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Evaluation of Patients with Postpartum Hemorrhage Patients in a University-Affiliated Tertiary Care Hospital

Üçüncü Basamak Afiliye Üniversite Hastanesinde Postpartum Hemoraji Tanısı Konan Hastaların Değerlendirilmesi

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Abstract

Aim: To retrospectively evaluate patients with postpartum hemorrhage (PPH) and to report the incidence, indication, and complications of PPH-related hysterectomies.

Methods: We evaluated medical records of patients who received the diagnosis of in a university-affiliated tertiary care hospital between February 2013 and September 2014.

Results: A total of 1724 deliveries were included in the study. 36 deliveries (2.08%) were complicated with PPH. PPH was found to result from the following conditions; uterine atony (n=19), placenta previa (n=8), vaginal lacerations (n=7), and coagulation disorders (n=2). A total of 7 patients (19.4%) with PPH, of whom two had uterine atony and five had placenta previa, underwent hysterectomy (4.06 per 1000 births). Application of B-Lynch uterine compression suturing and hypogastric artery ligation did not stop PPH in two patients with atony after primary caesarean section. Balloon tamponade was successful in 71.4% of patients with placenta previa. The most common complication among hysterectomy patients was admission to intensive care unit.

Conclusion: Despite the improvements in conservative management strategies, our hysterectomy rate was higher than the reported literature. We conclude that management options should be individualized according to diagnosis, hemodynamic stability of patients and also facilities of the medical centre.

Keywords: Uterine atony, hysterectomy, placenta previa, postpartum hemorrhage

Öz

Amaç: Postpartum kanama (PPK) tanısı alan hastaları retrospektif olarak değerlendirmek ve PPK'ya bağlı histerektomilerin insidans, endikasyon ve komplikasyonlarını bildirmektir.

Yöntemler: Bu çalışma üçüncü basamak afiliye üniversite hastanesinde Şubat 2013 ve Eylül 2014 arasında PPK tanısı alan hastaları tanımlayan retrospektif kesitsel çalışma olarak planlanmıştır.

Bulgular: Değerlendirilen 1724 doğum olgusunda 36 (%2,08) doğum PPK ile komplike olmuştur. PPK ile komplike olan gebeliklerin tanıları; uterin atoni (n=19), plasenta previa (n=8), vajinal laserasyonlar (n=7), koagülasyon bozukluklarıdır (n=2). PPK ile komplike olan bu 36 gebeliğin yedisinde (%19,4) histerektomi yapılmıştır. Bu 1000 doğumda 4,06 oranına denk gelmektedir. Histerektomi yapılan gruptaki hastalarda uterin atoni (n=2) ve plasenta previa (n=5) tanıları mevcuttu. Primer sezaryen sonrası uterin atoni gelişen iki hastada B-lynch sütürü ve hipogastrik arter ligasyonu yapılmış ancak PPK durdurulamayarak histerektomi yapılmıştır. Plasenta previa nedeni ile PPK geçiren hastaların %71,4'ünde sadece balon tamponat uygulaması ile PPK durdurulmuş ve histerektomi yapılmamıştır. PPK nedeni ile histerektomi yapılan hastalarda görülen en sık komplikasyon yoğun bakıma yatış yapılmasıdır.

Sonuç: Konservatif yönetim stratejilerinin artmasına rağmen histerektomi oranımız literatürdeki oranlardan yüksektir. Sonuç olarak PPK'nın yönetim şekli hastanın tanısına, hemodinamik stabilitesine ve mevcut kurumun olanaklarına göre şekillendirilmelidir.

Anahtar Sözcükler: Uterin atoni, histerektomi, plasenta previa, postpartum hemoraji

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Introduction

Maternal mortality (MM) is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy. According to the Millennium Development Goals adopted at the 2000 Millennium Summit, one of the targets was reducing the MM rate (MMR) by three quarters between 1990 and 2015 (1). Since then, the annual worldwide number of maternal deaths decreased by 34% between 1990 and 2008, from 546.000 to 358.000 deaths decreasing the MMR from 400 to 260 maternal deaths per 100.000 live births (2). In Turkey, MMR decreased from 68 to 23 per 100.000 live births between 1990 and 2008 (2). Since MMR is still considered as a strong indicator of international development, developing countries strongly focus on the preventable deaths especially from maternal causes (3). Direct maternal causes of MM are hemorrhage, hypertension, thromboembolism, dystocia and infections. postpartum hemorrhage (PPH) is a potentially preventable obstetric emergency which may complicate both vaginal and cesarean deliveries. Maternal mortality incidence due to PPH ranged between 1% and 5% among all deliveries (4). Since PPH is preventable, accurate and early diagnosis is very important in order to initiate attempts to save maternal lives. PPH is mostly defined as a blood loss of ≥500 mL in the 24 hours after a vaginal birth or ≥1000 mL after a cesarean delivery. PPH is defined as primary (early) or secondary (late) depending on the time of hemorrhage. If PPH occurs within 24 hours following delivery it is called as primary (early). Secondary or late PPH occurs in 24 hours to 12 weeks after delivery. Royal College of Obstetricians and Gynecologists (RCOG) also classifies PPH as minor (500 to 1000 mLs) or major (>1000 mLs) depending on the amount of blood loss (5). PPH is diagnosed clinically as severe uterine bleeding which makes the patient symptomatic (pallor, weakness, palpitations, syncope, air hunger) for signs of hypovolemia (hypotension, tachycardia, oliguria, and decrease in oxygen saturation). Regardless of the route of delivery, management options include pharmacological interventions (e.g., oxytocin, methergine, misoprostol), non-surgical interventions (e.g., uterine massage, iv fluids, balloon tamponade), surgical interventions (e.g., curettage, repair of lacerations, hypogastric artery ligation (HAL), focal myometrial excision, supracervical or total hysterectomy), radiological interventions (uterine artery balloon or embolization), and transfusion of blood bank products (packed red blood cells, platelets, fresh frozen plasma, cryoprecipitate). According to the policy of our institution, we meticulously register the performed treatment modalities and postpartum course of PPH patients in order to generate an ideal first-line treatment strategy for further cases and to prevent or reduce mortality from PPH. In this trial, we report our one-center experience in management options to stop PPH and results of the evaluations of patients with PPH-related hysterectomy.

Methods

This is a retrospective descriptive case series study of patients diagnosed with PPH who underwent hysterectomy due to PPH in Muğla Sıtkı Koçman University Training and Research Hospital. Ethical approval to perform the study was obtained from the Ethics Committee of Muğla Sıtkı Koçman University. We evaluated the medical records between February 2013 and September 2014 from hospital database. The data retrieved were as follows: maternal age, gestational age at admission, parity, median hemoglobin level before blood products transfusion, mean hospital stay, mean transfused blood volume, maternal outcome, potential risk factors for PPH, experienced procedures to manage PPH, type of PPH and complications. We also evaluated the performed management options that were uterine massage and compression, administration of uterotonics, balloon tamponade, uterine compression sutures, uterine artery ligation, HAL and blood products transfusion. Supracervical/total hysterectomy was reserved until these conservative managements failed. The data were analyzed by descriptive statistics.

Results

A total of 1724 deliveries were conducted within this time period. The total cesarean section (CS) rate was 62.22% whereas primary CS rate was 32.22%. Out of those deliveries, 36 pregnancies (2.08%) were complicated with PPH. The diagnosis of the patients complicated with PPH was as follows: uterine atony (n=19), placenta previa (n=8), vaginal lacerations (n=7), coagulation disorders (n=2). The indications for CS in patients with PPH were as follows: previous CS, fetal macrosomia, and cephalopelvic disproportion. Only two patients were diagnosed with late PPH and 34 patients were diagnosed as having early PPH. Diagnosis and delivery route of the patients at the time PPH and related hysterectomies are shown in Table 1. The mean age of the patients with PPH was 27.8±6 years (range=19-40 years).

Medical and conservative surgical procedures were successful in 29 PPH patients (80.5%). Immediate repair of genital lacerations was performed to stop hemorrhage in vaginal laceration group and none of the patients in vaginal laceration group (Table 1) underwent laparotomy or hysterectomy. PPH in two of the patients with thrombocytopenia (Table 1) responded to thrombocyte and fresh frozen plasma transfusion. Uterotonics, such as oxytocin (iv), methylergonovine (im) and misoprostol (rectal), and uterine fundal massage and transfusion of

Table 1. Diagnosis and delivery route of the patients at the time of postpartum hemorrhage and number of related hysterectomies

Age/Medical History	Parity	Gestation (weeks)	Route of delivery	Recognition time of the symptoms	Clinical symptoms and signs	Treatment	Transfusion	Complication
35, No any medical problem (Referral)	G2P1	39^{+2}	NSD	6 hours after delivery (early PPH)	SUB, RP, AU, MSU	UM, U, RUGA, SCH	9 PRC 5 FFP	Drainage site haemorrhage
38, No any medical problem	G3P2	38^{+3}	CS Previous CS PP	At caesarean section (early PPH)	SUB, PP	U, BT, UAHAL, TH	12 PRC 7 FFP 10 T	ICU
30, Skeletal and thorax deformity (Referral)	G2P1	38^{+2}	CS Previous CS	7 days after caesarean section (late PPH)	SUB, AU	UM, U, UP, TH	6 PRC 6 FFP	Pleural effusion, ICU
32, No any medical problem	G3P1A1	39^{+5}	NSD	6 hours after delivery (early PPH)	SUB, RP, AU, MSU	UM, U, RUGA, TH	6PRC 2 FFP	None
21, No any medical problem	G1P0	41^{+2}	CS Macrosomia*	4 hours after delivery (early PPH)	SUB, AU	UM, U, UAHAL, UCS, TH	8 PRC 7 FFP 6 T	Incision site infection, ICU
33, Skeletal and thorax deformity	G1P0	39^{+0}	CS CPD	At caesarean section (early PPH)	SUB, AU	UM, U, UAHAL, UCS, TH	6 PRC 6 FFP 2 T	Pleural effusion, ICU
35, No any medical problem	G4P2A1	37^{+1}	CS Previous CS PP	At caesarean section (early PPH)	SUB, PP, P. Percreta	U, TH	6 PRC 2 FFP	Bladder injury

PPH: Postpartum hemorrhage, AU: Atonic uterus, BT: Balloon tamponade, CPD: Cephalopelvic disproportion, FFP: Fresh frozen plasma, ICU: Intensive care unit, MSU: Mass suspicion in the uterus, PP: Placenta praevia, PRC: Packed red blood cell, RP: Retained placenta, RUGA: Attempt for removal of the retained placenta under general anaesthesia, SUB: Severe uterine bleeding, T: Thrombocyte, TH: Total hysterectomy, SCH: Supracervical hysterectomy, UAHAL: Uterine artery and hypogastric artery ligation, UM: Uterine massage, U: Uterotonics, UP: Uterine packing, UCS: Uterine compression sutures, CS: Cesarean section

blood products stopped bleeding in 14 atony patients (73.6%) (Table 1). Vaginal delivery rate in uterine atony group was 9/19 (47.4%) (Table 1) and only two patients did not respond to conservative medical interventions and underwent laparotomy. These two patients were suspected of having placental mass in the uterus. Attempts for the removal of these masses under general anesthesia also failed and hysterectomy was performed after bleeding started.

Hysterectomy was performed in seven (19.4%) out of 36 PPH-complicated pregnancies with a rate of 4.06 per 1000 births. The demographics, performed treatment modalities and postpartum complications of patients in hysterectomy group are shown in Table 2. The major reason for hysterectomy was failed attempts to stop bleeding by conservative methods (Table 2). Relaparotomy rate in vaginal delivery group was 2/16 (12%) while it was 2/20 (10%) in CS group. HAL was performed in one patient with placenta previa in order to decrease bleeding during hysterectomy and in two patients with uterine atony occurred after primary CS in order to strengthen the effects of uterine compression sutures. However, combination of HAL and B-Lynch uterine compression sutures failed in reducing PPH, thus, hysterectomy was performed.

The patients with placenta previa were evaluated separately (Table 3). In placenta previa group (n=8), one patient was finally diagnosed as having placenta percreta during CS and hysterectomy was performed without attempts for conservative options (Table 3). Except for the patient with placenta percreta, Bakri balloon tamponade stopped PPH in five patients (71.4%), HAL alone was able to stop bleeding in one patient (14.3%) (Table 3) and, in the remaining one patient, combined HAL and Balloon tamponade failed in stopping PPH (14.3%).

Discussion

The management of PPH might differ depending on the cause and on the route of delivery. The most common cause of PPH is atony which is responsible for 80% of PPHs. Since the great majority of PPH is due to uterine atony, primary interventions should be targeted to preserve uterine contractions by uterotonic drugs and uterine massage. If these first-line conservative treatment modalities fail to stop PPH, uterine tamponade either by balloon or packing should be applied. During these management options, patients should be carefully evaluated for vital signs and replacement modalities should not be delayed. If these fail to stop PPH, secondary interventions, such as uterine artery embolization must be performed. If uterine atony is unresponsive to conservative interventions, laparotomy is indicated. During laparotomy, conservative surgical interventions, such as uterine tourniquets, aortic compression, selective pelvic arterial embolization, intra-aortic balloon catheter placement, uterine artery and utero-ovarian artery ligation, HAL, and uterine compression sutures should be the first-choice. Hysterectomy, a non-conservative surgical intervention, is the last resort for the treatment of atony. In this trial, we evaluated the above mentioned treatment modalities that were performed in our patients with PPH and also the possible factors contributing to the high hysterectomy rates in our obstetrics and gynecology department. In our case series, first-line conservative treatment modalities, such as uterotonics and fundal massage were successful in 14 of 19 (73.6%) uterine atony patients. After failed first-line treatment modalities, only two patients with uterine atony, which occurred after vaginal delivery, underwent laparotomy. These described management approaches do not have to be ordered in steps as shown in detail in our case series. If the patient requires prompt control of hemorrhage, hysterectomy (total or supracervical) should not be delayed in order to prevent death from hemorrhage.

Our calculated incidence of hysterectomy due to PPH was 7 in 1724 live births (0.40%) between February 2013 and September 2014. Bakri (6) balloon was designed to tamponade uterus by applying uterine pressure up to efficient levels. The balloon can be inflated with a maximum of 800 cm^3 sterile water or saline in selected cases with low-lying placenta or placenta previa. Recommended volume of Bakri balloon is between 250 cm^3 and 500 cm^3. Bakri balloon has also the advantage of directly measuring

Table 2. Hysterectomy group-demographic characteristics of the patients

Diagnosis	n (%)	CS n (%)	Hysterectomy after CS n (%)	NSPD n (%)	Hysterectomy after NSPD n (%)	Total hysterectomy n (%)
Uterine atony	19 (52.8)	10 (52.6)	3 (30)	9 (47.4)	2 (22.2)	5 (26.3)
Placenta praevia	8 (22.2)	8 (100)	2 (25)	0	0	2 (25)
Genital laceration	7 (19.4)	0	0	7 (100)	0	0
Thrombocytopenia	2 (5.6)	2 (100)	0	0	0	0
Total	36 (100)	20 (55.6)	5 (25)	16 (44.4)	2 (12.5)	7 (19.4)

NSPD: Normal spontaneous vaginal delivery, CS: Cesarean section

Table 3. Treatment Modalities in Placenta Praevia Patients (excluding Placenta Percreta) at the time of postpartum hemorrhage and related hysterectomies

Treatment Modality	n	Primary CS n (%)	Previous CS n (%)	Hysterectomy n (%)
Balloon	5	3 (60)	2 (40)	0
HAL	1	0	1	0
Balloon+HAL	1	0	1	1
Total	7	3 (42.9)	4 (57.1)	1

HAL: Hypogastric artery ligation,
CS: Cesarean section

the amount of bleeding. Bakri et al. (6) have reported effective and non-traumatic use of balloon tamponade in six patients with cervical pregnancy, low-lying placenta and placenta previa with PPH. In patients in whom the Bakri Balloon tamponade was used, the hemorrhage was refractory to uterotonics and the balloon was inflated up to 300 cm^3. In our placenta previa group, Bakri Balloon tamponade managed to stop bleeding in five patients. After balloon tamponade and HAL ligation, uterine and abdominal layers were closed and the patient was examined in dorsolithotomy position in order to observe the amount of hemorrhage. However, hemorrhage could not be stopped and relaparotomy was finalized with hysterectomy. Cekmez et al. (7) have reported their success rate as 70% in their series on insertion of balloon tamponade for uterine atony and placenta previa. Alouini et al. (8) have reported 88% success rate of stopping PPH by applying balloon tamponade in patients with uterine atony, placenta previa, placental retention and cervical or vaginal tears. Regarding our preliminary results, more cases are needed to demonstrate our success rate of balloon tamponade in PPH.

B-Lynch et al. (9) first introduced uterine compression sutures, which stopped ongoing hemorrhage, in 1997. Since then, many compression sutures, such as Cho et al. suture (10), Hayman et al. (11) suture and Matsubara et al. (12) (MY) suture for controlling PPH. An average success rate of hemostasis by compression sutures has been reported to be 97% in an overview of 11 original articles (13) and 66% (14) and 75% (15) in other reported case series. We applied uterine compression sutures in two patients who underwent hysterectomy. Both patients were primiparous and were diagnosed as having uterine atony after primary CS. In these two patients, HAL together with uterine compression sutures failed to stop hemorrhage. We did not perform B-Lynch et al. (9) compression sutures in any patients with placenta previa or multiparous women with uterine atony.

HAL decreases uterine artery pulse pressure and increases the success rate in other surgical treatment approaches like Bakri balloon tamponade and uterine compression sutures to treat PPH. However, HAL together with balloon tamponade or B-Lynch et al. (9) uterine compression suture failed to stop PPH while the use of HAL alone in placenta previa managed to reduce bleeding and avoid hysterectomy in our case series.

Danışman et al. (16) have reported success rates of 40% and 25% for Bakri balloon tamponade and B-Lynch uterine compression sutures, respectively, and demonstrated that the effectiveness of balloon tamponade was facilitated by concomitant use of bilateral HAL. Joshi et al. (17) evaluated 84 patients who underwent therapeutic bilateral HAL to control PPH in 33 patients (39.3%), HAL failed and the patients underwent hysterectomy. Our conflicting results might be due to our limited number of the patients and limited facilities, such as intensive care unit and Bakri Balloon storage for emergency cases in our hospital.

Hysterectomy should be reserved for PPH patients resistant to conservative medical and surgical managements. Danisman et al. (16) evaluated 61 severe PPH patients and evaluated the efficacy of treatment modalities in these patients. The overall hysterectomy rate was 41% (25/61). Kaya et al. (18) evaluated 36 PPH cases of patients with uterine atony refractory to medical managements who were treated with B-Lynch compression suture with or without other surgical procedures. Two out of 36 women (5.5%) underwent hysterectomy after several surgical procedures failed. Shamsa et al. (19). evaluated 46.177 births and reported 56 cases of peripartum hysterectomy, a rate of 1.22 per 1000 births. In their retrospective study of data of 10864 women, Cekmez et al. (7) evaluated 32 PPH patients and have reported seven peripartum hysterectomy cases with a rate of 0.6 per 1000 births. In our case series, the overall hysterectomy rate was 19.4% in PPH patients, 4.06 per 1000 births. The rate of peripartum hysterectomy was higher in our case series than the reported literature. This might be due to referrals from other hospitals and being the only referral centre in the district.

According to our report of experiences with PPH-related hysterectomy cases, despite the improvements in effective medical and conservative management strategies, hysterectomy should be an option for PPH in hospitals with limited facilities.

Ethics

Ethics Committee Approval: It was taken, Informed Consent: Retrospective study. Peer-review: Internal peer-reviewed.

Authorship Contributions

Concept: Burcu Kasap. Design: Eren Akbaba, Data Collection or Processing: Gökalp Öner. Analysis or Interpretation: Mert Küçük. Literature Search: Melike Nur

Akın. Writing: Nilgün Turhan Öztürk, Rüya Deveer.

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