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Uterine Packing with Gauze Versus Bakri Balloon for Arresting Atonic Postpartum Hemorrhage after Cesarean Delivery

Elsayed Elshamy*[1,2], Wael Gaber[1], and Abd-Elhamid Shaheen[1]
[1]Department of Obstetrics and Gynecology, Menoufia University Hospital, Menoufia, Egypt.
[2]Department of Obstetrics and Gynecology, Rabia Hospital, Riyadh, Saudi Arabia.
***Corresponding author:** Elsayed Elshamy, **Mobile:** (+2)0100307124, **E-mail:** s_shamy77@ yahoo.com

ABSTRACT
Background: There is no adequately sufficient evidence to determine the effectiveness and safety of mechanical and surgical interventions for treating primary postpartum hemorrhage (PPH).
Objective: To assess the safety, efficacy and acceptability of uterine packing with gauze compared to Bakri balloon tamponade for treatment of atonic PPH after cesarean section.
Patients and Methods: A prospective observational study. A total of 176 patients with atonic PPH after cesarean section were treated either with uterine packing with gauze (n=84) or Bakri balloon tamponade (n=92). The success rate together with early and late complications were recorded and statistically analyzed.
Results: 90.4 percent of individuals with uterine packing were able to cease their active bleeding compared to 75 percent of those with the Bakri balloons ($p<0.05$). The uterine packing group's surgery took longer time, and the Bakri Balloon group's requirement for further vascular ligation was much higher, indicating a significant difference in procedure duration and need for further intervention ($p<0.05$). There were no significant differences in other operational and postoperative statistics between the two groups of patients. Uterine packing patients were more likely to be accepted by the patients ($p<0.05$), more satisfied with the surgery ($p<0.001$), and more likely to recommend it to others ($p<0.001$).
Conclusion: Although uterine packing with gauze may require longer time to insert with similar safety to Bakri balloon, yet it is more effective and more acceptable, less costly and readily available.
Keywords: Bakri balloon, Cesarean section, Postpartum hemorrhage, Uterine packing.

INTRODUCTION

After vaginal delivery and more after caesarean delivery, women are likely to experience primary postpartum hemorrhage (PPH), which is defined as a loss of 500 milliliters (1000 milliliters in CS) or more of blood, with uterine atony accounting for more than eighty percent of all cases [1,2].

Atonic PPH treatment hinges on a timely diagnosis, reasonable assessment of blood loss, and immediate therapies. PPH treatment includes uterine compression, uterotonic medications, and surgical treatments, as well as maternal resuscitation. If all else fails, a hysterectomy and/or vascular ligation (of the uterus, ovaries, or internal iliac vessels) will be the final option [3].

According to a recent Cochrane study, mechanical and surgical procedures to treat primary PPH are insufficiently supported by data [4]. When compared to less expensive, readily available devices like condom catheter balloons, the success rate and cost-effectiveness of the Bakri balloon have recently been questioned [5-7]. Also, uterine packing with gauze has been proved recently as effective as Bakri balloon for arresting PPH after cesarean section for placenta previa [8].

We aimed to compare uterine packing with gauze and Bakri balloon tamponade for the treatment of atonic postpartum hemorrhage (PPH) following caesarean section in terms of safety, effectiveness, and acceptability.

PATIENTS AND METHODS

During this investigation, we observed individuals who had atonic PPH following caesarean delivery and who were unable to respond to uterotonic medications and bimanual compression of the uterus. Between September 2018 and September 2021, research participants were selected from the operating room of the Department of Obstetrics and Gynecology at Rabia Hospital in Riyadh, Saudi Arabia.

Ethical considerations:

With written informed permission from all participants signed before the start of the trial, the hospital's (Rabia Hospital in Riyadh, Saudi Arabia) Institutional Review Board and Ethics Committee formally reviewed the study protocol in compliance with the 1964 Helsinki declarations as well as all their modifications.

Based on a recent trial to assess the efficacy of Bakri Balloon, 45 cases are required in each single group to detect significant difference in the success rate compared to control group [9].

After excluding cases caused by soft birth canal injury, uterine deformity, and placenta previa/accreta, 176 individuals with primary PPH were included in this study **(Figure 1).**

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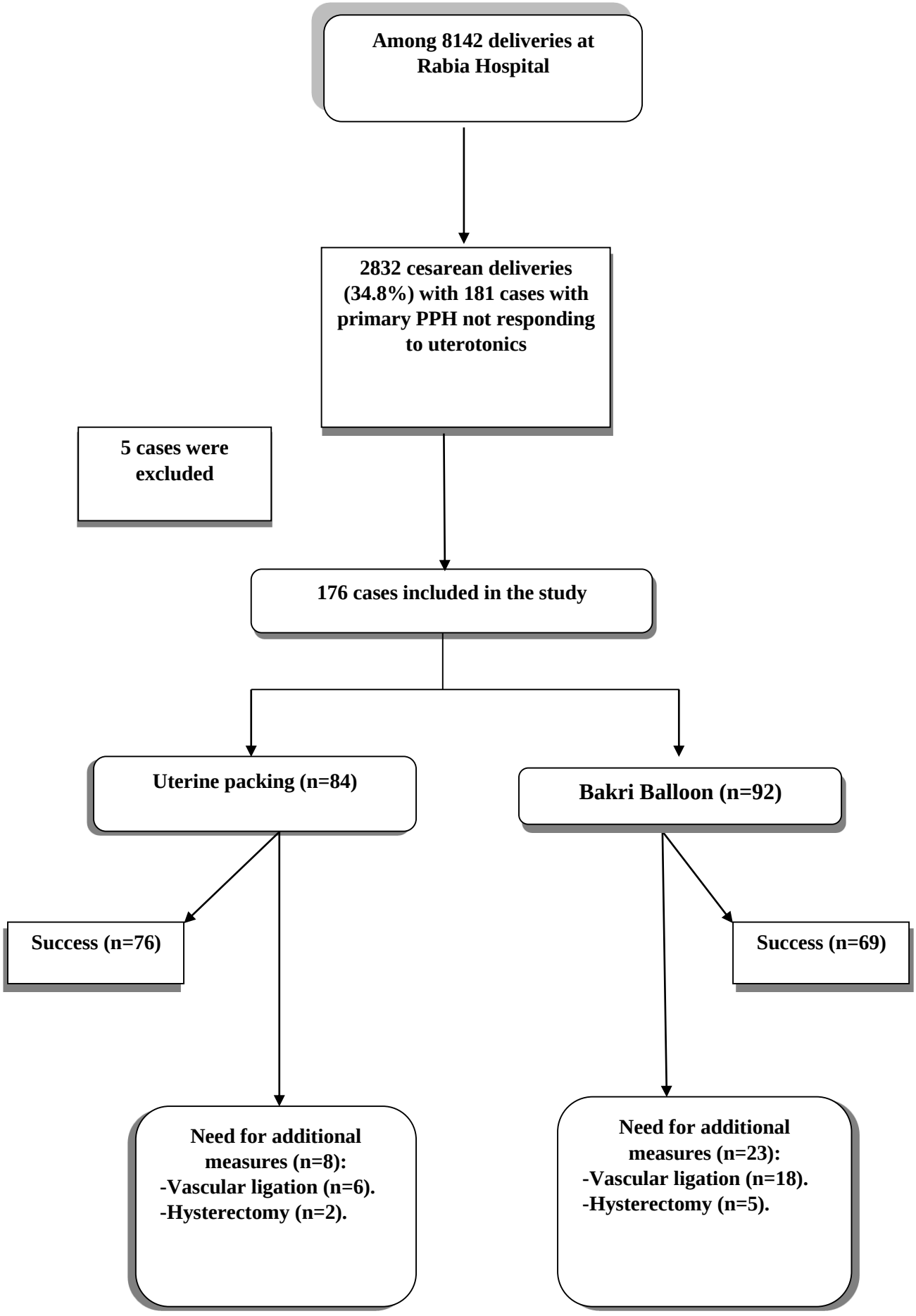

Figure (1): The flow diagram.

IVI injection of 5 IU oxytocin to atonic PPH cases (who lost blood averagely around 1 liter) was used; the ones who didn't respond to any additional early measures (In this case, the patient was given oxytocin through IV and ergometrine via intravenous injection, both of which were administered at the same time) were divided into two groups according to the preferences of the on-call obstetrician and the availability of Bakri balloon:

Group 1 (Uterine packing group): 84 women who had uterine packing implanted were included in this study. The sterile gauze was 3 m long, 4 cm wide, and soaked in povidone–iodine solution after squeezing out the extra moisture. Using ring forceps to hold the anterior lip of the cervix, the operator inserts sterile gauze into the uterine fundus without leaving any dead space to ensure the absence of active bleeding with the pack filled the uterine cavity and the vagina.

Group 2 (Bakri balloon group): Bakri balloons were used for 92 patients in this study. Following the ring forceps hold of the anterior cervical lip, the artery forceps was used to insert the balloon. The balloon was filled with 200-300 ml of normal saline and pulled downwards to be fixed to the patient's thigh by adhesive tape and connected to a collection bag. Clinical and analytical findings guided the use of blood products and other resuscitative measures, vital signs, uterine firmness, indwelling catheter output, and vaginal hemorrhage were monitored For 24 hours. Failure to stop uterine hemorrhage necessitated step-by-step devascularization or emergency hysterectomy as the final option for treatment.

Outcome measures:

-After removing the tamponade and keeping active bleeding under control for the whole 24 hours, the treatment was declared a success.

-Blood transfusion, a wound drain, and ICU admission and additional surgical steps to stop the bleeding.

-Late complications: (maternal- fever> 38°C).

following the removal of the tamponade, re-operation, wound hematoma, venous thrombo-embolism, and surgical site infection

-A questionnaire was used to determine whether or not the procedure was acceptable, comfortable and/or satisfactory following the removal of the tamponade.

Statistical analysis

In order to analyze the data acquired, Statistical Package for the Social Sciences version 22 was used to execute it on a computer (SPSS). The quantitative data were presented in the form of the mean, and standard deviation. Qualitative data were presented as frequency. The student's t test (T) was used to assess quantitative independent variables. Pearson Chi-Square was used to assess qualitatively independent data. The significance of a P value of 0.05 or less was determined.

RESULTS

In terms of maternal factors such as age, parity, body mass index, gestational age at delivery, previous caesarean deliveries, non-booking for antenatal care, medical conditions present, and multiple pregnancies there were no significant differences between the two groups as depicted in table (1).

Table (1): Maternal characteristics (Data are presented as mean±standard deviation or as frequency)

	Uterine Packing (n=84)	Bakri Balloon (n=92)	p-value
Age	32.11±5.64	31.98±5.61	>0.05
Parity	3.13±1.24	3.15±1.28	>0.05
Body mass index (Kg/m²)	24.89±6.88	25.12±6.64	>0.05
Gestational Age at delivery (weeks)	38.43±1.98	38.26±2.14	>0.05
Number of previous CD:			
-One	38	40	>0.05
-Two	26	24	>0.05
-Three	14	18	>0.05
-Four	6	10	>0.05
Non-booked for ANC	12	16	>0.05
Medical disorders	6	9	>0.05
Multiple pregnancies	3	7	>0.05

CD=Cesarean Delivery, ANC=Antenatal care.

90.4 percent of individuals with uterine packing were able to cease their active bleeding compared to 75 percent of those with the Bakri balloons. There was a highly significant difference regarding the duration of the procedure which was longer in the uterine packing group while the need for further vascular ligation was significantly higher in the Bakri Balloon group. There was no significant differences between the two groups regarding other operative and postoperative data (Table 2).

Table (2): Operative and postoperative data (Data are presented as mean±standard deviation or as frequency)

	Uterine Packing (n=84)	Bakri Balloon (n=92)	p-value
Duration of the procedure (min)	10.88±3.28	6.94±2.34	<0.001
Blood loss (mL)	1456.28 ±200.66	1462.36 ±196.98	>0.05
Preoperative Hb (gm%)	11.86±1.21	12.22±1.88	>0.05
Postoperative Hb (gm%)	8.28±1.78	8.16±1.92	>0.05
Need for blood transfusion	14	18	>0.05
Number of packed red blood cells units	3.86±1.24	3.98±1.12	>0.05
Need for vascular ligation	6	18	<0.05
Need for hysterectomy	2	5	>0.05
Admission to ICU	10	16	>0.05
Hospital stay (Days)	5.18±1.78	5.26±1.52	>0.05
Fever	12	14	>0.05
Wound drain	6	9	>0.05
Reoperation	0	0	-
VTE	2	4	>0.05
Wound hematoma	3	5	>0.05
SSI	4	7	>0.05
Maternal mortality	0	0	-

Hb= Hemoglobin, ICU=Intensive Care Unit, VTE=Venous Thromboembolism, SSI=Surgical Site Infection.

An overall decrease in pain, an increase in overall satisfaction, and an increase in the recommendation of the surgery to other women were all seen in the uterine packing group as shown in table (3).

Table (3): Maternal acceptability

	Uterine Packing (n=84)	Bakri Balloon (n=92)	p-value
Overall discomfort with the procedure:			
-Moderate/high/extreme.	16	34	<0.05
-None or slight.	68	58	<0.05
Overall satisfaction with the procedure:			
-Very or somewhat satisfied.	71	54	<0.001
-Neutral or somewhat not satisfied.	13	38	<0.001
Would suggest the method to other women:			
-Highly or somewhat agree.	70	52	<0.001
-Neutral or somewhat disagree.	14	40	<0.001

DISCUSSION

In our research, primary PPH after caesarean surgery affected 2.22 percent of patients. Even with proper management, PPH still accounts for roughly 5% of global deaths [10].

About 90% of patients in the uterine packing group had active bleeding stopped, compared to only 75% of those in the Bakri balloon group, in this study. According to a previous systematic review, the overall success rate of conservative care of primary PPH is about 84%[11].

A recent randomized trial included 92 patients with PPH caused by uterine inertia following caesarean section were divided into two groups: study group (n=46) had intrauterine Bakri balloon tamponade (IBBT) and ascending uterine artery ligation (AUAL) in combination and the control group (n=46) received IBBT alone (n=46). In the study group, the overall response rate (ORR) was 95.65 percent, compared to 80.43 percent in the control group, a remarkable difference [9].

A recent retrospective cohort study comparing the results of Uterine gauze packing (UGP) and Uterine balloon tamponade (UBT) indicated equal success rates in the management of postpartum hemorrhage (PPH) during caesarean section for both procedures[12].

A number of factors, including the volume of blood lost and the availability of free blood in the uterine cavity, could be to blame for a lower success rate for the Bakri balloon procedure [9].

Pre-pregnancy obesity and caesarean birth have been linked to the failure of Bakri balloon tamponade (BBT) for the treatment of PPH in a recent systematic review, coagulopathy, excessive blood loss, curettage prior to BBT insertion, anterior placement of the placenta, placenta accreta, prolonged operation time,

and coagulopathy are all factors that contributed to BBT failure independently [6].

No significant differences were seen between early and late maternal complications in the current investigation, which is in line with a previous cohort analysis[13].

In this series, maternal acceptability was higher in the uterine packing group which may be attributed to the fact that Bakri balloon is connected to a collection bag in addition to the urine collection bag which caused discomfort to the patients specially during walking while the uterine gauze is inside the vaginal orifice.

Strengths of this study include the inclusion of a large number of patients and the use of a consistent treatment approach for PPH.

Due to a lack of Bakri Balloons and a decline in the number of obstetricians on duty, this study was unable to execute randomized research.

Limitation: Lack of Bakri Balloons makes it impossible to run a randomized trial.

CONCLUSION

Uterine packing with gauze may take longer to insert than the Bakri balloon, but it is more effective and acceptable, and it is also less expensive and widely available.

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REFERENCES:

1. **Knight M, Callaghan W, Berg C *et al.* (2009):** Trends in postpartum hemorrhage in high resource countries: a review and recommendations from the International Postpartum Hemorrhage Collaborative Group. BMC Pregnancy Childbirth, 9: 55-59.
2. **Mousa H, Blum J, Abou El Senoun G *et al.* (2014):** Treatment for primary postpartum haemorrhage. https://pubmed.ncbi.nlm.nih.gov/24523225/
3. **Guidelines and Audit Committee of the Royal College of Obstetricians and Gynaecologists (2016):** Prevention and management of postpartum haemorrhage. Pp. 1-44. https://www.rcog.org.uk/guidance/browse-all-guidance/green-top-guidelines/prevention-and-management-of-postpartum-haemorrhage-green-top-guideline-no-52/
4. **Kellie F, Wandabwa J, Mousa H *et al.* (2020):** Mechanical and surgical interventions for treating primary postpartum haemorrhage. https://pubmed.ncbi.nlm.nih.gov/32609374/
5. **Joshi B, Shetty S, Venkobrao K *et al.* (2021):** Cost-effectiveness of uterine balloon tamponade devices in managing atonic post-partum hemorrhage at public health facilities in India. PLoS One, 16(8): e0256271. https://doi.org/10.1371/journal.pone.0256271
6. **Ruiz Labarta F, Pintado Recarte M, Joigneau Prieto L *et al.* (2021):** Factors associated with failure of Bakri balloon tamponade for the management of postpartum haemorrhage. Case series study and systematic review. Healthcare (Basel), 9(3): 295-99.
7. **Shetty S, Moray K, Chaurasia H *et al.* (2021):** Cost of managing atonic postpartum haemorrhage with uterine balloon tamponade devices in public health settings of Maharashtra, India: an economic microcosting study. BMJ Open, 11(3): e042389.
8. **Wei J, Dai Y, Wang Z *et al.* (2020):** Intrauterine double-balloon tamponade vs gauze packing in the management of placenta previa: A multicentre randomized controlled trial. Medicine (Baltimore), 99(7): e19221.
9. **Ma G, Gao L, Li Q *et al.* (2021):** Efficacy of intrauterine Bakri balloon tamponade combined with ascending uterine artery ligation on postpartum hemorrhage. Am J Transl Res., 13(5): 4995–5002.
10. **Varatharajan L, Chandraharan E, Sutton J *et al.* (2011):** Outcome of the management of massive postpartum hemorrhage using the algorithm 'HEMOSTASIS'. Int J Gynaecol Obstet., 113:152–54.
11. **Doumouchtsis S, Papageorghiou A, Arulkumaran S (2007):** Systematic review of conservative management of postpartum hemorrhage: what to do when medical treatment fails. Obstet Gynecol Surv., 62:540–47.
12. **Ge J, Liao H, Duan L *et al.* (2012):** Uterine packing during cesarean section in the management of intractable hemorrhage in central placenta previa. Arch Gynecol Obstet., 285:285–9.
13. **Guo Y, Ma J, Wang X *et al.* (2015):** Does uterine gauze packing increase the risk of puerperal morbidity in the management of postpartum hemorrhage during caesarean section: a retrospective cohort study. Int J Clin Exp Med., 8: 13740-7.