

Effectiveness of Intrauterine Balloon Tamponade in the Control of PPH due to Uterine Atony

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Abstract

Objective: To evaluate the effectiveness of uterine balloon tamponade using a condom catheter in the management of primary postpartum haemorrhage due to uterine atony.

Methods: This prospective study was done in the department of obstetrics and gynae unit II at Arif memorial teaching hospital, Rashid Latif Medical College from 1st March 2020 till 28th February 2021. Fifty patients either booked or unbooked, between age 20 to >35 years, either primipara, multipara or grand multipara, at 34-36+6 weeks or 37-39+6 week of gestation, suffering from primary postpartum haemorrhage due to uterine atony following vaginal delivery or Caesarean section, refractory to medical management were included. The main outcome measure was to check for the effectiveness of balloon tamponade to arrest bleeding within first 20 minutes of its insertion. The data was analyzed using SPSS version 20.

Results: The mean age of study participants was 28.3±2.79 years. The mean gestational age of patients was 37.79±1.49 weeks. 30(60%) patients out of 50 were multipara. 34(68%) patients were unbooked. 35(70%) Patients having Primary PPH delivered vaginally while 15(30%) patients delivered by caesarean section. 30(60%) patients delivered vaginally and 13(26%) patients having caesarean section responded to balloon tamponade within 20 minutes of its insertion making it effective in total 43(86%) patients. While in 5(10%) patients of SVD and 2(4%) patients of LSCS, Tamponade failed to control bleeding in first 20 minutes of its placement in uterine cavity and labelled as ineffective in total 7(14%) of the patients.

Conclusion: Intrauterine balloon tamponade is an effective means of controlling primary PPH as it is easily available, easier to practice and inexpensive treatment modality to treat PPH due to atonic uterus.

Key Words: Primary postpartum haemorrhage (PPH), Balloon tamponade, Condom catheter, Effectiveness.

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Introduction

Primary Postpartum hemorrhage (PPH) is defined as blood loss greater than 500ml following vaginal delivery and greater than 1000 ml following caesarean section from the female genital tract within first 24 hours of delivery.¹ Primary postpartum hemorrhage remains the leading cause of maternal mortality with 38000 maternal deaths reported worldwide in 2017 and 90% of these deaths occurring in low income

countries.² In Pakistan, the reported incidence of PPH is 34%.³

The most common cause of PPH is uterine atony which accounts for 70% cases of PPH while other causes include retained placenta (10%), lower genital tract trauma (20%), uterine rupture, uterine inversion and disseminated intravascular coagulation (<1%).⁴ In a modern obstetric consultant led unit, when a patient presents with PPH, stepwise management protocol is followed. Where uterine atony is found to be the cause of primary PPH, the steps of management include uterine massage, administration of uterotonic agents, followed by operative interventions including laparotomy to apply uterine compression sutures, uterine and internal iliac artery ligation or hysterectomy. But the morbidity and cost associated with these surgical procedures or the patient's own desire to retain her fertility

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has led the obstetricians to add uterine balloon tamponade as a preliminary management step for management of PPH before jumping onto the surgical procedures.⁵

In balloon tamponade, balloon technology based on the principle of a fluid filled structure exerting a tamponade effect on bleeding sinuses is used for PPH management. Different balloon devices have been used like Sangstaken-Blackmore tube, Rush balloon catheter, Foley's catheter or condom catheter with a reported success rate of 84%.⁶

Balloon tamponade is least invasive, successful in low resource settings, does not require extensive training programme or complex instruments and can be used at different levels of health care professionals (LHV, private clinics, tertiary care hospitals) allowing easier identification of failed cases necessitating surgical exploration.⁷ The timely use of balloon tamponade after PPH due to uterine atony can prevent massive blood loss and maternal mortality. We conducted this study at our hospital to review the effectiveness of balloon tamponade using condom catheter to arrest primary PPH due to uterine atony keeping in mind the low cost and easy availability of condoms.

Method

The study was done in the department of Obs/gynae at Arif Memorial Teaching Hospital affiliated with Rashid Latif Medical Complex for a period of 1 year from 1st March 2020 to 28th February 2021 after taking Ethical approval from ethical review board of RLMC. It was a prospective study. 50 patients were enrolled in the study using non probability consecutive sampling technique after fulfilling the inclusion criteria which was; Booked or unbooked patients, between 20 to >35 years of age, either primipara, multipara or grand multipara, at 34-36 +6 weeks or 37-39 +6 weeks of gestation, suffering from PPH due to uterine atony following SVD (> 500ml blood loss) or Caesarean section (>1000 ml blood loss), refractory to medical management.

Those patients having PPH due to genital tract trauma, retained products of conception, suspected uterine rupture, associated uterine fibroid, any known coagulation disorder or caesarean section done for placenta previa/morbidly adherent placenta were excluded from the study.

Written informed consent was taken from the patient and her family after fulfilling the inclusion and exclusion criteria. In patients who developed primary PPH

after spontaneous vaginal delivery or after completion of caesarean section, with aseptic measures, a Sims' speculum was introduced into the vagina to expose the cervix and then a sterile silicon Foley's catheter of French gauge 20 with a condom fitted on it with silk number 1 making it condom catheter was inserted inside the uterine cavity with the help of sponge holding forceps. This condom catheter was inflated with 300-500ml normal saline. At the same time in both these cases, 40 units of injection oxytocin in 1L ringer lactate were started in infusion form at the rate of 16 drops/minute to maintain contractility of the uterus. The patients undergoing the procedure were kept under observation for any active bleeding after the tamponade for next 20 minutes. Here the subjective assessment of blood loss was done with the help of 12×12 inch woven laparotomy sponge with blood absorbing capacity of 50-100 ml. Those patients having a well contracted uterus and no active bleeding through the cervix within first 20 minutes of condom catheter insertion were considered as successful for the procedure with an effective tamponade. The infusion syntocinon was continued for next 24 hours. In these patients, condom catheter was left in situ for 24 hours and then removed by gradual deflation at the rate of 50ml/ hr by senior obstetrician with infusion oxytocin going on for another 6 hours. But those patients having persistent uterine atony with active bleeding coming through cervical os soaking one 12×12 inch sponge even after 20 minutes of condom catheter insertion were labelled as unsuccessful for the procedure and balloon tamponade being declared as ineffective. These patients were immediately explored for further surgical interventions. In this study, our main outcome measure was to check the effectiveness of balloon tamponade to arrest bleeding within first 20 minutes of its insertion.

The data of study population e.g. age, parity, duration of gestation, booking status, mode of delivery and time for balloon tamponade to be effective to label as successful or unsuccessful was noted on a pre designed proforma. The data was analyzed using SPSS version 20. Quantitative variables like age, parity gestational age were presented as mean. Qualitative variables like booking status, mode of delivery, effectiveness of balloon tamponade and time to be effective were calculated as percentages.

Results

Table no 1 shows the demographic features of the study

population. 10(20%) of the patients were in the age group of 20-25 years, 13(26%) patients were between 26-30 years of age and 7(14%) patients were > 35 years of age. The mean age of our study population

Table 1: Demographic feature of study population

Age (in years)	No. of patients	Percentage
20-25	10	20 %
26-30	13	26 %
31-35	20	40 %
>35	07	14 %
Total	50	100 %
Mean age	28.3± 2.79	
Parity		
Primi para	16	32 %
Multi para	30	60 %
Grand multi para	04	08 %
Total	50	100 %
Gestational Age		
34-36 ⁺⁶ weeks	21	42 %
37-39 ⁺⁶ weeks	29	58 %
Mean age	37.79±1.49	
Booking Status		
Booked	16	32 %
Un booked	34	68 %
Total	50	100 %

was 28.3± 2.79.

Amongst 50 patients, 16(32%) patients were primipara, 30(60%) patients were multipara and 4(8%) were grand multipara. Regarding gestational age, 21(42%) patients were at 34-36 ⁺⁶ weeks of gestation and 29 (58%) patients were between 37-39 ⁺⁶ weeks of gestation at the time of their delivery. The mean gestational age was calculated as 37.79±1.49. Out of 50 patients, 16(32%) were booked and 34(68%) were unbooked.

Table 2 shows the mode of delivery and its relationship with effectiveness of balloon tamponade. Out of 50 patients, 35(70%) patients delivered by vaginal route had PPH. Out of these 35 patients, the balloon tamponade was effective in 30(60%) patients and failed in 5(10%) of the patients. 15(30%) patients undergone caesarean section had PPH and out of these 15

Table 2: Mode of delivery and effectiveness of balloon tamponade

MOD	No. of patients	Effectiveness	
		Successful	Unsuccessful
SVD	35 (70%)	30(60%)	5(10%)
LSCS	15 (30 %)	13(26%)	2(4%)
Total	50 (100 %)	43(86%)	7(14%)

patients, balloon tamponade was successful in 13(26%) patients while it was unsuccessful in 2(4%) patients. Thus the balloon tamponade was found effective in 43(86%) patients and it was ineffective in 7(14%) of the patients.

Table 3 shows the time for balloon tamponade to become effective to control bleeding. Out of 50 patients, in 14(28%) patients, it took <10 minutes for balloon tamponade to become effective, in 29(58%) patients, balloon tamponade become effective between 10-20 minutes and considered as successful in both above mentioned cases. In 7(14%) patients, balloon tamponade did not control bleeding even after 20 minutes of insertion and was considered as unsuccessful.

Table 3: Time for balloon tamponade to be effective

Time	No of patients	Percentage
<10 minutes (Successful)	14	28 %
10-20 minutes (Successful)	29	58 %
>20 minutes (Unsuccessful)	07	14 %
Total	50	100 %

Discussion

The top most cause of maternal mortality worldwide is obstetrical haemorrhage which is responsible for 25% of all the maternal deaths with a case fatality rate of 1% (8). Immediate and timely action is the key to save life in the instance of PPH. Current British and American society of Obstetrics guidelines recommend contemplation of uterine balloon tamponade before opting for invasive surgical procedures in case of postpartum haemorrhage that is refractory to medical therapy.^{4,9} The present research was carried out to assess the effectiveness of uterine tamponade using condom catheter in patients suffering from atonic postpartum haemorrhage.

In our study average age of the patients were 28.3± 2.7 years, which is in comparison to mean age 28.8 years observed in the study of Jaleel et al.¹⁰ In this study 60 % patients were multipara. This finding is comparable to that done by Humphrey¹¹ who also concluded that multiparous women are more likely to have atonic postpartum hemorrhage. This is most probably due to inadequate antenatal care they receive and associated risks (e.g. anemia, diabetes and hypertension) with multiparity predisposing them to postpartum hemorrhage. In our study the mean gestational age was 37.79± 2.79 which can be compared with the study by Kadioglu et al who documented a mean gestational

age of 37.9±3 weeks.¹² 68% patients having postpartum hemorrhage were unbooked in our study. This can be compared with study of R. Lohano et al who concluded that 70% patients in his study having PPH were unbooked showing that booking status is important to anticipate the risk of PPH.¹³

With regard to mode of delivery, 70% patients in our study who had postpartum haemorrhage delivered vaginally while 30% delivered by lower segment caesarean section. This result can be compared with the study of Manisha et al who showed that 76% patients delivered vaginally and 24% patients delivered by Caesarean section had postpartum hemorrhage⁽¹⁴⁾. This shows that although abdominal delivery is thought to be a risk factor for atonic PPH but in our study, patients having vaginal delivery suffered more from PPH.

In our study, the balloon tamponade was successful in 86% cases. It was ineffective in 14% of the cases and those patients underwent surgical intervention in the form of B-lynch suture, uterine artery ligation, internal iliac ligation or hysterectomy. This effectiveness of balloon tamponade to control obstetric haemorrhage can be compared with study of Suarez et al who reported the success rate of balloon tamponade of 85.9% while it failed to control haemorrhage in 14.1% cases.¹⁵

We also observed the time for balloon tamponade to be effective. In our study 86% patients responded to tamponade within first 20 minutes of balloon placement while 14% patients did not respond to balloon tamponade within first 20 minutes where it was considered as failed. This finding of our study is in comparison to that done by Kumar A et al who observed that in 90% patients, the postpartum bleeding responded to balloon tamponade within 20 minutes of intrauterine placement while in 8% patients, it was considered as a failed procedure as it did not control bleeding within 20 minutes of tamponade insertion.¹⁶ In our study, no cases of haemorrhage were reported with balloon tamponade being removed 24 hours after its placement which is similar to the study done by Tirumuru et al.¹⁷

Conclusion

Thus, we have concluded from our study that majority of the cases of primary postpartum haemorrhage due to uterine atony can be managed effectively with the timely use of intrauterine balloon tamponade. Reducing the maternal morbidity and mortality due to primary postpartum haemorrhage requires various evidence-based approaches to be employed effectively and uterine

balloon tamponade has emerged as a promising approach amongst these methods.

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Conflict of interest

None

References

1. B-Lynch C, Keith L, Lalonde A, Karoshi M. A Textbook of Postpartum Hemorrhage: A Comprehensive Guide to Evaluation, Management and Surgical Intervention, Jaypee Brothers, New Delhi, India. 2006.
2. Sheikh L, Zuberi NF, Riaz R, Rizvi JH. Massive primary postpartum haemorrhage: setting up standards of care. JPMA: Journal of the Pakistan Medical Association. 2006;56(1):26.
3. Bibi S, Danish N, Fawad A, Jamil M. An audit of primary post partum haemorrhage. Journal of Ayub Medical College Abbottabad. 2007;19(4):102-6.
4. Obstetricians RCo, Gynaecologists. Postpartum Haemorrhage, Prevention and Management (Green-top 52). Royal College of Obstetricians and Gynaecologists London; 2009.
5. Condous G, Arulkumaran S, Symonds I, Chapman R, Sinha A, Razvi K. The "tamponade test" in the management of massive postpartum hemorrhage. Obstetrics & Gynecology. 2003;101(4):767-72.
6. Doumouchtsis SK, Papageorghiou AT, Arulkumaran S. Systematic review of conservative management of postpartum hemorrhage: what to do when medical treatment fails. Obstetrical & gynecological survey. 2007; 62(8): 540-7.
7. Akhter S, Begum MR, Kabir Z, Rashid M, Laila TR, Zabeen F. Use of a condom to control massive postpartum hemorrhage. MedGenMed: Medscape general medicine. 2003;5(3):38-.
8. Khan KS, Wojdyla D, Say L, Gülmezoglu AM, Van Look PF. WHO analysis of causes of maternal death: a systematic review. The lancet. 2006; 367(9516): 1066-74.
9. Obstetricians ACo, Gynecologists. ACOG practice bulletin: clinical management guidelines for obstetrician-gynecologists number 76, October 2006: postpartum hemorrhage. Obstetrics and Gynecology. 2006; 108(4):1039-47.
10. Jaleel R, Khan A. Post-partum haemorrhage--a risk factor analysis. Mymensingh medical journal: MMJ. 2010;19(2):282-9.

11. Humphrey MD. Is grand multiparity an independent predictor of pregnancy risk? A retrospective observational study. *Medical journal of Australia*. 2003; 179 (6):294-6.
12. Kadioglu BG, Tanriverdi EC, Aksoy AN. Balloon tamponade in the management of postpartum hemorrhage: three years of experience in a single center. *Open Journal of Obstetrics and Gynecology*. 2016; 6(12): 698- 704.
13. Lohano R, Haq G, Kazi S, Sheikh S. Intrauterine balloon tamponade for the control of postpartum haemorrhage. *J Pak Med Assoc*. 2016;66(1):22-6.
14. Gupta M, Jain M. Role of condom catheter balloon tamponade in management of atonic postpartum haemorrhage in cases of failed medical management. *International Journal of Clinical Obstetrics and Gynaecology*. 2017;1(2):62-4.
15. Mavrides E, Allard S, Chandraharan E, Collins P, Green L, Hunt B, et al. On behalf of the Royal College of Obstetricians and Gynaecologists. Prevention and management of postpartum haemorrhage BJORG. 2016; 124.
16. Aruna K, Khushboo K, Shubha S. A study of the efficacy and safety of the balloon tamponade in the management of atonic post-partum hemorrhage. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2020;9(4):1576-9.
17. Sahithi T, Samiramis S, Hassan M, Basem M. Intrauterine balloon tamponade in the management of severe postpartum hemorrhage: A case series from a busy UK district general hospital. *Open Journal of Obstetrics and Gynecology*. 2013;3:, 131-6.

Authors Contribution

M.A: Conceptualization of Project

UA: Data Collection

M.A, U.A: Literature Search, Statistical Analysis

M.A, U.A, H.S: Drafting, Revision, Writing of Manuscript