

Intrauterine Balloon Tamponade in the Management of Severe Postpartum Haemorrhage: Case Series from a Tertiary Care Hospital

Sudha R¹, Anjali R²

ABSTRACT

Introduction: Uterine balloon tamponade technology is nowadays popularly used to control post partum haemorrhage. Among various methods, Foley's catheter tamponade is simple, easy to use and is effective. The study evaluates outcome of Foley's catheter tamponade.

Material and Methods: In this prospective observational study, foley's catheter tamponade was applied to twelve cases with post partum hemorrhage of different severity, refractory to all pharmacologic measures. The efficiency of the Balloon Tamponade Technology in the management of severe PPH was assessed along with any complications.

Results: The foley's catheter tamponade stopped bleeding in all the cases. Only two cases showed evidence of sepsis.

Conclusions: Thus, foley's catheter tamponade is an effective method to control intractable PPH. It is an easy procedure which does not require expertise to use. Hence it proves to an invaluable tool, especially in places with low resource settings.

Keywords: balloon tamponade, intrauterine, post partum haemorrhage

INTRODUCTION

Obstetrical haemorrhage is a major contributor to worldwide maternal morbidity and mortality (MMM).^{1,2} Even with appropriate management, approximately 3% of vaginal deliveries result in severe postpartum hemorrhage. It is most common cause of maternal death worldwide and causes significant maternal morbidity in developed countries.³

Uterine atony is responsible for 80% of primary PPH. The rest are attributed to retained placental tissues, uterine rupture, lower genital tract trauma, consumptive coagulopathy etc.⁴

Presently Uterine Balloon Tamponade is being advocated by various guidelines for the management PPH after the exclusion of retained products and genital tract trauma.⁵ In these situations, the balloon is usually used as a form of treatment following the failed use of first line uterotonics such as oxytocin, ergometrine, misoprostol and prostaglandin F2 alpha. In studies successful balloon tamponade outcomes have been reported in the range of 80–100%.^{6,7}

We report twelve cases of failed medical treatment of primary postpartum haemorrhage secondary to uterine atony which were managed successfully with foley's balloon tamponade. The aim was to add to the existing knowledge of foley's balloon tamponade and also to recommend the training of all skilled birth attendants on how to insert the foley's catheter for uterine tamponade.

MATERIAL AND METHODS

This study was a prospective study done in the Department

of Obstetrics and Gynaecology, Mysore Medical College and Research Institute, Cheluvamba Hospital, Mysore from June 2016 to September 2016. All cases who underwent foley's balloon tamponade to control massive PPH during vaginal delivery, not controlled by medical management were included in the study. Data analysed included age, parity, onset of labour, delivery details, need of blood and blood products transfusion and final outcome including need for additional procedures and associated complications.

PPH is defined as >500 ml approximate blood loss after vaginal delivery or >1000 ml after caesarean section (CS).⁶ Diagnosis is confirmed to be atonic PPH after excluding uterine and cervical trauma, deficient coagulation or retained placental tissue. Initial management of atonic PPH was implemented immediately upon diagnosis, which included resuscitative measures, correction of hypovolemia, using suitable uterotonics, uterine massage and/or bimanual compression. All these measures were tried for half an hour before the cases were termed intractable to these measures. Thus, in these cases, foley's catheter tamponade was applied. In the majority of cases the decision for balloon insertion was made on the basis of active continuous hemorrhage despite conservative measures.

For PPH following vaginal delivery, the balloon was inserted transvaginally (using sponge holding forceps or manually into uterine cavity using ring forceps to hold the cervix). After insertion, the balloon was inflated with normal saline until resistance was felt or bleeding was controlled – usually from 50-100 ml in our study. In cases of atonic PPH, to keep the uterus well contracted over the balloon, oxytocin infusion was continued for a minimum of 4 hours. In all cases, as a rule the urinary catheter was left in situ for the duration of balloon tamponade in all and the patients vitals were closely monitored. Clinical success was defined as control of bleeding following balloon insertion without further intervention.⁴

During the procedure, a surgical team was kept stand-by ready for surgical intervention (laparotomy and other necessary measures). If the bleeding did not stop within half an hour of tamponade application, the method was termed unsuccessful and surgical intervention sought. Throughout the procedure, adequate antibiotic coverage was maintained along with oxytocin drip and vaginal packing, the condition of the patient

¹Associate Professor, ²Post Graduate Student, Department of Obstetrics and Gynecology, Cheluvamba Hospital, MMC and RI, Mysuru, India

Corresponding author: Anjali R, #30, "Meghamalanjali", 2nd cross, P and T Colony, Vidyanagara, Kurubarahalli, Bangalore – 560086, India

How to cite this article: Sudha R, Anjali R. Intrauterine balloon tamponade in the management of severe postpartum haemorrhage: case series from a tertiary care hospital. International Journal of Contemporary Medical Research 2017;4(1):93-96.

continuously monitored in the Intensive care unit, specially noting the amount of bleeding and any other complications.

STATISTICAL ANALYSIS

Data was analysed with Microsoft Excel 2007. To interpret the data, descriptive statistics like mean and percentages were used.

RESULTS

In the present study, 12 patients underwent balloon tamponade for the management of PPH not responsive to medical line of management. 5 cases (41.76%) were aged below 20 years, 1 patient was aged above 30 years (8.33%) and rest 6 cases (50%) were aged between 20-30 years (Figure 1). Most of them were primigravida – 11 cases (91.76%). 7 cases (58.33%) of the 12 cases were term gestations, 3 cases (25%) were preterm and 1 case (8.33%) was post-dated (Figure 2). The birth weight of the patients ranges from 1.2 kgs to 3.6 kgs. 4 cases (33.33%) had birth weight \leq 2.5 kgs, 3 cases (25%) had birth weight 2.5-3.0 kgs, 4 cases (33.33%) – 3.0-3.5 kgs and 1 case (8.33%) above 3.5kgs (Figure 3).

Only one case was a documented intra-uterine fetal demise, rest 11 (91.67%) babies cried immediately after birth and were by mother's side. 11 cases (91.67%) had atonic PPH, whereas one case (0.83%) had atonic and traumatic PPH. Duration for which the balloon was left in-situ varied from 14 – 40 hours; most of them were removed between 25-36 hours – 7 cases (58.33%). Removal of the balloon was a one step procedure in all these women. Balloon deflation was done under very close observation preferably in the day time. Where deflation time happened to be during late hours, for safety considerations, it was deferred to the following morning. There were no cases noted of re-bleeding after balloon removal. 5 cases (41.67%) were transfused with 1 pint PRBC and 3 cases were transfused with 2 pint PRBC (25%), rest 4 cases (33.33%) did not undergo any transfusion (Figure 4).

All were vaginal deliveries with 3 being induced deliveries for pre-eclampsia, PROM and intra-uterine fetal demise and one being instrumental delivery. One case had HELLP syndrome and another case had features of chorioamnionitis.

PPH was primary in all patients. In all cases balloon insertion was done to control intractable hemorrhage, not controlled by medical management and the bleeding stopped in all the cases within 15 minutes of tamponade application.

There were minimal complications associated with balloon tamponade and only two patients had evidence of sepsis and were given broad spectrum antibiotics.

DISCUSSION

Postpartum haemorrhage is an obstetric emergency and a leading cause of maternal mortality. The recommendation is a step-wise approach to management of post-partum haemorrhage from less invasive therapies like uterine massage and uterotonic drugs to more invasive ones like arterial embolization, uterine compression sutures, uterine artery ligation and ultimately hysterectomy.⁸

These procedures are invasive, involving laparotomy, requiring specialist expertise and are associated with significant morbidity. There is also the possibility of compromise of the future fertility. Interventional radiology provides a minimally invasive, fertility-preserving alternative but it is not easily

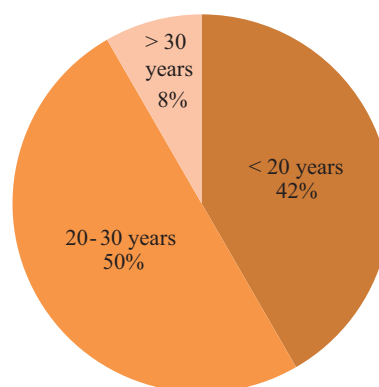


Figure-1: Age distribution of cases

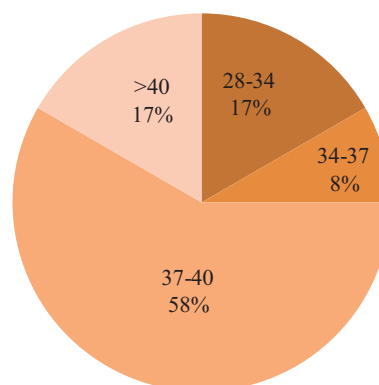


Figure-2: Distribution of cases as per gestational age

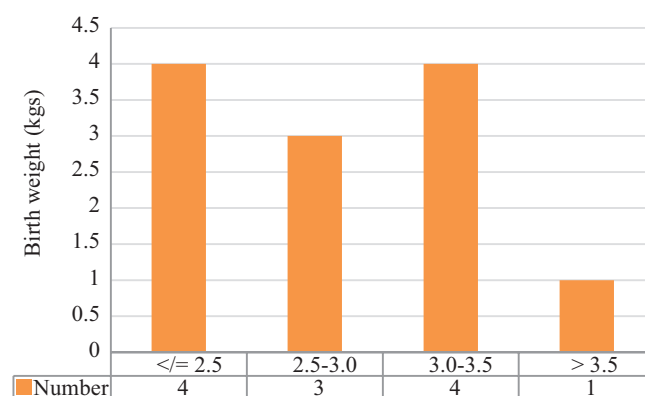


Figure-3: Distribution as per birth weight

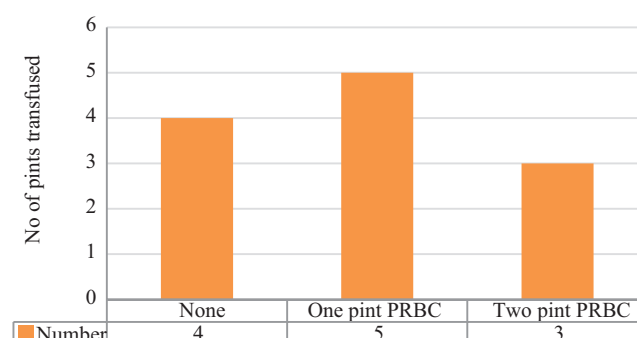


Figure-4: Post-procedure transfusion

available in most obstetric units as it requires special equipment and trained interventional radiologists.⁹

One of the earliest methods of achieving a tamponade effect to control PPH was by uterine packing.¹⁰ Uterine packing which was practised previously, has been abandoned in modern

obstetrics, due to the risk of uterine injury from blind insertion, infection and concealed hemorrhage. It has been replaced by Balloon Tamponade Technology (BTT). Balloon tamponade is a simple procedure that be easily performed by residents after adequate training. It is readily available in most units and has the advantages of immediate results, low cost and less morbidity.⁹ Goldrath was the first one to describe the successful use of a Foley catheter to tamponade acute profuse uterine bleeding in 17 of 20 patients in 1983.¹¹ A variety of devices have been used for uterine tamponade which include the Sengstaken-Blakemore tube, Bakri balloon, Rusch balloon, Foley catheter and the condom catheter balloon.⁹

The intrauterine balloon is considered to act by exerting “inward-to-outward pressure” that is greater than the systemic arterial pressure to prevent continual bleeding.¹² The presumed mechanism of action of the tamponade in stopping the bleeding is by creating an intrauterine pressure which exerts hydrostatic pressure on the capillaries and veins in the uterus. The pressure does not necessarily have to be higher than the systemic arterial pressure.^{13,14} In addition, hydrostatic pressure effect of the balloon on the uterine arteries has been proposed²⁰ and stimulation of uterine contractions by the balloon in the cervix has also been demonstrated.^{15,16}

Because the condom tamponade is meant for uterine atony, trauma as a cause of the PPH must be ruled out thorough thorough visual examination of the genital tract. That tamponade can be used to control bleeding even in the face of coagulopathy.⁸ Condoms do not allow for drainage of the uterine cavity. Even though some blood can flow over the surface of the condom into the vagina¹⁷, it is also possible for the blood to accumulate above the condom. There is therefore the need for close monitoring of the patient’s vital signs and the fundal height of the uterus to identify failure early and proceed with further treatment.⁸

A review of the many case reports, retrospective and prospective studies of balloon tamponade in the management of PPH done by Georgiou (2009) showed the procedure was successful in 97/106 (91.5%) cases.¹⁸ The Scottish Confidential Audit of Severe Maternal Morbidity (2009) identified 57 cases where balloon tamponade was used for the management of major PPH and hysterectomy was averted in 50 (88%) women with refractory PPH.¹⁹

Our study results show a success rate of similar order. As our hospital is a district general hospital, the population studied could be representative of the general population.⁹

In this study, bleeding stopped within 15 minutes at maximum, after insertion of condom tamponade, no further bleeding was noted after removal and thus no further intervention like laparotomy were required. Indeed, it is easily available, cheap, is easy to insert and take out, consumes less time, requires minimal anesthesia, and is less traumatic, needs no trained personnel, and acts immediately. Even if it does not work properly, it reduces blood loss and gives some time till surgical help becomes available. So, tamponade test can be performed in all the cases with failed medical means and maneuvers.

There are many studies on the use of intrauterine condom tamponade for management of Severe PPH. Dabelea et al reported 23 cases with postpartum hemorrhage unresponsive to medical therapy but managed successfully with intrauterine balloon tamponade.²⁰ Likewise, Airede LR et al reported

four cases of PPH due to uterine atony in which intrauterine tamponade with inflated condom stopped bleeding.²¹

Johanson R et al also supported tamponade method as innovative, simple and effective. They used Rüsçh urological hydrostatic balloon catheter. They reported two cases, in which medical therapy failed to control PPH, but the catheter worked and avoided further surgical interventions.²² Doumoouchtisis SK et al had similar results with balloon tamponade. They used Sengstaken-Blakemore Oesophageal Catheter (SBOC) on 27 cases of PPH not responding to medical management. Bleeding stopped satisfactorily among 22 of them, but five required surgical intervention – four had hysterectomy. They did not notice any significant complication of the procedure.²³ Among other forms of tamponade, Vitthala S et al used Bakri balloon tamponade with an effectiveness of 80%.²⁴

Marcovici I et al also found high efficacy of intrauterine inflated Foley’s catheter balloon for tamponade. They reported one case of profuse hemorrhage following evacuation of 17 week fetus, controlled with intrauterine balloon tamponade.²⁵

In our study, removal of the balloon was at the discretion of the attending physician and it was noted that the balloon was inflated for an average of 28 hours before removal. Studies by G. S. Condous et al. and J. Seror et al. quote similar results and duration of balloon tamponade in their studies was an average of 26 hour, 14 minutes and 30 hours respectively.^{26,27}

Time is of essence in the management of PPH. Most PPHs occur without any risk factor and in the absence of effective medical intervention patients with PPH on the average die within 2 hours. It is therefore imperative for every skilled birth attendant to be able to proceed to a second line of treatment such as putting in a condom tamponade when medical treatment fails.⁸

One of the significant limitation of our study is its lack of a control group. Another limitation is the estimation of total blood loss and use of balloon catheters was at the discretion of the attending physician.

CONCLUSION

Our study concludes that balloon tamponade is an effective means of controlling severe PPH with success rates of 100%. At times when PPH do not respond to pharmacologic measures, foley’s intra-uterine tamponade would be an emergency life saving procedure, especially in low-resource settings. As this technology avoids the need for further interventions including invasive surgical procedures like hysterectomy, it reduces the hospital stay and recovery period and hence it proves to be cost effective. Further studies are needed to standardize the ideal volume of fluid for balloon inflation, need for concurrent oxytocin infusion with dosage, duration of balloon tamponade and whether to be removed in single step or multiple steps; their merits and demerits.

REFERENCES

1. Lalonde A, Daviss BA, Acosta A, Herschderfer K. Postpartum haemorrhage today: ICM/FIGO initiative 2004–2006. *Int J Gynaecol Obstet.* 2006;94:243–253.
2. World Health Organization. Attending to 136 million births, every year: Make every mother and child count: Chapter 4: Risking death to give life. *The World Health Report 2005.* Geneva: WHO, 2005.
3. Chouristos Georgiou. A review of current practice in using

- Balloon Tamponade Technology in the management of postpartum Haemorrhage. *Hypertens Res Pregnancy*. 2014; 2:1–10.
4. John S, Seang LT et al. Post partum uterine atony. *Progress in obstetrics and Gynaecology*. 2007;17:264-74.
 5. Royal College of Obstetricians and Gynaecologists Green-top Guideline No. 52. Prevention and management of postpartum haemorrhage. London: RCOG, 2009.
 6. Doumouchtsis SK, Papageorghiou AT, Arulkumaran S. Systematic Review of Conservative Management of Postpartum Hemorrhage: What to Do When Medical Treatment Fails. *Obstet Gynecol Surv*. 2007;62:540–547.
 7. Georgiou C. Balloon tamponade in the management of postpartum haemorrhage: a review. *BJOG*. 2009;116: 748–757.
 8. Maya et al. Condom Tamponade in the Management of Primary Postpartum Haemorrhage: A Report of thource cases in Ghana. *African Journal of Reproductive Health* 2015;19:151-157.
 9. S. Tirumuru et al. Intrauterine balloon tamponade in the management of severe postpartum hemorrhage: A case series from a busy UK district general hospital *Open Journal of Obstetrics and Gynecology*. 2013;3:131-136.
 10. Georgiou, C. Balloon tamponade in the management of postpartum haemorrhage: A review. *British Journal of Obstetrics and Gynaecology*. 2009;116:748-757.
 11. Goldrath, M.H. Uterine tamponade for the control of acute uterine bleeding. *American Journal of Obstetrics and Gynecology*. 1983;147:869-872.
 12. Ishii, T., Sawada, K., Koyama, S., Isobe, A., Wakabayashi, A., Takiuchi, T., et al. Balloon tamponade during cesarean section is useful for severe post-partum hemorrhage due to placenta previa. *Journal of Obstetrics and Gynecology Research*. 2012;38:02-07.
 13. Georgiou C. Balloon tamponade in the management of postpartum haemorrhage: a review. *BJOG*. 2009;116:748–57.
 14. Sinha SM. The "tamponade test" in the management of massive postpartum hemorrhage. *Obstet Gynecol*. 2003; 102:641.
 15. Cho Y, Rizvi C, Uppal T, Condous G. Ultrasonographic visualization of balloon placement for uterine tamponade in massive primary postpartum hemorrhage. *Ultrasound Obstet Gynecol*. 2008;32:711–3.
 16. Yorifuji T, Tanaka T, Makino S, Koshiishi T, Sugimura M, Takeda S. Balloon tamponade in atonic bleeding induces uterine contraction: attempt to quantify uterine stiffness using acoustic radiation force impulse elastography before and after balloon tamponade. *Acta Obstet Gynecol Scand*. 2011;90:1171-2.
 17. Bagga R, Jain V, Sharma S, Suri V. Postpartum hemorrhage in two women with impaired coagulation successfully managed with condom catheter tamponade. *Indian J Med Sci*. 2007;61:157–8.
 18. Doumouchtsis SK, Papageorghiou AT, Arulkumaran S. Systematic review of conservative management of postpartum hemorrhage: What to do when medical treatment fails. *Obstet Gynecol Surv*. 2007;62:540–7.
 19. World Health Organization (WHO). *World Health Report 2005: make every mother and child count*. 2005. Geneva, Switzerland: World Health Organization.
 20. Dabelea V, Schultze PM, Duffie RS Jr. Intra uterine balloon tamponade in the management of postpartum hemorrhage. *Am J Perinatol*. 2007;24:359-64.
 21. Airede LR, Nnandi DC. The use of the condom–catheter for the treatment of postpartum hemorrhage. *Trop Doct*. 2008;38:84-6.
 22. Johanson R, Kumar M, Obharai M, Young P. Management of massive postpartum hemorrhage: use of a hydrostatic balloon catheter. *BJOG*. 2001;108:420-2.
 23. Doumouchtsis SK, Papageorghiou AT, Vernier C, Arulkumaran S. Management of postpartum hemorrhage by uterine balloon tamponade: prospective evaluation of effectiveness. *Acta obstet Gynecol Scand*. 2008;87:849-55.
 24. Vitthala S, Soumpou I, Anjum ZK, Aziz NA. Use of Bakri balloon in postpartum haemorrhage: A series of 15 cases. *Aust NZ J Obstet Gynaecol*. 2009;40:191-4.
 25. Marcovici I, Scoccia B. Post partum hemorrhage and intra uterine balloon tamponade. *J Reprod Med*. 1999;44:122-6.
 26. Condous, G.S., Arulkumaran, S., Symonds, I., Chapman, R., Sinha, A. and Razvi, K. The “tamponade test” in the management of massive postpartum hemorrhage. *Obstetrics and Gynaecology*. 2003;101:767-772.
 27. Seror, J., Allouche, C. and Elhaik, S. Use of Sengstaken-Blakemore tube in massive postpartum hemorrhage: A series of 17 cases. *Acta Obstetrica et Gynecologica Scandinavica*. 2005;84:660-664.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 15-12-2016; **Published online:** 27-01-2017