Emergency Peripartum Hysterectomy as Postpartum Hemorrhage Treatment: Incidence, Risk factors, and Complications

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ABSTRACT

Introduction: The aim of the research was to investigate incidence, risk factors, and complications associated with emergency peripartum hysterectomy, the ultimate treatment method for intractable postpartum hemorrhage.

Methods: This is a single center case-control study conducted in Chongqing city in central China from 1st January 2007 to 31st December 2012 for emergency peripartum hysterectomy performed as a treatment of postpartum hemorrhage both in caesarean and vaginal delivery cases. While the study group included emergency peripartum hysterectomy (n=61) due to intractable postpartum hemorrhage, the control group included no hysterectomy (n=333) during the same study period.

Results: We found 61 cases recorded for emergency peripartum hysterectomy for intractable postpartum hemorrhage. Incidence of peripartum hysterectomy was 2.2 per 1000 deliveries. Emergency peripartum hysterectomy as treatment of intractable postpartum hemorrhage include the followings: (i) blood loss 1000-2000 ml, crude odd ratio (OR) =18.48 (95% CI 5.1-65.7), adjusted odd ratio (AOR) = 9.1 (95% CI 2.2-37.7); (ii) blood loss >2000 ml, OR = 152 (95% CI 43.7-528.4), AOR = 45.3 (95% CI 11.6-176.9); (iii) previous caesarean section, OR = 5.5 (95% CI 2.9-9.7), AOR = 3.7(95% CI 1.4-9.9); (iv) uterine atony, OR = 11.9 (95% CI 5.8-24.6), AOR = 7.5 (95% CI 1.8-30.2); (v) placenta previa, OR = 2.04 (95% CI 1.1-3.5), AOR = none.

Conclusions: Emergency peripartum hysterectomy is the last resort as treatment of intractable severe postpartum hemorrhage. Our study depicts that severe post partum hemorrhage, further dreaded complex events for emergency peripartum hysterectomy, has significant association with placental factors, previous caesarean section, and uterine atony. Pathologically, placenta accreta remained the most leading cause of hysterectomy.

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Keywords: *caesarean section; hemorrhage; peripartum hysterectomy; placenta previa.*

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INTRODUCTION

Emergency peripartum hysterectomy (EPH) is defined as irretrievable removal of uterus performed after 20 weeks of gestation for intractable uterine bleeding not responsive to conservative measures occurring at any time after child birth but within the first six weeks postpartum. The incidences of peripartum hysterectomy reported in the literature varies widely from 0.2 per 1000 deliveries in Turkey,[1] 0.48/ 1,000 in London,[2] 2.2/1000 in our study to the highest record of 6.2/1000 in Nigeria.[3] Moreover, studies from different parts of the world confirmed complications after first caesarean delivery (CS) that lead to increased risk of repeat CS, uterine rupture,[4-6] placenta accreta,[7-9] scar pregnancy,[10] and even maternal death.[6]

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Our aim was to find out the reasons for increased rate of hysterectomy after child birth (CS > vaginal delivery hysterectomy). The study attempted to identify the independent high risk factors related to peripartum emergency hysterectomy, incidences, and complications. In addition, we also researched for alternative treatment for severe postpartum hemorrhage to prevent or minimize the increasing rate of EPH and preserve future fertility. Apparently, ours is an evidence based study covering a single institute of Chongqing city in central China and would contribute affirmatively for the possible prevention and better management of high risk pregnancy.

METHODS

We conducted a retrospective six years study of peripartum hysterectomy performed during 1st January 2007 to 31st December 2012 in the first affiliated hospital of Chongqing Medical University. Emergency peripartum hysterectomy performed immediately or within six weeks of vaginal or CS delivery was the inclusion criterion. Exclusion criteria were hysterectomy related to gynecology, oncology disease, and women < 20 weeks of gestation. There were 61 cases of peripartum hysterectomy recorded, all performed by consultant obstetrician. In the control group, we included postpartum hemorrhage at the same period. The estimated blood loss was obtained from the maternal anesthetic records and patient's continuous health record file during hospital stay. Statistical analysis was performed using SAS 9.13 software. We used univariate and multivariate logistic regression for analyzing our data. P < 0.05 was considered statistically significant.

RESULTS

During the six years study period (2007-2012), a total of 26,999 women delivered including both vaginal and CS delivery in our hospital. We divided them into two groups: EPH group (61 cases) and control or non hysterectomy group (333 controls). Incidence of EPH was 2.2 per 1,000 deliveries, of which six were performed after vaginal deliveries and 55 performed after CS (Table 1). We identified cesarean delivery enhance the incidence rate of EPH than vaginal delivery. In our study, maternal mean age was 31 years (ranged from 21–45 years) in their second and third trimester's pregnancy registered. Average hospital stay was 9.7 days (range 5–52 days). We found that maternal age and hospital stay had no significant difference in both study and control groups.

Table 1. Maternal general characteristic of EPH group.

Variables	Number (%)
Total delivery (1st Dec 2007- 1st Dec 2012 years)	26,999
Total emergency peripartum hysterectomy	61
EPH incidence per 1000	2.2
Age range (mean)	21-45 (31) years
Average hospital stay (mean)	5-52 (9.7) days
20-28 weeks	5 (8.1)
29-40 weeks	56 (91.8)
Primi	6 (9.8)
2-4(multiparity)	34 (55.7)
>4 (grand multiparity)	20 (32.7)
Fetal outcome	Cases
Female	25
Male	19
NICU	9
IUD	3
Timing of hysterectomy (n = 61)	Cases (%)
At Casarean section	27 (44.2)
Within 24 hour of caesarean section	20 (32.7)
> 24 hour casarean section	8 (13.1)
< 24 hour of vaginal delivery	4 (6.5)
>24 hour of vaginal delivery	2(3.2)
Hysterectomy (n = 61)	Cases (%)
Caesarean delivery hysterectomy	55 (90.1)
Vaginal delivery hysterectomy	4 (6.5)
Post D & C hysterectomy	2 (3.2)
Total hysterectomy	31 (50.8)
Subtotal hysterectomy	30 (48.2)
Relaparotomy	28 (7.1)

Univariate and multivariate logistic regression analyses revealed the following independent indication for EPH: (i) blood loss 1000-2000 ml, crude odd ratio (OR) =

18.48 (95% CI 5.1-65.7), adjusted odd ratio (AOR) = 9.1 (95% CI 2.2-37.7); (ii) blood loss > 2000 ml, OR = 152 (95% CI 43.7-528.4), AOR = 45.3 (95% CI 11.6-176.9); (iii) previous caesarean section, OR = 5.5 (95% CI 2.9-9.7), AOR = 3.7(95% CI 1.4-9.9); (iv) uterine atony, OR = 11.9 (95% CI 5.8-24.6), AOR = 7.5 (95% CI 1.8-30.2); (v) placenta previa, OR = 2.04 (95% CI 1.1-3.5), AOR = none (Table 2). Treatment by EPH is significantly associated with massive blood loss >2000 ml, previous cesarean section, uterine atony and placenta previa (p<0,0001). Occasionally, small number of infrequent risk factors, such as gestational diabetes mellitus (GDM), PROM, twins, broad ligament hematoma, scar pregnancy, oligohydramnios, polyhydramnios, and abruptio placenta, resulted EPH in study group; however, after adjusting into logistic regression analysis, it became insignificant (p>0.05).

Table 2. Comparison between study group vs. Control group for Emergency peripartum hysterectomy as a treatment of Postpartum hemorrhage.

Variable	Cases n = 61 (%)	Control n = 333 (%)	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Ages						
20-25	4(10.81)	33 (89.19)	1			
25-30	19 (14.29)	114 (85.71)	1.34 (0.4-4.5)			
30-35	13 (11.4)	101(88.6)	1.19 (0.30-3.6)			
35-40	18 (21.95)	64 (78.05)	2.4 (0.7-7.7)			
Hospital stay						
<7 days	14 (4.3)	308 (95.65)	1			
>7 days	47 (69.1)	21 (30.88)	50 (23.8-100)			
Blood loss						
Up to 1000 ml	3 (1.2)	240 (98.7)	1			
1000-2000	15 (18.5)	66 (81.4)	18.4 (5.1-65.7)	0.34	9.1(2.2-37.7)	0.0021
>2000	43 (43)	23 (65.15)	152 (43.7-528.4)	<0.0001	45.3 (11.6-176.9)	<0.0001
Abortions						
No	14 (16.8)	69 (83.1)	1			
Yes	47 (15.31)	260 (84.6)	0.8 (0.4-1.7)	0.7352		
Placenta previa						
No	27 (11.74)	203 (88.2)	1			
Yes	34 (21.2)	126 (78.7)	2.04 (1.1-3.5)	0.01		
Previous CS						
No	34 (10.5)	287(89.4)	1			
Yes	27 (39.1)	42 (60.8)	5.5 (2,9-9.7)	<0.0001	3.7(1.4-9.9)	0.0072
Uterine atony						
No	38 (10.8)	314 (89.2)	1			
Yes	23 (60.5)	15 (39.5)	11.9(5.8-24.6)	<.0001	7.5(1.8-30.2)	0.0046
GDM						
No	56(16.23)	289 (83.7)	1			
Yes	5 (11.11)	40 (88.8)	0.65 (0.24-1.7)	0.38		
PROM						
No	55 (15.58)	298 (84.4)	1			
Yes	6 (16.22)	31(83.78)	1.02 (0.41-2.57)	0.95		
Twins						
No	57 (15.7)	306(84.3)	1			

Yes	4 (14.8)	23 (85.1)	0.94 (0.31-2.8)	0.91
Severe pre eclampsia				
No	57 (15.79)	304 (84.2)	1	
Yes	4 (13.7)	25 (86.2)	0.82 (0.27-2.45)	0.731
Rupture uterus				
No	59 (15.2)	329 (84.7)	1	
Yes	2 (100)	0	>999.9 (0.001->999.9)	0.98
Polyhydramnious				
No	59 (15.6)	317 (84.3)	1	
Yes	2 (14.2)	12 (85.7)	0.83 (0.18-3.7)	0.81
Oligohydramnious				
No	59 (15.6)	317 (84.3)	1	
Yes	2 (14.2)	12 (85.7)	0.83 (0.18-3.7)	0.81
Scar pregnancy				
No	59 (15.2)	329 (84.7)	1	
Yes	2 (100)	0	>999.9 (0.001->999.9)	0.98
Broad ligament hematoma				
No	60 (15.4)	329(84.5)	1	
Yes	1 (100)	0	>999.9 (0.001->999.9)	0.98
Abruptio placenta				
No	57 (15.1)	320 (84.8)	1	
Yes	4(30.7)	9 (69.2)	2 (0.6-6.6)	0.23

In EPH group, failure of different conservative and surgical methods to prevent postpartum hemorrhage (PPH), and most frequently applied technique to control PPH was intrauterine gauze packing (32.7%) (Table 3). However, bilateral uterine artery embolism was also done as an advance treatment method failed to preserve uterus which ultimately ended with EPH. In control group, increased rate of intrauterine gauze packing 234 (70.2%) followed by B-lynch 112 (33.6%), and others methods minimized risk of EPH.

Regarding postoperative complications associated with EPH, maternal complications developed postoperatively; 31 patients (50.8%) needed intensive care unit management, 16 (26.2%) developed hypovolemic hemorrhagic shock and 23 (37.7%) developed disseminated intravascular coagulation (DIC), a circulatory collapse followed in rapid sequence (Table 4). Postoperative morbidities such as fever developed in 28 patients, three had paralytic ileus, and two developed acute respiratory distress syndrome. Heart failure developed in one case due to severe pre-eclampsia. Three cases had iatrogenic bladder injury during subtotal hysterectomy, later repaired by urologist. These patients had history of previous caesarean section and had dense adhesion that made the surgery difficult. Hysterectomy had to be performed in two patients in their second trimester due to post dilatation and curettage developed massive hemorrhage leading to hemorrhagic shock and disseminated intravascular coagulation. Those two women had scarred pregnancy with ruptured uterus. There were 28 (7.1%) cases of relaparotomy for persistent vaginal bleeding and unstable vital signs leading to EPH.

After reviewing all hysterectomy pathology reports, we found 48 cases (78.6%) of placenta accreta with trophoblastic tissue embedded into myometrium. Further, chronic cervicitis and chorioamnitis were found in 18% and 11.4% cases, respectively (Table 5).

In most women with EPH, clinical improvement followed with continued treatment including broad-spectrum antibiotic regimen, adequate blood products transfusion, and intravenous fluid management.

Table 3. Comparison between study group vs. Control group for medical or surgical management to control PPH.

Medical /Surgical management	Cases n = 61 (%)	Control n = 333 (%)
Oxytocin 20 unit (intrauterine)	61 (100)	333 (100)
Carboprost 250 µg (intrauterine)	53 (86.8)	201 (60.3)
Mesoprostol 800 µg (per oral stat dose)	27 (44.2)	79 (23.7)
Mesoprostol 800 µg (per rectal stat dose)	7 (11.4)	10 (3)
Mifepristone 200 mg (per oral stat dose)	5 (8.1)	20 (6)
Uterine packing	20 (32.7)	234 (70.2)
Vaginal Packing	9 (14.7)	93 (27.9)
Uterus and vaginal packing	12 (19.6)	47 (14.1)
B-Lynch brace suture	4 (6.5)	112 (33.6)
Lower segment belt	3 (4.9)	21 (6.3)
B-lynch + lower segment belt	3(4.9)	27 (8.1)
Placental bed suture with figure of '8'	2 (3.2)	85 (25.5)
B/L uterine artery embolism	2(3.2)	0

Table 4. Postoperative maternal complication after EPH.

Complications	Cases n = 61 (%)
Shock	16 (26.2)
DIC	23 (37.7)
ICU	31 (50.8)
Ventilator support	18 (29.5)
Fever	28 (45.9)
Hypoalbuminea	42 (68.8)
Paralytic ileus	3 (4.1)
Urinary Bladder repair	3 (4.1)
Incisional hernia	1(1.6)
Heart failure	1 (1.6)
ARDS	2 (3.2)

Table 5. Histopathology report of EPH group.

Pathology report	Cases n = 61(%)
Placenta accreta	48 (78.6)
Chronic cervicitis	11 (18)
Chorioamnitis	7 (11.4)
Fibroid tissue	6 (9.8)
Myometrium hemorrhage	4 (6.5)
Endometriosis	2 (3.2)
Cervical polyp	1(1.6)

DISCUSSION

Caesarean delivery is accelerating as a safe surgical delivery in healthy pregnant women around the world including China from 3.8% in 1988 to 39.3% in the year 2008; 11.3% in county site and 64.1% in the city.[11] There may be several reasons including patients' apprehension of labor pain, plan to have single birth, delay in childbearing as well as social influence. Our study documented that postpartum hysterectomy is associated with previous caesarean section with placenta previa, resulting in abnormal placentation that was difficult to remove after delivery of fetus during CS. Early or late, post partum hemorrhage is an unpredictable life threatening events leading to rapid exsanguinations if immediate action is not undertaken. Severe postpartum hemorrhage complicates in no time costing mother's life at any period of time during pregnancy and after delivery. This is a quite sensitive issue raised worldwide and attracts more attention for significant reduction in maternal mortality rate from massive obstetric hemorrhage.

Independent studies extensively described placenta previa,[3] uterine inertia, and uterine rupture,[6] as the significant causes of postpartum massive hemorrhage and indication for emergency hysterectomy. The association of placenta previa with prior CS has colossal risk of developing placenta accreta due to invading of defective myometrium by anchoring trophoblastic tissue.[12] Ananth et al,[13] recognized significant association of placenta previa with history of abortions in 70% women because of scarred uterus. In a review of 553 emergency hysterectomy procedures record spanning over 22 years, authors found that 25% of pathology report confirmed placenta accreta.[14] In this study, we observed pathological confirmation of placenta accrete, a signature for massive hemorrhage, in 78.6% cases.

This study found incidence of EPH in 2.2 per 1000 deliveries in our referral tertiary center. According to our study absolute indications for EPH are circumstantially

associated with massive hemorrhage (>2000ml) (OR = 152, 95% CI 43.7-528.4; AOR = 45.3, 95% CI 11.6-176.9), uterine atony (OR = 11.9, 95% CI 5.8-24.6), previous CS section (OR = 5.5, 95% CI 2.9-9.7), placenta previa (OR = 2.04, 95% CI 1.1-3.5) , and 48 cases (78.6%) of placenta accreta. We also observed increased rate of EPH in cesarean delivery hysterectomy 55 (90.1%) than vaginal delivery hysterectomy five (6.5%). The decision of EPH was higher during cesarean section and within 24 hour of postoperative period than post vaginal delivery. In this group the rate of EPH as treatment of PPH was higher in multigravida (G2-4), grandmultigravida (G4-11) than primi gravida associated with history of previous CS and multiple medical or surgical abortions had central placenta previa. This study shows education on family planning methods such as contractive pill/device is lacking to prevent unwanted pregnancies. However, 20 years primi gravida was found to be treated with EPH after 19th day of post cesarean section because of continuous bleeding for six days prior to readmission. She was known case of GDM. Her vitals was tachycardia, papery white anemia, and with features of hypovolemic shock. This result indicates that increase in the rate of cesarean delivery also increase the incidence of EPH as treatment of PPH. Abortion history and previous caesarean section were more likely related to development of placenta previa leading to massive hemorrhage while removing adhered placenta in our hysterectomy group.

In recent years, because of advanced surgical skills and anesthetic facilities, many pregnant women believe CS as a no risk surgery. In general, 21st century will have leverage on caesarean delivery worldwide strongly influencing women as well as throwing new challenges to obstetrician; especially, contributing to abnormal placentation, a critical condition for pregnancy.[13] Moreover, the enhanced rate of CS as a safe mode of delivery predisposes risk factor for EPH indirectly through its association with placenta previa; and previous CS is more directly associated with placental pathology. Reassuringly, literatures provide ample evidences of escalating rate of caesarean delivery connecting to high maternal morbidity, and subsequent pregnancy is relatively contributing in the development of malicious placenta adherence.[15-18] It has also been shown that placenta previa is the only risk factor attribute to antipartum hemorrhage and PPH.[19-21]

We identified blood loss >2000 ml (adjusted ratio 45.3) remained higher probability of hemorrhagic emergency peripartum caesarean hysterectomy associated with difficulty in the manual removal of abnormally adherent placenta. We also observed application of an alternative method tourniquet at lower segment of uterus during

caesarean section reduced volume of blood loss.[21-23] However, this simple method was applied by few surgeons during procedures. If this temporary method is applied in pre-symptomatic sign of uterine atony and abnormal placental factors, we could have further reduced significant blood loss during dealing with profuse bleeding. Since any woman can suffer from PPH, our study revealed that additional indications for EPH, such as premature rupture of membrane (PROM) (6/61), abruptio placenta (4/61), multiple fibroid, GDM (5/61) and multifetal pregnancy (4/61), scar pregnancy (2/61), rupture uterus (2/61), and very rarely broad ligament hematoma (1/61), presumably makes it more likely. Interestingly, we found women, who admitted with premature uterine contraction treated with intravenous retodrine chloride 50-150 mcg/min (8-30 drops per minutes through automatic perfusion pump) for longer period (e.g., more than two to three weeks) continuously, developed post operatively uterine atony ending with EPH. Controversy over this medicine, failed to contract uterus immediately, still remains. Scar pregnancy is another emerging high risk factor for EPH. If the embryo implantation occurs in the scar site, it would endanger women's life as gestation week progress; rupture over previous scar leads to massive hemorrhage. Therefore, during surgical termination of pregnancy, implementation of bundle of care should be considered to prevent possible massive bleeding. These results suggest that multiple abortions and previous caesareans scar are high risk for healthy pregnancy. Polyhydramnious may rarely cause emergency hysterectomy; however, oligohydramnious remains an independent risk factor for EPH, not expected in our study. The reason of association of oligohydramnious with massive bleeding is yet to be known. In our study, in a case with placenta percreta, urinary bladder invasion developed a hole of 0.5x1.0 cm. In other two cases, placenta accreta, embedded at lower segment with hypertrophied vessels, invaded the urinary bladder; these two cases also had previous CS. An association between previous CS and placenta percreta, resulting most likely in invading the urinary bladder, may complicate with bladder laceration, urinary fistula, and ureteral transection.[24] Our study revealed that healthcare provider and child birth related events strongly concerned various aspects of treatment procedures. Child birth is the most beautiful phenomena, but may at any time face deadly events just because of excessive blood loss at any time during pregnancy, child birth and or after delivery. Are physicians responsible for increasing rate of caesarean PPH and its consequences by allowing women to choose mode of delivery?

Massive bleeding is associated with developing complications in women during pregnancy and or after delivery. In our study group, 26.2% cases developed

hemorrhagic shock and one case with maximum of 9000 ml blood loss, 37.7% developed disseminated intravascular coagulation during hysterectomy. These women required early blood products transfusion, coagulation factors, intravenous fluids, and intensive care unit management with ventilator support to maintain blood pressure, urine output and coagulation. In 28 cases (7.1%), re-laparotomy had to be performed as a result of persistent heavy vaginal bleeding, enlarged uterine size, hypotension, tachycardia, and state of early hemorrhagic shock. Ozden et al and Smith et al reported 6.8% and 11% events of such re-laparotomy.[25,26] In the specimen of all hysterectomies, 48 cases (78.6%) had chorionic villi embedded into the myometrium resulting in detection of placenta accreta microscopically. In total hysterectomy specimens, out of 31 cases 11 patients also had chronic cervicitis. Clinically, co-relation of chronic cervicitis to placenta previa during pregnancy has not yet been defined.

Compression sutures, such as B-lynch and Hayman sutures are also frequently applied in the management of PPH. Intrauterine gauze packing has been successful as the conservative mechanical compressor to control PPH, minimizing risk of hysterectomy.[27] Despite aggressive medical, surgical or radiological interventions instituted in both case (n = 61) and control (n = 333) groups, uterus could not be preserved in 61 mothers because of unstable hemodynamic instability from massive hemorrhage. In our study, post partum hemorrhage treatments were either medical and/or surgical management such as intravenous or intramyometrium oxytocin 20 unit, carboprost 250 μg, mesoprostol 800 μg oral or rectal, mifepristone 200 mg. Active surgical treatments included vaginal packing, uterine packing, B-lynch brace suture, lower segment belt and figure of eight placenta bed suture. Advanced radiological intervention, bilateral uterine artery embolism, was applied in two cases of study group. In control group consisting of 333 PPH cases, conservative management and surgical compressions suture achieved hemostasis and reduced hysterectomy rate; uterine artery embolism was not necessary. Control group shows intrauterine gauze packing in 234 patients (70.2%), B-lynch brace compression suture in 112 patients (33.6%) found highly effective treatment methods to prevent PPH. Other methods were also effective methods for preventing and reducing events of emergency hysterectomy. Recently, 10/37 (28%) patients successfully treated with SB-tube during cesarean delivery for primary PPH had median blood loss about 2030 ± 860 ml associated with low lying placenta previa. None developed post procedural morbidities.[28] There are varieties of balloons tamponade available including the Bakri,[29] Foley,[30] Rusch[31] and condom catheter.[32] These procedures are minimally invasive and most rapidly done procedure

to arrest primary PPH. In the EPH group who failed to achieve hemostasis with multiple methods applied prior hysterectomy, ultimately meet unavoidable events of hemorrhagic hysterectomy to preserve a life of mother.

With the recent advances in intervention technology, success of invasive procedure with pelvic artery embolization in post partum hemorrhage has provided success rate of 86.5% to 89.5%.[33,34] Although, uterine artery embolization is another safe and successful invasive technique for controlling PPH,[35] we could not preserve uterus of two mothers and ultimately treated with EPH. Another alternative method to EPH, the study reported that after delivery of fetus in a selected case of abnormally adherent placenta left in situ with postoperative uterine artery embolization 4/6 (67%) preserved uterus, reduced rate of PPH, EPH, and operative time.[36] Similar method of uterine vessels ligation in intractable PPH has high achievement rates in reducing hysterectomy.[19] Overall, these radiological interventions in controlling PPH with 100% success are controversial as well as expensive.

Total hysterectomy is the preferred surgical method of hysterectomy for cervical stump malignancy, bleeding, and discharge. However, surgeon experiences reduced operation time, reduced blood loss, and post operative complications in subtotal hysterectomy. Importantly, subtotal hysterectomy might be unfavorable in the management of diffuse lower segment bleeding because of vascular supply by intact cervical branch of uterine artery to supply cervical stump.

This case-control study was worthy of discerning treatment of intractable PPH is emergency peripartum hysterectomy. However, limitations of this study include its retrospective nature and data collection from single center covering small area of Chongqing city. In addition, we also could not verify some variables such as complications as well as surgical procedure in control group minimizing obstetric hysterectomy. Ultrasound/MRI diagnosis, timing of total/subtotal hysterectomy, preoperative and postoperative hemoglobin level, etc are also not clearly defined in this study.

CONCLUSIONS

In summary, sixty one women who were successfully treated on demand EPH in our tertiary center faced severe near missing events of life was discharged from hospital with full recovery. In light of severe intractable uterine hemorrhage, hysterectomy is the immediate and unavoidable best treatment. We advise effective education, as well as motivation, can appreciably reduce abortion rate as elective abortion is not a contraceptive technique. In primi parity, caesarean section should be fulfilled for absolute indication, a key

to minimize placental factors in subsequent pregnancy. Caesarean section on maternal request or for physician's convenience should be minimized to avoid associated risks to mother in consequent pregnancy. Cesarean delivery may enhance the incidence of EPH due to difficulty in the removal of placenta in many cases of placenta previa (placenta accreta/percreta). In such case timely decision is important for saving life at the cost of organ removal.

ACKNOWLEDGEMENTS

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