

**Research Article**

## **Comparison of intrauterine balloon tamponade and B lynch suture in severe postpartum hemorrhage**

**<sup>1</sup>Sana Fatima, <sup>2</sup>Neelam Shahzadi  
and <sup>3</sup>Saad Fazal**

<sup>1</sup>House Officer, Bahawal Victoria Hospital, Bahawalpur

<sup>2</sup>Women Medical Officer, RHC Abdul Hakim

<sup>3</sup>Medical officer, BHU 87/6R Sahiwal

### **ABSTRACT**

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

**Materials & 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) 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.

**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:** Postpartum hemorrhage, compression sutures, hysterectomy.

### **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> It is generally assumed that by preventing and treating PPH, most PPH-associated deaths could be avoided. The prevention and treatment of PPH

are therefore vital steps towards improving the health care of women during childbirth and the achievement of the Millennium Development Goals. To reach these objectives, health workers in developing countries should be given access to appropriate medications and be trained in procedures relevant to the management of PPH. Countries also need evidence-based guidance to inform their health policies and improve their health outcomes.<sup>4</sup>

B-Lynch sutures are brace sutures used to mechanically compress an atonic uterus in the

face of severe PPH.<sup>5</sup> It was developed by Christopher B-Lynch, a consultant obstetrician and gynaecological surgeon based at Milton Keynes General Hospital, Milton Keynes, Buckinghamshire, England.<sup>6</sup> B-Lynch was born in 1947 in Sierra Leone with the birth name of Christopher Balogun-Lynch. The technique was first described in 1997.<sup>7</sup> It can stop postpartum hemorrhage without the need for pelvic surgery and potentially preserving fertility.<sup>8</sup> It is regarded as "the best form of surgical approach for controlling atonic PPH as it helps in preserving the anatomical integrity of the uterus."<sup>9</sup> Baskett TF et al<sup>10</sup> has shown its success upto 82% in severe postpartum hemorrhage management.

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**

**Study design:** Randomized controlled trial.

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

**Duration of study:** September 2015 to March 2016

### **Inclusion Criteria:**

- a. All patients with diagnosis of severe postpartum haemorrhage as per operational definition.
- b. Age 20-35 years.
- c. Parity 2-5.
- d. Gestational age 36-42 weeks.

### **Exclusion Criteria:**

- a. Patients with genital tract trauma.
- b. Patients with retained products of conception.
- c. Patients with ruptured uterus.
- d. Patients with perineal trauma.
- e. History of any bleeding disorder.
- f. Patients on heparin/warfarine.
- g. Successful medical treatment.

### **Data collection procedure:**

After approval from local ethical committee, 104 patients who developed postpartum haemorrhage after delivery and were admitted in the Department of Obstetrics & Gynaecology, Bahawal Victoria Hospital, Bahawalpur, fulfilling the inclusion/exclusion criteria were selected. Informed, written consent was taken after explaining the aims, methods, reasonably anticipated benefits, and potential hazards of the study. Subjects were informed that their participation is voluntary and that they may withdraw consent to participate at any time during the study. They were also informed that choosing not to participate will not affect their care. Senior gynaecologist (with five year post fellowship experience) was available for more detailed information both for patients and researcher if required.

After a patient had given informed consent for participation in the study, all patients with severe gestational hypertension were offered to pick up a slip from total mixed up slips (half-slips were contained letter 'A' and other half slips were contained letter 'B') and she was placed in that respective group. 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.

### **Procedural detail:**

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 1<sup>st</sup> contained the patients bio data while part 2<sup>nd</sup> contained the study variables.

**Statistical analysis:**

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 success rate of both groups and p-value ≤ 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

**Table-I:** Age distribution for both groups (n=104).

Age (years)	Group A (n=52)		Group B (n=52)		Total (n=104)	
	No. of patients	%age	No. of patients	%age	No. of patients	%age
20-25	13	25.0	13	25.0	26	25.0
26-30	28	53.85	27	51.92	55	52.88
31-35	11	21.15	12	23.08	23	22.12
Mean ± SD	27.69 ± 3.68		27.60 ± 3.65		27.64 ± 3.65	

**Table-II:** %age of patients according to Gestational age in both groups.

Gestational Age (weeks)	Group A (n=52)		Group B (n=52)		Total (n=104)	
	No. of patients	%age	No. of patients	%age	No. of patients	%age
>36-38 weeks	09	17.31	10	19.23	19	18.27
>38-40 weeks	21	40.38	19	36.54	40	38.46
>40-42 weeks	22	42.31	23	44.23	45	43.27
Mean ± SD	39.98 ± 1.57		40.04 ± 1.68		40.01 ± 1.62	

effect on outcome. P-value ≤ 0.05 was considered as significant.

**RESULTS**

Age range in this study was from 20 to 35 years with mean age of 27.64 ± 3.65years. The mean age of women in group A was 27.69 ± 3.68 years and in group B was 27.60 ± 3.65years. Majority of the patients 55 (56.30%) were between 26 to 30 years of age as shown in Table I. Gestational age was from 36 to 42 weeks with mean gestational age of 40.01 ± 1.62weeks. The mean gestational age in group A was 39.98 ± 1.57weeks and in group B was 40.04 ± 1.68weeks. Majority of the patients 45 (43.27%) were >40 to 42 weeks of gestation as shown in Table II. The mean parity in group A was 3.40 ± 0.98 and in group B was 3.37 ± 1.01. Majority of the patients 39 (37.50%) were of para-2 as shown in Table III.

There was stoppage of bleeding within 15 minutes in 35 (67.31%) patients in Group A (intrauterine balloon tamponade) while in Group B (B Lynch suture), it was seen in 46 (88.46%) patients as shown in Table IV. So, 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 as shown in Figure III. Stratification of age groups and gestational age in both groups with respect to success was shown in Table V & VI respectively which showed statistically significant difference among both groups between 31-35 years of age and >40 to 42 gestational age. Stratification of parity with respect to success has shown in Table VII.

**Table III:** %age of patients according to parity in both groups.

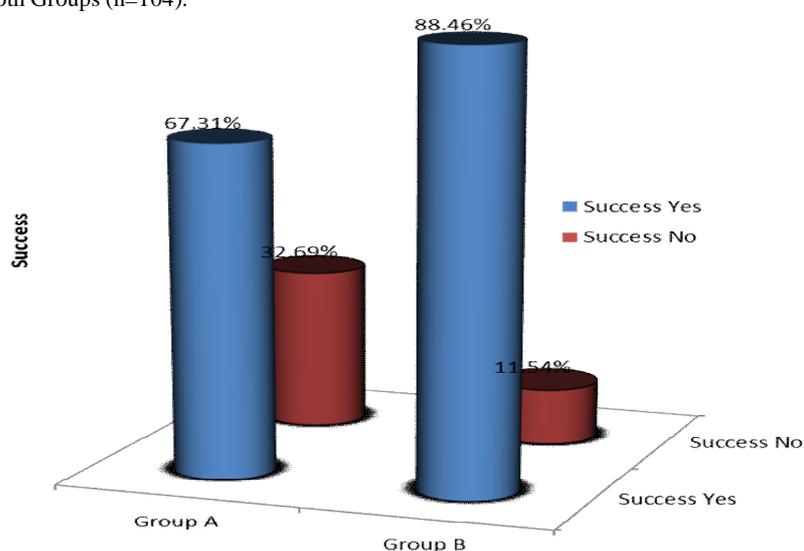
Parity	Group A (n=52)		Group B (n=52)		Total (n=104)	
	Frequency	%age	Frequency	%age	Frequency	%age
2	10	19.23	11	21.15	21	20.19
3	19	36.54	20	38.46	39	37.5
4	15	28.85	12	23.08	27	25.96
5	08	15.38	09	17.31	17	16.35
<b>Mean ± SD</b>	<b>3.40 ± 0.98</b>		<b>3.37 ± 1.01</b>		<b>3.38 ± 0.99</b>	

**Table IV:** Comparison of Success between both Groups (n=104).

		Group A (n=52)		Group B (n=52)	
		No. of Patients	%age	No. of Patients	%age
SUCCESS	Yes	35	67.31	46	88.46
	No	17	32.69	06	11.54

➤ P value is 0.009 which is statistically significant.

**Figure 1:** Success of both Groups (n=104).



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

Age of patients (years)	Group A (n=52)		Group B (n=52)		p-value
	Success		Success		
	Yes	No	Yes	No	
20-25	10 (76.92%)	03 (23.08%)	12 (92.31%)	01 (7.69%)	<b>0.277</b>
26-30	19 (67.86%)	09 (32.14%)	23 (85.19%)	04 (14.81%)	<b>0.130</b>
31-35	06 (54.55%)	05 (45.45%)	11 (91.67%)	01 (8.33%)	<b>0.043</b>

**Table VI:** Stratification of Gestational age with respect to success.

Gestational age (weeks)	Group A (n=52)		Group B (n=52)		p-value
	Success		Success		
	Yes	No	Yes	No	
36-38 weeks	08 (88.89%)	01 (11.11%)	10 (100.0%)	00 (0.0%)	<b>0.279</b>
>38-40 weeks	15 (71.43%)	06 (28.57%)	17 (89.47%)	02 (10.53%)	<b>0.154</b>
>40-42 weeks	12 (54.55%)	10 (45.45%)	19 (82.61%)	04 (17.39%)	<b>0.042</b>

**Table VII:** Stratification of parity with respect to success.

Parity	Group A (n=52)		Group B (n=52)		p-value
	Success		Success		
	Yes	No	Yes	No	
2	09 (90.0%)	01 (10.0%)	10 (90.91%)	01 (9.09%)	<b>0.943</b>
3	14 (73.68%)	05 (26.32%)	18 (90.0%)	02 (10.0%)	<b>0.184</b>
4	08 (53.33%)	07 (46.67%)	11 (91.67%)	01 (8.33%)	<b>0.030</b>
5	04 (50.0%)	04 (50.0%)	07 (77.78%)	02 (22.22%)	<b>0.232</b>

## DISCUSSION

This randomized controlled study has 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 a very much comparable with study of Yaqub U et al<sup>11</sup> who had found a mean age of 27 years with majority of patients between 26 to 30 years of age. Khamaiseh K et al<sup>12</sup> in his study had also found the mean age of 28 years in PPH patients. On the other hand, Nizam K et al<sup>7</sup> and Ferrazzani S et al<sup>13</sup> in their studies had found much larger mean age i.e. 35 & 36 years respectively 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 U et al<sup>11</sup> and Tirumuru S et al.<sup>14</sup>

In our study, there was stoppage 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 TF et al<sup>15</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 CT et al<sup>16</sup> in another cases series reported this success rate of 77%.

Diemert A et al<sup>17</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 YKC et al.<sup>18</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>19</sup> since the first paper by B-Lynch in 1997.<sup>20</sup> In recent years, larger case series done by Palacios-Jaraquemada JM et al<sup>21</sup> on different surgical methods to treat postpartum hemorrhage, the overall success rate found with B-Lynch suture was 94%, while for Hayman sutures, Cho sutures, and Pereira sutures, the rates were 92%, 100%, and 100% respectively. Neelam N et al<sup>22</sup> found this success rate of B Lynch suture in postpartum hemorrhage as 83%. In a case series done in Pakistan,

## 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.

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