Management of Postpartum Hemorrhage By Uterine Balloon Tamponade: Prospective Evaluation of Effectiveness

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ABSTRACT

Objective *To determine the success rate of uterine balloon tamponade in patients with postpartum hemorrhage (PPH).*

Study design *Cross sectional study.*

Place & Duration of study *Department of Obstetrics and Gynecology, Jinnah Postgraduate Medical Centre (JPMC) Karachi, from June 2020 to December 2020.*

Methods *Patients with postpartum hemorrhage were enrolled. Patients with uterine anomalies, diabetes mellitus, cardiac and renal diseases were excluded. Standard therapy of postpartum hemorrhage including Syntometrine® (oxytocin 5IU/ ergometrine 0.5 mg) intramuscular was given. If needed IV infusion of Syntocinon® (40 IU in 500ml 0.9% saline) and rectal misoprostol 600 microgram (3 pessaries) were used. When these measures failed then balloon catheters were inserted in the uterine cavity and filled with 60-90 ml tap water in delivery room. Failure of the balloon tamponade was defined as the persistence of the uterine bleeding with a need for additional procedure to arrest the hemorrhage. If bleeding stopped with intrauterine balloon tamponode, then procedure was considered as successful. The balloon was removed after 24-hours.*

Results *A total of 139 patients with postpartum hemorrhage, between 17 to 45 years of age were enrolled. Majority (n=92 - 66.19%) of the patients were between 17 to 30 years of age. Mean gestational age was 36.40±2.27 weeks, mean parity 3.34±1.84, mean birth weight of the newborn was 2830.22±682.35 grams, mean preoperative and postoperative hemoglobin was 8.31±1.89 g/dl and 7.17±1.64 gm/dl respectively. Uterine balloon tamponade was found successful in controlling bleeding in 125 (89.93%) women.*

Conclusion *The success rate of uterine balloon tamponade as an additional measure in patient with postpartum hemorrhage was highly successful.*

Key words *Postpartum hemorrhage, Balloon tamponade, Obstetrical complication, Anemia, Misoprostol, Oxytocin.*

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INTRODUCTION:

Obstetric hemorrhage is a major contributor to maternal morbidity and mortality worldwide.[1] The prevalence rate of PPH is 5-15%. It is defined as bleeding of more than 500ml within 24-hours after vaginal delivery or more than 1000ml following cesarean delivery.[2,3] Two third of the women developing PPH have no identifiable risk factors thus making it difficult to predict its occurrence. Genital tract trauma, retained placenta and coagulation

abnormalities are the commonest causes of PPH.[4] Weakness, fatigue, hypotension, acute renal failure and DIC are the complication that may result due to PPH.[5]

Traditionally the treatment options for PPH include the use of uterotonic drugs, exploration of genital tract followed by laparotomy, uterine compression suture, uterine and internal iliac artery ligation and hysterectomy.[6] Uterine balloon tamponade (UBT) technique is commonly used to control PPH. It is simple, safe and cost effective procedure that is used after the failure of uterotonics medicine. It is advocated by WHO for uterine atony management when uterotonic drugs are inaccessible or ineffective.[7-10] It is a non surgical intervention performed at the point of care by skilled health care provider and involves insertion of Foley catheter inside the uterine cavity and its balloon filled with clear water. Effective tamponade results in the arrest of hemorrhage.

Literature search revealed the effectiveness of uterine balloon tamponade from 85% to 95% in the management of PPH when no response is noted with medical treatment.[11,12] This study was done to determine the success rate of uterine balloon tamponade in patients with PPH in order to establish the local perspective.

METHODS:

Study design, place & duration: This cross sectional study was conducted in the Department of Obstetrics and Gynecology, Jinnah Postgraduate Medical Center Karachi, from June 2020 to December 2020.

Ethical considerations: The study was approved by the Ethical Review Committee JPMC letter No.F.2.281/2021-GEN/58673(A)/JPMC dated 20-04-2021. Informed consent was taken from the patients.

Inclusion / Exclusion criteria: Women between 17 years to 45 years of age who delivered either by spontaneous vaginal delivery or cesarean section, of any parity, were included. Patients with uterine anomalies, diabetes mellitus, cardiac and renal diseases were excluded.

Study protocol: Postpartum hemorrhage was defined according to the WHO criteria. Blood loss was assessed by weighing the soaked packs (sponges) or pads, measured as one ml of blood weighs almost one gram. Inability to insert Foley catheter (inside the uterine cavity) or inflate the balloon, was defined as failed catheter placement. Persistence of uterine bleeding despite properly inflated balloon was considered as failure of the procedure. Successful UBT was defined as an arrest of bleeding after inflation of balloon which was removed after 24-hours. Preterm babies were considered as those delivered at less than 37 weeks of gestation while full term were those born between 37 -41 weeks of gestation. Still birth was defined as the delivery of the baby with no signs of life (after 24 weeks of gestation).

Standard PPH therapy including intramuscular Syntometrine® followed by Syntocinon® IV infusion and rectal misoprostol were used. Balloon catheter was placed following failure of above measures. Foley catheter size 24Fr maximum three in number were inserted through the cervix into the uterine cavity either in the delivery room or in OR and each inflated with 90ml tap water. Vaginal bleeding was assessed and patient kept under observation. Balloon was removed after 24-hours.

Statistical analysis: Data were collected on predesigned form, entered into SPSS version 21 and analyzed. Frequencies and percentages were calculated for the qualitative variables such as booking status, parity, neonatal status, mode of delivery outcome of tamponade. For reporting quantitative variables such as age of mothers, gestational age, hemoglobin level and birth weight, mean ± SD were calculated. Stratification of data was performed to observe effect of the modifier on outcome. Chi square test applied and $p < 0.05$ was considered as significant.

RESULTS:

A total of 139 patients with postpartum hemorrhage were included. Age of the patients was from 17 years to 45 years with the mean age of 30.24±6.64 years. Majority (n=92 - 66.19%) of the patients were between 17 years to 30 years of age. The mean gestational age was 36.40±2.27 weeks. Details are given in table I. The success rate of the procedure was 89.93% as PPH was controlled. This included 82 patients of 17 to 30 years of age and 43 patients among the age of 31 to 45 years. In 83 patients who were more than 36 years of gestation balloon tamponade was found successful (table II).

DISCUSSION:

Uterotonic drugs including oxytocin and prostaglandins are the first line of management in PPH. Obstetrical hysterectomy is often deemed necessary when conservative measures fail. It is commonly performed as a life-saving procedure to arrest the massive haemorrhage.[13] In this study

Table I: Distribution of Patients According To The Demographic Variables

Demographic Variables		No of Patients (n)	Percentage (%)
Age (Years)	17 – 30	92	66.19
	31 – 45	47	33.81
Parity (n)	< 3	81	58.27
	> 3	58	41.73
Booking Status	Un-booked	104	74.82
	Booked	35	25.18
Mode of Delivery	Vaginal delivery	97	69.78
	Vacuum delivery	00	00
	Forceps Delivery	04	2.88
	Cesarean section	38	27.34
Birth weight	< 3000	76	54.68
	> 3000	63	45.32
Neonatal status	Pre-term	48	34.53
	Full-term	91	65.47
Delivery outcome	Still birth	23	16.55
	Alive Birth	116	83.45

Table II: Success of Uterine Balloon Tamponade After Stratification

Variables		Outcome		P- Value
		Successful	Unsuccessful	
Age (Years)	17 – 30	82	10	0.662
	31 – 45	43	04	
Gestational Age (weeks)	< 36	42	03	0.356
	> 36	83	11	
Parity (n)	< 3	78	03	0.003*
	> 3	47	11	
Booking Status	Un-booked	92	12	0.322
	Booked	33	02	
Mode of Delivery	Vaginal delivery	86	11	
	Vacuum delivery	04	00	--
	Forceps Delivery	00	00	
	Cesarean section	35	03	
Birth weight	< 3000	64	12	0.014
	> 3000	61	02	
Neonatal status	Pre-term	45	03	0.277
	Full-term	80	11	
Delivery outcome	Still birth	21	02	0.810
	Alive Birth	104	12	

uterine balloon tamponade was successful in controlling postpartum hemorrhage in large number of patients. However, obstetrical hysterectomy may be a last ditch effort in a dire situation. Akhter from Bangladesh in 2001 used condom as a balloon tamponade.[14]

Results of our study showed that the mean age of the patients was 30.24±6.64 years which is somewhat higher than reported by Ahonen et al and

Dabelea et al.[4,6] Patients in those studies had a mean age of 29 years and 28 years respectively. Lalonde et al and Tindell et al reported a mean age of 26 years which is lower as compared to our study.[2,15]

Diemert et al reported a success rate of 60% in controlling PPH.[16] This is quite low as compared to multiple studies reported in literature. Regardless of the etiology of PPH, UBT was found highly successful in controlling hemorrhage and is suggested as an essential component of PPH controlling protocol.[17,18] An 86% success rate of UBT was reported by Laas et al and 94% by Yousseff et al.[19,20] These studies have comparable success rate as that of ours.

Various surgical techniques are also employed to control PPH and avoid obstetrical hysterectomy which is a difficult procedure and associated with number of complications. This include uterine packing, application of compression sutures and selective de-vascularization procedures. However, UBT remained the most attractive option to employ in conjunction with uterotonic drugs.

Limitations of the study: It is a single center study about a commonly performed techniques for the management of PPH.

CONCLUSION:

A high success rate of uterine balloon tamponade is found in controlling postpartum hemorrhage. It was found safe, cost effective, and easy to perform technique and aids to avoid obstetrical hysterectomy and preserving fertility.

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