



# Glove Balloon in Postpartum Hemorrhage: A Case Report

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Received: 19 November 2022 / Accepted: 23 March 2023 / Published online: 10 April 2023  
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## Abstract

Postpartum hemorrhage is a long-running and frequent cause of maternal death in most developing countries and is associated with uterine atony. Nowadays, balloon tamponade has gained popularity due to its advantages. It is a technically simple, safely applied, time saver, and easily removed in a low-risk method and also needs less expertise and no special equipment. Despite all advantages, the Bakri balloon is very expensive in less developed countries and not available everywhere, especially in limited resource settings. Such disadvantages prompted us to perform an innovative, cost-effective, and practical method relying on low-resource equipment and named it “Glove Balloon.” A 26-year-old woman presented in her third pregnancy underwent an elective cesarean section. Following the surgeon’s mention of low segment atony, the patient returned to the operating room quickly. The bleeding continued despite the administration of uterotonic drugs, and because of active bleeding, the decision was made to apply a glove balloon. After gently inserting the glove balloon into the uterus, 500 ccs of saline was inflated into the balloon, and the bleeding stopped shortly afterward. The patient was discharged on the third postoperative day and remained well after. We believe that junior obstetricians and midwives should consider all options, even new strategies, to stop hemorrhages before considering invasive surgical procedures. The “Glove Balloon” is an innovative, practical uterine tamponade balloon that can make the difference between life and death in treating postpartum hemorrhage cases and should be considered a life-saver tool in all settings.

**Keywords** Postpartum hemorrhage · Balloon tamponade · Maternal mortalities · Uterine atony

## Introduction

Postpartum hemorrhage is a long-running and frequent cause of maternal death in most developing countries and is associated with uterine atony. Following FIGO<sup>1</sup> and ICM<sup>2</sup> statements, postpartum hemorrhage is a preventable obstetric emergency through rapid and effective medical intervention [1]. There are several treatment options available to treat

uterine atony, recommended by the World Health Organization, including uterotonic drugs, uterine massage, and tamponades [2]. Over time, gauze tamponade packs were less frequently used due to a high risk of infection and concealed ongoing bleeding. Nowadays, balloon tamponade has gained popularity due to its advantages. It is a technically simple, safely applied, time saver, and easily removed in a low-risk method and also needs less expertise and no special equipment [3]. Therefore, the balloon tamponade reduces unnecessary laparotomies, hysterectomies, and blood loss [4]. Despite all advantages, the Bakri balloon is very expensive and not widely available in less developed countries. The use of condoms is another alternative to Bakri’s, which in some areas and even in Iran may not be free and are hardly ever found in poor settings. Such disadvantages prompted us to perform a cost-effective method relying on low-resource and obstetrical settings equipment and named it “*glove balloon*.” The simple materials needed are as follows (Fig. 1):

1. A surgical glove.

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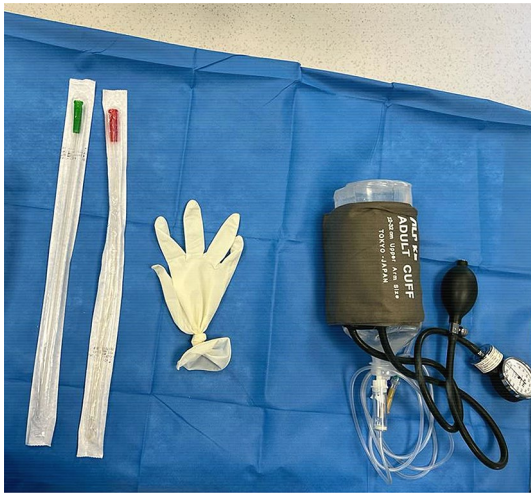
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<sup>1</sup> FIGO: The International Federation of Gynecology and Obstetrics.

<sup>2</sup> ICM: The International Confederation of Midwives.



**Fig. 1** Glove balloon materials

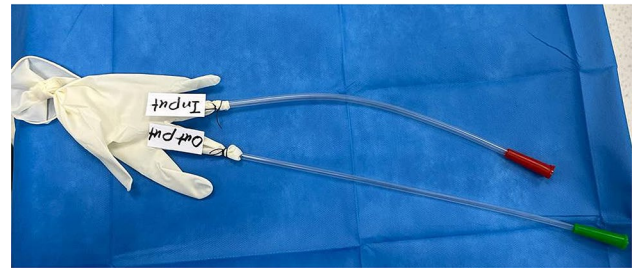
2. Two Nelaton catheters size 14–18 (intermittent catheters, “in/out” catheters, short-term bladder catheters).
3. Scissors.
4. 500-ml bottle of saline.
5. Surgical sutures.
6. Manual blood pressure monitor.

## Case

We present one of the life-threatening postpartum hemorrhages due to cesarean section with not responding to medical management, which was treated effectively by glove balloon. This case was reported by the author, who worked as a midwife in the maternity ward at Dr. Solati’s private hospital in 2019.

A 26-year-old woman presented in her third pregnancy (gravida 3, para 0, abortion: 2) at 39 weeks and 2 days by the date of her last menstrual period and underwent an elective cesarean section. As far as the patient’s medical and surgical history was concerned, she had an uncomplicated prenatal period, except for thalassemia minor, which was treated by oral iron supplements during the antenatal period. Her booking hemoglobin (Hb) in this pregnancy was 10.2 g/dl with MCV 84.8. fl. A transverse lower segment section was performed at 9:40 a.m., and the uterine incision was closed in two layers using chromic catgut. During the recovery period after surgery, the midwife noticed a large amount of bleeding and clot passages when she checked on the patient. There was over 500 CC of blood knots removed from the uterus and vagina by manual compression during the procedure.

The patient returned to the operating room immediately after the surgeon mentioned low segment atony. The bleeding continued despite the administration of 30 IU/ml infusion of oxytocin, 0.2 mg intramuscular injection of



**Fig. 2** Insertion of Nelaton catheters in glove balloon and fastening tightly by sterile chromic catgut

methylergonovine at the same time, and then 600 mcg rectal of misoprostol after 10 min, and because of active bleeding, the decision was made to apply a glove balloon. A sterile surgical glove was knotted tightly at the proximal end, and two fingers were cut to insert two Nelaton catheters into the glove. One Nelaton catheter was inserted only 3–5 cm into the finger to avoid air embolisms in unpredictable explosions and improve arterial compression by placing saline liquid instead of air (Fig. 2).

The other catheter was placed near the glove’s proximal side and connected to the saline through the intravenous infusion set to fill the glove with saline. The cuff of the blood pressure monitor is placed around the plastic bottle of saline to raise the saline liquid pressure two or three mmHg degrees higher than the patient blood pressure (Fig. 1). Both catheters were fastened tightly by sterile chromic catgut. After gently inserting the glove balloon into the uterus, 500 ccs of saline was inflated into the balloon, and the bleeding stopped shortly afterward. In order to prevent fluid loss, the distal sides of both catheters were folded and then fastened with sterile chromic catgut. The saline bottle pressure was kept at 150/90 mmHg, while the patient’s pressure was 120/70 mmHg. Intravenous fluid resuscitation and packed red cells transfusion started immediately due to her hemoglobin concentration of 8 g/dL. Postoperatively, the patient made a good recovery. Within 12 h, the balloon was deflated slightly; there was no more bleeding during the checkup, so the balloon was gently removed. During the first 2 days after surgery, the patient received prophylactic antibiotics, was discharged on the third postoperative day, and remained well afterward. Postpartum visits were performed for 6 weeks, and no complications, including intrauterine infection and bleeding, were detected.

## Discussion

Over the past 3 years, an Iranian gynecologist named Dr. Tizro has successfully managed 53 postpartum hemorrhages without injuring the uterus with this technique. A

key advantage of glove balloons is their affordability, which can be used in any setting, even resource-poor ones, and can be used quickly and easily by primary health prior to any invasive procedure. By achieving hemostasis, it may be able to control uterus bleeding completely or give time to the referral patient. It is worth mentioning that we experienced all cases stopping bleeding just after placing the balloon. The capacity of glove balloons is also greater than that of Bakri balloons and condom balloons, as they are much larger. It is important to note that the amount of saline that is inflated in each patient is adjusted based on the amount of bleeding, the capacity of the uterine cavity, and the arterial blood pressure of the patient. The strength of such a method lies in that when the saline liquid pressure is higher than the patient's blood pressure, bleeding arteries are gradually compressed, and the bleeding certainly stops. In order to keep the balloon in place, unlike condom or Bakri balloons which tend to fall out or become loose when in place, it is not necessary to pack the vagina with gauze or roll it up as a balloon keeper because the glove forms just like the uterine cavity. Therefore, there is a significant decrease in the risk of lower genital tract laceration that occurs as a result of this procedure. The procedure also prevents the accumulation of blood in the uterus and the concealment of ongoing hemorrhages. It appears that the most significant weakness of all balloons is substantial pain due to distension in the uterine cavity and theoretical concerns of rupture of the uterus, which still needs more research. All in all, we believe that junior obstetricians and midwives should consider all options, even new strategies, to stop hemorrhages before considering invasive surgical procedures. The "Glove balloon" is an innovative, practical uterine tamponade balloon that can make the difference between life and death in

treating postpartum hemorrhage cases and should be considered as a life-saver in all settings.

**Funding** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## Declarations

**Conflict of interest** The authors declare that they have no conflict of interest.

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