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Successful use of BT-Cath® balloon tamponade in the management of postpartum haemorrhage due to placenta previa

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ABSTRACT

Objective: To investigate efficacy of the BT-Cath® in cases of uncontrollable haemorrhage due to placenta previa.
Study design: Retrospective study of women treated with the BT-Cath in the event of postpartum haemorrhage (PPH) due to placenta previa, despite optimal management with medical treatment.
Results: Between 2011 and 2013, 237 women had placenta previa (0.45%) at the study hospital. This study evaluated 53 women who underwent uterine tamponade with a BT-Cath. Haemostasis was achieved in 45 women (85%), and hysterectomy was required in six women (11%). Two women required repeat laparotomy. The mean duration of balloon tamponade was 9.8 h (standard deviation 6.4 h). When the relationship between balloon volume and treatment success was evaluated, the area under the receiver operating characteristic curve was 0.803 (95% confidence interval 0.633–0.973; $p = 0.007$) and the optimal cut-off point was 220 ml, with sensitivity of 88% and specificity of 71%.
Conclusion: The intra-uterine BT-Cath is simple to use, even among clinicians with little experience, and is an effective treatment choice in patients with PPH due to placenta previa when medical treatment is unsuccessful. Minimal inflation of the balloon, a shorter period of intra-uterine balloon tamponade and early deflation of the balloon are recommended.

Introduction

Placenta previa is a serious obstetric condition with a prevalence rate of 0.3–0.5% [1–3]. It is associated with older maternal age, higher parity, uterine scar tissue, endometrial damage and multiple gestations [2]. Placenta previa is one of the main causes of postpartum haemorrhage (PPH), and is the most common indication for caesarean hysterectomy [4–9]. In recent years, caesarean section has become the preferred mode of delivery by expectant mothers and doctors in Turkey, even in cases without medical or obstetric need [10]. In 2012, 48% of all births in Turkey were delivered by caesarean section; demographic and health surveys in 1993, 1998, 2003 and 2008 reported rates of 8%, 14%, 21% and 37%, respectively [11–15]. The prevalence of placenta previa has increased in conjunction with caesarean deliveries.

At present, there is no recommended approach for conservative management of PPH due to placenta previa [16]. When intractable uterine haemorrhage does not respond to medical treatment, surgical interventions such as uterine packing, compression sutures, pelvic vessel ligation (internal iliac and uterine arteries) and arterial embolization are used to avoid the need for hysterectomy [17–20]. The use of intra-uterine balloons has been reported to be effective for women with PPH due to uterine atony. Intra-uterine balloon tamponade is used as a prophylactic method for placenta previa. However, the efficacy of intra-uterine balloon tamponade in women with PPH due to placenta previa remains unclear, as few studies have been reported, and these were small case series that used various intra-uterine balloons such as condoms, Foley catheters, Sengstaken–Blakemore tube, and Rusch and Bakri balloons [21–28]. The BT-Cath® is a soft silicone balloon tamponade catheter that is used to control PPH [29]. The aim of this study was to evaluate the success rate of the BT-Cath in cases of uncontrollable haemorrhage due to placenta previa.

Materials and methods

This retrospective study evaluated 53 women treated with a BT-Cath (Utah Medical Products, Inc., Midvale, UT, USA) [29] after

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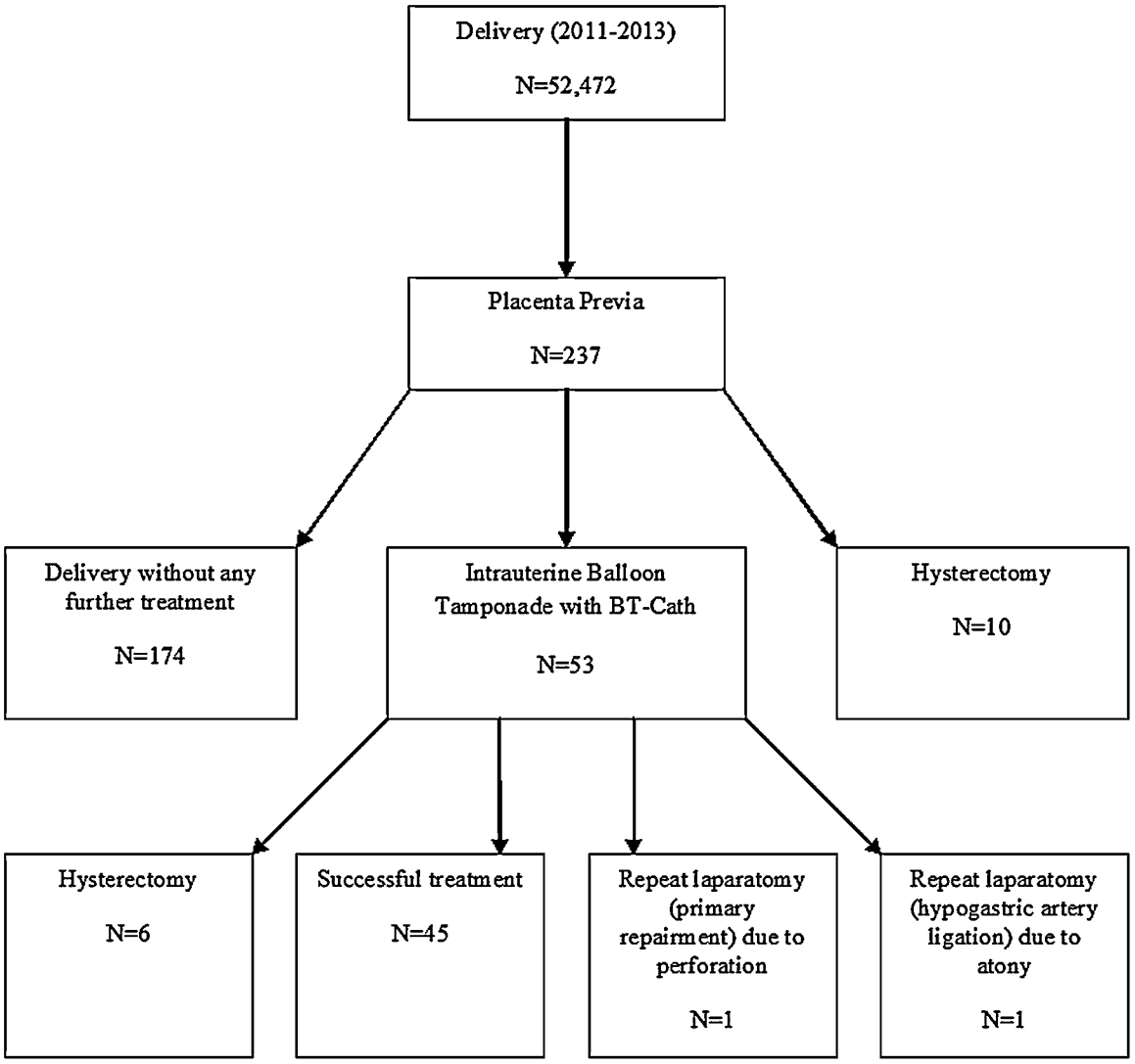

Fig. 1. Flowchart for the treatment of women with placenta previa.

unsuccessful medical treatment of PPH due to placenta previa at Zekai Tahir Burak Women's Health Care, Training and Research Hospital, Ankara, Turkey between January 2011 and December 2013. This hospital is a tertiary referral centre and accepts women with high-risk pregnancies from many Turkish cities. As such, the prevalence of placenta previa is relatively high at this hospital. The study was approved by the Institutional Review Board (57# 26/02/2013).

In total, 52,472 women gave birth at the study hospital between 2011 and 2013; 23,838 of these women had a caesarean section (45%). During the study period, 237 women (0.45%) were admitted to the study hospital with a diagnosis of placenta previa, confirmed by transvaginal ultrasound examination on admission. Of these, 174 women were managed with medical therapy and no further treatment was necessary following delivery (Fig. 1).

Prior to intra-uterine balloon insertion, all women received oxytocin (40 IU in 1000 ml of Ringer's solution at a rate of 250 ml/h intravenously), ergometrine (0.25–0.5 mg intramuscularly) and misoprostol (800 μg rectally or sublingually) in sequence. At the study hospital, if medical treatment fails and haemorrhage continues during a caesarean section, the use of a balloon is the first choice in women with placenta previa. The distal end of the balloon shaft is passed through the cervical opening using a long ring forceps, and retrieved vaginally by an assistant. The cervix is dilated with Hegar dilators if required. The balloon is inflated with up to 50 ml of warm saline stained with methylene blue to confirm balloon expansion (Fig. 2). As bleeding may conceal any leakage of saline from the balloon, methylene blue is used to ensure that any punctures in the balloon are easily noticed. The uterine incision is

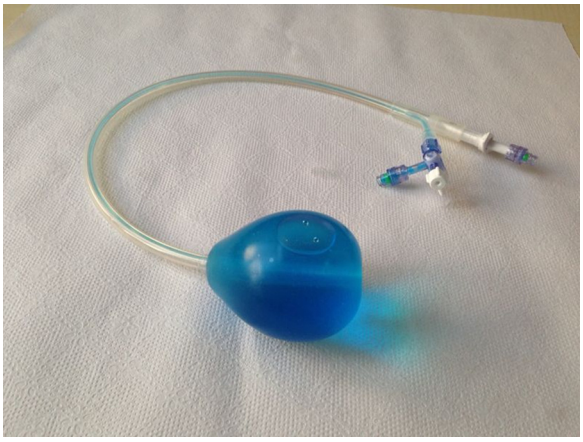

Fig. 2. The BT-Cath after inflation with warm saline stained with methylene blue.