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# An inflatable surgical glove to control postpartum bleeding to prevent caesarean hysterectomy.

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**BACKGROUND:**
Bleeding after delivery (PPH) is the main source of maternal mortality around the world. Every year, around 14 million women experience PPH, bringing about around 70,000 maternal deaths worldwide. In any event, when ladies get by, they frequently need some urgent mediation to control the bleeding and might be left with long-lasting reproductive handicaps[1].

**OBJECTIVES**: To assess the effectiveness of introducing glove-uterine tamponade (GUT) for postpartum hemorrhage management.

**OUTCOME:** Glove uterine tamponade effectiveness, additional surgical intermediations (artery ligations, compressive sutures) or, hysterectomy, and maternal mortality

**METHODOLOGY:**
**DESIGN: Comparative Cross-sectional.**
**SETTING: MCH PUMHS, OBSTETRICS & GYNECOLOGY WARD UNIT I.**
**SAMPLING TECHNIQUE: CONSEQUETIVE NON PROBABLITY.**
**DURATION: FROM 08-06-2023 TO 07-12-23.**

**METHOD:** glove uterine tamponade was inserted in 34 patients after fulfilling the inclusion criteria. Variables assessed were demographical characteristics, obstetrical factors, GUT successfulness, GUT characteristics, concurrent procedures, and maternal death. Data was recorded on self-designed questionnaires and analyzed on SPSS 25. Data was compared between the successful group and the failure group.

**RESULT:**
During the study period, GUT was inserted in 34 women. It was successful in 22 cases (64.7%) & bleeding was arrested, while in 12 cases (35.3%) the GUT failed to arrest bleeding. Of the 12 failures, two ended up in hysterectomy, artery ligation in 5 cases, and compression suture in 5 cases, and all were in the failure group. One patient died due to coagulopathy. We found anemia a common risk factor (58%) and atony a common cause of PPH. 64% of patients had a smooth recovery and the most common complication seen was fever.

**CONCLUSION**: PPH is yet a bad dream in the OBGYN field. It is considered as main reason for maternal mortality and represents one-fourth of maternal mortality. In recent times of modern obstetrics, it is upsetting to say that ladies pass on from postpartum hemorrhage. Well-timed meditation in the precious first hour can bring several mothers back to life.

**Operational definition:**
**GUT Successful:** if there is no bleeding from the genital tract or the drainage channel of the balloon catheter.
**GUT un-successful:** if bleeding lasts up to 15 minutes of GUT insertion, and a concurrent procedure is needed.

## INTRODUCTION:

Post-delivery bleeding is a main causation behind maternal mortality, especially in underdeveloped countries. Almost 300,000 pregnant ladies lose their lives yearly across the world with roughly 20-25% of those passings brought about by haemorrhage[1,2]. It can likewise prompt the mother to have huge long-term clinical and mental issues. A lot of efforts have been put in worldwide to reduce the PPH burden and its consequences. FIGO treatment, WHO guidelines, and International Confederation of Midwives as well as work on the factors that influence the management of PPH and so on[4].

A multidisciplinary team approach is needed to manage the PPH. Resuscitation to hemorrhage, digging out of cause, and treatment of cause run side by side in managing the patients with PPH. Uterine atony is the most frequent reason for PPH and is managed by uterotonics to restore uterine tone and tranexamic acid (WOMAN 2017), once genital tract trauma and coagulopathy have been excluded. If these conservative measures fail to control the situation, support from compression techniques to compress the uterus is required. A series of various methods has been introduced in the recent couple of years to catch the bleeding from the uterus.

In recent days, balloon tamponade is become a famous strategy owing to its benefits. A recommendation from the WHO was also given for its utilization in dealing with PPH[5]. Its introduction is not only easy, safe, and simple, but also rapidly applied, and easily removable. its insertion does not require expertise or special equipment. WHO, FIGO, and RCOG all recommend a uterine balloon tamponade whenever conservative measures fail to control haemorrhage after delivery[8]. Bakri balloon is proven to be effective by multiple studies[6,11]. Even with all these benefits, the Bakri balloon is steep-priced in underdeveloped nations and not generously available everywhere. A study showed its failure in the placenta accreta spectrum & twin gestation[7]. Considering these circumstances there is a need to introduce innovative, cost-effective techniques which can perform the same action as done by Bakri Balloon. “Glove Balloon.” Also fitted to these requirements.

A case report[3] was given which suggest GUT was as effective as the Bakri balloon, which inspired us to work on such measure to grow such an innovative idea, suitably performed by even junior obstetricians & health workers at primary and secondary health care level.

The “Glove Balloon” seems to be an attractive, innovative, and practical method that can be used to mechanically compress the uterine sinuses and can be a life-saving procedure in massive hemorrhage.

## METHODS

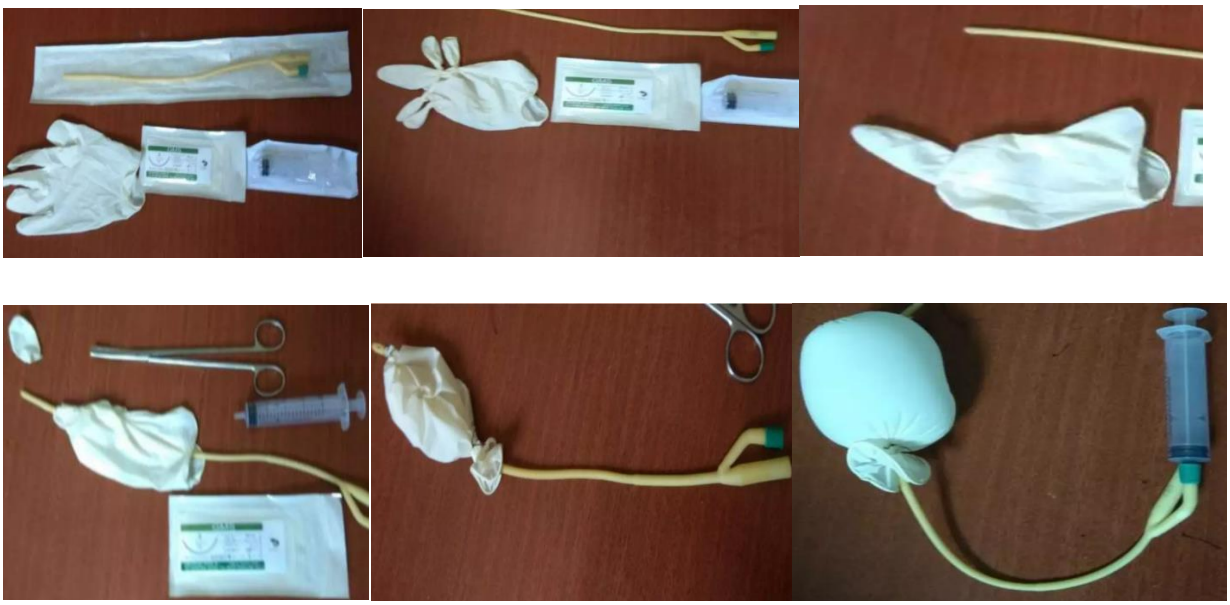
After getting approval from the People University of Medical & Health Science Ethical Review Committee study was started. Women were selected from the labour room and operational theatre of Obstetrics & Gynecology, PUMHS nawab shah, fulfilling the inclusion criteria (Intractable PPH where standard medical management was ineffective). After the operation, the required data was obtained and entered SPSS. Parameters to be assessed were biodata, risk factors

for PPH (patient age, parity, mode of delivery BMI, past cesarean section, (IOL) induction of labor, large for gestation, placenta previa), causes of PPH, time since PPH diagnosis till tamponade inserted, collector bag measurement for estimating blood loss, and tranexamic acid usage. Different variables related to tamponade (Effectiveness, volume inflated) were also analyzed.
These variables were also compared in the success and failure groups. Frequency and percentages were used for qualitative variables and mean and standard deviation for quantitative variables. Student T-test and chi-square or Fisher's exact test for comparison respectively. Results were declared significant if $p < 0.05$.

**The preparation of the glove tamponade**

After getting written informed consent, and excluding RPOCs and trauma to the genital tract, the decision was made to put GUT. The required things are a glove, foley catheter, silk thread syringe 50cc, and saline bottle.
Any easily available sterile latex glove (6.5 or a number 7) is chosen. Tie peripheral four fingers of the glove, leaving the middle fingers, invert the glove, and excise (not merely incise) the bulb of the catheter after inflating it with air. Cut the end of the middle finger and insert the foleys into the middle finger. Tie the middle finger over Foley's catheter below its tip and above the bulb by silk threads. Tie the end of the glove at its distal third of the foley catheter by silk 2 threads (all foley shaft length 38cm). Introduce your hand with the device or with long forceps then inflate with warm saline till no space. Go out with your hand or forceps. Continuing filling till bleeding reduced considerably further inflation was stopped.

During caesarean section.
Determine uterine volume by intraoperative direct examination. From above put the glove partly in the uterine cavity. The assistant will pull the Foley catheter through the cervix and the vagina and make sure the glove is entirely in the uterine cavity. Close the incision per normal procedure, taking it to a syringe with saline. Document the quantity of fluid filled in the glove. Slightly pull the foleys and attach them to the patient's inner thigh with tape. Pack the vagina with packing and a sanitary pad was applied. The collection bag is attached to the drainage port to monitor blood loss after the balloon is inflated.



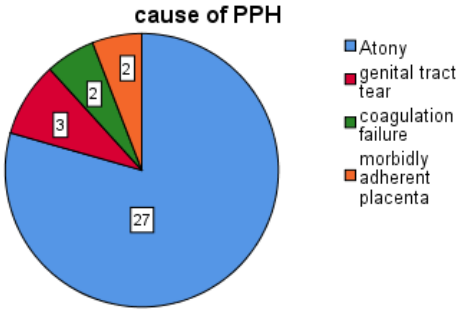
**RESULT:**

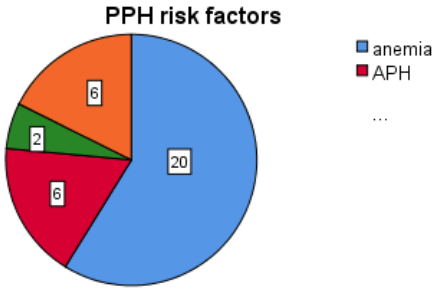
During the study period, 34 GUT was used in 22 patients (64.7%) and hemostasis was achieved, though, in 12 samples (35.3%), the GUT failed to arrest bleeding. Out of the 12 failed cases, caesarean hysterectomy was performed in two patients, artery ligation in 5 cases, and compression suture in 5 cases. The failure was seen because of the expulsion of the balloon in 7 cases. One mother died due to a massive hemorrhage after DIC. GUT was removed after 24 hours in a successful group where no further bleeding was seen after removal. Anemia was seen in 58% of the patients, antepartum hemorrhage in 6 patients, and uterine overdistension in 2 patients. The commonest cause of PPH seen in the study was uterine atony (79.4%), while genital tract tear in 3 patients, morbidly adherent, and coagulation disorders in 2 patients. Most of the study population falls in the multiparity (2-5) group, with 55.9% delivering vaginally. 58% bleed less than 1 liter, 23% 1-1.5 liter. 55.9% of patients receive tamponade within 5 minutes while 17.6% get delayed tamponade (after 15 minutes). The average volume infused into tamponade was 400-500 ml where 64.7% had smooth recovery post-operative, and the most common complication observed was fever, the second most common surgical site infection.

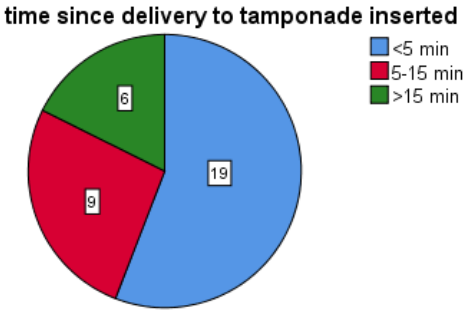
After comparing the failure group with the successful group, we found that 62% of cases of fever, all paralytic ileus, and all surgical site infections were in the failure group, The Failure group had a common risk factor of PPH as APH, and a

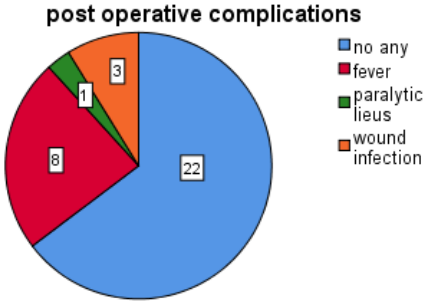
**GUT effectiveness * additional method Crosstabulation**
Count

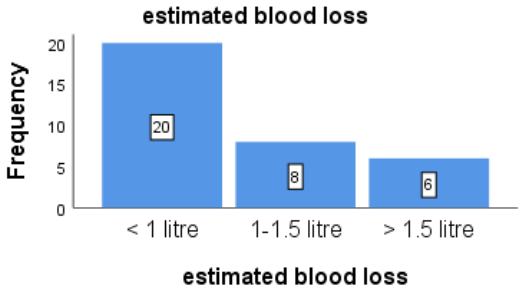
common cause of uterine atony, but patients with coagulopathy and genital tract tears did not respond to GUT. Vaginally delivered were more in the failure group. Those who received the measure within 5 minutes were effectively managed and arrested for bleeding. The volume infused was comparable in both groups (failure & successful).



| | | additional method | | | | |
|---|---|---|---|---|---|---|
| | | no any | artery ligations | compression stitch | hysterectomy | Total |
| GUT effectiveness | no | 0 | 5 | 5 | 2 | 12 |
| | yes | 22 | 0 | 0 | 0 | 22 |
| Total | | 22 | 5 | 5 | 2 | 34 |

**DISCUSSION:**

We select the glove as it is cheap, easily available, least intrusive, quickly made with next to no aptitude, non-allergic, and strong enough to sustain fluid in liters. Very few studies have been conducted on this tamponade to control hemorrhage.

Living ligatures in the uterine musculature work once the placenta is expelled. But unfortunately, when uterine atony occurs this natural preventive life-saving process is lost, and the blood is rapidly filled into the uterine cavity. The GUT can capture hemorrhage from the uterine cavity. The glove tamponade functions by applying an internal to external strain inside the uterine cavity, powerful than the systemic arterial pressure[10]. It activates the uterine contraction activity of the uterine muscles along with the pressure effect. The tamponade also acts by pressing the womb's blood supply areas and promoting the formation of clots. It is vital to put the GUT on as soon as possible. This is for the methodology runs by acting to stop bleeding by clotting the blood in the uterine vessels[11].

Afterward a fruitful addition of GUT, it is kept in place for one day for effective work. A wide range of anti-microbials is given. The patient was managed in H.D.U., with oxygen supplementation and continued vitals monitoring. Uterotonics in the form of oxytocin started in infusion form. blood cell components are given as needed. The above is practically like as described by Nalini et al.[12] No active bleeding was seen after tamponade removal.

A similar study was done by Tasneem F et al[13]. but there was no drainage channel in their technique. Compared to that study we modified our Foley's insertion technique to facilitate drainage as well. The benefits of our strategy are the easy availability of gadgets needed to prepare a glove uterine tamponade, the

preparation is very simple, no technique related to blood loss, Effortlessness, speedy method, and negligible sedation (occasionally required).

Lau MS, Tee JC et al asses the usefulness of balloon catheters in dealing with bleeding after delivery of placenta during caesarean section in placenta previa, but owing to the limited sample size, they could not provide definitive evidence of its efficacy[14].

Akhtar[15] used Condoms tamponade on 23 patients with postpartum hemorrhage who could not be managed on other measures in Dhaka Medical College Hospital setup. However certain limitations were seen as small sample size, unavailability of the comparative group, and possibility of selection bias.

**CONCLUSION:**

The non-accessibility and exorbitance of inflatable gadgets in low-resource countries their a significant disadvantage. Thus, we might want to stress this strategy for glove tamponade which was tracked down fruitfully in the patients of our establishment. Glove tamponade is a compelling, modest, safe, and promptly accessible technique for treating essential PPH, and for those with fruitful situations, no careful bleakness was noticed. The potential for it to be involved by unpracticed administrators in regions with restricted assets makes it a valuable assistant in the management of PPH.

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