

Management of intractable postpartum haemorrhage in a tertiary center: A 5-year experience

Hüseyin Cengiz, Levent Yaşar, Murat Ekin, Cihan Kaya, Sema Karakaş

Department of Gynecology and Obstetrics, Bakirkoy Dr. Sadi Konuk Teaching and Research Hospital, Istanbul, Turkey

ABSTRACT

Background: The purpose of this study is to describe treatment alternatives to prevent postpartum hysterectomy after failure of conventional therapies. Prevention of hysterectomy was the main outcome studied. **Materials and Methods:** This is a retrospective study of 19 patients diagnosed to have intractable postpartum hemorrhage and not managed with medical treatment who were subsequently treated with operative interventions in our unit between January 2004 and January 2009. The cases were identified by review of medical records. **Results:** In the period under review, a total of 17,341 deliveries were conducted, out of which 19 women were managed for intractable PPH. The incidence of severe PPH unresponsive to standard medical treatment was 0.1%. The mean maternal age was 33.5±3.4 years (range 27–39 years). The mean gestational age was 38.3±1.3 weeks (range 37–41 weeks). Organ preserving surgery methods were utilized in all the patients with a success rate 78.9%. The mean duration of surgery was 95 minutes (range 50–130 minutes) and the mean hospital stay was for 5 days. The mean transfused blood volume was 2.4 units as packed red cells. Among these 19 cases, 4 cases were resorted to hysterectomy. **Conclusions:** In the presence of uncontrolled hemorrhage, this simple procedure should be tried before other complex treatment alternatives are undertaken. Our case series suggests that the combination of uterine artery ligation with B-Lynch sutures might be the best surgical approach because it preserves future fertility better than other methods and avoids high operative risks and morbidity.

Key words: B-Lynch, hysterectomy, intensive care, postpartum hemorrhage, uterine artery ligation

Address for correspondence:

Dr. Hüseyin Cengiz,
Tevfik Sağlam Cad. No:11,
Zuhuratbaba, İstanbul.
E-mail: obstetrik@gmail.com

INTRODUCTION

Hemorrhage remains a major cause of maternal morbidity and mortality in the developed and developing world. Fourteen million cases of postpartum hemorrhage (PPH) occur worldwide each year, with a case-fatality rate of 1%; this is a total of 140,000 women, (one every 4 minutes).¹ PPH traditionally has been defined as blood loss in excess of 500 ml after a vaginal delivery and 1000 ml after a cesarean delivery. Using the traditional definitions, at least one half of deliveries would be categorized as having PPH. Perhaps a more useful definition of PPH would include blood loss sufficient to cause symptoms of hypovolemia, a 10% drop in the hematocrit after delivery or to require

transfusion of blood products.² Postpartum hemorrhage that occurs during the first 24 hours following delivery is termed primary, or early, postpartum bleeding.^{3,4} Secondary, or delayed, postpartum hemorrhage is usually defined as excessive bleeding from the genital tract, with a blood loss of 500 ml or more, that occurs after the first 24 hours following delivery until the 6th week of the puerperium.^{3,4}

Treatment options for PPH include conservative management with uterotonic drugs, selective devascularization by ligation or embolization of the uterine artery, external compression with uterine sutures (B-Lynch, Hayman, Cho), and intrauterine packing.⁵⁻⁹ The choice of treatment depends on several factors: delivery mode, the site of origin and volume of bleeding, the patient's hemodynamic tolerance, the technical, and human factors.

The purpose of this study is to describe treatment alternatives to prevent postpartum hysterectomy after failure of conventional therapies. Prevention of hysterectomy was the main outcome studied.

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MATERIALS AND METHODS

This is a retrospective study of 19 patients diagnosed to have intractable postpartum hemorrhage and managed with medical treatment who were subsequently treated with various interventions in our unit between January 2004 and January 2009. The cases were identified by review of medical records. Data retrieved were as follows: primary admission or referred case, duration between onset of PPH and arrival, condition at admission, resuscitative measures, procedures to manage PPH, presence of disseminated intravascular coagulation (DIC) and its management, duration of intensive care unit (ICU) stay, and maternal outcome. Early postpartum hemorrhage is described as that occurring within the first 24 hours after delivery and late postpartum hemorrhage is defined as the hemorrhage after 24 hours of delivery. In our unit, standard management for PPH included uterine massage, bimanual compression, and medication with oxytocin or analogs of prostaglandins E1 in selected cases. If these therapies failed to stop the bleeding, surgical treatment included uterine artery ligation, compression sutures with or without Bakri balloon tamponade and as a last resort, hysterectomy is considered. The study was approved by the institutional review board. The data were analyzed by the computed version of Statistical Package for Social Sciences for Windows (SPSS, version 15.0).

RESULTS

A total of 17,341 deliveries were conducted, out of which

19 women were managed for intractable PPH. The incidence of intractable PPH unresponsive to standard medical treatment was 0.1% ($n=19/17,341$). Table 1 summarizes the clinical characteristics of the patients included in this report. The mean maternal age was 33.5 ± 3.4 years (range 27–39 years). The mean gestational age was 38.3 ± 1.3 weeks (range 37–41 weeks). The median birthweight of the study population was 3479 g (range, 2550–4200). Five patients were admitted to the intensive care unit for postoperative surveillance. The median hemoglobin level before transfusion was 7.0 mg/dl (range, 4.0–9.4).

In 12 cases (63.2%), PPH was due to uterine atony, which was unresponsive to oxytocin (20–40 units in 1 l normal saline or lactated Ringer's solution intravenously), or analogs of prostaglandin E1 (800 mcg rectally). Other clinical indications for operative intervention was intractable bleeding due to placenta previa ($n=5$, 26.3%) and arteriovenous malformations ($n=2$, 10.5%). In all, 15 patients underwent caesarean section and four patients delivered vaginally.

Organ preserving surgery methods were utilized in all the patients with a success rate 78.9%. The mean duration of surgery was 95 minutes (range 50–130 minutes) and the mean hospital stay was for 5 days. The mean transfused blood volume was 2.4 units as packed red cells (range 0–9 units). Among these 19 cases, four cases were resorted to hysterectomy. All hysterectomies were performed within 24 hours after delivery. Surgical injuries related to hysterectomy included bladder laceration only

Table 1: Patient characteristics

Case no.	Delivery mode	Age	Parity	Gestational age/weeks	Adjunctive therapy			Transfusion, units	ICU	Etiology	Hb g/dl
					UAL	B-Lynch	Other				
1	Vaginal	34	5	39	+	+		2PBCs	—	Uterine atony	8.1
2	Cesarean	34	3	37	+	+	H	—	—	Placenta previa	9.2
3	Cesarean	33	3	37	+		H	2PBCs	—	Placenta previa	6.1
4	Cesarean	33	4	38	+		IILAL,H	5PBCs, 2FFPs	+	Placenta previa	5.1
5	Vaginal	32	2	38	+	+		2PBCs	—	Uterine atony	7.9
6	Cesarean	36	2	37	+	+		2PBCs	—	Uterine atony	7.6
7	Cesarean	35	3	37	+	+		4PBCs	—	Placenta previa	6.8
8	Cesarean (delayed hemorrhage)	27	2	39	+		IILAL,H	5PBCs, 4FFPs	+	AVM	4.0
9	Vaginal	29	3	39	+	+	Bakri	9PBCs, 4FFPs	+	Uterine atony	4.1
10	Cesarean	35	3	40	+	+		2PBCs	—	Uterine atony	8.4
11	Cesarean	38	2	41	+			—	—	Uterine atony	9.1
12	Cesarean	31	3	39	+	+		—	—	Uterine atony	7.5
13	Cesarean	38	2	37	+	+	Bakri	4PBCs, 2FFPs	+	Uterine atony	5.4
14	Cesarean	38	2	37	+	+	Bakri	4PBCs, 2FFPs	+	Uterine atony	5.4
15	Cesarean	31	2	41	+			—	—	Uterine atony	9.4
16	Cesarean (delayed hemorrhage)	27	2	38			Uterine artery embolization	—	—	AVM	7.6
17	Vaginal	39	4	40	+	+		4PBCs, 2FFPs	+	Uterine atony	6.1
18	Cesarean	35	3	37	+	+	IILAL	2PBCs	—	Uterine atony	7.5
19	Cesarean	37	2	37	+	+	IILAL	4PBCs	—	Placenta previa	6.4

H – Hysterectomy; UAL – Uterin artery ligation; IILAL – Internal iliac artery ligation; PBC – Packed blood cells; FFP – Fresh frozen plasma; AVM – Arteriovenous malformation; ICU – Intensive care unit; Hb – Hemoglobin (lowest concentration recorded before transfusion)

in one patient. One patient had wound infection in the postoperative period related to hysterectomy.

DISCUSSION

Traditionally, intractable postpartum hemorrhage (PPH) is defined as a life-threatening hemorrhage that is unresponsive to conservative treatment, such as uterine massage and uterotonic agents, and inevitably requires surgical intervention. The exact incidence of PPH is difficult to determine due to the difficulty of measuring blood loss accurately; most studies quote figures ranging from 5% to 12% of vaginal deliveries.^{10,11} In this study, the incidence of severe PPH was 0.1% (19/17,341) of all deliveries; this relatively low value may be due to the routine management of the third stage of labor with oxytocics in our referral center, which has been associated with a ~60% reduction in the incidence of PPH.¹²

Many publications have reported that placenta accreta has become the most common cause of intractable PPH.¹³⁻¹⁶ In our study, the most common cause of intractable PPH was uterine atony. Our hospital is a major referral center in an area with a low socioeconomic status. In this population, a low proportion of women have knowledge of the signs of complications that may occur during pregnancy, labor, birth, and the immediate or late postpartum periods. Thirteen of the patients were referred to our clinic from other hospitals. The management of PPH is dictated by several considerations, including hemodynamic status and the desire to preserve fertility. The last possible treatment option for severe PPH is hysterectomy, but conservative interventions are recommended primarily.¹⁷⁻²⁰ Doumouchsis *et al.*,²¹ found no significant difference in the success rates for arresting PPH using balloon tamponade, arterial embolization, iliac artery ligation, uterine devascularization, or uterine compression sutures. These options appear to be safe procedures that do not impair subsequent fertility and pregnancy outcomes.

We tried to preserve the uterus in all patients, but failed to stop the hemorrhage in four cases, for a total success rate of 78.9%. Three of four hysterectomies were performed due to abnormal placental implantation. The other indication was arteriovenous malformation. Uterine artery ligation (UAL) was the first choice in all cases except case 16 (arteriovenous malformation). The first reports of bilateral UAL were published by Waters²² in 1952 and O'Leary in 1966.²³ The reported success rate varies from 80% to 96%. Failures have been reported in cases of abnormal placentation and severe disseminated intravascular coagulation. Salvat *et al.*,²⁴ and Gungor *et al.*,¹⁶ reported a 100% success rate for a stepwise procedure with progressive ligation of the uterine and ovarian arteries. In our series, four patients underwent UAL; two of them had undergone hysterectomies. In our clinic, we almost always add compression sutures to UAL.

The reported success rate of bilateral hypogastric artery ligation varies widely from 42% to 93%.²⁵ Causes of hemorrhage, such as uterine atony and placenta accreta, are a major source of failure. We ligated the internal iliac artery in four patients, but had to perform hysterectomies in two of these. We have not ligated the internal iliac artery since 2008. We believe that for intractable PPH, the uterine artery ligation should be performed instead of internal iliac artery ligation, which is less effective and technically more difficult. Compression techniques aim to achieve hemostasis by compressing the myometrium with transfixing sutures. The two most common techniques are the B-Lynch plication technique described by B-Lynch *et al.*,⁶ and multiple mattress sutures described by Cho *et al.*⁸ According to Basket,²⁶ hysterectomy was avoided with the use of compression sutures in 82% of patients. Price and B-Lynch²⁷ presented a detailed review of 15 published reports, which included 46 cases with two failures. We prefer to perform the B-Lynch technique in our clinic in case of atony bleeding. B-Lynch compression sutures were used in 13 cases in this study, but we do not use these sutures alone; we apply them after ligating the uterine vessels. Only one patient had a hysterectomy, and that patient had abnormal placental implantation. No short- or long-term complication was observed in patients receiving compression sutures. Given the serious complications related to hysterectomy after PPH, alternative procedures, such as intrauterine balloon tamponade, have gained popularity.²⁸⁻³³ Vitthala *et al.*,³² treated 15 PPH cases with Bakri balloons, achieving an overall effectiveness of 80%. We used Bakri balloons in combination with B-Lynch sutures as a second step in three cases. Diemert *et al.*,³⁴ reported the largest series in which PPH was treated with Bakri balloons in combination with B-Lynch sutures. None of our patients receiving this treatment required a hysterectomy; thus, combination treatment with Bakri balloons was successful in our series.

Only one of our patients underwent arterial embolization. She was 27 years old and was referred to our clinic 7 days after a Cesarean section. The bleeding decreased immediately after embolization. Given its high success rate, relatively low complication rate, and preservation of fertility potential, arterial embolization should be considered as the treatment of choice for intractable PPH.³⁵ With the availability of specialists and facilities for arterial embolization, the procedure is a safe alternative to surgery. We acknowledge that our study is limited because we could not determine the total amount of patients' blood loss. The study was also retrospective in design and included a limited number of cases. However, given the severity of this emergency condition, a prospective, randomized, controlled trial would be impossible for ethical and legal reasons.³⁶

In conclusion, in the presence of uncontrolled hemorrhage, this simple procedure should be tried before other complex treatment alternatives are undertaken. Our case series suggests that the combination of uterine artery ligation

with B-Lynch sutures might be the best surgical approach because it preserves future fertility better than other methods and avoids high operative risks and morbidity. With our positive experience, we will continue to perform uterine artery ligation combined with the use of B-Lynch sutures to treat severe PPH.

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