

Role of Balloon Tamponade in Controlling Postpartum Hemorrhage (PPH)

Bakth Ranra, Humeera Naz, Zul-e-Huma, Aneesa Sadiq, Parveen Shafi and Maida Khan

ABSTRACT

Objective: To evaluate the efficacy of balloon tamponade in controlling PPH.

Study Design: Descriptive cross sectional study

Place and Duration of Study: This study was conducted at the Department of Obstetrics and Gynecology, GKMC Swabi from January 2023 to June 2023.

Methods: A total of 134 patients were included in the study. Information regarding age, gestational age, mode of delivery, assessment of effective bleeding was recorded. Effectiveness was measured if the bleeding stops within 15 minutes of applying tamponade, and if no bleeding occurred within 24 hours and after removing of balloon tamponade. Blood loss estimation sanitary pad was weighed beforehand and after being soaked in blood was weighed again and difference was noted, 1 gm was taken as 1ml. All the data was analyzed by using SPSS.

Results: This study was conducted on 134 patients. The Mean and SD for age was 26.69 ± 4.21 . Mean and SD for gestational week was 38.51 ± 1.102 . Mean and SD for parity was 2.04 ± 2.11 . Mean and SD for blood loss in mL was 896.34 ± 186.72 . The mode of delivery in 126 (94%) patients was spontaneous and in 8 (6%) patients it was instrumental. Balloon tamponade was found effective in 127 (94.8%) patients and was not found effective in 7 (5.2%) patients.

Conclusion: We conclude that the use of condom balloon tamponade can effectively help in reducing blood loss and both maternal morbidity and mortality associated with PPH.

Key Words: Postpartum hemorrhage (PPH), Normal vaginal delivery, Condom Balloon Tamponade.

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INTRODUCTION

Obstetric hemorrhage is one of the major cause of maternal deaths worldwide and major type of obstetric hemorrhage is Postpartum hemorrhage. Postpartum hemorrhage (PPH) is defined as bleeding of more than 500ml after normal vaginal delivery. It can also be defined as a blood loss of 1000ml after caesarean section (CS) from the birth canal OR any amount of blood loss from birth canal which leads to 10 % drop in hematocrit or which makes a patient hemodynamically unstable and necessitates blood transfusion¹⁻².

Deaths due to pregnancy are a leading cause of premature death worldwide.

Department of Gynae, Gajju Khan, Medical College Shamansoor, Swabi.

Correspondence: Humeera Naz, Assistant Professor of Gynae, Gajju, Khan Medical College Shamansoor, Swabi.

Contact No: 0332-5428893

Email: humeera@kmc@gmail.com

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According to WHO report, 127000 deaths occur annually worldwide mainly due to obstetric hemorrhage¹. Post-partum hemorrhage is an equal opportunistic killer. Despite appropriate management, 3% of vaginal deliveries end up with life threatening postpartum hemorrhage³. Postpartum hemorrhage (PPH) complicates up to 18% of all deliveries and accounts for 25-30% of all maternal deaths worldwide². The prevalence of PPH in Pakistan is 34%⁴.

Pathogenesis of PPH involves abnormality in any one among the four processes (tone, tissue, trauma, thrombin) or combination of these³. Among these processes uterine atony is on the top, accounts for almost 80% cases of PPH^{3,5}. Other causes of primary PPH include trauma of lower genital tract, retained placental tissues, inversion of uterus, uterine rupture and consumptive coagulopathy. Common complications of PPH include hypovolumic shock, renal and hepatic failure, adult respiratory syndrome (ARDS) disseminated intravascular coagulopathy (DIC) which end up with maternal death⁶.

PPH Management requires a stepwise management that includes the ruling out of genital tract trauma and retained products of conception. Uterine atony management includes uterine massage, bimanual uterus compression and by use of various utero tonic medication such as oxytocin, misoprostol, argometrine

and prostaglandin F2 alpha^{6,7}.

When medical treatment fails surgical intervention will be required in the form of uterine compression sutures, uterine and internal iliac artery ligation, and possible hysterectomy. As hysterectomy is as a life-saving procedure, but it leads to lifelong morbidity in form of permanent infertility, and psychosocial complications⁸

Recently uterine tamponade has been introduced and should be used as 2nd line in case of failure of medical treatment before going to surgical intervention. Previously tamponade was done by uterine packing⁹ but due to complications like risk of perforation and infection⁵, it has been replaced by uterine balloon tamponade³. Use of many type of balloon devices has been reported, that includes Bakri balloon, Sagstaken-Blakemore tube, Rusch balloon, Condom catheters and Foley catheters^{10,11}. This balloon acts by exerting an internal pressure higher than the systemic arterial pressure, which compresses the arteries and consequently, stops the bleeding. As it is logically the least invasive procedure, it would be utilized before arranged for surgery and probable hysterectomy³. laparotomy can be avoided by this procedure, minimal anesthesia required for its insertion, painless removal, and procedural failure can be identified quickly and easily. Due to simplicity of the procedure it can be implemented by primary health worker before referral to tertiary care center which will reduce loss of blood and will prevent mortality and irreversible shock^{12,13}. The purpose of this study was to assess the efficacy of condom balloon tamponade in controlling PPH.

METHODS

This study was conducted in the Obstetrics and Gynecology department, GKMC Swabi.

Study duration:

Six months from the date of approval of synopsis. January 2023 to June 2023.

Sample size:

Sample size will be of 134 cases calculated by open EPI software by taking 95% confidence level, 5 % margin of error and expected percentage of efficacy with balloon tamponade as 90.4%.

Sampling technique:

Non Probability consecutive sampling technique.

Inclusion Criteria: Patient with age group 18-35 years with history of gestational age > 37 weeks presented with primary PPH due to uterine atony (will be assess by per abdomen examination of uterus) and normal vaginal delivery after failing medical treatment.

Exclusion Criteria: All females presented with PPH due to retained product of conception, cervical vaginal tears, perineal tears or coagulation disorder.

Females with history of previous caesarian section
Secondary PPH

Data collection procedure: A total of 134 patients who were admitted through emergency with PPH or those patients who developed PPH after delivery in the labour room in whom medical treatment fails and fulfilling the inclusion criteria were included in the study. After approval of ethical committee of GKMC and CPSP, taking an informed consent, patient were put in lithotomy position and condom fitted with rubber catheter was inserted into uterus with help of sponge holding forceps and condom balloon will be inflated with 250-500 ml saline until resistance is felt or bleeding stopped.

Compression vaginal packing was done by gauze piece to keep catheter in position. If bleeding stopped within 15 mints of applying tamponade. Syntocinon 40 units in form of infusion was given for 4 hour during and after procedure. Patient was catheterized and kept in observation for 24 hours in ward. Vitals and input output record were monitored in ward for 24 hours.

Antibiotics were prescribed prophylactically for 7 days and aseptic techniques were ensured. After 24 hours if patient was hemodynamically stable and no further bleeding was observed the balloon was deflated gradually in presence of senior gynecologist having a minimum of 5 years' experience. Information regarding age, gestational age, mode of delivery, assessment of effective bleeding was recorded. Effectiveness was measured if the bleeding stopped within 15 minutes of applying tamponade, and if no bleeding occurred within 24 hours and after removing of balloon tamponade. Blood loss estimation sanitary pad was weighed before hand and after being soaked in blood was weighed again and difference was noted, 1 gm was taken as 1ml.

Data analysis:

All Data was entered and analyzed through SPSS version 20. Numerical variables such as patient age, parity, gestational age, loss of blood, blood pressure and Pulse rate were calculated as Mean and SD. Nominal variables like efficacy, mode of delivery, booking status was presented as frequency and percentages.

RESULTS

This study was conducted on 134 patients. The Mean and SD for age was 26.69±4.21. Mean and SD for gestational week was 38.51±1.102. Mean and SD for parity was 2.04±2.11. Mean and SD for blood loss in mL was 896.34±186.72. Mean and SD for systolic BP was 81.65±6.306. Mean diastolic BP was 49.81±6 and Mean and SD for pulse rate was 100.36±5.1 (Table 1). In the age group of 18 to 26 years there were 73 (54.5%) patients and 61 (45.5%) were in the age group of 26 to 35 (Figure 1). According to gestational age wise distribution, 73 (54.5%) patients were in the gestational age group of 37 to 38 weeks and 61 (45.5%) patients were in the gestational age group of 39 to 40 weeks (Table 2). According to parity wise distribution

there were 111 (82.8%) patients in the parity group of 1 to 3 and 23 (17.2%) patients in the parity group of 4 to 5 (Table 3). The mode of delivery in 126 (94%) patients was spontaneous and in 8 (6%) patients it was instrumental (Table 4). According to the booking status,

11 (8.2%) patients were booked and 123 (91.8%) patients were not booked (Table 5). Balloon tamponade was found effective in 127 (94.8%) patients and was not found effective in 7 (5.2%) patients (figure 2).

Table No. 1: Descriptive statistics:

Numerical Variables	Minimum	Maximum	Mean	Std. Deviation
Patient's age in years	18	35	26.69	4.210
Gestational age in weeks	37	40	38.51	1.102
Parity	1	5	2.04	1.110
Blood loss in ml	558	1194	896.34	186.726
Systolic BP mmHg	70	90	81.65	6.306
Diastolic BP mmHg	40	60	49.81	6.001
Pulse rate	91	108	100.36	5.192

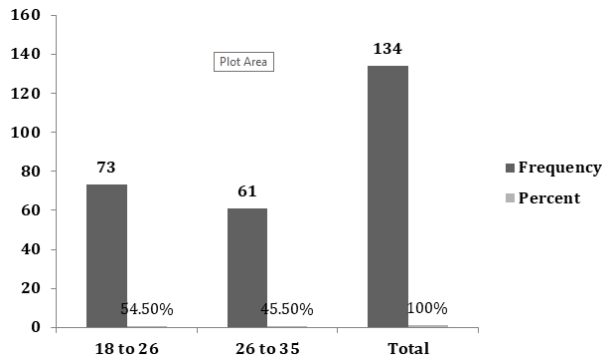


Figure No. 1: Age wise distribution of patients

Table No. 2: Gestational age wise distribution

Gestational age groups	Frequency	Percent
37 to 38	73	54.5%
39 to 40	61	45.5%
Total	134	100%

Table No. 3: Parity group wise distribution (n=134)

Parity groups	Frequency	Percent
1 to 3	111	82.8%
4 to 5	23	17.2%
Total	134	100%

Table No. 4: Frequencies and percentages of mode of delivery

Mode of delivery	Frequency	Percent
Spontaneous	126	94%
Instrumental	8	6%
Total	134	100%

Table No. 5: Frequencies and percentages of booking status

Booking status	Frequency	Percent
Yes	11	8.2%
No	123	91.8%
Total	134	100%

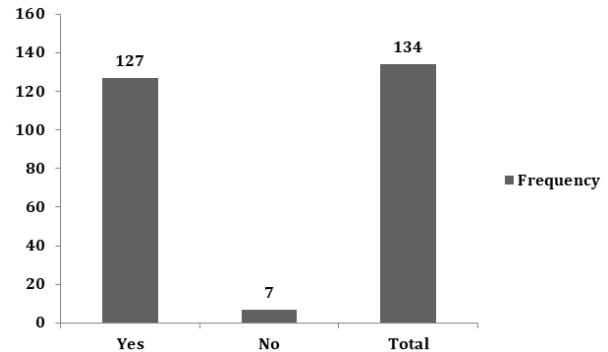


Figure No. 2: Frequencies and percentages of efficacy of balloon tamponade

DISCUSSION

One of the most common issues obstetricians encounter globally is PPH. In PPH, there is a limited period of opportunity to save lives, hence preventive measures are crucial. Approximately 60% people who use prophylactic uterotonics develop PPH¹⁴. Patients with uncontrollable bleeding might swiftly experience hemodynamic instability and a cascade of problems that can result in the patient's death. Hemostasis after these surgical procedures should begin as soon as possible. Although successfully attempted, alternatives like ligating the uterine or internal iliac arteries entail complicated pelvic dissection and might not always be feasible. Embolization is not an option available in remote hospitals since it needs a multidisciplinary strategy and expensive setup. Historically, hysterectomy was the only option left for treatment, but pressure to preserve fertility and avoid hysterectomy has spurred the development of a number of procedures recently¹⁵. Another promising approach for controlling PPH is the B-Lynch procedure, which is nonetheless invasive. The balloon tamponade is a more straightforward and practical alternative for halting the bleeding. It is a widely accepted treatment for individuals who have uncontrollable PPH, particularly when the condition is

brought on by atony, coagulopathy, and placenta accreta. The majority of patients with intractable PPH respond positively to tamponade using a variety of balloon devices, including the Sengstaken-Blakemore tube¹⁶, the Foley catheter, the less costly "Bakri tube,"¹⁷ and condom catheter. They are employed to stop PPH by compressing the uterine sinuses. In the past, tamponade was attempted by filling the uterine chamber with ribbon gauze. In order to prevent bleeding from continuing above the packing, a 20-meter ribbon is securely put within the uterus beginning at the fundus. But because of concerns over on-going hidden bleeding and infection of uterine cavity, this came into contempt. Sengstaken-Blakemore tubes and Foley catheters are two further types of tamponade that have been utilized successfully. These are costly, complicated, and sometimes inaccessible. Contrarily, a condom catheter is a straightforward, affordable, and unquestionably effective substitute. It naturally conforms to the shape of the uterine cavity, requires no complicated packing, and is simple to remove. Since it does not involve any direct intrauterine manipulation and does not require for a high level of surgical skill, it carries no risk of infection.

In our study balloon tamponade was effective in 94.8% cases, which is comparable with various studies. A study conducted in Srinagar, Kashmir¹⁸ showed the efficacy of balloon tamponade was 96%. Another study conducted in Pakistan¹¹ showed that balloon tamponade was effective in 90.4% cases. A similar study conducted in India¹⁹ showed that in 94.44% cases postpartum bleeding was stopped within 10 minutes of creating balloon tamponade.

In our study the mean age of the patients was 26.69±4.21, 126 (94%) patients had spontaneous delivery while 8 (6%) patients had instrumental delivery. 11 (8.2%) patients had been booked and 123 (91.8%) had been un-booked. Our results are comparable with a Pakistani^[11] study which showed a mean age of 26.4±4.2, 90.4% patients had spontaneous vaginal delivery while 9.6% patients had instrumental delivery. The booked cases were 28.8% while un-booked were 57.7%. Our results have shown statistical significance between efficacy of balloon tamponade and mode delivery (p=0.01), efficacy of balloon tamponade and booking status (p=0.04) and efficacy of balloon tamponade and parity (p=0.0001). Condom tamponade is a low-cost and easily available method. It is an easy to use technique and can be practiced by trained birth professionals in developing countries while arrangements for hospital transportations are made especially in rural areas. The bleeding is stopped as a result of the inflated condom's natural adjustment to the shape of the uterine cavity and its ability to keep uniform pressure on the sinuses. It is inflated for 250–300 ml, which is often enough, till the

bleeding is under control. The saline first runs freely before slowing down. This is consistent with a decrease in bleeding.

CONCLUSION

From the present study we conclude that balloon tamponade is a low budget, simple and easily available but still effective alternative for managing a serious life threatening complication like PPH. PPH is frequently encountered in under developed and developing countries where deficient resources create hurdles for ideal care delivery for common patients at local level especially in peripheral medical setups. Use of condom tamponade can effectively help in reducing blood loss and both maternal morbidity and mortality associated with PPH.

Author's Contribution:

Concept & Design of Study: Bakth Ranra
 Drafting: Humeera Naz, Zul-e-Huma
 Data Analysis: Aneesa Sadiq, Parveen Shafi, Maida Khan
 Revisiting Critically: Bakth Ranra, Humeera Naz
 Final Approval of version: By all above authors

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