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CLINICAL ARTICLE

Management of postpartum hemorrhage with intrauterine balloon tamponade using a condom catheter in an Egyptian setting

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ABSTRACT

Objective: To evaluate uterine balloon tamponade using a condom catheter for the management of early postpartum hemorrhage (PPH). *Methods:* In a prospective observational study at Menoufia University Hospital, Shebin Elkom, Egypt, women with early PPH were enrolled between May 2011 and September 2012. Uterine balloon tamponade with a condom catheter was applied in women who were unresponsive to uterotonics and bimanual compression; patients with successful catheter placement were included in analyses. The primary outcome was successful control (reduction or cessation) of bleeding. *Results:* A condom catheter was successfully placed for 50 of the 151 women enrolled. The overall success rate of the procedure was 96% (48/50). The condom catheter was successful in all 28 cases of atonic PPH after vaginal or cesarean delivery. It successfully controlled PPH due placental site bleeding in 20 (91%) of 22 patients with placenta previa and a well-contracted uterus. *Conclusion:* Condom balloon catheter was found to effectively control PPH. The procedure is simple, inexpensive, and safe, and can preserve reproductive capacity, as well as saving the life of the mother.
ClinicalTrials.gov: NCT02672891.

1. Introduction

Postpartum hemorrhage (PPH) is defined as blood loss of more than 500 mL after vaginal delivery, or more than 1000 mL after cesarean delivery [1,2]. It remains one of the most common causes of maternal mortality and serious morbidity among women worldwide [1]. Even with appropriate treatment, severe PPH occurs in approximately 3.9% of vaginal deliveries [3]. The frequency of PPH is higher in operative deliveries, especially those conducted under general anesthesia. The incidence has been reported as 6.4% for cesarean deliveries [3].

The first-line treatment for atonic PPH is conservative management with uterotonic agents (e.g. oxytocin, methylergonovine, or prostaglandins) and bimanual compression. The second-line treatment for PPH includes external compression sutures such as B-Lynch and selective devascularization by ligation or embolization of the uterine artery [4–8]. When these conservative approaches fail, hysterectomy—which can be associated with additional blood loss and morbidity—is often undertaken [9].

The American College of Obstetricians and Gynecologists has recommended that, when uterotonic agents fail to lead to sustained uterine contractions and satisfactory control of PPH, uterine tamponade might be used as an effective means to treat PPH that is secondary to uterine atony [1]. Balloon tamponade has been widely used before application of the more invasive treatments [10]. Options for balloon tamponade include the Bakri balloon, the Rusch balloon, the Sengstaken–Blakemore tube, or Foley catheters [11].

The use of a condom catheter was first described by authors southeast Asia, who demonstrated the potential life-saving utility of their technique [12]. The aim of the present study was to evaluate the outcome of uterine balloon tamponade using a condom catheter in the management of early PPH in a low-resource setting.

2. Materials and methods

The present prospective observational study was undertaken in the Department of Obstetrics and Gynecology at Menoufia University Hospital, Shebin Elkom, Egypt, between May 1, 2011, and September 30, 2012. Women with early PPH (first 24 hours after delivery) were enrolled. Patients with traumatic PPH, retained placenta, coagulopathy, and severe systemic diseases were excluded. The local ethics committee at Menoufia University Hospital approved the study protocol and informed consent was obtained from all participants.

The standard therapy for PPH was intravenous oxytocin infusion, followed by 0.2 mg intramuscular ergometrine every 30 minutes for three doses if the uterus remained atonic, or 800–1000 μg rectal misoprostol and intramuscular prostaglandin F2-α (250 μg every 15–90 minutes to maximum of 2 mg) as needed. When these measures failed, balloon tamponade using a condom catheter was applied. If this treatment option also failed, a laparotomy with additional operative

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procedures was performed on the basis of the clinical situation and the preference of the attending consultant.

The balloon tamponade was inserted in either the delivery room or the operating room under intravenous sedation, spinal analgesia, or general anesthesia. The balloon tamponade comprised a latex condom (SURE, Shanghai, China) and a 16-20-F, 2-way silicon-coated Foley catheter. The catheter was placed inside the condom and fixed in place tightly with a silk suture to prevent air from escaping (Fig. 1). Transvaginal insertion was done after securing the anterior lip of the cervix with ring forceps. The balloon catheter was inserted into the uterine cavity manually or with forceps. For women with a patulous cervix owing to old cervical lacerations from previous deliveries, a stitch was place laterally between the anterior lip and the posterior lip of the cervix to narrow the os and prevent slippage of the balloon of the catheter. Vaginal packing was also inserted to prevent displacement of the balloon catheter. For women who delivered by cesarean, the catheter was inserted either through the uterine incision (pushing the tip to the fundus and the drainage port through the cervix into the vagina) or transvaginally, and the balloon was inflated after the uterine incision was closed.

The balloon was inflated with sterile normal saline until the uterine fundus was firmly palpable or no blood came through the cervix or the drainage channel. Inflation was usually started with approximately 100 mL using a 50-mL syringe with a small tip. The patient was reassessed and if the bleeding persisted, inflation was continued in 50-mL increments until adequate inflation was obtained; the maximum volume was 1000 mL.

Bleeding at the outflow port and the cervix was continually evaluated. The uterine fundus was palpated abdominally and marked with a pen as a reference line from which any uterine enlargement or distention was noted. Vaginal packing was then inserted to maintain the correct placement of the balloon and to maximize the effect of the tamponade.

Oxytocin was infused continuously to keep the uterus contracted (40 IU in 1 L of normal saline). Antibiotics (intravenous cefotaxime, 1 g every 8 h) were used to prevent infection for at least 24 hours after catheter removal. Analgesics were used to control pain.

Pulse, arterial blood pressure, uterine fundal height, blood in the collection bag of the drainage channel, and the presence of any vaginal bleeding were noted every 30 minutes. Patient temperature was recorded every 2 hours and urinary output every hour via an indwelling Foley catheter. After 18–24 hours, the balloon was removed. After the removal of the vaginal pack, the balloon was deflated slowly over approximately 5–10 minutes but was kept inside the uterus for 30 minutes. The oxytocin infusion was continued even with no bleeding. If there was still

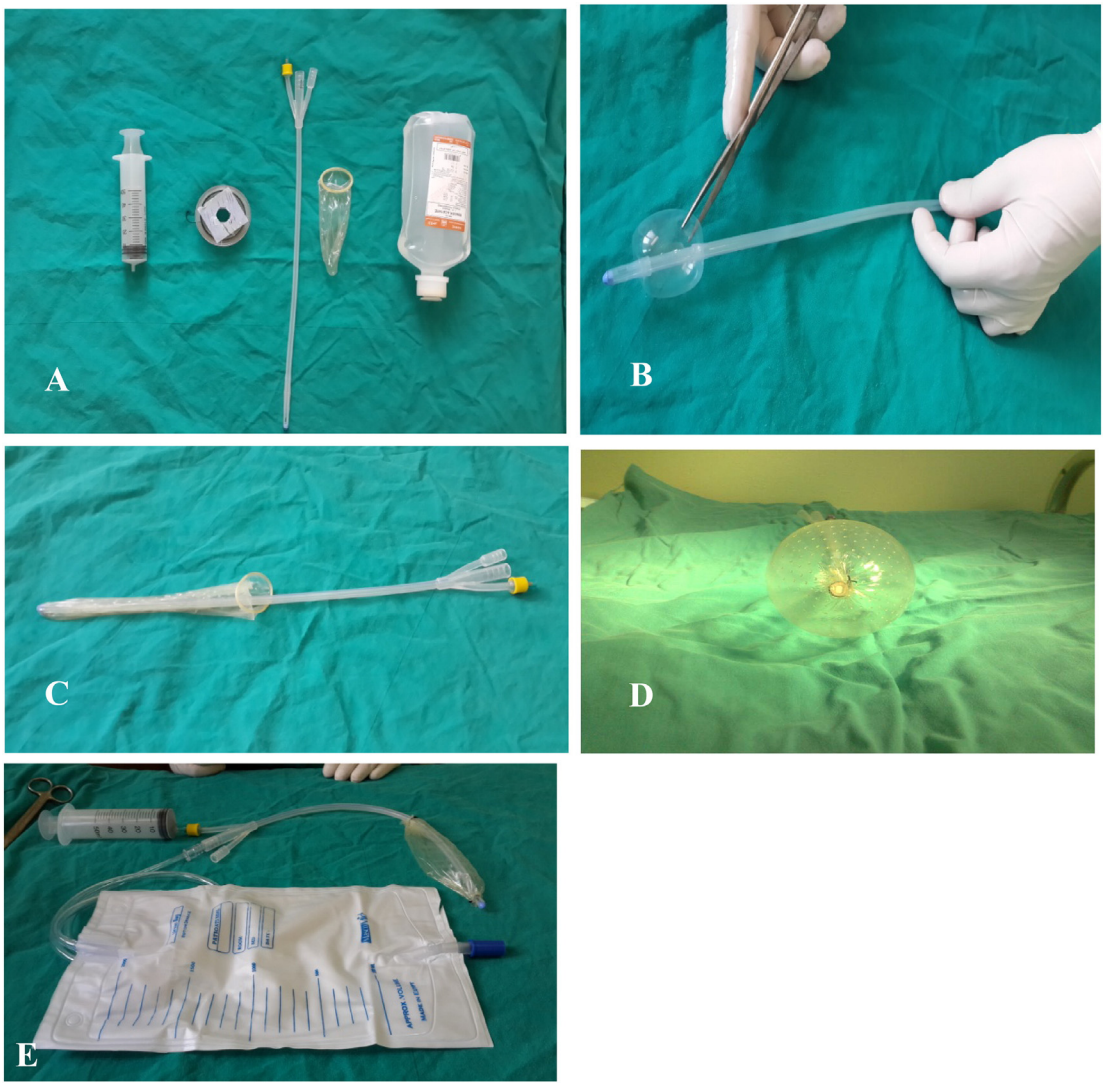

Fig. 1. Steps in the preparation of a condom balloon catheter. (A) Tools used (a 50-mL syringe, silk suture material, 16-20-F, 2-way silicon-coated Foley catheter, a latex condom, and normal saline solution for inflation). (B) Rupture of the balloon of the silicon catheter. (C) Application of the condom to the distal end of the silicon catheter. (D) Inflation of the condom catheter. (E) Channels for drainage.

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