

## COMPARISON OF INTRAUTERINE BALLOON TAMPONADE AND B LYNCH SUTURE IN SEVERE POSTPARTUM HEMMORHAGE

Bilqees Akhtar Malik, Zaib-Un-Nisa, Ambreen Shabbir, Muhammad Mudassir Saleem

Combined Military Hospital Bahawalpur/National University of Medical Sciences (NUMS) Pakistan

### ABSTRACT

**Objective:** To determine the success rate of intrauterine balloon tamponade versus B Lynch suture in the management of severe postpartum hemorrhage.

**Study Design:** Randomized controlled trial.

**Place and Duration of Study:** This study was conducted in department of Obstetrics and Gynaecology, Combined Military Hospital, Bahawalpur, from Jan 2017 to Jun 2017.

**Materials and Methods:** A total of 104 patients with severe postpartum hemorrhage, 20 to 35 years of age of gestational age 36-42 weeks were included in the study. Patients with genital tract trauma, retained products of conception, ruptured uterus and any bleeding disorder were excluded. Then selected patients were placed randomly into group A (intrauterine balloon tamponade) & group B (B Lynch suture) by using lottery method. Outcome variables like control of bleeding within 15 minutes after procedure (success rate) was noted.

**Results:** The mean age of women in group A was  $27.69 \pm 3.68$  years and in group B was  $27.60 \pm 3.65$  years. The mean gestational age in group A was  $39.98 \pm 1.57$  weeks and in group B was  $40.04 \pm 1.68$  weeks. Success was 67.31% in group A (intrauterine balloon tamponade) and 88.46% in group B (B Lynch suture) with *p*-value of 0.009, showing statistically significant difference between the two groups.

**Conclusion:** This study concluded that success rate (stoppage of bleeding within 15 minutes) of B Lynch suture is better as compared to intrauterine balloon tamponade in the management of severe postpartum hemorrhage and should be used as first line procedure in controlling severe PPH.

**Keywords:** Compression sutures, Hysterectomy, Postpartum haemorrhage.

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### INTRODUCTION

Postpartum haemorrhage (PPH) is defined as an estimated blood loss of more than 500 ml after vaginal delivery and 1000 ml after caesarean delivery<sup>1</sup>. Postpartum haemorrhage (PPH) is a major cause of maternal morbidity and mortality worldwide, with an increasing trend in incidence over time also in developed countries<sup>2</sup>. More than 30% of maternal deaths in developing countries are attributed to postpartum haemorrhage (PPH)<sup>3</sup>. However, death from PPH can largely be avoided through proper prevention, diagnosis and management<sup>4</sup>. Uterine atony is the most common cause of PPH, but genital tract trauma (i.e. vaginal or cervical lacerations), uterine rupture, retained placental tissue, or maternal

coagulation disorders may also result in PPH. Although the majority of women who experience PPH complications have no identifiable clinical or historical risk factors, grand multiparity and multiple gestation are associated with an increased risk of bleeding after birth. PPH may be aggravated by pre-existing anaemia and, in such instances, the loss of a smaller volume of blood may still result in adverse clinical sequelae<sup>5</sup>. First line treatment options for PPH include conservative management with uterotonic drugs (oxytocin or prostaglandins); second-line therapy includes uterine packing, external compression with uterine sutures, and selective devascularisation by ligation or embolisation of the uterine artery<sup>6,7</sup>. Failure of conservative management is often deemed to warrant hysterectomy and today, hysterectomy is the most common procedure to achieve arrest of severe PPH<sup>8</sup>. Postpartum hysterectomy is associated with short and long

**Correspondence:** Dr Bilqees Akhtar Malik, Department of Obs & Gynae, CMH Bahawalpur Pakistan

Email: [bilqees.malik123@outlook.com](mailto:bilqees.malik123@outlook.com)

Received: 18 Jul 2018; revised received: 24 Oct 2018; accepted: 31 Oct 2018

term complication such as blood loss, injury of other organs, impaired wound healing, infection, and loss of fertility<sup>9</sup>. In order to avoid hysterectomy and its complications, alternative procedures such as uterine compression sutures (B Lynch sutures)<sup>9,10</sup> or intrauterine balloon tamponade<sup>3,7</sup> have gained popularity. All intrauterine balloon catheters were initially designed to stop bleeding from sites other than the uterus. However, case reports and cases series have been published where these catheters have been used successfully in management of PPH<sup>3,7</sup>. Diemert *et al*<sup>9</sup> has shown its success upto 60% of cases. As postpartum haemorrhage is a lethal complication of delivery and is associated with high maternal mortality and morbidity, so the purpose of this study was to compare the success rate of intrauterine balloon tamponade and B Lynch suture for management of severe postpartum hemorrhage in local population. So, on the basis of this study results, these particular patients could be provided with a technique which was associated with higher success rate in order to reduce maternal morbidity and mortality due to severe postpartum hemorrhage. Moreover, hysterectomy could be avoided in these patients and some practical recommendations could be made in our routine practice guidelines for managing severe postpartum haemorrhage by fertility preserving method.

## **MATERIAL AND METHODS**

This randomized controlled trial study was conducted at the department of Obstetrics and Gynaecology, Combined Military Hospital, Bahawalpur from 1<sup>st</sup> Jan 2017 to 30<sup>th</sup> Jun 2017. Sample size was calculated by using WHO sample size calculator by keeping the confidence interval of 90%, absolute precision required (d) 0.10, anticipated population proportion (p1) 0.609 and anticipated population proportion (p2) 0.909, thus the calculated sample size was 104 patients (52 patients in each groups). Total 104 patients with severe postpartum haemorrhage (PPH) having age 20-35 years, parity 2-5 and gestational age 36-42 weeks were selected by non-probability consecutive sampling. Patients with genital tract

trauma, patients with retained products of conception, patients with ruptured uterus, patients with perineal trauma, patients with history of any bleeding disorder, patients on heparin/warfarin and patients with successful medical treatment were excluded from the study. An approval was taken from the institutional review committee and written informed consent was taken from every patient. Severe postpartum haemorrhage (PPH) was defined as Blood loss after vaginal delivery >1000 mL or after cesarean section >1500 mL that was measured by collection of immediate blood loss in the kidney tray having capacity of 500 ml and later on was used 3×11×1 inches sized pads. Completely saturated pad holds 80 ml of blood and 50% saturated pad holds 25 ml blood, a peripartum decline in hemoglobin of 4 g/dl or more from baseline and required acute transfusion of at least 3 or more blood pints was considered as severe PPH. All the selected patients were randomly divided into two equal groups i.e. group A & group B by lottery method. Base line investigations like complete blood count, random blood sugar, urine complete examination, renal functions tests and ECG (where needed) were done in every patient on admission. In the group A patients, intrauterine balloon tamponade was applied by inserting 4 Foleys catheter of No. 24 Fr size, through the cervix into the uterine cavity, having an average balloon capacity of 80-100 ml. Warm saline was instilled into the balloons creating a total volume of 320-400 ml of fluid. While in group B patients, B Lynch suture was applied with patient in the lithotomy position for access to the vagina. The abdomen was opened by Pfannenstiel incision or, if the patient has had a cesarean section after which she bled, the same incision was re-opened. First, bimanual compression was applied and at the same time, the vagina was swabbed out by an assistant to confirm adequate control of bleeding. The two lengths of suture were pulled tight, assisted by bi-manual compression to minimize trauma and to achieve or aid compression. The suture was more or less vertical and lying about 4 cm from

the cornua. The procedure was considered successful, if the bleeding was stopped within 15 minutes after the procedure. If the bleeding was not ceased within 15 minutes after procedure, we performed hysterectomy and procedure was declared unsuccessful. This all data was recorded on a predesigned proforma which contained two parts i.e. part 1st contained the patients bio data while part 2nd contained the study variables. All the data was entered and analyzed by using SPSS version 16.0. The quantitative variables like age were presented as mean and standard deviation. The qualitative variables like parity and success of intrauterine balloon tamponade and B Lynch suture (yes/no) were presented as frequency and percentage. Chi square was used to compare the

weeks and in group B was  $40.04 \pm 1.68$  weeks. The mean parity in group A was  $3.40 \pm 0.98$  and in group B was  $3.37 \pm 1.01$ . There was stoppage of bleeding within 15 minutes in 35 (67.31%) patients of group A (intrauterine balloon tamponade) while in 46 (88.46%) patients of group B (B Lynch suture). Significantly higher success rate was observed in group B as compared to group A with *p*-value 0.009 (table-I). All the selected patients were divided into three age groups i.e. age group 20-25 years, age group 26-30 years and age group 31-35 years. Total 13 (25%) patients of group A 13 (25%) patients of group B belonged to age group 20-25 years. Success rate of treatment was noted in 10 (76.92%) patients of group A and 12 (92.31%) patients of group B. Statistically

**Table-I: Comparison of success between both groups (n=104).**

Group	Success		<i>p</i> -value
	Yes (%)	No(%)	
A	35 (67.31%)	17 (32.69%)	0.009
B	46 (88.46%)	6 (11.54%)	

**Table-II: Stratification of age groups with respect to success.**

Age groups (years)	Group A (n=52)		Total	Group B (n=52)		Total	<i>p</i> -value
	Success			Success			
	Yes	No		Yes	No		
20-25	10 (76.92%)	03 (23.08%)	13 (25%)	12 (92.31%)	01 (7.69%)	13 (25%)	0.59
26-30	19 (67.86%)	09 (32.14%)	28 (53.85%)	23 (85.19%)	04 (14.81%)	27 (51.92%)	0.130
31-35	06 (54.55%)	05 (45.45%)	11 (21.15%)	11 (91.67%)	01 (08.33%)	12 (23.08%)	0.043

success rate of both groups and *p*-value  $\leq 0.05$  was considered as significant. Effect modifiers like age, parity and gestational age were controlled through stratification and post-stratification chi square was applied to see their effect on outcome. A *p*-value  $\leq 0.05$  was considered as significant.

**RESULTS**

Age range in this study was from 20 to 35 years with mean age of  $27.64 \pm 3.65$  years. The mean age of women in group A was  $27.69 \pm 3.68$  years and in group B was  $27.60 \pm 3.65$  years. Gestational age was from 36 to 42 weeks with mean gestational age of  $40.01 \pm 1.62$  weeks. The mean gestational age in group A was  $39.98 \pm 1.57$

insignificant (*p*=0.59) difference of success rate between both group was noted. Out of 28 (53.85%) patients of group A and 27 (51.92%) patients of group B, success of treatment was noted in 19 (67.86%) and 23 (85.19%) patients of both groups respectively, but the difference of success rate between both groups was statistically insignificant with *p*-value 0.130. In age group 31-35 years, out of 11 (21.15%) patients of group A and 12 (23.08%) patients of group B, success of treatment was noted in 6 (54.55%) patients and 11 (91.67%) patients, but the difference rate between the both groups was statistically significant with *p*-value 0.069 (table-II). Patients were divided into

three gestational age groups i.e. 36-38 weeks gestation, >38-40 weeks gestation and >40-42 weeks gestation. Nine (17.31%) patients of study group A and 10 (19.23%) patients of group B were found with 36-38 weeks gestation and success rate in group A and B was 8 (88.89%) and 10 (100%) respectively, but the difference of success rate between both groups was insignificant with *p*-value 0.47. Total 21 (40.38%) patients of study group A and 19 (36.54%) patients of study group B were found with >38-40 weeks gestation and

and 5 was statistically insignificant and significant in para 4.

**DISCUSSION**

The key to management of PPH is early identification and treatment. Massive postpartum hemorrhage is an emergency lifethreatening situation and an obstetrician's nightmare<sup>11</sup>. Optimal management of these patients require multi disciplinary input from obstetrician, anesthetists and hematologist. Modern obstetrics aim is uterine preservation especially in case of

**Table-III: Stratification of gestational age with respect to success.**

Gestational age (weeks)	Group A (n=52)		Total	Group B (n=52)		Total	<i>p</i> -value
	Success			Success			
	Yes	No		Yes	No		
36-38	08 (88.89%)	01 (11.11%)	09 (17.31%)	10 (100.0%)	0 (0.0%)	10 (19.23%)	0.279
>38-40	15 (71.43%)	06 (28.57%)	21 (40.38%)	17 (89.47%)	02 (10.53%)	19 (36.54%)	0.154
>40-42	12 (54.55%)	10 (45.45%)	22 (42.31%)	19 (82.61%)	04 (17.39%)	23 (44.23%)	0.042

**Table-IV: Stratification of parity with respect to success.**

Parity	Group A (n=52)		Total	Group B (n=52)		Total	<i>p</i> -value
	Success			Success			
	Yes	No		Yes	No		
2	09 (90.00%)	01 (10.00%)	10 (19.23%)	10 (90.91%)	01 (9.09%)	11 (21.15%)	1.00
3	14 (73.68%)	05 (26.32%)	19 (36.54%)	18 (90.0%)	02 (10.0%)	20 (38.46%)	0.215
4	08 (53.33%)	07 (46.67%)	15 (28.85%)	11 (91.67%)	01 (8.33%)	12 (23.08%)	0.04
5	04 (50.00%)	04 (50.00%)	08 (15.38%)	07 (77.78%)	02 (22.22%)	09 (17.31%)	0.33

success rate was noted in 15 (71.43%) and 17 (89.47%) patients of group A and B. Difference of success rate between both groups was statistically insignificant with *p*-value 0.24. Success of treatment was noted in 12 (54.55%) and 19 (82.61%) patients of group A and B who belonged to >40-42 weeks gestation group. The difference of success rate between the both groups was statistically significant with *p*-value 0.042 (table-III). As shown in table-IV, difference of success rate between study group A and B for para 2, 3

low parity<sup>12</sup>. Recently several techniques have been tried to avoid hysterectomy, when uterotonic drugs fail to control massive postpartum hemorrhage. These include surgical compression sutures like B-lynch brace sutures, Hayman suture and balloon tamponade with an intrauterine catheter with good results<sup>13</sup>. This randomized controlled study compared the success rate (in terms of cessation of bleeding and avoiding hysterectomy) of intrauterine balloon tamponade versus B Lynch suture in

management of severe postpartum haemorrhage. Mean age of patients in our study was  $27.64 \pm 3.65$  years. The mean age of women in intrauterine balloon tamponade group was  $27.69 \pm 3.68$  years and in B Lynch suture group was  $27.60 \pm 3.65$  years. Majority of the patients 55 (56.30%) were between 26 to 30 years of age. These results were much comparable with study of Yaqub *et al*<sup>14</sup> who had found a mean age of 27 years with majority of patients between 26 to 30 years of age. Khamaiseh *et al*<sup>15</sup> in his study had also found the mean age of 28 years in PPH patients. On the other hand, Ferrazzani *et al*<sup>16</sup> in their study had found much larger mean age i.e. 36 years with majority of patients were >31 years of age. These findings contradict our results. The mean gestational age in our study was  $40.01 \pm 1.62$  weeks with majority of the patients 45 (43.27%) were >40 to 42 weeks of gestation. This shows that risk of postpartum hemorrhage increases in patients with larger gestational age. These results were also coincides with findings of Yaqub *et al*<sup>15</sup> and Tirumuru *et al*<sup>17</sup>. In our study, there was stopp age of bleeding within 15 minutes in 35 (67.31%) patients in intrauterine balloon tamponade group while in B Lynch suture group, it was seen in 46 (88.46%) patients. So, success was 67.31% in intrauterine balloon tamponade group and 88.46% in B Lynch suture group with *p*-value of 0.009 which is statistically significant. Baskett *et al*<sup>18</sup> in a case series of 28 patients of PPH had found the success rate of 82% in avoiding hysterectomy and controlling bleeding. Similarly, Wohlmuth *et al*<sup>19</sup> in another cases series reported this success rate of 77%. Diemert *et al*<sup>9</sup> in his study reported success rate of 60% in patients treated with the balloon alone and 90% with the balloon and the B-Lynch suture. This success rate found for B-Lynch compression sutures alone to prevent hysterectomy was 66%, and in conjunction with other surgical procedures was 74% by Victoria *et al*<sup>20</sup>. This success rate was much lower as compared to our study but very high success rates with compression sutures, usually in the range of 90% to 100%, have been reported in many studies<sup>21</sup>. In one study by

Palacios-Jaraquemada *et al*<sup>22</sup> success rate found with B-Lynch suture was 94%. Neelam *et al*<sup>23</sup> found this success rate of B Lynch suture in postpartum hemorrhage as 83%. In a case series done in Pakistan, success rate of B Lynch suture in controlling PPH was found to be very high i.e. 97.78%<sup>24</sup>.

## CONCLUSION

This study concluded that success rate of B Lynch suture (88.46%) is higher for management of severe postpartum hemorrhage as compared to intrauterine balloon tamponade (67.31%). So, we recommend that B Lynch suture technique should be used as prime technique in these particular patients in order to reduce maternal morbidity and mortality due to severe postpartum hemorrhage. Moreover, hysterectomy could be avoided in these patients and this technique should be used routinely in our general practice for managing severe postpartum haemorrhage by fertility preserving method.

## CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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