

Comparison between Balloon Inflation and Uterovaginal packing after Vaginal Delivery in Term of Control of Primary Post-Partum Hemorrhage

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ABSTRACT

Aim: To compare balloon inflation with uterovaginal packing after vaginal delivery in term of control of primary post-partum hemorrhage.

Study design: Randomized Controlled Trial.

Study duration: May 2022 to November 2022

Setting: Department of Obstetrics & Gynecology Bahawal Victoria Hospital Bahawalpur.

Methods: Total 140 patients of PPH after vaginal delivery age between 18-40 years, all parity and both booked and un-booked were selected and control of PPH was compared.

Results: Total 140 females who experienced PPH after vaginal delivery were enlisted in this study. Their mean age was 28.41 ± 5.894 years. In the Balloon inflation group and Uterovaginal packing group, the mean ages were 28.14 ± 6.240 years and 28.69 ± 5.557 years, respectively. Balloon inflation was utilized in the Balloon inflation group, and it was observed to be efficacious in controlling PPH in 39 (55.71%) patients. However, in the Uterovaginal packing group, uterovaginal packing was utilized and was noted to have controlled Primary PPH in 59 (84.29%) patients after vaginal delivery. The control rate of primary PPH was observed to be significantly ($P=0.000$) higher in the uterovaginal packing group when compared to the balloon inflation group.

Practical implication: that for the control of PPH after vaginal delivery, uterovaginal packing is more effective in control of PPH than balloon inflation.

Conclusion: Our study concluded that for the control of PPH after vaginal delivery, uterovaginal packing is more effective in control of PPH than balloon inflation.

Keywords: Vaginal delivery, PPH, uterovaginal packing, balloon inflation

INTRODUCTION

Postpartum hemorrhage (PPH) is a major factor in worldwide maternal Mortality and morbidity.¹ An excessive loss of blood being equal to or more than 500 ml post vaginal delivery or 1000 ml post a C-section is characterized as PPH. To add on it can also be defined as any vital sign disruption or 10% decrease in hemoglobin levels from baseline due to any amount of blood loss².

Postpartum bleeding, often known as PPH, is the primary reason for maternal illness and death across the globe. It is responsible for over 25% of yearly maternal fatalities, highlighting its importance as a global public health issue. According to data from the World Health Organization (WHO), PPH contributed to 60% of maternal deaths in low-income countries, leading to over 100,000 maternal deaths around the world annually.³ Primary PPH occurs within the first 24 hours after delivery and is often attributed to uterine atony, trauma, or retained placenta. Although the majority of women will experience some degree of bleeding after childbirth, excessive blood loss can be life-threatening if not appropriately managed⁴.

According to the Pakistan Demographic Health Survey, maternal mortality accounts for 20% of all deaths in women of reproductive age. Postpartum hemorrhage has been identified as the primary cause of maternal death, responsible for 27.2% of all maternal deaths⁵. The World Health Organization estimated that the prevalence of postpartum hemorrhage in Pakistan is approximately 34%⁶.

One of the most common methods used to manage PPH is uterine balloon tamponade, which involves the insertion of a balloon into the uterus and inflation with saline or air to exert pressure on the bleeding vessel walls⁷. Another method that has gained popularity is uterovaginal packing, which involves the insertion of sterile gauze into the uterus and vagina to provide mechanical compression on the bleeding vessels⁸.

Uterine packing has been in use for many years, but its popularity declined after 1960 due to concerns about concealed hemorrhage and infection. However, with improvements in both areas over time, uterine packing has regained its place as a viable option for managing PPH. It is not only a quick and simple method to apply, but it is also easy to teach and cost-effective⁹.

Postpartum hemorrhage (PPH) significantly contributes to maternal health complications and fatalities across the globe, especially in low- and middle-income nations. Inflating a balloon and employing uterovaginal packing are both suggested techniques for handling PPH, yet there is a scarcity of data examining their effectiveness, particularly in relation to primary PPH following vaginal birth. This research seeks to fill this knowledge void by offering a thorough comparison of the two methods.

MATERIAL AND METHODS

During the half-year period from May 2022 until November 2022, an investigation employing randomized control took place at the Department of Obstetrics & Gynecology in Bahawal Victoria Hospital located in Bahawalpur. Total 140 patients of PPH after vaginal delivery age between 18-40 years, all parity and both booked and un-booked were selected. Patients having twin pregnancy. History of C-section and bleeding disorder were not included in this study. Prior to the commencement of the research, the ethical review committee granted its approval and a written informed consent was acquired from each participant. The medical history and demographic information of the participants were recorded. A lottery method was used to randomly assign the patients into two study groups: balloon inflation and uterovaginal packing. The patients in the balloon inflation group were managed with balloon inflation, using condoms as the method of inflation. The patients in the uterovaginal packing group were managed with uterovaginal packing. After 24 hours, all patients were evaluated for control of PPH, and the results were recorded on a pre-designed proforma in terms of whether or not PPH was

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successfully controlled. Permission was granted by IRB to start this research.

SPSS version 20 was used for analysis purpose. Age was presented by mean and SD, while frequencies were used to present categorical variables. The control of PPH between the two groups was compared using the chi-square test, and a p-value ≤ 0.05 was considered statistically significant.

RESULTS

Total 140 women with PPH after vaginal delivery were recruited. Mean age of females was 28.41 ± 5.894 years, mean age of Balloon inflation group was 28.14 ± 6.240 years and Uterovaginal packing group was 28.69 ± 5.557 years. In Balloon inflation group, balloon inflation methods was effective in term of control of PPH among 39(55.71%) patients, while in Uterovaginal packing group, uterovaginal packing method had controlled Primary PPH in 59(84.29%) patients after vaginal delivery. Significantly ($P=0.000$) higher control rate of primary PPH was noted in uterovaginal packing group as compared to balloon inflation group (Table 1).

Among patients aged 18-30 years, the study group utilizing Uterovaginal packing exhibited a notably higher rate of successful PPH control at 34(80.95%), compared to the study group that used Balloon inflation with only 23 (51.11%) success. This difference was statistically significant with a p-value of 0.003. Similarly, for patients aged 31-40 years, the success rate for PPH control was higher in the Uterovaginal packing group at 25(89.29%) as compared to the Balloon inflation group with 16(64%) success. This difference was also statistically significant with a p-value of 0.047.(Table 2)

Among primiparas, 19(27.14%) and 12(17.14%) patients were enrolled in group Balloon inflation and Uterovaginal packing, respectively. Although control of PPH was observed in 11(57.89%) patients of group Balloon inflation and 11(91.67%) patients of group Uterovaginal packing, the difference was statistically insignificant ($P=0.101$). In multiparas, out of the total 51(72.86%) patients in group Balloon inflation, control of PPH was effective in 28(54.90%) patients. However, out of the total 58 (82.86%) patients in group Uterovaginal packing, control of PPH was found in 48(82.76%) patients, with a significant difference observed ($P=0.002$) between the two groups (Table 3).

In the study, 55(78.57%) patients in the Balloon inflation group and 53 (75.71%) patients in the Uterovaginal packing group were booked. Control of PPH was effective in 31(56.36%) patients in the Balloon inflation group and 45 (84.91%) patients in the Uterovaginal packing group. A significant difference in the control of PPH was observed between the two groups ($P = 0.001$). Out of the 15(21.43%) un-booked patients in the Balloon inflation group, control of PPH was effective in 8(53.33%) patients. In contrast, out of the 17(24.89%) un-booked patients in the Uterovaginal packing group, control of PPH was noted in 14(82.35%) patients. However, the difference in the control of PPH was not significant ($P= 0.128$) between the two groups (Table 4).

Table 1: "Comparison of control of PPH between the both groups"

Groups	Control of PPH		Total	P value
	Yes (%)	No(%)		
Balloon inflation	39 (55.71)	31 (44.29)	70	0.000
Uterovaginal packing	59 (84.29)	11 (15.71)	70	

Table 2: "Comparison of control of PPH between the both groups for age"

Groups	Control of PPH		Total	P value
	Yes(%)	No(%)		
Age group 18-30 years				
Balloon inflation	23 (51.11)	22 (48.89)	45 (64.29)	0.003
Uterovaginal packing	34 (80.95)	8 (19.05)	42 (60)	
Age group 31-40 years				
Balloon inflation	16 (64)	9 (36)	25 (35.71)	0.047
Uterovaginal packing	25 (89.29)	3 (10.71)	28 (40)	

Table 3: "Comparison of control of PPH between the both groups for parity"

Group	Control of PPH		Total	P value
	Yes(%)	No(%)		
Primipara				
Balloon inflation	11 (57.89)	8 (42.11)	19 (27.14)	0.101
Uterovaginal packing	11 (91.67)	1 (8.33)	12 (17.14)	
Multipara				
Balloon inflation	28 (54.90)	23 (45.10)	51 (72.86)	0.002
Uterovaginal packing	48 (82.76)	10 (17.24)	58 (82.86)	

Table 4: "Comparison of control of PPH between the both groups for booking status"

Group	Control of PPH		Total	P value
	Yes	No		
Booked cases				
Balloon inflation	31(56.36%)	24(43.64%)	55(78.57%)	0.001
Uterovaginal packing	45(84.91%)	8(15.09%)	53 (75.71%)	
Un-booked				
Balloon inflation	8(53.33%)	7(46.67%)	15(21.43%)	0.128
Uterovaginal packing	14(82.35%)	3(17.65%)	17(24.89%)	

DISCUSSION

Atony of the uterus is the main factor leading to postpartum hemorrhage, with additional influences including injuries to the genital tract, torn uterus, lingering placental tissue, or blood clotting issues.¹⁰ Postpartum hemorrhage can result in severe consequences, including widespread intravascular clotting dysfunction (DIC), reduced blood volume shock, adult breathing difficulties (ARDS), and liver or kidney failure, potentially culminating in the mother's death¹¹.

Postpartum hemorrhage (PPH) is a potentially life-threatening condition that can occur after vaginal delivery. In order to prevent and control PPH, different interventions have been proposed, including balloon inflation and uterovaginal packing. In this study we compared these two interventions in terms of their effectiveness in controlling primary postpartum hemorrhage.

The average age in the study cohort was 28.41 years with a standard deviation of 5.894. Within this group, the mean age for the Balloon Inflation group was 28.14 years (± 6.240), while for the Uterovaginal Packing group, it was 28.69 years (± 5.557). In the Balloon Inflation group, 39 patients (55.71%) experienced effective control of postpartum hemorrhage (PPH) with this method. Conversely, in the Uterovaginal Packing group, the technique successfully managed primary PPH for 59 patients (84.29%) after vaginal birth. Significantly ($P=0.000$) higher control rate of primary PPH was noted in uterovaginal packing group as compared to balloon inflation group.

Ujala S et al¹², selected 104 patients of PPH and divided in group. In one group, balloon inflation technique was used and in other group uterovaginal packing technique was used for the control of PPH. Authors found mean age as 27.69 ± 3.68 years and 27.60 ± 3.64 years in study groups. Control of PPH seen in 88.46% patients and 65.38% patients ($p=0.005$) respectively in balloon inflation and uterovaginal packing group. These findings are in consistent with our findings. Rehman F et al¹³ compared control of PPH between Balloon Inflation and Uterovaginal Packing group. In balloon inflation methods control of PPH was found 55% patients, while in uterovaginal packing method had control of PPH in 85% patients. In a study conducted by Kishwar N et al¹⁴ on 140 patients, The efficacy of both methods was observed to be 90% and 87.1%, respectively.

In a study by Ashraf N et al¹⁵, total 212 patients of PPH after vaginal delivery were selected. Mean age of patients was 29.22 ± 6.52 and 29.05 ± 6.802 years respectively in Balloon inflation and Uterovaginal packing group. Control of PPH was 73.6% patients and 59.4% respectively in Balloon inflation and Uterovaginal packing group and difference was significant. In another study by Bibi S et al,¹⁶ Uterovaginal packing was done PPH after vaginal delivery and control of PPH was found in 98.6% patients which is in consistent with our study. In a study by Guo Y et al¹⁷. 305 instances of PPH following vaginal birth, the Bakri

balloon was employed, effectively managing PPH in 93.26% of patients. A study subgroup received dual compression, exhibiting an improved clinical effectiveness rate of 96.3% (157 out of 163 patients). In contrast, the success rate for cases where only the Bakri balloon was used (comparison group) stood at 87.3% (124 out of 142 patients). Sharma R et al¹⁸ recruited 53 patients of PPH from 20 to 35 years of age. The mean age was 24.81±4.468 years. Control of PPH was noted in 84.90% patients.

CONCLUSION

Our study concluded that for the control of PPH after vaginal delivery, uterovaginal packing is more effective in control of PPH than balloon inflation. In addition, it is worth noting that balloon tamponade and uterovaginal packing can be used as a temporary measure to control PPH until definitive management can be provided, such as uterine artery embolization or surgical interventions. Therefore, the choice of intervention should also be based on the availability of definitive management options.

Conflict of interest: Nil

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