

Bakri balloon in the treatment of postpartum hemorrhage

Bakri balloon in postpartum hemorrhage

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Abstract

Aim: Bakri Balloon is used in the treatment of postpartum hemorrhage (PPH) for conservative management of uterine bleeding. The aim of this study is to evaluate the results of using Bakri balloon in the treatment of PPH in a 5-year period in a tertiary hospital.

Material and Methods: Patients who underwent Bakri balloon for PPH treatment from October 2015 to December 2020 were retrospectively screened.

Results: The total number of deliveries were 17117, including 9595 vaginal (56%) and 7522 cesarean sections (44%). The Bakri balloon was applied to a total of 60 patients with a median age of 29 years; 20% of these patients were nullipara, 25% primiparous and 55% multiparous. The delivery method of 83.3% of the patients was cesarean section and vaginal delivery in 16.7% of the patients. A previous cesarean section history was present in 60% of the patients. While 47 patients were above the 34th gestational week, 13 patients were below the 34th gestational week. While 40 newborns were healthy, 2 newborns died and 18 were hospitalized in intensive care units. The cause of uterine hemorrhage was placenta previa in 29 patients and uterine atony in 28 patients. Bakri balloon treatment was sufficient in 91.7% of the patients, and no additional method was required. The Bakri balloon application failed in 5 patients (8.3%) and these patients underwent surgery.

Discussion: According to this study, the most common Bakri balloon indications were bleeding due to placenta previa and uterine atony. In these patients, treatment with Bakri Balloon was successful. In the treatment of PPH caused by placenta previa or uterine atony after both vaginal delivery or cesarean delivery, obstetricians can benefit from the cushioning effect of the Bakri balloon on the endometrial space to reduce or stop bleeding.

Keywords

Uterine hemorrhage; Uterine atony; Pregnancy complications

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Introduction

Postpartum hemorrhage (PPH) is defined as a blood loss of 1,000 mL or more or signs and symptoms of hypovolemia within the first 24 hours after delivery and up to 12 weeks postpartum, regardless of method of delivery (vaginal or cesarean) [1]. Early or primary PPH, the most common type occurs within the first 24 hours of delivery. PPH is the cause of approximately 35% of all maternal deaths. In the developing world, about 1.2% of deliveries are associated with PPH, and when PPH occurred, about 3% of women died [2]. Most research on PPH has focused on the PPH prevention. Although controversy continues regarding the optimal protocol for PPH prevention, the use of oxytocin is currently preferred. Misoprostol may be a reasonable option when parenteral administration of uterotonics is not possible [3]. There is little evidence to guide treatment decisions when PPH occurs [4]. Pharmacological, mechanical, and surgical methods to treat PPH are mentioned in many publications [5]. Many reports recommend uterine massage and bladder emptying to induce uterine contractions as first-line therapy. [6] Surgical options are usually laparotomy to apply compression sutures, bilateral uterine and/or hypogastric artery ligation, hysterectomy (total or subtotal) or Pelvic tamponade (abdominal packing) [6-8].

In recent years, many studies have referred to intrauterine balloon tamponade as a second-line therapy, before resorting to emergency peripartum hysterectomy in cases with PPH and uterotonic treatment failure [9-12]. The Bakri balloon is the first specifically designed for the uterus cavity [13].

In this study, the 5-year Bakri balloon experience in a maternity hospital was reviewed. General characteristics of the patients who underwent Bakri balloon, indication, whether the procedure was successful, and the condition of the newborn were analyzed.

Material and Methods

Local ethics committee approval was obtained for this study (Date: February 5, 2021 Number: 2709). In this study, patients with Bakri balloon records for the last 5 years (from October 1, 2015, to December 30, 2020) were scanned from the hospital pharmacy. Since the Bakri balloon is a high-cost device, the insurance system requires an official report, which is recorded in the hospital pharmacy. Patients were found from these records, and then the files of these patients were collected from the hospital archive. The age, gravida, parity, delivery method, gestational week of these patients were found in the patient file. The cause of postpartum bleeding, the condition of the newborn, and whether the Bakri balloon application was successful or not, were recorded in excel format.

Patient selection

As a clinical approach, in the maternity ward, patients are taken to the follow-up room after birth (cesarean or vaginal delivery) where blood pressure, pulse, vaginal bleeding and hemogram are closely monitored. According to this monitoring by the service nurse, the delivery team is informed when PPH is detected. Patients diagnosed with PPH are applied uterine massage and medical treatment (oxitocin and misoprostol) as first-line therapy. Among the patients who did not respond to this treatment, Bakri Balon implanted patients were included in the study. The entire study group consists of patients who failed

this first- line treatment. The Bakri balloon was inserted during cesarean section in cases of bleeding during cesarean section (especially in patients with placenta previa) and continuing bleeding despite sufficient suturing in the uterine bed. The Bakri balloon was inflated to an average of 300 to 500 cc. Patients who underwent laparotomy directly for hysterectomy or uterine artery ligation without applying Bakri balloon were excluded from the study.

Results

The total number of deliveries was 17117, including 9595 vaginal (56%) and 7522 cesarean sections (44%). The Bakri balloon was applied in a total of 60 patients with a median age of 29 (14-42) years (Table 1); 20% (n=12) of these patients were nullipara, 25% (n=15) primiparous and 55% (n=33) multiparous. In terms of delivery method, 83.3% (n = 50) of the patients had a cesarean section and 16.7% (n = 10) had a vaginal delivery. 60% (n = 36) of the patients had a previous cesarean section history. While 47 patients (78.3%) were above the 34th gestational week, 13 patients (21.7%) were below the 34th gestational week. While 40 newborns (66.7%) were healthy, 2 newborns died and 18 received intensive care treatment. In the study group, 2 patients had twin pregnancy and the rest had single pregnancy. The cause of uterine hemorrhage was placenta previa in 29 patients (48.4%) and uterine atony in 28

Table 1. Data of 60 patients with Bakri balloon applied

Feature	
Age, median (min-max)/(25%-75% percent)	29(14-42)/(24.2-35.7)
Parity, n %	
Nullipar	12 (20%)
Primipar	15 (25%)
Multipar	33 (55%)
Delivery method, n %	
Cesarean	50 (83.3%)
Vaginal delivery	10 (16.7%)
Gestational week at birth	
< 30	3 (5.0%)
30-34	10 (16.7%)
35-38	31 (51.6%)
>38	16 (26.7%)
Twin pregnancy, n %	2 (3.3%)
Cause of postpartum hemorrhage, n %	
Placenta previa	29 (48.4%)
Atony	28 (46.7%)
Placenta accreta	2 (3.4%)
Placental detachment	1 (1.7%)
Newborn outcomes	
Healthy	40 (66.7%)
Intensive care	18 (30.0%)
Exitus	2 (3.4%)
Bakri balloon treatment	
Successful	55 (91.7)
Laparotomy requirement	5 (8.3%)
Hysterectomy	3 (5.1%)
Hypogastric artery ligation (HAL)	1 (1.7%)
HAL plus Recurrent Bacri	1 (1.7%)

patients (46.7%). Two patients (3.4%) were diagnosed with placenta accreta and one patient (1.7%) was diagnosed with ablatio placenta and Bakri balloons were applied.

Bakri balloon treatment was sufficient in 91.7% of the patients, and no additional method was required. The Bakri balloon application failed in 5 patients (8.3%), and these patients underwent surgery. Postpartum hysterectomy was applied to three of these patients, hypogastric artery ligation to one and hypogastric artery ligation plus recurrent Bakri balloon to one.

Discussion

In this study, the results of patients who were unresponsive to first-line treatment (oxytocin, misoprostol and uterine massage) for PPH and who were applied Bakri balloon were reviewed. The purpose of Bakri balloon application is to treat uterine bleeding, provided that laparotomy and possible hysterectomy are avoided. The success of the Bakri balloon can be mentioned in patients who have achieved PPH treatment without the need for surgical approach. In our study consisting of 60 patients, we saw that the Bakri balloon was successful in 55 patients (91.7%). According to the results of this study, Bakri balloon seems to be quite effective. We think that patient selection has a critical role in this. We saw that the number of patients with insertion anomalies such as placenta accreta, increta or percreta was low in the study population (2 patients). This approach may be effective in the emergence of this high rate. The predominant group (95.1%) of the study were patients with uterine atony or placenta previa.

Postpartum hemorrhage continues to be a gross cause of maternal deaths [2]. Timely and appropriate approach plays a critical role in preventing maternal death. There are many publications in the literature on the place of the Bakri balloon at PPH, and a consensus seems to have been occurred for the Bakri balloon with meta-analyses and systematic reviews in recent years [14-16].

Application of Bakri balloon instead of uterine-sparing surgical approaches (uterine/hypogastric artery ligation, B-lynch suture) is more advantageous to prevent the morbidity of the surgery. In this topic, Ramler et al. in their study, compared uterine artery embolization and uterine balloon tamponade in 100 patients with postpartum hemorrhage and stated that no difference in the risk of peripartum hysterectomy and/or maternal death was observed between women who had intrauterine balloon tamponade and women who underwent uterine artery embolization as initial management for persistent postpartum hemorrhage [9]. In another study, Kaya et al. found that the Bakri balloon and B-Lynch suture had similar success rates in uterine atony during cesarean section [11].

Grange et al. found 74.1% Bakri balloon success for persistent PPH in their study and stated that Bakri balloon is an effective second-line treatment for persistent primary PPH. In their study, they found that pre-pregnancy obesity was a risk factor for Bakri balloon failure [17]. Cho et al. used a Bakri balloon during cesarean section due to postpartum bleeding from the lower uterine segment and they found that Bakri balloon was successful in 75% of the patients and stated that Bakri balloon is an adequate adjunct management for postpartum hemorrhage following cesarean section for placenta previa to

preserve the uterus [18]

This study has limitations such as being retrospective, partially a small number of patients, and lack of some data. If it was recorded how many cc of Bakri balloon was inflated for each patient, more useful results could be obtained.

In conclusion, intrauterine tamponade with a Bakri balloon can be considered as an option before the surgical approach, especially in patients with PPH due to uterine atony or placenta previa who do not respond to first-line therapy such as uterine massage, oxytocin and misoprostol. Identifying the group with the high probability of failure of the Bakri balloon also plays a critical role.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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