

## Effectiveness of intrauterine condom tamponade in atonic postpartum hemorrhage

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### ABSTRACT

**Introduction:** Postpartum hemorrhage(PPH) is the leading cause of maternal mortality. The intrauterine balloon tamponade is the efficient and economical means to treat atonic PPH so this study was done to evaluate the outcome of uterine balloon tamponade in atonic PPH.

**Method:** This was a retrospective study conducted at the Patan Academy of Health Sciences Lalitpur, Kathmandu from January 2017 to December 2019. It included women with postpartum haemorrhage due to uterine atony in whom medical treatment had failed.

**Result:** The condom tamponade was successful in 94.7% women with uterine atony, who did not respond to uterotonic drugs and 5.3% required peripartum hysterectomy. Majority of women were in the 25-29 years age group. 73.3% were multigravida and 63.2% had vaginal delivery. No case of febrile morbidity and wound sepsis was noted.

**Conclusion:** The study concludes the use of condom tamponade as an effective means of controlling atonic PPH. It is safe, easily available, inexpensive, minimally invasive, does not require anesthesia, easy to use and can be performed by any level of health personnel with some training.

**Keywords:** Condom tamponade, postpartum hemorrhage (PPH), uterine atony

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## INTRODUCTION

Postpartum haemorrhage (PPH) is one of the leading cause of global maternal morbidity and mortality.<sup>1</sup> In Nepal, estimated maternal mortality ratio (MMR) is 170 per 100,000 live births and 24% of these deaths are attributable to PPH.<sup>2</sup> The most common cause of PPH is uterine atony which accounts for 80-85%, followed by Trauma, Tissue and Thrombin.<sup>3</sup> After failed medical therapy and before surgical procedure compressing uterine sinuses with intrauterine balloon tamponade can be the reasonable option to control atonic PPH which has been added to this armamentarium in the management of atonic PPH.<sup>4</sup> Options for balloon tamponade include the Bakri balloon, the Rusch balloon, the Sengstaken–Blakemore tube and Foley catheters.<sup>5</sup> Successful results have been shown in various researches by using a Sengstaken-Blakemore tube and a Rusch urologic hydrostatic balloon catheter to create intrauterine tamponade for treatment of atonic PPH.<sup>6</sup> Given the difficulty and potential traumatic procedure of insertion of roller gauze packs, the use of uterine balloon tamponade has been favored more recently.<sup>7</sup>

Advantages of this method include avoidance of laparotomy, easy and rapid insertion with minimal anesthesia, the fact that it can be performed by relatively inexperienced personnel, painless removal, and rapid identification of failed cases.<sup>8</sup> As this is a simple procedure to perform, primary health workers can implement it too before referring the patient to a tertiary care center which will minimize blood loss and prevent irreversible shock and mortality. The current study was planned to evaluate the efficacy of condom balloon tamponade to arrest atonic PPH.

## METHOD

This was a retrospective study done in the department of Obstetrics and Gynecology at Patan Academy of Health Sciences from January 2017 to December 2019 using medical records of Patan hospital, Kathmandu, Nepal. Ethical approval was taken from Institutional Review Committee (IRC) Ref: drs2009291451. Informed written consent was taken from the patient husband before proceeding to condom tamponade. Those women with PPH refractory to medical measures later managed with condom tamponade were enrolled in this study. A total of 19 patients underwent this procedure. The first line pharmacologic measures included ergometrine, oxytocin, 15 methyl analogue of prostaglandin F<sub>2α</sub> (carboprost), prostaglandin E<sub>1</sub> (misoprostol). All these measures

were tried for half an hour before the cases were termed intractable PPH.

PPH not associated with uterine atony like due to trauma (episiotomy site, cervical tear) and retained bits of placental tissue were excluded from this study. Case files of the included patients were retrieved from medical record section. Details regarding patient's age, parity, known medical comorbidity (hypertension, diabetes mellitus, preeclampsia, anemia), mode of delivery, amount of blood loss by measuring suction machine, requirement of blood transfusion (unit) following management of PPH with condom tamponade will be recorded in the proforma. Data was entered in Microsoft excel and statistical analysis carried out.

## Condom Tamponade Procedure:

Condom tamponade tray include- Foley catheter of size 16, a packed condom, scissors, I/V set, 500-ml bottle of saline, Silk thread, sponge holding ring forceps. With aseptic precautions, a condom was rolled over a Foley catheter (no. 16) and tied with a silk thread on two sites 1 cm apart. Sims speculum was inserted in the vagina to expose the cervix. The cervix was identified and the condom tamponade was introduced into the uterine cavity manually. Condom was inflated with 350-500ml of normal saline injected through the catheter drainage port with help of I/V set till bleeding ceased. The catheter was then tightened by silk thread. Vagina was packed with 6-inch ribbon gauze. Indwelling catheter was left in bladder till the condom tamponade was in place. Fundal height was marked on abdomen to assess the increase in height of uterus due to collection inside the uterine cavity. Oxytocin drip (10-20 units in half liter DNS) was continued for at least 24 hours after the procedure. Broad spectrum antibiotics injectable ceftriaxone was also administered prophylactically. Patients were monitored for vital signs, pallor, rise in fundal height and bleeding per vagina. If bleeding stops, condom tamponade was kept for 48 hours. Clinical success was defined as control of bleeding without further intervention. If the bleeding did not stop within half an hour of condom tamponade insertion, the method was termed unsuccessful. After counselling to patient family members and taking consent about the need of surgical intervention, will proceed for laparotomy and other necessary measures, even hysterectomy.

## RESULT

A total of 19 cases were identified in which condom tamponade was used to control PPH. The

mean age was 29 years with standard deviation of 6.8 years. Most of the women were multigravida. Regarding mode of delivery majority had normal vaginal delivery. There were no comorbidities in more than half of the women. Table 1

Out of 19 women, 18 had success in intrauterine condom tamponade and only 1 required peripartum hysterectomy. Table 2.

There were no complications in 9 of the women and 10 women required blood transfusion. Table 3.

**Table 1. Patient characteristics (N=19)**

Characteristics	Frequency (%)	Characteristics	Frequency (%)
Age		H/O abortion	
20-24	5 (26.3%)	Yes	8 (42.1%)
25-29	6 (31.6%)	No	11 (57.9%)
30-35	5 (26.3%)	H/O PPH	
35+	3 (15.8%)	Yes	2 (10.5%)
Parity		No	17 (89.5%)
Primi	5 (26.3%)	Comorbidities	
Multi(>1)	14 (73.7%)	Anemia	2 (10.5%)
Mode of delivery		hypothyroidism	2 (10.5%)
Vaginal delivery	12 (63.2%)	Preeclampsia	0 (0%)
Caesarean section	7 (36.8%)	None	15 (79.0%)

**Table 2. Efficacy of condom tamponade**

Efficacy	Frequency	Percentage
Yes	18	94.7%
No	1	5.3%

**Table 3. Complications during the procedure**

Complications	Frequency	Percentage
Fever	0	0
Abdominal pain	0	0
Need for blood transfusion	10	52.6
Hysterectomy	1	5.3
None	8	42.1

## DISCUSSION

PPH is one of the leading cause of maternal death in developing countries causing 10% of the women requiring major surgical interventions and hysterectomy to save their lives. The method of uterine balloon tamponade have been added to the armamentarium for managing PPH.<sup>9</sup> The idea of balloon tamponade was first generated in Bangladesh in 2001 by Akther, et al, in response to the high cost of commercially available UBT devices.<sup>10</sup> UBT is an effective treatment option for control of PPH and has obtained satisfactory results particularly in the management of uterine atony.<sup>11</sup>

In our study, the age group most affected was in between 24-29yrs constituting 31.6% cases which was near as Lohano, et al.(18-26), Thapa, et al.(18-30), Joshi, et al.(20-29)<sup>12,13,14</sup> but Akhter et al and Nato, et al. reported 19-40 yrs and 24-38 yrs<sup>10,15</sup> respectively. In this study multigravida was affected more than primigravida (73.3%) which was same as study by Jain et al and Mishra et al.<sup>16,17</sup> 42.1% cases had previous history of abortion likewise 10.5% had history of PPH(Table1). In

comorbidity only 10.5% had anemia whereas Jain reported 22.22% of anemia.<sup>16</sup> The effectiveness of the condom tamponade was not compromised by the presence of risk factors for PPH, a result that supports the use of this treatment in this type of patients.

In present study, 63.2% cases of atonic PPH in whom condom catheter was used, had normal vaginal delivery and 36.8% had caesarean section which was similar to study by Akhter et al( 61% vs13%), Jain et al (68.18%vs 31.82%)and Joshi et al constituting 72.41% vs27.5% respectively <sup>10,16,14</sup> whereas Hasabe, et al. and Lohano, et al. showed 91.66% vs8.37% and90.4%vs 9.6%.<sup>18,11</sup> Kadioglu BG, et al., reported no significant difference between patients with vaginal delivery and caesarean section in terms of successful hemostasis rate.<sup>19</sup>

In present study, the condom catheter was successful in controlling PPH in 94.7% women which was similar to study by Ranatunga (95.2%), Hasabe (94.4%) and Rathore (94%).<sup>20,18,21</sup> In the study by Rathore the mean amount of fluid filled in

the condom catheter balloon was 409 mL. The mean duration for which condom catheter balloon was left in situ was 27.5 hrs. The average amount of blood loss was 1330 mL. In our study it was kept for 48 hrs and amount of fluid was around 500 ml. In comparison, Bagga, et al. and Thapa, et al. reported 100% success.<sup>22,13</sup> Seror, et al. reported on 17 patients with uterine atony or retained products treated with balloon tamponade for postpartum bleeding who failed medical treatment.<sup>23</sup> The condom catheter was successful in controlling PPH in 90.9% women in the Jain study.<sup>16</sup> Dabelea, et al., reported 23 cases with postpartum hemorrhage unresponsive to medical therapy but managed successfully with intrauterine balloon tamponade.<sup>11</sup> Airede LR, et al., reported four cases of PPH due to uterine atony in which intrauterine tamponade with inflated condom stopped bleeding.<sup>24</sup> In present study, all women were treated with same device i.e. intrauterine condom balloon catheter. While in a study by Georgiou, different types of intrauterine balloons were used for the treatment of PPH, with an overall success rate of 91.5%.<sup>5</sup> In study by Tirumuru S, et al., Rusch balloon was used in 48 cases and Bakri balloon was used in 10 cases.<sup>25</sup> Condous, et al. reported that balloon tamponade controlled postpartum bleeding among 12 (71%) of 17 patients.<sup>26</sup>

Though the tamponade was effective in most of the cases, 5.3% cases required hysterectomy despite successful placement of the catheter in our study (Table 2). Jain and Dabelea, et al., reported 90% success and 10% required hysterectomy.<sup>16,11</sup> No death was reported in this study. An important factor in the maternal mortality resulting from PPH is late recognition of the severity of the bleeding with a resulting delay in blood replacement. In the study by Lahono, et al., out of the 5 failures of condom tamponade, hysterectomy was required in 4 cases and in the remaining case the failure was associated with expulsion of the balloon, but haemostasis was achieved with further conservative measures. Among the failed cases, there was one maternal death due to amniotic fluid embolism with cardiac arrest and PPH secondary to coagulopathy.<sup>12</sup> In present study, none of the patients developed febrile morbidity and wound sepsis following condom catheter placement. Similarly, in study by Akhter S et al, there was no intrauterine infection as documented by clinical signs and symptoms and culture and sensitivity of high vaginal swab.<sup>9</sup> In a study by Tirumuru S, et al., there were 2 cases of endomyometritis but there were 28% febrile morbidity in the study by Jain.<sup>23,16</sup>

In our study 52.6% received blood transfusion and Lohano, et al. reported two units of blood transfusion during the procedure.<sup>11</sup> In the study by Kandell, et al., 46 out of 50 cases required transfusion.<sup>27</sup> Mishra 2019 reported two unit of blood transfusion using Chhattisgarh balloon catheter which was little different than conventional balloon catheter.<sup>28</sup> We did not include a comparison group of patients with similar blood loss who did not have balloon tamponade. This was the main limitation of our study. Future studies should address the details of risk factors leading to atonicity and the amount of blood loss during the procedure is also equally important. Lastly the prospective study would address the problem so as to manage it in a better way.

### CONCLUSION

Condom tamponade was effective in controlling PPH unresponsive to medical therapy. There should be further study of such interventions to better understand the barriers for successful implementation and its use in resource-limited settings. The threshold should be low for prophylactic use of balloon tamponade in women at high risk of PPH, considering its ease of use, low complication rate and ability to maintain reproductive ability.

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### Author Contribution

All authors read and approved the final manuscript.

### Conflict of Interest

None

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None

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