather et al.⁹ (mean reported volume was 342.8 mL). The maximum volume of fluid used in the study was 500 mL.

In our study the mean time taken to arrest bleeding after the application of balloon tamponade was 6.66 minutes which was comparable to the study by Rathore et al.¹⁰ (6.06 minutes). While

waiting for the arrest of hemorrhage simultaneous arrangements can be made to proceed to surgical management.

Besides being so advantageous, the main limitation of the study was the small sample size and also the impact of condom catheter in long-term outcomes like pelvic inflammatory disease, menstrual disturbances, and future fertility due to the short duration of study.

CONCLUSION

Modified condom uterine balloon tamponade is a minimally invasive, easy to perform, cheap, and fertility-sparing treatment option and it has shown an excellent hemostatic effect even in the setting of DIC.

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