



You should add the Bakri balloon to your treatments for OB bleeds

↻ For hemorrhage after C-section or vaginal delivery, this simple tool is an effective second-line measure

Every obstetrician fears the day when one of her (or his) patients has a massive postpartum hemorrhage. For good reason, we endeavor continuously to improve our ability to respond to this obstetric emergency (TABLE, page 7): Postpartum hemorrhage is a major cause of pregnancy-related death in both developed and developing nations.

One of those improvements in care is the Bakri balloon (Bakri Postpartum Balloon, Cook Medical) (FIGURE), which, I believe, is one of the most important recent advances for treating serious postpartum hemorrhage. I'll explain here why this device should be utilized more often when treatment with a uterotonic hasn't adequately resolved bleeding.

How, and how well, the Bakri balloon works

The Bakri balloon is a 24-French, 54-cm long, silicone catheter that contains a large central lumen and a 500-mL balloon that can be inflated once the device is inserted in the

Dr. Barbieri reports no financial relationship with Cook Medical, manufacturer of the Bakri balloon.

Do you use a Bakri balloon?

Instant Poll

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uterus. Downward traction on the balloon helps to ensure that the surface of the balloon is tightly opposed to the lining of the lower uterine segment. **The catheter provides temporary reduction of postpartum uterine bleeding** if management with uterotonics, repair of genital lacerations, and removal of retained placental tissue has been unsuccessful.

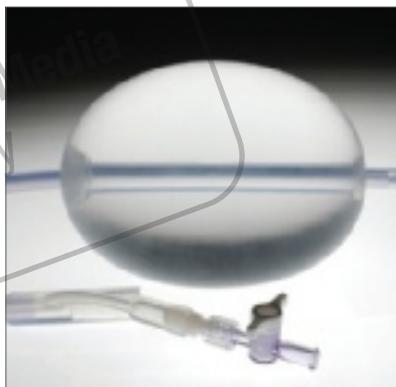
The literature on the use of the Bakri balloon comprises case reports and case series.

Bakri's first report described how he placed—simultaneously—10 (or more) standard Foley balloons in the lower uterine cavity to control postpartum hemorrhage.¹ Building on this success, he and his team later developed a single, large balloon with a large central lumen and used it successfully in women experiencing postpartum hemorrhage.

In an initial case-series report, the single balloon was used to treat postpartum hemorrhage in women with placenta previa or low-lying placenta and a suspicion of placental accreta.² Two subjects had placenta previa and a history of, in one case, three and, in the other, five prior cesarean deliveries—putting them both at greatly increased risk of placenta accreta. The Bakri balloon was placed at the time of cesarean delivery for those two women.

"How" in cesarean delivery. When the balloon is placed at the time of

FIGURE Bakri Postpartum Balloon



SOURCE: COOK MEDICAL, INC. USED WITH PERMISSION.

cesarean delivery, an assistant working from below helps pull the distal end of the balloon shaft through the cervix into the vagina. Next:

- The hysterotomy incision is closed
- A vaginal pack is placed to keep the balloon seated in the uterus
- The balloon is filled with 250 to 500 mL of sterile isotonic fluid
- The distal end of the balloon is attached to a weight, such as a liter intravenous fluid bag, to ensure that a tamponade effect is maintained.

After vaginal delivery. After vaginal delivery, minimal anesthesia is needed to place the Bakri balloon, as follows:

- A Foley catheter is inserted in the bladder to monitor urine output and reduce bladder volume

- The uterus is examined to ensure that there are no retained placental fragments
- The balloon is inserted into the uterus so that the entire balloon is past the internal cervical os; ultrasonographic guidance can help determine proper placement
- Using a syringe, the balloon is filled with sterile saline to the desired volume—again, typically, 250 to 500 mL
- Gentle downward traction is placed on the balloon stem to ensure that a tamponade effect is maintained
- A balloon that protrudes through the cervix can be deflated, repositioned, and reinflated
- Vaginal packing may be useful to help keep the balloon within the lower uterine segment
- The drainage port of the balloon is connected to a fluid collection bag to monitor uterine bleeding; the drainage port and tubing can, if necessary, be flushed with sterile saline to ensure patency and prevent clots from obstructing the drainage port
- The balloon is kept inflated for 12 to 24 hours—the maximum indwell.

Most clinicians administer an antibiotic until the balloon is removed. When the decision is made to remove the balloon, it can be deflated **1**) all at once or **2**) in two or three stages, with attention to the onset of new bleeding. An alternative approach, such as exploratory laparotomy or interventional radiology (IR), is indicated if a patient continues to bleed after the balloon is placed.

Advantages. The Bakri balloon is easily placed and removed. Its silicone composition reduces the chances that the balloon will “stick” to the uterine lining. The large central port provides real-time assessment of the effectiveness of balloon tamponade.

TABLE At your disposal, a range of interventions for postpartum hemorrhage

Pharmacotherapy		
Carboprost	Misoprostol	Vasopressin
Methergine	Oxytocin	
Blood banking		
Cryoprecipitate	Platelets	Red blood cells
Fresh-frozen plasma		
Surgery		
Repair of lacerations	Ligation of the hypogastric artery	Pelvic packing
B-Lynch suture	Other uterine compression sutures	Pelvic tourniquet
Hysterectomy, supracervical		
Hysterectomy, total		
Nonsurgical procedures		
Bakri Postpartum Balloon	Uterine balloon tamponade	Uterine packing
Interventional radiology		
Uterine artery balloons	Uterine embolization	
Consultation		
Anesthesiologist-intensivist	Interventional radiologist	Urologist
Gynecologic oncologist	Trauma surgeon	

This property of the device allows it to be used in a diagnostic manner—the so-called tamponade test.

Tamponade test

A common challenge for the OB when a woman has a massive postpartum hemorrhage is to determine—quickly—if she requires exploratory laparotomy or can be treated with conservative measures. In one case series, investigators concluded that, in women who have severe postpartum hemorrhage that is unresponsive to uterotonics, immediate placement of a uterine tamponade balloon is an effective test for rapidly distinguishing patients who need exploratory laparotomy from those whose condition can be managed conservatively.³

In that series, women who developed postpartum hemorrhage were

treated first with uterotonics, including oxytocin, ergometrine, and carboprost. Next, they underwent initial exploration to look for lacerations of the uterus, cervix, and vagina and to ensure that no placental tissue had been retained.

Sixteen subjects (most of whom had uterine atony as a provisional diagnosis) continued to have massive bleeding after those first two steps were employed. They next had a Sengstaken-Blakemore esophageal catheter placed in the uterine cavity. The catheter was then filled with 70 to 300 mL of warm saline. Gentle downward traction was applied to the catheter to ensure contact of the catheter with the lining of the uterus.

Uterine bleeding stopped quickly in 14 women after the intrauterine balloon was filled to produce the tamponade effect. Bleeding contin-

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ued in two women; they underwent exploratory laparotomy. Route of delivery for these 16 women included 10 vaginal and six cesarean deliveries; two of the 10 vaginal deliveries involved prostaglandin-induced second trimester abortions. This indicates that the tamponade test can be used after either vaginal or cesarean delivery and in either the second or third trimester.

The authors of a more recent case series also reported that balloon tamponade is successful for postpartum hemorrhage in most cases.⁴

The Bakri balloon can also be used in conjunction with additional interventions, including uterine compression sutures and uterine artery embolization.

The uterine sandwich

Combined use of a uterine compression stitch (B-Lynch compression suture using a 1-Vicryl suture) along with the placement of the Bakri balloon—the so-called uterine sandwich—may be indicated when postpartum hemorrhage occurs after C-section in select patients. In a report of a case series of five women in whom this combined technique was first described, uterotonics had failed to control the hemorrhage and no retained placental products were detected.⁵ Management proceeded as follows:

- A B-Lynch compression suture was placed with a 1-Vicryl suture
- A Bakri balloon was also placed, if determined to be necessary, with the stem brought out through the vagina
- The Bakri balloon was filled with, on average, 100 mL of fluid (range, 60 to 250 mL).

This approach controlled bleeding in all five cases.

Balloon combined with uterine artery embolization

Treatment of severe postpartum hemorrhage can also be accomplished by combining the Bakri balloon and uterine artery embolization. Initial management steps include, as mentioned, administration of uterotonics; uterine massage; fluid resuscitation; examination to detect and repair cervical and vaginal lacerations; and evaluation for retained placental tissue.

If those steps do not stop hemorrhage, a Bakri balloon can be placed and IR consultation requested to perform uterine artery embolization. Gathering a team to perform uterine artery embolization often takes 1 to 4 hours; in this setting, a Bakri balloon is a useful temporizing step that reduces bleeding while the IR team is assembled.

Potentially, a lifesaver

Postpartum hemorrhage occurs after approximately 5% of deliveries. A clinician who performs, say, 160 deliveries a year will confront this complication about eight times in that span. For an event that occurs only every 6 weeks, you need to develop, and rehearse, a systematic plan of response⁶ (TABLE, page 7). One component of a good plan, I believe, should be the Bakri balloon, which can be a life-saving device for women whose severe postpartum hemorrhage hasn't responded to first-line measures. 



OBG@DOWDENHEALTH.COM

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Cesarean delivery, uterine atony, hemorrhage, maternal death—what was the verdict in this malpractice case?

Find out on page 58 of *Medical Verdicts*

Instant Poll



How often did you use a Bakri balloon to treat postpartum hemorrhage during the past year?

- I did not use a Bakri balloon
- I used one once
- I used one between two and five times
- I used one more than five times

Take the **Instant Poll** at obgmanagement.com. How often did your colleagues use a Bakri balloon? Find out when **Instant Poll Results** are published in an upcoming issue.