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## Role of condom catheter balloon tamponade in management of atonic postpartum haemorrhage in cases of failed medical management

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### Abstract

**Background:** Postpartum haemorrhage is an acute emergency in obstetrics which is highly related to maternal mortality if not managed urgently. PPH has been defined as blood loss more than 500 ml following vaginal delivery and more than 1000 ml following caesarean section. Another definition is any blood loss which causes a 10% drop in hematocrit or which threatens the hemodynamic stability of the patients is defined as PPH.

**Aim:** The aim of the study was to evaluate efficacy of a condom catheter tamponade in the management of atonic postpartum haemorrhage (PPH) where single medical method has failed.

**Methods:** It was a prospective interventional study done in Jhalawar Medical College Rajasthan, India. Twenty five women with intractable PPH unresponsive to medical management were managed by uterine balloon tamponade using a condom-catheter assembly prior to surgical intervention. Under aseptic precaution, a sterile Foley's catheter fitted with a condom, was introduced into the uterus. Condom was inflated with 250-500cc Normal saline according to need. Vaginal bleeding was observed for 15 min. If bleeding stopped then tamponade was continued along with oxytocin and if bleeding did not stop then patient taken for surgical management.

**Results:** The catheter successfully controlled haemorrhage in all 25 (100%) patients. In cases where the balloon was successful, it was removed around 24-48 hours later and no further bleeding or complication was observed.

**Conclusions:** Placement of a condom catheter balloon can successfully treat atonic PPH refractory to medical management. It is simple, inexpensive, easily available and requires lesser skills in limited resources area.

**Keywords:** Postpartum haemorrhage, Condom catheter balloon tamponade, Obstetric haemorrhage

### Introduction

PPH has been defined as blood loss of more than 500ml in vaginal delivery and more than 1000 ml in caesarean section [1]. In another words its also defined as any blood loss which causes a 10% drop in hematocrit or which threatens the hemodynamic stability of the the patients is known as PPH [2]. Postpartum haemorrhage is the most important cause of maternal mortality worldwide accounting for 25% of maternal deaths annually. It is estimated that worldwide one woman dies every four minutes due to postpartum haemorrhage with an average yearly incidence of about 1,40,000 women deaths [3]. Most common cause of PPH is atonicity. Whatever the cause of PPH, death should be preventable, and outcome is largely dependent upon timely interference and efficiency and vigor of medical practitioners. Active management of the third stage of labor reduces uterine atony and is the mainstay of prevention of haemorrhage [4]. However, death from PPH can largely be avoided through proper prevention, diagnosis and management [5]. Doumouchtsis SK *et al.* [6] in a systematic review to identify all the studies evaluated the success rates of treatment of PPH with uterine balloon tamponade, uterine compression sutures, pelvic devascularisation and arterial embolization. The cumulative outcomes showed success rates of 84% (95% CI, 77.5%-88.80%) for balloon tamponade. This study concluded that balloon tamponade is the least invasive and most rapid method for PPH management and should be considered as the first step following failure of medical therapy. Condom catheter is a cheap and easily available alternative to catheters like Sengstaken Blakemore tube and Bakri balloon which are commonly used for tamponade in post-partum haemorrhage. This prospective study was planned to evaluate the utility of condom catheter tamponade in non-traumatic PPH after failure of medical management.

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## Method

Our study was a prospective interventional study conducted at Jhalawar medical college Rajasthan, India from May 2016 to June 2017. All patients who delivered either vaginally or by Caesarean section and developed non-traumatic postpartum haemorrhage not responding to medical management were included in this study. Total 25 cases were selected. Written consent was taken from patients and from patients relative. The procedure was performed without additional anaesthesia. First, bleeding due to local trauma or retained tissue in the uterus was excluded. Blood loss was estimated by visual method including use of calibrated mops and suction apparatus. A condom was tied over the distal end of the Foley's catheter with a silk thread. Condom-catheter assembly was inserted into the uterine cavity with a sponge holding forceps after introduction of sim's speculum into the vagina and holding cervical lips with sponge holding forceps. Condom was inflated with appropriate volume of normal saline (250 to 500ml) till bleeding was arrested and balloon was visible through the cervical canal. Outer end of Foley's catheter was clamped and tied with silk thread. Bleeding was observed for next 15 minutes. If bleeding stopped, tamponade was continued for next 12-24hrs. Oxytocin infusion was continued until 12 to 24 hours in the postoperative period.

After 12-24 hours, if the uterine fundus remained at the same level and no bleeding was seen through the cervix, balloon was removed. Oxytocin infusion (20 U in 500ml Normal Saline) was started half an hour before deflation, if not already on flow. The balloon was deflated slowly (at the rate of 15 to 20 ml per minute) but not removed until next 30 minutes, in case need for re-inflation arose.

Oxytocin infusion was continued during deflation. If the patient did not bleed for next 30 minutes, the catheter balloon assembly was removed and oxytocin infusion continued according to clinical assessment, for a maximum of 6 hours. Statistical analysis was done using simple measures like mean, median etc.

## Result

All women included in the study had primary PPH. Atonicity (A) of the uterus was the cause in 23 (92%) and bleeding placental bed in 2(8%) cases. The characteristics of patients selected for the condom catheter intervention are summarized in Table 1.

**Table 1:** Characteristics of Patients Selected for Condom Catheter Intervention.

Characteristics	Mean	± SD
Age (yrs)	26.82	6.36
Parity	Range	Median
	1-6	2
Mode of Delivery	Number	%
	Spontaneous vaginal delivery	19
Lower segment cesarean section	6	24

**Table 2:** The mean time taken to arrest bleeding after the application of the condom catheter balloon Tamponade.

Time taken	Frequency	Percentage (%)
NA	2	8%
1-5 min	4	16%
6-10 min	17	68%
>10 min	2	8%
Total	25	
Mean±SD	7.00 ± 2.76SD	

The patients were between the ages of 19 and 40 years, and the mean age was 26.8 years. Parity ranged from 1-6, with a median of 2. (In our experience, multiparous women are more prone to develop PPH.) The majority of the 19(76%) cases had spontaneous vaginal delivery and 6(24%) cases by cesarean section and developed PPH immediately after delivery.

## Intervention

With aseptic precautions, a sterile rubber catheter fitted with a condom was introduced into the uterus. The condom was inflated with 250-500 mL normal saline according to need. Vaginal bleeding was observed and further inflation was stopped when bleeding ceased. To keep the balloon in situ, the vaginal cavity was filled with roller gauze and finally a sanitary pad. If bleeding continues, this vaginal pack will usually become soaked with blood, and if profuse it will trickle through the introitus to soak the outside pad and undergarments. This did not happen in any of our cases. Removal of a pack did reveal that it was soaked with blood, but no profuse bleeding occurred, so no blood came through introitus. Uterine contractility was maintained by oxytocin drip for at least 6 hours after the procedure. As mentioned, the condom catheter was used in those cases in which oxytocin and other drugs were not effective for management of PPH. However, as it maintains the tone of uterus, oxytocin was administered along with introduction of the condom catheter.

After introduction of the catheter, a tight vaginal pack is applied and then saline is administered into the catheter.

Antibiotics were also administered prophylactically because of the presence of a foreign body inside the uterus. The triple antibiotic regimen used was amoxicillin (500 mg every 6 hrs) plus metronidazole (500 mg every 8 hrs) plus gentamicin (80 mg every 8 hrs) administered intravenously for 7 days. High vaginal culture swab was done to determine whether there was any invading organism even after giving antibiotics, as some organisms may be resistant to this triple antibiotic regimen.

The condom catheter was kept for 24-48 hours, depending upon the initial intensity of blood loss. For those who had severe bleeding, the catheter was kept for the longer duration. Bleeding did not resume in any patient, and the condom was deflated slowly over 10 to 15 minutes during the same sitting.

## Results

After failure to control bleeding by medical measures, the condom catheter was introduced. In all the cases (100%), the condom catheter was introduced within 0-4 hours after delivery. In all 25 patients, bleeding was stopped within 15 minutes. The patients were followed up for 24-48 hours. No patient needed further intervention. From 200-500 mL (average 350 mL) saline was required to inflate the balloon. The volume was increased until there was resistance to addition of more fluid and the bleeding ceased. On average, 3.23 units of blood (range 2-6 units) were needed to produce hemodynamic stability. No patient went into irreversible shock. There was no intrauterine infection documented by clinical signs and symptoms and culture and sensitivity of high vaginal swab.

## Discussion

In the study period, 12460 deliveries took place of which 184 patients developed non-traumatic PPH. Twenty five patients were enrolled for the study and 23 of those patients (92%) had atonicity as the only cause for PPH while the 2(8%) had bleeding from the placental bed along with atonic uterus. Tindell K *et al* conducted a systemic analysis to evaluate the

effectiveness of various types of uterine balloon tamponade in the management of PPH in resource poor settings [7]. The studies used various types of uterine balloon tamponade, including condom catheter (number of women =193), Foley's catheter (n =5), and Sengstaken-Blakemore oesophageal catheter (n = 1). In these studies, uterine balloon tamponade successfully treated intractable PPH in 234 out of 241 women. Akhter S [8] *et al* evaluated the efficacy of hydrostatic condom catheter to control PPH due to atonicity and morbid placental adhesions in 23 patients. The condom was inflated with 250 to 500 ml of normal saline and was kept in situ for 24 to 48 hours. In all 23 cases bleeding was successfully controlled. No patient needed further intervention and no intrauterine infection was documented. Condous GS *et al.* [9] evaluated the tamponade test in the management of massive PPH in 16 patients and success was met with in 14 (87.5%) of them [9]. Two (12.5%) gave negative tamponade test and hence underwent laparotomy. This diagnostic test rapidly identified patients with PPH who required a laparotomy. Rathore AM *et al.* [10] in their prospective study conducted from 2009 to 2012 at Maulana Azad Medical College New Delhi India, studied the efficacy of condom catheter tamponade in the management of non-traumatic PPH resistant to medical therapy in 18 patients with a success rate of 94%. In our study the mean time taken to arrest bleeding after the application of the balloon tamponade was  $7.00 \pm 2.76$  minutes which was comparable to the study by Rathore AM *et al* (6.06 minutes). 8 While waiting for arrest of haemorrhage, simultaneous arrangements can be done to proceed to surgical measures. So waiting for 10 - 15 minutes for the haemorrhage to stop while patient and operation theatre are prepared for laparotomy can be justified, when weighed against the radical procedures like hysterectomy. Hence guarded wait can prevent radical procedures, more importantly so in primiparous women, and the much valuable uteri can be salvaged. Average blood loss in this study was 1.48 litres which was estimated by visual inspection method.

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