



# Use and Effectiveness of Intrauterine Hydrostatic Balloon (Condom) Catheterization to Prevent Postpartum Hemorrhage

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## ABSTRACT

Postpartum haemorrhage is any amount of bleeding from or into genital tract following birth of the baby up to the end of puerperium which adversely affects the general condition of the patient evidenced by rise in pulse rate and falling blood pressure. Postpartum haemorrhage is a major complication of delivery world wide as well as in Bangladesh. It is also a leading factor in maternal mortality and morbidity all over the world. It has been estimated that more than 125 thousand women die of PPH. In Bangladesh it contributes 26% of maternal deaths. However the present study has conducted to observe the efficacy of hydrostatic ballooning by condom, as an intrauterine tamponade in controlling PPH, where medical treatment fails, to find out safety and complication, to evaluate the morbidities after the procedure, to identify the risk factors cost effectiveness of the procedure and to evaluate the overall outcome of PPH cases after use of intrauterine balloon tamponade. The study was a prospective study. The study was conducted at department of Obstetrics and Gynaecology, Kumudini Women Medical College and Hospital at Tangail in Bangladesh. Fifty consecutive cases were being drawn from the admitted patients having PPH, after delivery. Under aseptic precautions a sterile rubber catheter was inserted within the condom and tied near the mouth of the condom by a silk thread. Urinary bladder was kept empty by indwelling Foley's catheter. After putting the patient in the lithotomic position, the condom was inserted within the uterine cavity. Inner end of the catheter remained within the Condom. Outer end of the catheter was connected with a saline set and the condom was inflated with 250-500mL of running normal saline till resistant to flow developed. Bleeding was observed, and when it was reduced considerably, further inflation was stopped and outer end of the catheter was folded and tied with thread. Uterine contraction was maintained by oxytocin drip for at least 6 hours after the procedure. The uterine condom was kept tight in position by ribbon gauze pack sterile sanitary pad or another inflated condom placed in the vagina. The condom catheter was kept for 24-48 hours depending upon the initial intensity of blood loss and then it was deflated gradually over (10-15 minutes) and removed. Patient was kept under triple antibiotic coverage (amoxicillin {500mg every 6 hrs} + metronidazole {500mg every 8 hrs} + gentamicin {80mg every 8 hrs}) administered intravenously for 2 days followed by oral 5 days. A questionnaire was used to collect information on age, parity, gestational weeks, antenatal care, mode of delivery, neonatal outcome, interval between delivery and PPH, time interval of onset of PPH and introduction of condom, duration of retaining condom in situ, place of occurrence of PPH, other associated complicating factors for PPH, hospital stay, blood transfusion and outcome PPH. Sample was selected as consecutive convenient sampling interview was taken from patient or her attendance that was available at that time. Antenatal, postnatal details and clinical examination findings were recorded. Medical treatment, interventional procedure and outcome recorded. Postpartum hemorrhage is an obstetric emergency. It becomes life threatening when it occurs in helpless women delivering at remote area/home. Uterine inertia, retained placenta with morbid adhesion is to be the major cause of postpartum hemorrhage along with mismanaged third stage of labour, Identification of the risk factors for developing PPH during the antenatal checkup, labour conducted by skilled birth attendant reduces the frequency of PPH. Immediate transfer of PPH cases to a health center where blood transfusion and operative facilities are available in

short possible time is recommended. Hydrostatic method for control of obstetric haemorrhage is simple, safe, highly effective and economic. It can be used in developing country as well as developed for controlled of hamorrhage. Health providers involved in safe delivery practice including the paramedics can be easily trained in this procedure and can reduce maternal mortality to a great extent. If a readymade device with condom and plain rubber catheter can be made available in sterile packs (which should be cost effective) it would have been more applicable in all levels of health sectors. It is recommended to make large control trail of this type of study to control PPH to make this packing technique more acceptable and evidenced based thereby contributing to the safe delivery and safe motherhood programs of this country.

**Keywords:** *Postpartum haemorrhage, Management, Condom, Women, Delivery, Pregnancy, labour, antenatal check up.*

## INTRODUCTION

Postpartum haemorrhage (PPH) may be defined clinically as any amount of bleeding from or into genital tract following birth of the baby up to the end of puerperium which adversely affects the general condition of the patient evidenced by rise in pulse rate and falling blood pressure. Quantitatively it is defined as blood loss of more than 500ml after vaginal delivery or more than 1000 ml after Caesarean section. In spite of modern technology PPH yet remains as a major complication of delivery world wide as well as in Bangladesh. It is also a leading factor in maternal mortality and morbidity all over the world. It has been estimated that more than 125 thousand women die of PPH<sup>2</sup> 2%-5% of deliveries may lead to PPH with blood loss more than 1000ml in 1st 24hrs<sup>3</sup>. It showed in a population-based study conducted in eight developing countries that 28% of all maternal deaths are due to PPH<sup>4</sup>. In Bangladesh it contributes 26% of maternal deaths. Mortality due to PPH is relatively preventable and depends on timely & proper interference according to the cause of PPH. Avoidance of haemorrhage remains the principal rationale for active management of 3<sup>rd</sup> stage of labour. Ecboolic drugs used as prophylaxis to ensure the maintenance of a well contracted uterus include oxytocin and ergometrine. The modern management of an atonic PPH includes the use of prostaglandin in vaginal oral and parental route. Each has its advantages and disadvantages in terms of efficacy, side effects, availability, cost, stability and ease of administration. Bi-manual compression, uterine packing, surgical interventions like B-lynch brace suture, ligation of uterine artery, ovarian artery internal iliac artery and embolization are also effective methods of controlling intractable haemorrhage. Hysterectomy is the last resort to save life, irrespective of parity of the patient. All these procedure may lead to trauma sepsis and other morbidities. Above and all a well equipped facility, skilled manpower and standard logistic supports are essential to perform the above mentioned procedure.

But in the developing country, with various constraints for logistic supports, equipped facilities and skilled manpower are cost-effective. Simple alternative to control intractable PPH is a demand for long time specially for rural and remote area. Inflated stomach balloon of a sengstaken. Blacke more tube and rusch urological hydrostatic balloon catheter is used for stopping bleeding in atonic PPH. Sengstaken Blackemore tube and other analogues devices are effective but expensive (approximately 14OUK pound). In Dhaka Medical College Sayeba et al has introduced an innovative device since quite few years by using condom to control massive PPH. Now it has been practicing in various peripheral medical colleges and hospitals in a trial basis. This method is an inflated condom having the same efficiency in controlling atonic PPH as Rusch hydrostatic balloon or sengstaken Blackemore tube. Condom is inexpensible, easily available even in remote rural area selling in Bangladesh. In uncontrolled PPH it can be used to compress uterine sinuses effectively before proceeding to major surgery. The procedure is very simple, efficient and can be used even by grass root level health workers with minimum skill. In developing countries have very poor maternal health coverage and most women don't have the scope of coming to big health setting for management of her emergency problem like PPH. Present study is designed to identify the efficiency and simplicity of the method.

## AIMS AND OBJECTIVES

### General Objective:

The main aim of the study is to test the safety and effectiveness of intrauterine Balloon (Condom) catheterization), a method which is simple, easily available and cost effective for the management of post partum haemorrhage.

**Specific objective**

1. To observe the efficacy of hydrostatic ballooning by condom, as an intrauterine tamponade in controlling PPH, where medical treatment fails.
2. Find out safety and complication
3. To estimate the time required for controlling PPH.
4. To evaluate the morbidities after the procedure.
5. To identify the risk factors cost effectiveness of the procedure.
6. To evaluate the overall outcome of PPH cases after use of intrauterine balloon tamponade.

**MATERIALS AND METHOD**

**Type of study:** Prospective study

**Place of study:** Department of Obstetrics and Gynaecology, Kumudini Women Medical College and Hospital.

**Duration of study:** July 2004 to June 2005

**Study Population:** Fifty consecutive cases were being drawn from the admitted patients having PPH, after delivery.

**Inclusion criteria:**

- ◆ Patients having PPH in the hospital or those referred from outside to the hospital.
- ◆ Patients who have failed to respond to usual medical treatment in controlling PPH.
- ◆ Both primary and secondary PPH due to a tonicity or due to any other cause were included.

**Exclusion criteria:**

- ◆ PPH due to cervical tear.
- ◆ PPH due to perineal tear.
- ◆ PPH due to DIC.
- ◆ PPH due to irreversible shock.

**Procedure of hydrostatic ballooning by Condom: Steps:**

Under aseptic precautions a sterile rubber catheter was inserted within the condom and tied near the mouth of the condom by a silk thread.

1. Urinary bladder was kept empty by indwelling Foley's catheter.
2. After putting the patient in the lithotomic position, the condom was inserted within the uterine cavity.
3. Inner end of the catheter remained within the Condom.
4. Outer end of the catheter was connected with a saline set and the condom was inflated with 250-500mL of running normal saline till resistant to flow developed.
5. Bleeding was observed, and when it was reduced considerably, further inflation was stopped and outer end of the catheter was folded and tied with thread.
6. Uterine contraction was maintained by oxytocin drip for at least 6 hours after the procedure.
7. The uterine condom was kept tight in position by ribbon gauze pack sterile sanitary pad or another inflated condom placed in the vagina.
8. The condom catheter was kept for 24-48 hours depending upon the initial intensity of blood loss and then it was deflated gradually over (10-15 minutes) and removed.
9. Patient was kept under triple antibiotic coverage (amoxicillin {500mg every 6 hrs} + metronidazole {500mg every 8 hrs} + gentamicin {80mg every 8 hrs}) administered intravenously for 2 days followed by oral 5 days.

## Data Collection:

**Preparation of questionnaire:** A questionnaire was used to collect information on age, parity, gestational weeks, antenatal care, mode of delivery, neonatal outcome, interval between delivery and PPH, time interval of onset of PPH and introduction of condom, duration of retaining condom in situ, place of occurrence of PPH, other associated complicating factors for PPH, hospital stay, blood transfusion and outcome PPH.

**Data Collection procedure:** Sample was selected as consecutive convenient sampling interview was taken from patient or her attendance that was available at that time. Antenatal, postnatal details and clinical examination findings were recorded. Medical treatment, interventional procedure and outcome recorded.

## RESULTS

During this study period from July 2004 to June 2005 total admission in Obstetric department KWMCH were 3596 and of these 2328 were obstetric cases. Total PPH cases were 95, so the incidence of PPH was 4.08% of the total obstetric cases. During this period the number of vaginal deliveries were 1152 (55.65%) and abdominal deliveries were 918 (44.35%). The incidence of PPH among deliveries was (4.58%). Among the 95 PPH cases 43 (45.26%) were managed medically, 50 (52.63%) managed by using intrauterine hydrostatic balloon by condom. There were 2 (4.10%) cesarean hysterectomy for PPH.

**Statistical Analysis:** Collected data were compiled and necessary calculations was performed using computer based software for statistical package for social science (SPSS).

### Description of Table-1

Table 1 shows that mean ( $\pm$ SD) age of the patients was 25.70 $\pm$ 4.46 median was 26 and range of age was 18-40. Median parity was 1 and range was from 0-5. Mean Gestational age was 36.67  $\pm$  3.06 weeks, median 37 weeks and range 31 to 42 weeks. Antenatal care of the patient shows 40% had antenatal care and 60% had no antenatal care and statistically the difference was significant.

**Table-1: Basic data of the patient (n=50)**

Parameters	Mean tSD	Median	Range
Age (Years)	25.70 $\pm$ 4.46	26.0	18.00-40.00
Parity		1.00	0.00-5.00
Gestation (week)	36.67 $\pm$ 3.06	37.00	31.00-42.00

Antenatal Care	Number of Patients	Percentage
Yes	20	40
No	30	60

### Description of Table-2:

Table 2 shows normal vaginal delivery in 21 (42%) patients, assisted vaginal delivery in 2 (4%), LSCS in 27 (54%) patients.

**Table – 2: Mode of delivery (n=50)**

SL No	Mode of delivery	Number of Patient	Percentage
1.	LUCS	27	54%
2.	Normal vaginal	21	42%
3	Assisted Vaginal	2	4%

### Description of Table - 3:

Table – 3 show Neonatal outcome among the PPH patients. There were live birth 36 (72%). and stillborn were 14 (28%).

**Table- 3 Neonatal outcome (n=50)**

Neonatal outcome	Number of Patients	Percentage
Live birth	36	72%
Stillborn	14	28%

**Description of Table - 4:**

Table - 4 shows the interval between delivery and onset of PPH 25 (50%). patients had immediate onset. Among other 18 (36%) started to bleed within 1-24 hours. 2(4%) started within 25-72 hours and another 5 (10%) started to bleed within 4 days to 2 weeks of delivery.

**Table - 4: Interval between delivery and PPH**

Factors	Number of Patients	Percentage
Immediate	25	50%
1-12 hours	18	36%
25-72 hours	2	4%
4 days to 2 weeks	5	10%

**Description of Table - 5:**

Table - 5 shows time interval of condom introduction after development of PPH. in 37 (74%) cases condom introduced within 0-4 hours and in rest of the cases 13(26%) it was introduced within 5-24 hours of development of PPH. Condom was introduced after removal of retained product of conception.

**Table - 5: Time interval of condom introduction after development of PPH (n=50)**

Condom introduction After (hours)	Number of Patients		Percentage
0-4 hours	37	LUCS - 20	40%
		NVD - 17	34%
5- 24 hours	13	LUCS - 07	14%
		NVD-06	12%

**Description of Table - 6:**

Table - 6 shows that primary PPH was 43 (86%) Secondary PPH was only 7. (14%)

**Table - 6: Type of postpartum haemorrhage (n=50)**

Type of PPH	Number of Patients	Percentage
Primary	43	86%
Secondary	7	14%

**Description of Table - 7:**

Table - 7 shows the duration of keeping condom in uterus. In 32 cases 64% condom was kept for 24 hours and in 18 (36%) it was kept for 48 hours.

**Table - 7: Condom kept (n=50)**

Condom Kept for (hours)	Number of Patients	Percentage
24 hours	32	64%
48 hours	18	36%

**Description of Table - 8:**

Table - 8 shows place of occurrence of postpartum haemorrhage. 34 (68%) patients developed PPH in this hospital and others 16 (32%) were referred from outside.

**Table - 8: Place of occurrence of postpartum haemorrhage (n=50)**

Type of PPH	Number of Patients	Percentage
In hospital	34	68%
Outside hospital	16	32%

**Description of Table - 8:**

Table - 8 shows place of occurrence of postpartum haemorrhage. 34 (68%) patients developed PPH in this hospital and others 16 (32%) were referred from outside.

**Table - 8: Place of occurrence of postpartum haemorrhage (n=50)**

Type of PPH	Number of Patients	Percentage
In hospital	34	68%
Outside hospital	16	32%

**Description of Table - 9:**

Table - 9 shows predisposing factors for PPH. These are pregnancy induced hypertension 16, (32%), Jaundice 3 (6%) Premature rupture of membrane 6 (12%), Multiple pregnancy 4(8%), obstructed labour 6 (12%), Abruptio placentae 4 (8%), Placenta praevia 6(12%) Secondary PPH following C/S 2(4%), HELLP Syndrome 1(2%), Sepsis 2(4%), Morbid adhesion 1(2%), Multiple fibroid 1(2%), Retained product 2 (4%), Induction /Augmentation of labour 24(48%)

**Table - 9: Predisposing factors for PPH (n=50)**

Factors	Number of Patients	Percentage
Pregnancy induced hypertension	16	32%
Jaundice	3	6%
PROM	6	12%
Multiple pregnancy	4	8%
Obstructed Labour	6	12%
Abruptio Placentae	2	4%
Placenta praevia	4	8%
Secondary PPH following C/S	2	4%
HELLP syndrome	1	2%
Sepsis	2	4%
Morbid adhesion	1	2%
Multiple fibroid	1	4%
Induction/Augmentation of labour	24	48%

**Description of Table -10:**

Table - 10 shows management of the patients where blood transfusion needed. Amount of Blood required 1-9 units mean  $\pm$  SD 2.93 + 1.74 median 2.5. Mean amount of saline required to make tamponade was 348.33 89.52 ml, ranging 250 to 500 ml, average required saline 300ml.

**Table - 10: Management of the patients (n=50)**

Parameters	Mean $\pm$ SD	Median	Range
Blood Transfusion (units)	2.93 $\pm$ 1.7	2.50	1.00-9.00
Amount of saline (ml) required to make tamponade	348.33 $\pm$ 89.52	300.00	250-500

**Description of Table 11:**

Table -11 shows outcome of the patients. Mean hospital stay was 8.37  $\pm$  5.68, median 6 days ranging from 3-21 days.

There was no adverse effect like infection in any of the cases due to the packing by inflated condom.

**Table- 11: Outcome of the patients (n=50)**

Parameters	Mean $\pm$ SD	Median	Rang
Hospital stay (days)	8.37 $\pm$ 5.68	6.00	3.00-21.00
Sepsis due to inflated condom	0	0	0

## DISCUSSION

Postpartum Haemorrhage (PPH) still is a challenging problem for the obstetricians, PPH remains a significant complication of childbirth in many developed and developing countries<sup>8</sup>. Although most can be treated successfully with conservative measures; such as medication about 10% Of the women with PPH require major surgical procedures and even hysterectomy to save their lives (Rouf s. eta', unpublished data). Parenteral use of prostaglandin in the management of atonic PPH is not widely available, expensive and heat sensitive<sup>11</sup>. Rectal or vaginal misoprostol, although attractive for its cost, stability and ease of administration, but less effective and is not always available in our country, in addition it is associated with side effects like diarrhoea, vomiting, fever, flushing, headache, hypertension and bronchospasm. When the medical treatment fails then an alternative method of management is necessary. A variety of surgical techniques are used including Uterine artery ligation, Ovarian artery ligation, Internal iliac artery ligation and B-Lynch Brace suture<sup>(12'13'14)</sup> If the all method mention previously fails to control PPH there is only the way that is hysterectomy to save the woman's life. But each of the above techniques entails a laparotomy and there is a potential risk of ligating external iliac vessels, ureteric injury and more haemorrhage, moreover skilled personnel and anesthetic support needed for the above mentioned procedures.

B-Lynch Brace<sup>(3'12)</sup> suture is used to compress the uterus without compromising major vessels. The advantage of the B-Lynch procedure is that the identification of specific blood vessels is not required, which is invariably a difficult part in ligation of arteries. Although it is helpful during cesarean section, the B-Lynch procedure requires a laparotomy and therefore is not the first approach in cases of PPH followed by vaginal delivery and even where medical management of PPH has failed. The control of uterine haemorrhage by the use of intracavitary packing has been described for over a century (Ramsbotham 1856) but fears of the concealment of continued bleeding; uterine trauma and infection together with increasingly effective medical and surgical measure to treat uterine atony have lead to its fall from favour<sup>15</sup>.

The attractiveness of uterine packing however is that it does not require invasive surgery. Although there is a chance of intrauterine infection, but appropriate and aseptic packing techniques with prophylactic antibiotic therapy can minimize this complication<sup>16</sup>. A good packing technique involves careful layering of the ribbon gauze pack, but this may be easier in theory than in practice. Keeping in mind the technique of packing in controlling PPH by compressing the uterine sinuses. Sengstaken -Blackemore tube and Rusch Urological hydrostatic balloon catheters as well as inflated condom<sup>17</sup> have been used by some researchers to control intractable heamorrhage. The Sengstaken -Blackemore tube is complex to use and expensive approximately 140 pounds or \$225 (USD). The Rusch Urological hydrostatic balloon catheter, although simple and effective, is also expensive (20 pound or \$ 32 USD) and not available in developing countries such as Bangladesh. On the contrary a packet of condom and catheter is only 11 Tk. which is equivalent to a few pence (and 19 cents US). Hydrostatic balloon conforms naturally to the contour of the uterus and compresses the open sinuses effectively and does not require complex packing technique and is easy to remove, and as condom is slippery there is no chance of concealed bleeding. There is also a lower risk of infection, as there is no direct intrauterine manipulation. This intervention can be done easily, Cost effectively and quickly and in addition it does not require special skilled personnel.

In this study 50 patients were taken consecutively in whom the medical management have failed to control PPH before proceeding for major surgical methods the packing of uterine cavity by hydrostatic balloon by condom was done. The sample size of the study is small though the study showed that massive PPH was effectively controlled very quickly by this tamponade of inflating condom. There are a very few studies related to this present study.

During the study period of the 95 PPH cases 43 were managed medically. Two were managed by cesarean hysterectomy which was 52.63% of total PPH cases. The high rate of cesarean hysterectomy was due to, as some maternity unit went for direct surgical procedure after failed medical treatment without choosing packing in between. In a similar type of study done by Sayeba et. al", in the year 2002 there were 152 cases of PPH, 109 were managed medically, 20 were managed by B-Lynch suture during cesarean section and 23 were managed by using inflated condom. Another study by Sultana Musarrat (as personal communication) in the year 2003 there was 143 cases of PPH, 96 were managed medically 17 by sub-total Hysterectomy during caesarean section and 30 were managed by using inflated condom. Results of all studies were satisfactory by using hydrostatic condom, which is applicable for this study as well.

Findings show the characteristics of the study subjects (Tablet). Out of 50 respondents the range of age was 18-40 years and mean age was 25.70 4.46(SD), median age 26 years. In a study by D.O. Selo-Ojeme et. al. Nigeria showed the mean age of PPH were 27 years in their study and the range were between 20-40 years<sup>18</sup>. In a separate study by Sayeba et.al. showed the age range of 19-40 years and mean age 26.8 years. So the age range and median age of my study is consistent with the study conducted by Sayeba et.al<sup>17</sup>. In our experience multiparous women are more prone to develop PPH. While several studies have shown that grand multiparity predisposes to PPH (19,20,21) others have not found any such association<sup>22</sup>. Gestational age in this study showed ranging from 31-42 weeks with median 37 weeks. Sometimes pre-maturity and sometimes postdated pregnancy predisposes to retained placenta, which is one of the causes of PPH.

Regarding the antenatal care of the 50 patients only (40%) had antenatal care rest 30 (60%) had no antenatal care at all. The P value was less than 0.05, which was statistically significant. The finding of the present study was similar to Sayeba et al. In her study all 23 patients who had massive PPH associated other complicating factors also did not had any antenatal care. It can be recommended that proper antenatal care sometime identify the high risk patients and can prevent PPH by proper management in health care setup by skilled personnel. Regarding parity two studies should median parity 1 & 2 respectively. PPH occurred after normal vaginal delivery in 21(42%), assisted vaginal delivery in 2(4%) and cesarean section in 27(54%) cases.

Interval between delivery and PPH in the respondents. Out of 30 patients in 25(50%) PPH developed immediately after delivery and in 18(36%), it developed within 24 hrs and 2(4%) developed within 25-72 hrs. In 5(10%) cases it developed between 4 days to 2 weeks. The total no of primary PPH is 43(86%) where's secondary PPH 7(14%). It indicates that the majority of PPH were primary, which occurs within 24 hours of delivery. So the number of catastrophes from primary PPH can be reduced if this tamponade of inflated balloon by condom is used by trained persons who conduct deliveries. It would be able to reduce the PPH related deaths in near future. Table-5 shows the time interval of condom introduction after development of PPH. In 37 patients 74% it was introduced within 0- 4 hours and in 13 (26%) between 5-24 hours. It indicates that in those patients where medical management failed, before going for surgical intervention this inflated condom was introduced within short time. And only in 23.31% where medical management failed after 5-24 hours, were they were managed by this tamponade.

The frequency distribution of the respondents shows, in 32 patients (64%) the condom kept for 24 hours and in other 18 (36%) it was kept for 48 hours. The time to keep the balloon in situ was decided upon the amount of PPH and the time required controlling the haemorrhage after introduction. It was decided that in the respondents where the PPH was controlled immediately they had this balloon for 24 hours and those who had slightest tricking even after introduction was kept for 48 hours. The results of the study co-related with the study of Sayeba et.al<sup>17</sup>.

The place of occurrence of PPH. In 34 patient 68% PPH started in hospital and managed effectively. Eight cases 16(32%) developed PPH outside the hospital and were managed after admission. That means most of the patients of PPH cannot reach hospital due to massive hemorrhage. Regarding the predisposing factors for PPH it showed out of 50 patient 16(32%) had pregnancy induced hypertension (PIH) 3(6%) pregnancy with jaundice 6(12%) Obstructed labor, 2(4%) Retained product, 24(48%) induction/augmentation. From these date it is clear that all the patients had one or multiple risk factors or complicating factors in the antenatal period, which ended with PPH in early or late postpartum period. So these risk factors should be considered carefully from antenatal period.

Regarding the management of patients most were haemodynamically unstable so needed blood transfusion. They received 1-9 units of blood transfusion and median of which is 2.5. Immediate blood loss prevented by this technique reduces the amount of blood transfusion. These patients became haemodynamically stable very soon after using the technique. This result is also consistent with the study of Sayeba. et.al<sup>17</sup>.

Table-11 shows the hospital stay of patient from 3-21 days. This great variation is due to some other complications like some of the patients with pregnancy induced hypertension had pulmonary oedema or it took time to control their severe hypertension or the patient with jaundice remained in the hospital to reduce their bilirubin level. Otherwise all other patients were discharged within 6 days with complete recovery. Their postnatal follow up was quite satisfactory. None of the patients had any complication due to



introduction of inflated condom like sepsis. This finding is also in accordance with the finding of Sayeba et.al."

## SUMMARY AND CONCLUSION

A well-designed study was conducted by practical and closely observational way to find out the efficiency and test the effectiveness of hydrostatic ballooning by Condom. Objective of the study was to find out the effectiveness of such a simple, easily available cost-effective and an easier method for the management of post partum haemorrhage. For the study 50 patients were selected consecutively, who were primarily by managed medically to prevent PPH. All the patients, delivered in the KWMCH and referred from outside were treated medically at first. Among them who failed to control PPH and continued to bleed were given intrauterine hydrostatic balloon by condom and normal Saline. They were managed successfully by this experimental new method PPH was controlled effectively without proceeding for the intervention like B-lynch suture, uterine artery ligation internal iliac artery ligation and avoided the operative procedure. Bleeding was controlled effectively in almost 98% cases. The cost of the method is very minimum and easy availability of devices all over the world in comparison to the other methods made the method popular to all. So where the leading cause of maternal mortality is PPH in developing and undeveloped country, it is the appropriate method of time demand due to its effectiveness, low cost, maximum availability and easily applicability. To make safe mother hood, it can also save the uterus of many young women to conserve their productive capacity.

As this procedure is very safe and easy and does not require anesthesia or many logistic supports so it can be introduced in grass root level from where communication to the hospital is very difficult and time consuming. It can be given by the primary health care providers or other health workers before referring the patient to higher center without losing much blood or before women becomes haemodynamically unstable.

## RECOMMENDATIONS

Postpartum hemorrhage is an obstetric emergency. It becomes life threatening when it occurs in helpless women delivering at remote area / home. Uterine inertia, retained placenta with morbid adhesion is to be the major cause of postpartum hemorrhage along with mismanaged third stage of labour, Identification of the risk factors for developing PPH during the antenatal checkup, labour conducted by skilled birth attendant reduces the frequency of PPH. Immediate transfer of PPH cases to a health center where blood transfusion and operative facilities are available in short possible time is recommended. More studies are needed in this field to formulate the prevention and management of PPH cases there by re-editing the maternal mortality and morbidity.

### Recommendations Proposed herewith relation to the study:

This hydrostatic method for control of obstetric haemorrhage is simple, safe, highly effective and economic. It can be used in developing country as well as developed for controlled of hamorrhage.

- Health providers involved in safe delivery practice including the paramedics can be easily trained in this procedure and can reduce maternal mortality to a great extent.
- If a readymade device with condom and plain rubber catheter can be made available in sterile packs (which should be cost effective) it would have been more applicable in all levels of health sectors.
- It is recommended to make large control trail of this type of study to control PPH to make this packing technique more acceptable and evidenced based thereby contributing to the safe delivery and safe motherhood programs of this country.

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