CASE REPORT

Intrauterine tamponade balloon use in the treatment of uterine inversion

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SUMMARY

Uterine inversion is a rare but life-threatening obstetrical emergency that occurs when the fundus of the uterus prolapses through the cervix, hence turning the uterus inside out. In this case report, we present our experience using an intrauterine tamponade balloon for management of uterine inversion, and a review of the literature. The utility of an intrauterine tamponade balloon in cases of uterine inversion, especially when maternal medical conditions preclude the use of uterotonic, or reinversion is observed should be kept in mind.

BACKGROUND

Uterine inversion predominantly occurs during the third stage of labour where the fundus of the uterus prolapses through the cervix, turning the uterus inside out. It is a rare and life-threatening emergency, which has been associated with macrosomia, rapid labour and delivery, short umbilical cord, nulliparity, use of uterine relaxants, abnormal placental and presence of uterine abnormalities.¹ While the diagnosis of uterine inversion is typically obvious, this occurrence is not always preventable. Active management during the third stage of labour is recommended, especially with women who are already at risk. Unless promptly recognised and treated, mismanagement of uterine inversion can lead to maternal morbidity, with the percentage of maternal mortality as high as 15%.¹

Optimal treatment of uterine inversion includes replacement of the uterus into its correct position, management of accompanying postpartum haemorrhage (if present), and prevention of recurrent inversion. While various medical and surgical techniques have been described for the treatment of an inverted uterus, data are sparse with respect to the use of a hydrostatic balloon. In this case report, we present our experience using an intrauterine hydrostatic balloon.

CASE PRESENTATION

A 38-year-old gravida 1 para 1 woman with an uncomplicated pregnancy underwent an induction of labour secondary to post-term pregnancy using Oxytocin. After an unremarkable labour course, she successfully delivered a male infant without any accompanying perineal lacerations or other complications. Immediately after expulsion of the placenta, which was accomplished with traction on the umbilical cord and manual uterine massage, uterine inversion and resultant postpartum haemorrhage were observed. Accordingly, the institution's postpartum

haemorrhage protocol was activated, and the rapid response team consisting of the on-duty obstetric (OB) hospitalist, anaesthesiologist and additional nursing staff was notified. Oxytocin infusion was discontinued, sublingual nitrous was administered, a second intravenous access obtained and uterotonic prepared for administration. The uterus was replaced manually; however, reinversion was observed shortly thereafter. Therefore, due to the ongoing postpartum haemorrhage and observed reinversion, the patient was moved to the operating suite. In the operating suite, due to the ongoing postpartum haemorrhage and reinversion, a dual-catheter intrauterine tamponade balloon (Ebb Balloon, Glenveigh Medical LLC, Tennessee, USA) was inserted under direct ultrasound guidance by the OB hospitalist, given his training and extensive experience with the device. The intrauterine and intravaginal balloons were infused with 400 and 240 mL of saline, respectively. The patient's haemodynamic parameters were noted to be within normal limits, although her laboratory evaluation demonstrated a mild anaemia (haemoglobin 9.6 g/dL, haematocrit 27.7%) and mild hypofibrinogenemia (212 mg/dL). The patient's postpartum course was unremarkable. Her postpartum haemorrhage resolved without any further intervention, her laboratory and haemodynamic parameters remained stable, and the intrauterine balloon was removed on postpartum day 1. Of note, antibiotic prophylaxis was administered while the balloon remained in place. She was discharged on postpartum day 2, and was noted to be doing well at her 6-week postpartum follow-up.

OUTCOME AND FOLLOW-UP

She was discharged on postpartum day 2, and was noted to be doing well at her 6-week postpartum follow-up.

DISCUSSION

Uterine inversion is an unpredictable and severe complication of childbirth that can lead to maternal death if not recognised and treated during the early stages. This incidence occurs when the uterus turns inside out, hypothesised to be caused by mismanagement of the third stage of labour.² Successful treatment of this condition is contingent on effective recognition and management of uterine inversion.

Management of uterine inversion generally involves (1) replacement of the uterus, (2) management of postpartum haemorrhage (if present) and (3) prevention of recurrence. Given that uterine atony is common following replacement of the uterus, use of uterotonic agents including oxytocin,

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carboprost, misoprostol or methylergonovine has been suggested. With the same end result in mind, several authors have reported the successful use of a uterine tamponade balloon and suggested its consideration for cases on inversion.^{3–6} In our case, given the reinversion following initial placement, along with the ongoing haemorrhage, led to the OB hospitalist's decision to place the balloon.

In 2009, Majd *et al* reported the successful use of an SOS Bakri tamponade balloon catheter (Cook Medical Incorporated, Bloomington, Indiana, USA) for a case of uterine inversion with reinversion 2 h following the initial replacement. In this case, the balloon infused with 300 mL of saline, which was removed 2 days later. The patient had an unremarkable recovery and was discharged to home 4 days following the inversion. Of note, she was maintained on antibiotic prophylaxis (piperacillin and tazobactam) while the balloon remained in situ.³

In 2010, Majumdar *et al*⁴ reported the successful use of the Rusch urological balloon catheter (Teleflex Incorporated, North Carolina, USA) in managing a case of uterine inversion. Within the same year, two other groups reported successful management of uterine inversion with the Rusch balloon as well, citing the low cost, large capacity and ease of use as advantages.^{5 6} The infused volume in the latter reports ranged between approximately 300 and 720 mL, antibiotic prophylaxis was employed in two of the three described cases, and the balloon was removed after 24 h in each case without any adverse sequelae.

In 2013, Kaya *et al* reported a case of a 22-year-old woman, who underwent a laparotomy, and subsequent Huntington procedure due to inversion. Unfortunately, despite uterotonics, recurrent inversion was encountered at which point an SOS Bakri balloon was inserted, and inflated with 600 mL of fluid. No further reinversion was noted.⁷

Similar to the above reports, the use of the balloon in our case assisted in resolution of the postpartum haemorrhage and appeared effective in prevention of reinversion. Furthermore, our device's vaginal balloon may have been helpful in preventing the intrauterine balloon from prolapsing out. This is an interesting point, which in some ways relates to the technique first described by O'Sullivan in 1945, and modified by Ogeuh in 1997 involving the use of hydrostatic pressure. As with his theory and subsequent modifications, optimal use of the technique involves blockage of fluid exit by maintaining the surgeon's hand or another device at the opening of the vagina.⁸ With the Ebb balloon, which was employed in our case, the vaginal and uterine balloons are separate, which may be advantageous in inversion cases as the vaginal balloon may prevent the unintended expulsion of the uterine balloon and accordingly decreases the likelihood of reinversion. Although Dildy *et al*⁹ recently documented the Ebb balloon's efficacy with respect to

postpartum haemorrhage, to our knowledge, this is the first report of the balloon's use for the management of uterine inversion.

In summary, we describe a case of uterine inversion managed by the dual-catheter Ebb tamponade system, along with several reports of successful management on inversions with the Bakri and Rusch balloons. The utility of an intrauterine tamponade balloon in cases of uterine inversion, especially when maternal medical conditions preclude the use of uterotonics, or reinversion is observed should be kept in mind.

Learning points

- ▶ Successful treatment of uterine inversion is contingent on effective recognition and management of uterine inversion.
- ▶ When traditional measures fail or are contraindicated, consideration should be given to the use of a hydrostatic balloon.
- ▶ Owing to the presence of an intrauterine foreign object, and ongoing lochia, antibiotic prophylaxis should be considered as long as the balloon remains in situ.

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Competing interests None.

Patient consent Obtained.

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REFERENCES

- 1 Witteveen T, van Stralen G, Zwart J, *et al*. Puerperal uterine inversion in the Netherlands: a nationwide cohort study. *Acta Obstet Gynecol Scand* 2013;92:334–7.
- 2 Hussain M, Jabeen T, Liaquat N, *et al*. Acute puerperal uterine inversion. *J Coll Physicians Surg Pak* 2004;14:215–17.
- 3 Majd HS, Pilsniak A, Reginald PW. Recurrent uterine inversion: a novel treatment approach using SOS Bakri balloon. *BJOG* 2009;116:999–1001.
- 4 Majumdar A, Saleh S, Bird A, *et al*. Successful conservative management of inversion of a fibroid uterus by hydrostatic balloon. *J Obstet Gynaecol* 2010;30:202–3.
- 5 Keriakos R, Chaudhuri SR. Managing major postpartum haemorrhage following acute uterine inversion with Rusch balloon catheter. *Case Rep Crit Care* 2011;2011:541479.
- 6 Uzoma A, Ola B. Complete uterine inversion managed with a Rusch balloon catheter. *J Med Cases* 2010;1:8–9.
- 7 Kaya B, Tüten A, Celik H, *et al*. Non-invasive management of acute recurrent puerperal uterine inversion with Bakri postpartum balloon. *Arch Gynecol Obstet* 2014;289:695–6.
- 8 Ogeuh O, Ayida G. Acute uterine inversion: a new technique of hydrostatic replacement. *BJOG* 1997;104:951–2.
- 9 Dildy GA, Belfort MA, Adair CD, *et al*; ebb Surveillance Study Team. Initial experience with a dual-balloon catheter for the management of postpartum hemorrhage. *Am J Obstet Gynecol* 2014;210:136.e1–6.

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