

Glove Tamponade for Atonic Postpartum Haemorrhage using Glove band.

¹Dr Shankar Ram HS, ²Dr Sandhya Ram

¹MS FMAS DMAS FAGE Department Of Minimal Access Surgery (Obstetrics and Gynecology)

²DA Department of Emergency and Anesthesia .

^{1,2}Sandhyaram Hospital, Kadampazhipuram Palakkad Kerala India 678633

Abstract: Introduction: Balloon tamponade is effective and recently included in armamentarium of management of PPH. Condom tamponade is also popular and widely used in low resource setting. We introduced in this study, tamponade with glove and glove band using the same principles.

Methods: Tamponade with glove using both pneumatic and hydrostatic method was studied in 2 cases. Glove bands are used to tie the gloves to Ryles tube with stilette inside which was used for inflation and facilitate placement. The device appears similar to uterine thermal balloon. After inflation When tamponade test was positive, the vagina was packed and Ryles tube with stilette is folded and strapped at the introitus. Drainage channel was attached to glove end. Double glove was used in pneumatic tamponade. Stethoscope tubing was used as y-connector with dial pressure meter and BP apparatus inflator.

Results: Hemostasis was achieved in all 2 cases. The device could be placed successfully and immediately after opening the prepared kit and there was no incidence of air or saline leak and no popping-out /prolapse or bursting of the glove. There were no complications or mortality.

Conclusion: Hydrostatic tamponade needs longer time especially when double gloves are used. Single glove serves the purpose well. The action of pneumatic glove tamponade is effective and instantaneous. We recommend this when the blood loss is marked in atonic PPH and there is lack of time. The device is simple, cheap, made with easily available materials and can be safely applied. Glove band prevents leakage of saline as well as air effectively without occlusion of the ryles tube lumen.

Key Words: pneumatic, hydrostatic, glove tamponade, PPH, Glove band

I. Introduction:

Effective packing is recognized for control of bleeding in surgical hemorrhage. Bleeding from the presacral plexus after abdomino perineal resection and decortication thoracotomy bleeding respond well to packing. Use of Foley catheter in control of hemorrhage from prostate plexus after TURP, after hemorroidectomy and for PPH is well known and work on the same principles.

Balloon Tamponade has been recently added in the armamentarium of management of atonic PPH. A balloon tamponade may arrest or stop bleeding in 77.5% to 88.8% or more cases without any further need for surgical treatment (Lalonde, FIGO 2006: 246) .[1 -4]. It also involves the hydrostatic pressure effect of the balloon on the uterine vessels. Measures like external aortic compression, anti shock garments, bimanual compression are often combined with medical and surgical management.

Uterine atony or floppy uterus is the major cause of PPH. In an already anaemic women, a trivial loss of blood can amount to impending death. Uterine balloon has been used for trial in Africa, after which condom tamponade had evolved and was widely used in low resource setting. Tamponade 'buys time' and prevents impending disaster [5]

Many catheters and balloons has been used before. El Menia with air inflation and hydrostatic balloons like Bakri, BT cath, Foley, Sengstaken Blakemoore, BP cuff in glove [6] have been used. Various descriptions describe filling the balloons until bleeding is controlled. This tamponade test is considered 'positive' if control is achieved following inflation of the balloon. A 'negative' tamponade test suggests that further management, such as laparotomy, or an early course to hysterectomy is necessary[1] Instrument design is based on surgical glove using similar principles which is capable of pneumatic as well as hydrostatic tamponade.

II. Methods, Principle, Design And Technique :

Gloves, Ryles tube, Stethoscope tubing, BP apparatus inflator, semiflexible stilette or endotracheal tube stilette or a sterilized cycle spoke are the materials used. The stilette is fed in to the Ryles tube from the side hole near the tip. Glove is tied to the ryles tube with glove bands. The upper end of the inner glove is freely tied. If air is used for inflation, a second glove(double) is applied. The lower end is tied such that it lies above the level of cervix when placed and inflated.

The introduction of device is similar to endotracheal intubation. Stilette holds and helps to negotiate the glove. If stilette is not readily available, the glove is held with sponge holder and introduced. The uterine cavity in postpartum is flattened, oval and retroverted.[7] However during atonic PPH, the device can be inserted easily. The glove band is tied to fix the glove. Another layer of glove (larger than ½ inch size) prevents leak absolutely. To one end of stethoscope y-connector tubing, the BP pressure gauge is connected and the other arm is fixed to Ryles tube. The tail end is fitted to inflator. Pressure can be monitored each time the glove is inflated.

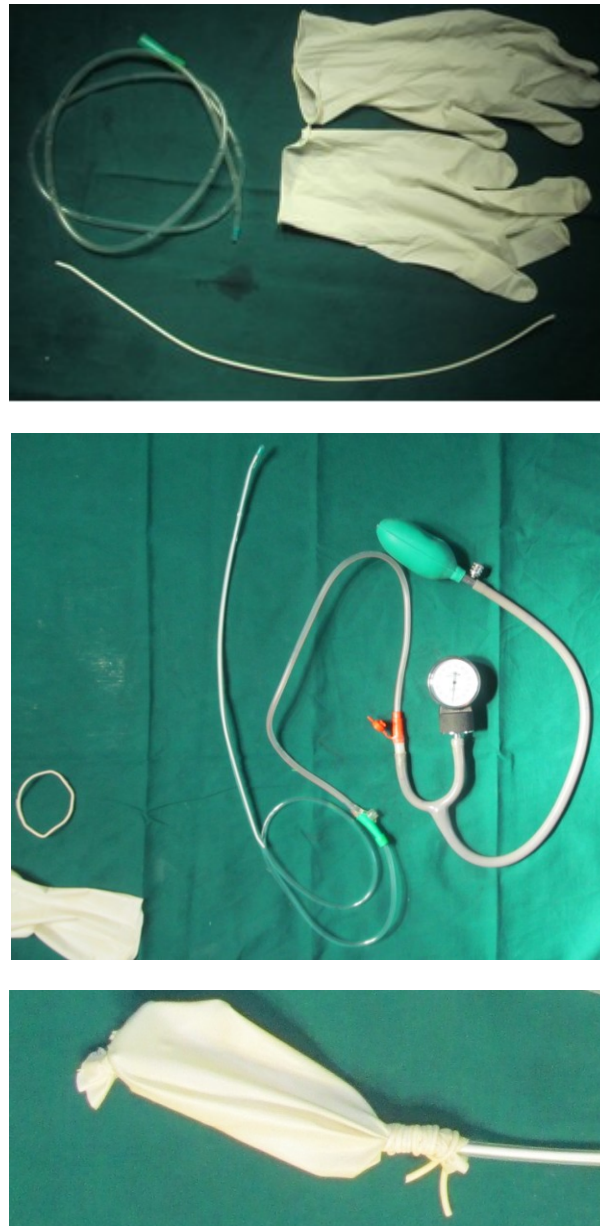


Figure 1. Components of glove tamponade device which include a pair of gloves, Ryles tube, drainage channel tube, stethoscope y-tubing, sphygmomanometer dial with inflator. Glove bands are separated from the gloves and stilette is fitted to the ryles tube by introducing inside through the opening near the tip and pushed to the bead.



Figure 2: Glove band used to tie the glove to the Ryles tube with stillette is being tested for leak with double glove and single glove in saline. Hydrostatic method demonstrated here is similar to condom tamponade. Glove tamponade Kits are made for at least 2 or 3 sets which is kept prepared and sealed for ready use.



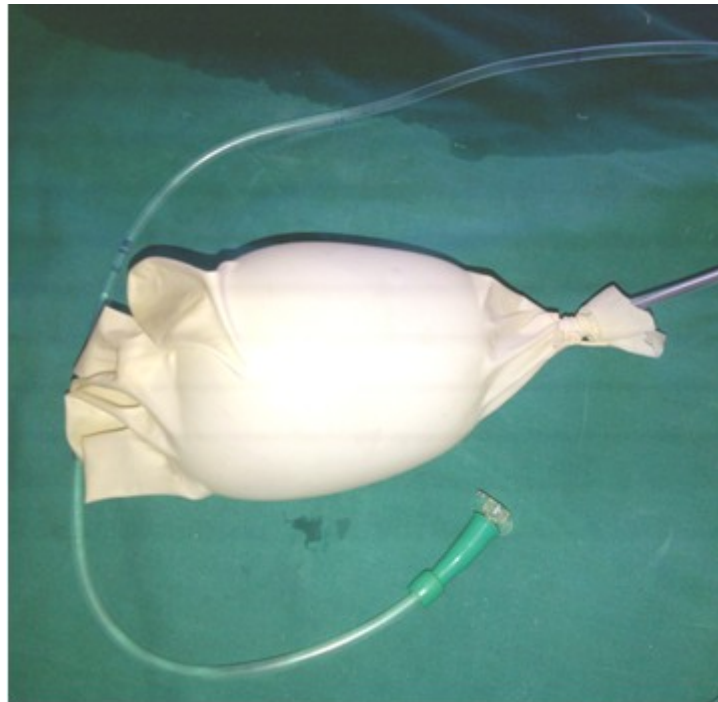
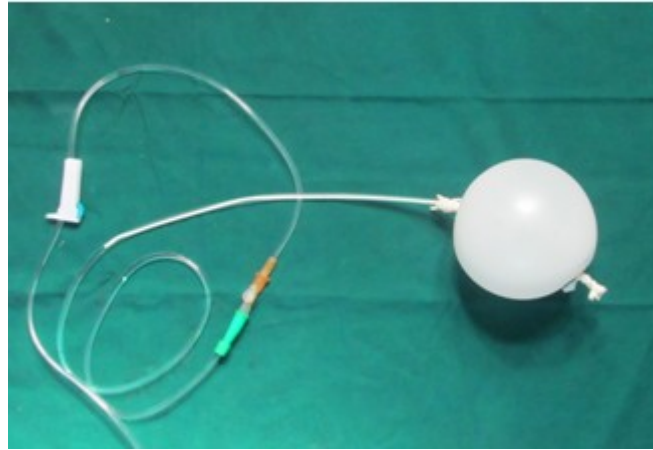




Figure 3 : Demonstration of inner glove inflation and also with outer glove with pneumatic as well as Hydrostatic method..The glove takes the shape of gravid uterus like a fish. Also shown is the placement of drainage channel.

Stillette give pin cushion effect and transmits the pressure to the fundus on pushing further. The fundus of the uterus can be felt with the stillette. Stillette acts like a valve and prevents air leak. Handling the stillette ensures glove does not “pop” out as it is filled. The stillette is folded at the introitus and strapped after packing vagina. The device is inflated within seconds and the job is done with immediate effect. Depending the size of uterus the size of the glove can be adjusted on the stillette. It prevents prolapse while inflation and helps to hold the glove in uterine cavity. Inflation till pressure about normal human systolic pressure is recommended (preferably less than 140 mm Hg as described by El Menia et al) [8].

Through Ryles tube the glove can also be filled with saline. If double glove is used, the glove needs to be inflated with 50 cc syringe as more pressure is required for inflation and also time as well. The device can be combined with a drainage channel like ICD tube, large Foley, or malecots catheter or urosac bag tubing with fenestrations. Vital parameters and drainage was monitored during the entire procedure.

III. Results:

In our pilot study, there were two cases with successful outcome.

Case 1: Atonic PPH managed with pneumatic glove tamponade with drainage channel (ICD tube tied to upeer glove band.). The device was introduced within 2 min from opening the kit. Hemostasis was achieved as soon as pressure was inflated to 90 mm Hg within 15 seconds. The device was kept for 6 hrs and deflated gradually and removed.

Case 2: Hydrostatic glove tamponade in grand multipara with preterm pre-eclampsia with IUD (intrauterine death) and moderate PPH with single glove for 12 hrs with gradual deflation of balloon over 3hrs.

IV antibiotics and oxytocics were administered in all cases and urinary bladder was catheterized .

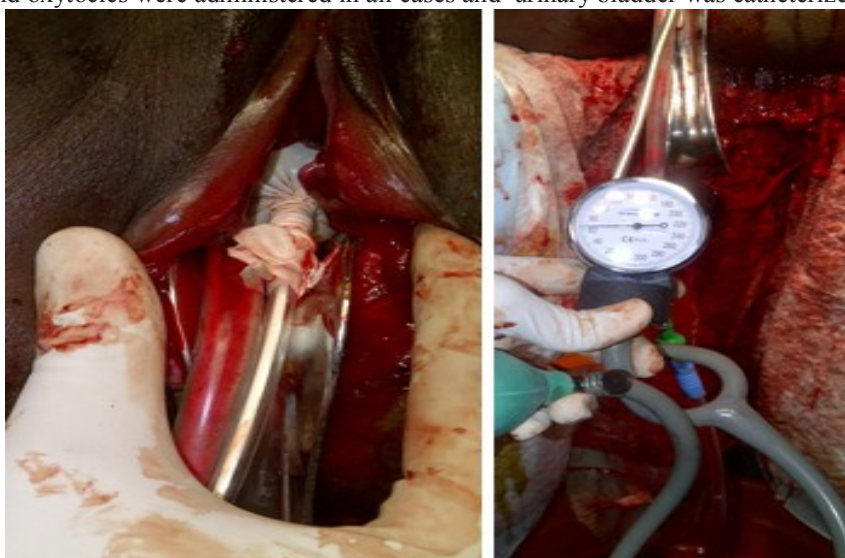


Figure 4: Placement of pneumatic glove tamponade in case 1. Glove bulge is seen through introitus after positive tamponade test and the dial showing the pressure.

IV. Discussion:

The armamentarium for Management of PPH includes simple measures like Cervix clipping.[9]. For the first time pneumatic balloon tamponade was demonstrated safe and effective by El Menia et al. Cervical encircage was done in their case series and with a special balloon. We have introduced the glove and also stillette with glove bands with Ryles tube, keeping the same principles in a low resource setting. Instead of Foley catheter, a Ryles tube was used in our study and cervical encircage was not done. Foley catheter was avoided since a little extra tightening of band or suture material causes occlusion of the foley lumen. At the same time if the knot is suboptimal in tension there is chance of slippage while inflation.

Our device configuration is cheap. The simplest configuration is a glove and Ryles tube tied with a glove band which can be made quickly & can be even blown to inflate safely. The use of glove band ensures leak proof and also permits the passage of air or fluid without occluding the lumen of Ryles tube and hence used for pneumatic tamponade. Unlike condom which might slip off the Foleys or leak over silk suture, the glove band is very effective and easy to apply. However Application of glove band on Foley catheter easily occludes the lumen and not that of ryles tube. We recommend use of glove band for fixing plastic or latex materials and prefer ryles tube for tamponades in PPH.

For the inflation device which is connected, it is observed that pressure over 200 mm Hg the inner glove will burst. Leak can be checked after inflation and keeping the glove in tray of saline. In-vivo a pressure of 20 mm hg without tamponade is enough for the expansion of the entire glove. Air initially can later be filled with saline. Inflation is done till bleeding stops and pressure is kept at optimum in two digits. 140 mmHg is the max limit as described by El-Menia et al. We recommend to use sterile new gloves always which are readily available.

These equipment are easily available, cost effective and sterile. The learning curve is very short and is simple to operate. This is suitable for low resource settings and in emergency can be used by trained midwives especially the hydrostatic method. PPH kit should contain (sterile)- pair of gloves of appropriate size, stillette, glove bands, ryles tube and drainage channel. Connecting set is made of stethoscope tubing which acts like Y connector, BP dial, and connector for Ryles tube. The junctions can be sealed with Opsite in case of any leak.

The ultimate aim is to save mother from succumbing to PPH and make every mother and child count. It is that critical moment to put in all the possible efforts which ever possible to prevent this horrendous mortality one way or the other. No wonder that many more methods (simple or complex) are always evolving everyday to overcome this tragedy. Death following PPH remains a major cause of maternal mortality in developing countries and developed as well. The appropriateness of response within 10 minutes of the onset of PPH has been shown to be critical to ensuring a successful outcome and minimizing adverse events with 80 percent of the deaths are clearly avoidable. [10-12].

V. Conclusion:

Our simple technique of glove tamponade will be helpful to allow adequate time for temporary stabilisation till definite arrangements and procedures are accomplished. Clinical drills, training, team work and prophylactic intervention trials will improve the preparedness and outcome in combating PPH. The Golve band ensures leak proof without slippage as well as compression of the ryles tubing during the procedure.

References:

- [1]. C Georgiou. Balloon tamponade in the management of postpartum haemorrhage: a review. BJOG 2009;116:748-757.
- [2]. Delalnde JP, Hay JM, Fingerhut A, Kohimann G, Paquet JC: Perineal wound management after Abdominoperineal rectal excision for carcinoma with unsatisfactory hemostasis or gross septic contamination: primary closure vspacking. A multicenter controlled trial. French Association of Surgical Research. *Sis Colon Rectum* 1994;3:890-896.
- [3]. Papalambros E, Felekouras E, Sigala F, Kiriakopoulos A, Giannopoulos A, Assessopos A, Bastounis E, Mirilas P et al. *Zentralbl Chir.* 2005 Jun;130(30):270-3
- [4]. Caceres M, Buechter KJ, Tillou A, Shih JA, Liu D, Steeb G. Thoracic packing for uncontrolled bleeding in penetrating thoracic injuries. *South Med J.* 2004 Jul;97(7):637-41.
- [5]. Nelson BD, Stoklosa H, Ahn R, Eckardt MJ, Walton EK, Bruke TF. Use of balloon tamponade for control of post-partum hemorrhage by community based health providers in Sudan. *Int J Gynecol Obstet.* 2013 ;122(1):2-32.
- [6]. Fawcus S, Moodley J. Management of Postpartum Hemorrhage. *SAJOG* 2011;(17):26-27
- [7]. Mulic-Lutvica A¹, Bekuretsion M, Bakos O, Axelsson O. Ultrasonic evaluation of the uterus and uterine cavity after normal, vaginal delivery. *Ultrasound Obstet Gynecol.* 2001 Nov;18(5):491-8.
- [8]. Sotan MH, Mohamed A, Ibrahim E, Gohar A, Ragab H, El-Menia Air Balloon in controlling Atonic Postpartum Hemorrhage. *International Journal of Health Sciences, Qassim University.* 2007 ;1:53-59.
- [9]. Matsubara S. Available hemostatic measures for postpartum hemorrhage in rural settings. *Rural and Remote Health* 12:2248
- [10]. Tirumuru S, Saba S, Morsi H, Muammar B. Intrauterine Baloon tamponade in the management of severe postpartum hemorrhage : A case series from a busy UK district Hospital. *Open Journal of Obstetrics and Gynecology.* 2013;3:131-6
- [11]. Barbieri RL. Have u made best use of the Bakri balloon in PPH? *OBG management.* 2011;23:7.
- [12]. Baskett TF. Preparedness for Postpartum Hemorrhage : an Obstetric Hemorrhage equipment Tray. Chapter 37. A comprehensive text book of Postpartum Hemorrhage. 2nd edn. FIGO. pp 314-316.