

Original Research Article

Glove balloon uterine tamponade for post-partum haemorrhage: indigenous, readily available, cheap, easy to learn and practice, yet effective

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Received: 17 December 2020

Accepted: 15 January 2021

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ABSTRACT

Background: Postpartum haemorrhage (PPH) is still a nightmare in obstetrics. It is the leading cause of maternal mortality and morbidity accounting for one quarter of the maternal mortality worldwide. In a simple language, we can say PPH is allowing the delivered woman to bleed till death. Uterine atony is the cause in 80% of cases.

Methods: This study is conducted in a tertiary care and teaching hospital between May 2019-2020. There were 5400 vaginal and 2100 caesarean sections conducted in our institute in the study period. 20 patients who underwent vaginal delivery and 12 patients of caesarean section had PPH. Only one patient had unsuccessful glove tamponade who underwent stepwise devascularisation for her survival. Hence the success rate of glove tamponade in our institute is found to be 95% (n=19).

Results: We chose glove as it is simple, safe, least invasive, rapidly made without any expertise, non-irritant, doesn't rupture easily, doesn't slip and cost effective. We have manually tried out the capacity of the glove and found to be enormous, of 10 litres. After a successful insertion of glove tamponade, it is left *in situ* for 24 hours in our study.

Conclusions: In this era of advanced medical services, it is annoying to say women still die of postpartum haemorrhage. Timely intervention (medical or surgical) in the golden hour can bring back many mothers back to life.

Keywords: Postpartum haemorrhage, Stepwise devascularisation, Glove tamponade

INTRODUCTION

Postpartum haemorrhage is still a nightmare in obstetrics. It is the leading cause of maternal mortality and morbidity accounting for one quarter of the maternal mortality worldwide.¹ In a simple language, we can say PPH is allowing the delivered woman to bleed till death. Any pregnant woman can land up in haemorrhage being a part of natural phenomenon and this can be absolutely prevented.

Postpartum haemorrhage is defined as any amount of blood loss causing potential hemodynamic instability to the mother.² The traditional definition says bleeding >500

ml in vaginal delivery and >1000 ml in caesarean section within first 24 hours of birth of the baby.

Uterine atony is the cause in 80% of cases; the rest is due to retained tissue, lower genital tract trauma, uterine rupture and coagulopathy.³ While all the patients undergo active management of third stage of labor, the first line of management of uterine atony follows use of uterotonics, bladder drainage, bimanual uterine massage, aortic compression and the second line follows intrauterine balloon tamponade, uterine arterial embolization and surgical procedures such as uterine compression sutures, stepwise devascularisation and peripartum hysterectomy. There is no significant difference in success rates between the 4 procedures.⁴

World health organization (WHO), the international federation of gynaecology and obstetrics, Royal college of obstetrics and gynaecology, all recommend a uterine balloon tamponade if uterotonics and uterine massage fail to arrest the bleeding.⁵

Dr Younes Bakri introduced Bakri balloon tamponade, the first intrauterine tamponade system for the treatment of PPH in the year 1999.⁶ This device is FDA approved. The other devices are: condom catheters, BT-Cath, ESM-UBT (every second matters-uterine balloon tamponade), Ebb balloon and Zhukovskyballoon.⁷⁻¹¹

The devices that have been used but not intended for this purpose are:¹²

Sengstaken-Blakemore tube for treatment of bleeding oesophageal varices, single or multiple Foley's catheter for bladder drainage, by Golrath in 1983, Rusch urological balloon for stretching the bladder, Condom catheter.

The non-availability and unaffordability of these devices in resource poor settings is their major drawback.

Hence, we would like to emphasize on this method of glove tamponade which was found successful in the patients of our institute.

METHODS

This study is conducted in a tertiary care and teaching hospital between May 2019-May2020.

Active management of third stage of labour is performed to all the patients who deliver in our institute as a prophylaxis against PPH. If uterine atony persists, uterotonics (injection oxytocin 20 IU in 500 ml of ringer lactate at 40-60 drops per minute, injection methyl ergometrine 0.2 mg (IM), injection prostaglandin F2a 250 microgram (IM) are given (if not contraindicated) and bimanual uterine massage is simultaneously started. We do not wait till the complete schedule of uterotonics is given as time is of utmost essence here. We always have a PPH tray in labour room ready, with a sterile glove tamponade made ready and kept in it. If not, assembling a glove tamponade would take 30-60 seconds approximately. The decision to proceed with balloon tamponade is made based on the patients' vitals, hemodynamic stability and blood loss. Before the patients shows signs of DIC, glove tamponade is secured in utero.

Inclusion criteria

Inclusion criteria included all the patients delivered in our institute and landed up in atonic postpartum haemorrhage and had failure of action of uterotonics and bimanual uterine massage. Patients delivered in some other hospitals and referred to our institute for the management of PPH.

Exclusion criteria

Exclusion criteria excluded traumatic PPH, congenital anomaly of uterus (identified with prior ultrasound reports), clinical evidence of chorioamnionitis and retained placenta.

Statistical analysis is done in Microsoft excel.

The making of the glove tamponade

A written informed consent is taken. Clinically make sure that there is no retained tissue or trauma to genital tract.

In step 1- A sterile 6.5 or a number 7 latex glove (as per the availability) is taken. In step 2- the sleeve end of the glove is closed by tying a knot manually. Step 3- Included the tip of the middle finger of the glove is cut; a sterile plastic tube with a large bore (we prefer nasogastric tube) is inserted into this making sure all the openings of the nasogastric tube are inside the glove. The proximal end of the urobag tube can also be used. Infant feeding tube has too small lumen for the flow of fluid and foleys catheter kinks when tied. Hence, we avoid them. Step 4- After removing the air in the glove, the nasogastric tube is tied to the glove using the index and ring finger of the glove and secured tight. Thread is also not required. For step 5-This is now inserted into the uterine cavity using sponge holding forceps transvaginal making sure the sleeve ends manually secured knot is towards the fundus and the nasogastric tube is towards the cervix. A phantom application is not required as it just wastes time. In step 6- The sterile fluid kept at room temperature is connected to this nasogastric tube via a drip set and the glove is filled with the fluid. The infusion stand is kept at a height of approximately 4.5 feet above the ground. The amount of fluid in the balloon is documented. Step 7- The flow of the fluid will be stopped once we see a back flow of the fluid. The nasogastric tube is clamped and stuck to inner aspect of her thighs. A pack is kept per vaginum (preferably in the posterior fornix) only if we find the glove tamponade may slip through the dilated cervix. (Figure 1 shows the making of glove balloon uterine tamponade).

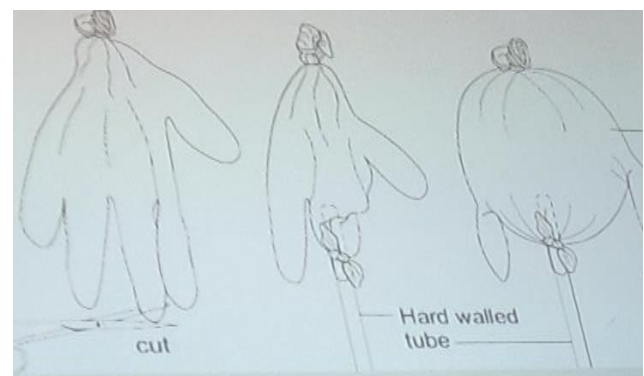


Figure 1: The making of glove balloon uterine tamponade.

If bleeding even after glove tamponade insertion persists, it is said to be unsuccessful and surgical intervention will be proceeded with.

Removal of the glove tamponade

One pint blood and uterotonics are kept ready prior to deflate the balloon tamponade. The deflating is done after 24 hours of insertion. Deflate the balloon at the rate of 100 ml per 15 minutes with a vigilant watch over vitals and bleeding per vaginum. If bleeding persists the balloon is refilled back and uterotonics are given. In the absence of bleed, the remaining volume of fluid and balloon are gradually removed. The glove tamponade is for one time use only.

The date and time of insertion and deflation of the balloon tamponade is documented. The patient is observed for the next 24 hours for episodes of bleed.

RESULTS

There were 5400 vaginal and 2100 caesarean sections conducted in our institute in the study period. 20 patients who underwent vaginal delivery and 12 patients of caesarean section had PPH. All the patients who had PPH after vaginal delivery underwent glove tamponade after uterotonics and uterine massage were at vain. For the 12 patients who had PPH intra-operatively in caesarean section, we found doing uterine compression sutures and/or stepwise devascularisation to be less time consuming and more convenient than glove tamponade. Hence, glove tamponade in caesarean section PPH is not routinely done in our institute. Focussing on the 20 patients who underwent balloon tamponade, 6 (30%) had delivered in other health centres or private hospitals and referred to our hospital for the management of PPH. 3 (15%) were un-booked cases. 5 patients (25%) underwent induced vaginal labour whereas 15 (75%) had spontaneous vaginal delivery. The mean age group in our study is 23 years, ranging between 19-27 years. The most important predisposing factors for postpartum haemorrhage in our study is found to be preeclampsia/eclampsia (n=14, 70%). 9 patients had added complications like, 5 patients had DIC, 2 had multisystem involvement and 2 had (PRES) posterior reversible encephalopathy syndrome seen in their postpartum period. All the 20 patients were in need of blood and/or blood products. The patients who were critically ill received inotropic and ventilator support in intensive care unit (n=11, 55%).

Only one patient had unsuccessful glove tamponade who underwent stepwise devascularisation for her survival. Hence the success rate of glove tamponade in our institute is found to be 95% (n=19). One patient of uterine inversion was managed with manual reposition of uterus with glove tamponade. A patient had vaginal lacerations with atonic PPH, underwent vaginal exploration with glove tamponade. Another patient with

retained placenta had manual removal of placenta and glove tamponade done for her atonic PPH. Both the above patients were discharged successfully on day 3. One patient of ante-partum eclampsia with placental abruption with who underwent glove tamponade had her haemorrhage successfully arrested but landed up in acute renal failure requiring dialysis and hence was referred to higher centre. 3 patients (15%) of acute fatty liver of pregnancy (AFLP) succumbed due to hepatic encephalopathy and not due to haemorrhage. The rest (n=16, 80%) were discharged successfully.

DISCUSSION

We chose glove as it is simple, safe, least invasive, rapidly made without any expertise, non-irritant, doesn't rupture easily, doesn't slip and cost effective (retail price 60 rupees). It is an effective procedure which avoids invasive procedures and their morbidity. We have manually tried out the capacity of the glove and found to be enormous, of 10 litres (glove no. 7). Not many studies regarding glove tamponade to arrest primary postpartum haemorrhage is seen in the world.

Soon after the separation of placenta, the myometrium arranged in a criss-cross fashion clamp the perpendicularly traversing blood vessel through it. Hence, the name living ligature. In case of uterine atony, this mechanism is lost and the vessels pour into the uterine cavity leading to postpartum haemorrhage. The glove tamponade can arrest bleeding from upper segment due to uterine atony and from the lower segment due to placental implantation. The glove tamponade acts by exerting an inward to outward pressure within the uterine cavity which is greater than the systemic arterial pressure.¹² It stimulates a contractile response of the uterine musculature secondary to stretching of the uterine muscles. The tamponade effect acts distally by compressing the uterine arteries and at the balloon-endometrial interface it promotes clot formation. It is very important to place the tamponade as early as possible as it becomes ineffective once coagulopathy sets in. This is because the procedure works by facilitating the blood in the uterine vessels to clot and stop further bleed.¹³

After a successful insertion of glove tamponade, it is left *in situ* for 24 hours in our study. Broad spectrum antibiotic is given for 3 days. Blood and blood products as per the need are transfused. The patient is given oxygen supplementation. Vitals are checked hourly and patient is shifted to obstetric intensive care unit. Oxytocin infusion is continued to 3 hours postpartum. The above said is almost similar to the study by Nalini et al.¹⁴ After removal of the balloon tamponade we did not encounter any cases of re-bleeding. When compared to other sophisticated balloon devices, our glove tamponade doesn't have drainage system. There is no much disadvantage due to this as balloons claiming drain tracks tend to block. As such there is enough interface (utero-

balloon) to allow seepage of blood into the vagina to prevent concealment.

Advantages of our method are-All the necessities are readily available in labour room, the training is quite easy, there is auto filling of the glove i.e., no repeated syringe is required), No procedure related blood loss, Simplicity and rapidity and minimal anaesthesia (sometimes not needed too).

CONCLUSION

In this era of advanced medical services, it is annoying to say women still die of postpartum haemorrhage. Timely intervention (medical or surgical) in the golden hour can bring back many mothers back to life. We were successful in doing this with no much cost or expertise. We are sure if this is followed worldwide, the deaths due to postpartum haemorrhage will not be heard one fine day.

ACKNOWLEDGEMENTS

Author would like to acknowledge Dr Arun Mahale for his support and guidance throughout.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Tasneem F, Sharma VM. Glove balloon uterine tamponade for post-partum haemorrhage: indigenous, readily available, cheap, easy to learn and practice, yet effective. Int J Res Med Sci 2021;9:538-41.