



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Bakri balloon placement in the successful management of postpartum hemorrhage in a bicornuate uterus: A case report



Cynthia Abraham

Hofstra University, Northwell Health System, Staten Island University Hospital, United States

ARTICLE INFO

Article history:

Received 2 October 2016

Received in revised form 21 January 2017

Accepted 22 January 2017

Available online 24 January 2017

Keywords:

Bakri balloon

Cesarean

Uterine atony

Case report

ABSTRACT

INTRODUCTION: Postpartum hemorrhage is an obstetric emergency that accounts for 25% of maternal deaths worldwide. Initial management consists of uterotonic administration but in cases in which there is a failure of response to medication, uterine cavity tamponade can be effective. This is the first reported case of successful Bakri balloon placement in the management of postpartum hemorrhage at the time of cesarean delivery in a patient with a bicornuate uterus.

PRESENTATION OF CASE: The patient was a primigravid female who presented at 40 weeks and 1 day gestation with known bicornuate uterus and findings suggestive of placental abruption. Labor was subsequently induced and magnesium was administered after a diagnosis of preeclampsia with severe features was made. Cesarean delivery was then performed for category II fetal heart rate tracing remote from delivery. Intraoperative course was significant for uterine atony unresponsive to oxytocin, carboprost, methylergonovine and misoprostol administration. The right uterine horn was noted to be markedly atonic compared to the left. A Bakri balloon was then placed transvaginally and inflated with 600 mL of saline in this location. Atony then resolved.

DISCUSSION: Although uterine malformation is not a documented contraindication to Bakri balloon placement, there is no literature on its efficacy in the treatment of hemorrhage in the presence of this anomaly.

CONCLUSION: In the management of postpartum hemorrhage, Bakri balloon placement is associated with success in the presence of a bicornuate uterus. Care should be taken to direct insertion of the balloon in the appropriate location.

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1. Introduction

Postpartum hemorrhage is an obstetric emergency that accounts for 25% of maternal deaths worldwide [1]. It is defined as an estimated blood loss of over 500 mL following vaginal delivery or of over 1000 mL following cesarean delivery. The most common cause of postpartum hemorrhage is uterine atony which comprises 80% of these cases. Initial management of postpartum hemorrhage in the setting of uterine atony consists of administration of uterotonics which include oxytocin, carboprost, methylergonovine, and misoprostol. In cases in which there is a failure of response to uterotonic administration, tamponade of the uterine cavity has been found to be effective and can be performed by either packing with four-inch gauze or by placing a Foley catheter, Sengstaken-Blakemore tube or a Bakri balloon [2]. The Bakri balloon is the only one of these that was designed exclusively for uterine tamponade and there have been multiple studies, albeit it with small sample sizes, that have supported its efficacy in cases not only of uterine atony but also in those involving a low-lying placenta or

placenta previa [3,4]. However, to date, there exists no literature on its efficacy in those with uterine atony in the presence of uterine malformations.

This case bears the distinction of being the first reported case of successful use of the Bakri balloon in the management of postpartum hemorrhage in the presence of a bicornuate uterus. This case is being reported in line with the SCARE criteria [5].

2. Presentation of case

A 37 year old Hispanic primigravid woman at 40 weeks and 1 day gestation presented via ambulance to a university hospital with vaginal bleeding and painful contractions suggestive of placental abruption. She had no significant past medical or surgical history. Family and psychosocial history were also unremarkable. However, antepartum course was significant for sonographic imaging at 22 weeks gestation that detected an intramural fibroid measuring 28 mm and a bicornuate uterus with the fetus residing in the right uterine horn. Patient had not been aware of the uterine malformation prior to initiating prenatal care. Labor induction was initiated with use of the dinoprostone vaginal insert and continued with oxytocin. During the patient's intrapartum course, a

E-mail address: cabraham@northwell.edu

<http://dx.doi.org/10.1016/j.ijscr.2017.01.055>

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Fig. 1. Bicornuate uterus after cesarean delivery.

diagnosis of preeclampsia with severe features was made based on presence of severe range blood pressures and headache and scotomata. Magnesium infusion was then started for seizure prophylaxis. Further in the induction process, prolonged fetal heart rate decelerations were noted and subsequently, the decision was made by an attending physician in the Department of Obstetrics and Gynecology (OB/GYN) to proceed with cesarean delivery for category II fetal heart rate tracing remote from delivery. The cervix was dilated six centimeters. The cesarean delivery was performed by an attending OB/GYN physician and a second year OB/GYN resident. A Pfannenstiel incision was made and after delivery of the infant and closure of the uterine incision, the uterus was noted to be atonic after administration of 20 units of oxytocin mixed in intravenous fluids. Placenta had been removed easily and delivered intact. Fig. 1 depicts the bicornuate uterus after cesarean delivery. At this point, an additional 20 units of oxytocin mixed in intravenous fluids and three doses of carboprost each containing 250 micrograms (one intramuscular in deltoid, two in myometrium) were administered. No improvement in uterine tone was appreciated and approximately 600 mL of blood clots were noted on underlying sheets by the nurse. The patient was hypotensive (blood pressure nadir was 50/30) and tachycardic (heart rate maximum was 120). Subsequently, methylergonovine 0.2 mg was administered into the myometrium and 1000 micrograms of misoprostol per rectum was administered. No improvement in uterine tone and bleeding was appreciated. In the setting of ongoing bleeding, a decision was made to place a Bakri balloon transvaginally and the balloon was directed into the right uterine horn which was noted to have markedly decreased tone in comparison to the left. 600 mL of normal saline were used to inflate the balloon. Vaginal packing was placed and bleeding resolved. The remainder of the cesarean section was performed in the usual fashion. Two units of packed red blood cells were transfused intraoperatively and two more units of packed red blood cells were transfused on postoperative day 3. Preoperative hemoglobin was 14.3 g/dL. Hemoglobin immediately after surgery was 9.8 g/dL and trended down to 6.3 g/dL on postoperative day 3. Hemoglobin on postoperative day 4 was 9.5 g/dL. Coagulation profile parameters were within normal limits throughout the intraoperative and postoperative courses. Magnesium sulfate infusion for preeclampsia with severe features was resumed six hours after surgery after hemodynamic stability was confirmed. Immediate output from the Bakri balloon on placement was 200 mL but output over the 24 h that the Bakri balloon stayed in place ranged from 10 to 30 mL per hour.

Antibiotics were administered during the duration of Bakri balloon placement. No complications were encountered after Bakri balloon removal. Excessive vaginal bleeding did not recur. The patient was discharged to home on postoperative day 4 in stable condition and is currently doing well as of her gynecologic health maintenance assessment one year after this surgery.

3. Discussion

Postpartum hemorrhage is one of the most frequent obstetric complications in the United States. Intrauterine tamponade has emerged as an effective mode of nonsurgical treatment. The only method of uterine tamponade developed exclusively for purposes of suppressing hemorrhage is the Bakri balloon which is an inflatable balloon on a double lumen shaft that is 58 cm long and made of silicone material. Maximal balloon capacity is 800 mL and the tip of the shaft has two holes for drainage so ongoing hemorrhage can be detected after placement [6]. Multiple studies have been performed indicating the efficacy of the Bakri balloon in the management of postpartum hemorrhage and have cited success rates ranging from 65 to 90% [7]. Specifically, in one study that evaluated 151 cases of low-lying placenta and placenta previa, 114 developed postpartum hemorrhage of which in 72 of these cases, hemorrhage was managed with placement of a Bakri balloon with an associated success rate in achieving hemostasis of 87.5% [8]. However, based on a thorough PUBMED search, there have been no published reports indicating its use in those with uterine malformations.

This patient did not respond to multiple doses of uterotonics and the only non-surgical option that remained was uterine tamponade. Surgical options consist of uterine artery ligation, placement of B-Lynch sutures, hypogastric artery ligation and hysterectomy. The decision to proceed with uterine tamponade prior to implementing these surgical techniques was based on the finding that the right uterine horn was significantly more atonic than the left. It was also felt that uterine artery ligation, placement of B-Lynch sutures and/or hypogastric artery ligation would not be appropriate for several reasons. First, these procedures are difficult to perform and carry a risk of inadvertent injury to adjacent structures which is magnified in the setting of distorted pelvic anatomy. Second, they may not be effective in the presence of ongoing blood loss given the collateral blood supply of the uterus and may increase the risk of developing disseminated intravascular coagulopathy. Third, use of B-Lynch sutures would not necessarily address the lack of uterine tone in the right uterine horn and are associated with a risk of myometrial necrosis [9]. The diagnosis of a placenta accreta was of low consideration given the ease of placenta delivery and the patient's lack of risk factors for having placenta accreta.

In spite of the entire uterine cavity appearing to have a volume markedly greater than the maximal capacity associated with the balloon, placement of this balloon was directed in such a way as to address the area of concern. In this manner, not only did the vaginal bleeding cease but hemodynamic stability was attained. Furthermore, fertility was preserved and the patient did not experience any further complications.

4. Conclusion

This is the first reported case of successful use of the Bakri balloon in the management of postpartum hemorrhage in the presence of a bicornuate uterus. Physicians should be aware that uterine malformation is not a contraindication to Bakri balloon placement. We recommend when performing Bakri balloon placement in the presence of uterine malformations, efforts be made to precisely locate the site of bleeding. Furthermore, this case highlights the effectiveness and importance of attempting nonsurgical methods prior

to moving towards more invasive measures in the management of postpartum hemorrhage especially in those in whom surgical methods may carry a greater risk of adverse outcomes.

Conflict of interest statement

The author has no conflicts of interest to disclose.

Funding

None.

Ethical approval

Not applicable.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Author contribution

The author wrote the manuscript and performed the surgery described.

Guarantor

The Guarantor is Cynthia Abraham.

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