

# Secondary Postpartum Haemorrhage following vaginal delivery — a 3-year survey of causes and management

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## ABSTRACT

**Objectives:** Secondary postpartum haemorrhage (PPH) is a serious complication of childbirth and a life-threatening condition that may lead to infertility amongst women during the reproductive age groups.

The objective of this study is to highlight the underlying causes of secondary PPH and outcomes for patients who delivered vaginally, with the aim of reducing maternal mortality and morbidity.

**Material and Methods:** This is a prospective cohort study conducted in the Department of Obstetrics and Gynaecology at AL-Yarmouk Teaching Hospital, Baghdad, Iraq. The study was conducted over a 3-year period from December 2015 to December 2018. Women who delivered vaginally with a gestational age of at least 24 weeks, with no previous caesarean or uterine scars, who were admitted to the hospital complaining of bleeding from their genital tracts after 24 hours of delivery, but prior to 6 weeks from delivery, were enrolled in the study. Patients received resuscitative measures and medical treatment and were observed regarding their response to medical treatment and whether they required surgical intervention. Types of management were also evaluated, and histopathological reviews were gathered and recorded for those who needed retained pieces of product evacuated or hysterectomies.

**Results:** Two hundred cases were analysed; the incidence of severe secondary postpartum haemorrhage was 60 per 10,000 deliveries. Endometritis was the leading cause (64% of patients), followed by retained placental pieces (13.5%); emergency hysterectomy was performed in 34.5% of patients. This study is novel because it is the first to shed light on secondary postpartum haemorrhage in unscarred uteri in Iraq.

**Conclusions:** Endometritis was the most common cause of secondary postpartum haemorrhage, and emergency hysterectomy was the most common strategy of treatment.

**Key words:** secondary postpartum haemorrhage; caesarean section; hysterectomy; endometritis

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## INTRODUCTION

Complications of pregnancy and childbirth have been one of the leading causes of death and disability among women of reproductive age [1]. Postpartum haemorrhage (PPH) is an unusual complication following a vaginal delivery with an incidence of about 4% of all deliveries; it contributes to one-third of maternal mortalities in developing countries [2]. Secondary postpartum haemorrhage is any significant bleeding from a genital tract by any route (intra-abdominal or vaginal) that commences after the first 24 hours following delivery until the 6<sup>th</sup> weeks of puerperium. Because the estimated blood loss is difficult to assess, the diagnosis depends on the clinical evaluation of the patient [3]. The presentation varies from mild spotting or excessive lochia, which can be managed by medical treatment, to severe life-threatening bleeding that requires

surgical removal of a retained piece of tissue or a lifesaving hysterectomy to stop the bleeding and save the life of the mother [4]. The most common etiological factors are retaining a piece of placenta, endometritis, sub involution of placental bed, pseudoaneurysm of the uterine artery, arteriovenous malformation, dehiscence of the uterine scar and, rarely, gestational trophoblastic disease (GTD) [5]. Complications and consequences of secondary postpartum haemorrhage have importance to the researcher for assessing risks factors and preventive method spatially the alarming outcome of secondary PPH and subsequent effect in further fertility [6].

### The aim of the study

The objective of this study is to evaluate the underlying causes of secondary PPH and the outcomes for patients.

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## MATERIAL AND METHODS

This is a prospective cohort study that was done at the Department of Obstetrics and Gynaecology of AL-Yarmouk Teaching Hospital, Baghdad, Iraq. The study was conducted over a 3 year period from December 2015 to December 2018. The study protocol was approved by the Ethics Committee of the Medical College at Al-Mustansiriyah University, Iraq. Verbal consents were received from all participants.

### Inclusion criteria

Women of any age who delivered vaginally with a gestational age of at least 24 weeks who were admitted to the hospital after 24 hours of delivery, but prior to 6 weeks from delivery, with complaints of heavy bleeding or with a history of repetitive attacks of irregular vaginal bleeding with unstable vital signs or with a drop in haemoglobin levels were enrolled in the study.

### Exclusion criteria

All patients with prior scars, with previous uterine surgery, presenting with primary PPH, or presenting with placenta previa and accrete syndrome were excluded from the study.

A full history was obtained including age, parity, residence, educational level, modes of previous deliveries, intervals between pregnancies, history of medical diseases such as hypertension and diabetes mellitus, and gestational age. Place of delivery, time of presentations and any primary post-partum bleeding and amount of bleeding were also recorded. We conducted a systemic and local examination of each patient, including vital signs. Investigations included complete blood count, liver and renal function test, and high vaginal swab that was sent for culture and sensitivity. Ultrasounds were performed on all patients, and abnormalities were identified, such as retained pieces of product. All the patients received intravenous fluid, oxytocic drugs, tranexamic acid, blood and/or blood products and broad-spectrum antibiotics of the same type based the hospital's protocol, which includes clindamycin 900 mg three times per day and Garamycin (Gentamicin) 20 mg/kg per dose. Thereafter, each patient was observed regarding her response to medical treatment and whether she required surgical intervention. Additionally, histopathological specimens were sent for examination for cases of retained pieces of placenta and hysterectomy cases, and the records were collected and recorded.

### Statistical analysis

Statistical Package for Social Sciences (SPSS version 25)\* was used for data analysis. Categorical data were represented by frequencies and percentages. Associations

**Table 1. General characteristics of the study group**

Variable	No. (200)	%	
Age (years)	< 20 years	37	18.5%
	20–29 years	65	32.5%
	30–39 years	83	41.5%
	40+ years	15	7.5%
Area of residence	Urban	92	46%
	Rural	108	54%
Education	Illiterate	59	29.5%
	Primary	73	36.5%
	Secondary	30	15%
	College & Higher	38	19%
BMI (Kg/m <sup>2</sup> ) at the time of presentation	Normal (18.5–24.9)	55	27.5%
	Overweight (25.0–29.9)	51	25.5%
	Obese (=> 30.0)	94	47%

between variables were measured using Pearson's Chi-square test. Results were considered statistically significant when the p-value equal to or less than 0.05.

\*IBM Corp. Released in 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp

## RESULTS

During the study period, there were 33,000 live births in the Al-Yarmouk teaching hospital, which covers a wide area of Baghdad. The total number of vaginal deliveries was 17,830 (55%) while the total number of CS was 15,170 (45%). Two hundred patients were identified with severe secondary PPH following vaginal deliveries and required admission to the hospital, and the incidence was 6%. Of the study group, 83 (41.5%) were 30–39 years old, 108 (54%) were living in a rural area, more than one-third had primary school education and less than one-fifth had higher education. Most of the patients (47%) were obese (Tab. 1).

About 90 (45%) of women in the study group has a parity of 2–4. The babies delivered between 36–38 were 98 (49%). About 121 (60.5%) of the patients had no antenatal care. The most frequent medical disease during the index pregnancy was a history of anaemia, found in 87 women (43.5%). About three-quarters — 149 (74.5%) — of the patients delivered in a hospital (whether our hospital or other hospitals). The onset of labour was spontaneous for 64% of study participants and induced for the remaining 36%. Prolonged labour was found in 87 (43.5%) of the patients and birth weight greater than 4 kg was found in 97 (48.5%) of the patients (Tab. 2).

The induction of labour was performed most frequently for premature pre-labour rupture of membrane (PPROM) (29.2%) or postdate pregnancy (25%) (Fig. 1).

**Table 2. Pregnancy and delivery parameters of last pregnancy**

Variable		No. (200)	%
Parity	1	78	39%
	2–4	90	45%
	≥ 5	32	16%
Gestational age	Less than 35	29	14.5%
	≥ 36–38	98	49%
	≥ 39–41	73	36.5%
Inter-pregnancy interval (years)	One	95	47.5%
	Two	76	38%
	More than 3	29	14.5%
Antenatal care (ANC)	Yes	79	39.5%
	No	121	60.5%
Medical disease during pregnancy	Anaemia	87	43.5%
	Hypertensive disorder	8	4%
	Diabetes mellitus	9	4.5%
	Coagulation disorder	5	2.5%
Place of delivery	Hospital	149	74.5%
	Home delivery	51	25.5%
Onset of labour	Spontaneous	128	64%
	Induced	72	36%
Prolonged labour		87	43.5%
Birth weight (Kg)	< 2.5	21	10.5%
	2.5–4	82	41%
	> 4	97	48.5%

Time of presentation after delivery varied and 44.5% presented 6–10 days following delivery. Nearly half of the patients (45.5%) had a history of primary PPH. PROM was found in 57 (28.5%) cases. On admission, 147 (73.5%) presented with shock, while 159 (79.5%) patients had a fever. On admission, maternal haemoglobin less than 7 was seen in 105 patients (52.5%). Hospitalization more than 5 days needed in 98 (49%). Readmission observed in 94 (47%) (Tab. 2).

All patients needed a transfusion of blood, blood product Factor VII and 149 (74.5%) needed a massive blood transfusion, (≥ 10 red blood units within 24 h, the transfusion of > 4 red blood units in 1 h) [7]. Additionally, 33 (16.5%) of cases responded to medical treatment (including Oxytocic drugs, antibiotics, tranexamic acid blood and or blood products and factor VII).

Vaginal exploration was done for the patients, which included removal of retained products of conception for 27 (13.5%), suturing of cervical tears for 18 (9%) and uterine balloon for 2 (1%). Laparotomies with the conservative of the uterus, including B lynch and internal iliac artery ligation, were required in 20 (10%) and 12 (6%) needed their ruptured uterus repaired. Emergency transabdominal hysterectomy without salpingo-oophorectomy was performed on 69 (34.5%) of the patients, and 19 (9.5%) need hysterectomy with internal iliac artery ligation. The major reason for performing a hysterectomy was the inability to stop bleeding using more conservative methods. All the specimens of the uterus and retained pieces of product

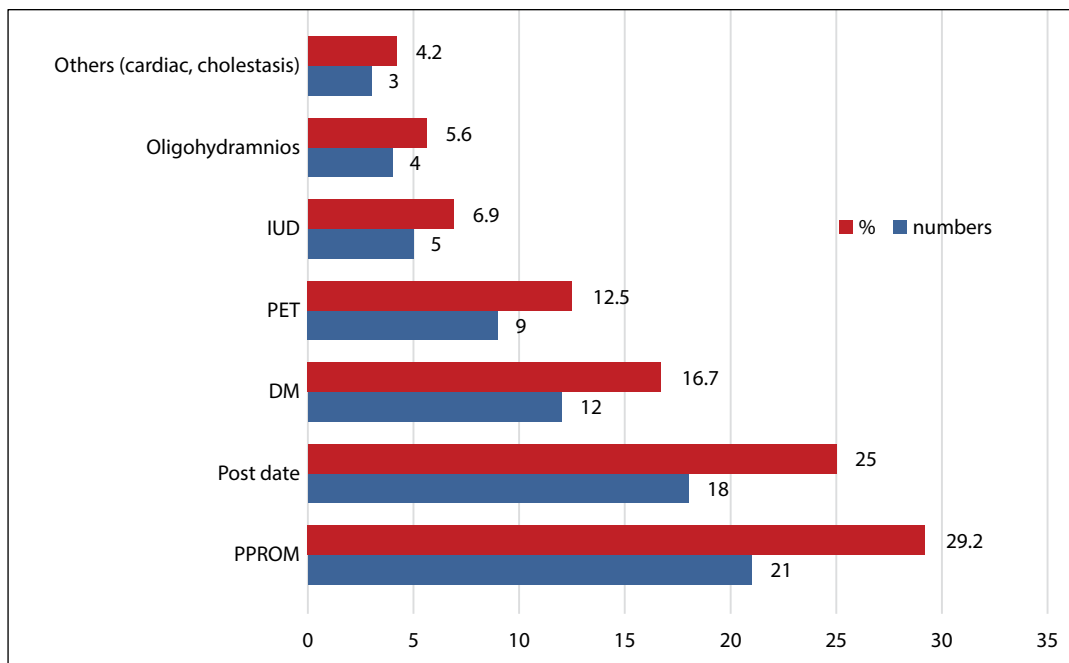


Figure 1. The indication of induction of labour

Variable	No.(200)	%	
<b>Time of presentation after delivery (days)</b>	1–5	66	33%
	6–10	89	44.5%
	10–20	27	13.5%
	20–42	18	9%
<b>History of primary PPH</b>	91	45.5%	
<b>History of PROM</b>	57	28.5%	
<b>Signs and symptoms</b>	Shock	147	73.5%
	Fever	159	79.5%
<b>Maternal haemoglobin on admission</b>	Less than 7	105	52.5%
<b>Hospitalization more than 5 days</b>	98	49%	
<b>Readmission</b>	94	47%	

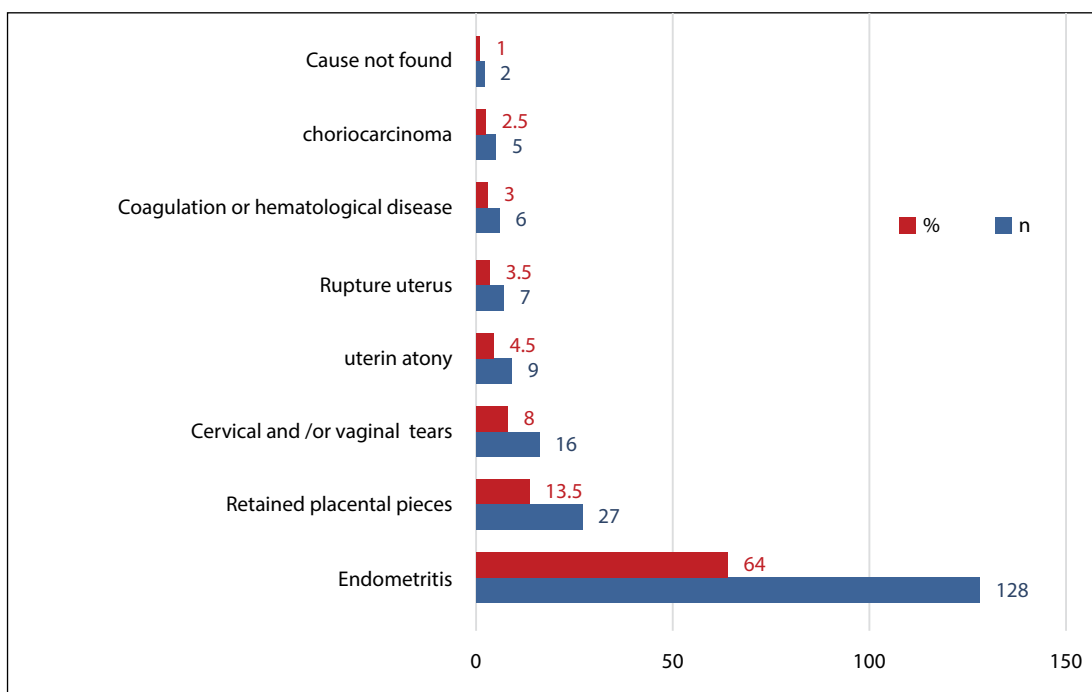
Types of intervention	Numbers	%	
<b>Massive blood transfusion</b>	149	74.5%	
<b>Responded to conservative medical treatment (antibiotics, blood and blood product, factor 7, tranexamic acid)</b>	33	16.5%	
<b>Vaginal exploration</b>	Removal of retained products of conception	27	13.5%
	Cervical and or vaginal tears suturing	18	9%
	Uterine balloon	2	1%
<b>Laparotomy with the conservation of the uterus</b>	Repair of ruptured uterus	20	10%
	B lynch and internal iliac artery ligation	12	6%
<b>Hysterectomy</b>	Hysterectomy only	69	34.5%
	Hysterectomy with internal iliac artery ligation	19	9.5%
<b>Admission to respiratory care unit</b>	17	8.5%	
<b>Mortality</b>	2	1%	

were sent for histopathology. Admission to RCU was 8.5% and the mortality rate was 1% (Tab. 3).

Endometritis was the leading cause of secondary PPH among the patients of this study (64%), followed by retained placental pieces (13.5%), 8% was due to cervical or vaginal tears, 4.5% was related to uterine atony, ruptured uterus was found in 3.5% of cases, coagulation or haematological disease in 3%, which was 4 cases of idiopathic thrombocytopenic purpura and 2 cases of Von Willebrand disease diseases, choriocarcinoma in 2.5% and the remaining 1% of cases had a different cause of the cause was not found (Fig. 2).

### DISCUSSION

One of the most challenging conditions to manage in obstetrics is a postpartum haemorrhage, which is considered one of the most important causes of maternal death and morbidity worldwide [6]. Optimal management and saving the life of the mother depend on the early diagnosis of this condition. Many studies have attempted to shed light on the management options available; for example, BUL — BUL S et al. [8]



**Figure 2.** The causes of secondary PPH

found that the highest age group for women who presented with PPH was between 30 to 35 years — which we also found in this study — perhaps due to the higher parity in this age group. Most of the patients admitted to AL-Yarmouk hospital were from rural areas, which is similar to the previous study by Carrole et al. [8]. This finding may be related to a deficiency of talent and difficulty in attainment health care centres. Moreover, we found that women with BMIs of more than 30 Kg/m<sup>2</sup> were more at risk for secondary PPH, which agrees to some extent with a study done in 2013 [9]. Concomitantly, obese women tend to have longer first and second stages of labour compared to non-obese women, which considered one of the risk factors for postpartum haemorrhage. In this study, we observed secondary PPH more in multiparas women, although another study by Mulic-Lutvica et al. in 2009 [10] found that PPH was more common in primiparas women. Other studies [11, 12] reported the majority of grand multiparous women developed secondary postpartum haemorrhage. The differences among these study results may be related to geographic and ethnic differences and to the preference among most of the primigravida to deliver by a midwife. The present work revealed a higher incidence of secondary PPH among women who hadn't been booked or had irregular ANC, in agreement with the study by Ajenifuja, Ko et al., 2010 [13]. Anaemia was found to be prevalent in 43.5% of patients who developed secondary PPH, which was similar to a study by Khalil, Rozhan [14]. Our work observed that 149 of women who developed secondary PPH delivered in the hospital and 51 of women delivered at home, in contrast to a previous study by Jabbar, Shazia; 2019 [15] in which he found that most of the patients who developed secondary PPH delivered at home or in health facilities. This difference may be related to AL-Yarmok's status as a teaching hospital and tertiary centre that receives referral cases from all areas in our country. The time interval between delivery and onset of secondary PPH was 6–10 days for 44.5% of patients, which is similar to the finding published by Waseeqa Nigeen [16]. A history of primary PPH among women with secondary PPH in our current work was 45.5%, higher than the value cited by Dossou M et al. (19%), and it has been suggested that immediate PPH is a predictive factor of hysterectomy (4). Signs and symptoms of tachycardia and hypotension (shock) were founded most commonly, and we also observed more hysterectomies in patients who presented with severe hypotension and tachycardia, similar to a study by Kreshna H. M. et al.; 2011 [17], which may be due to patients ignoring bleeding, underestimating the amount of bleeding and delaying care. Those factors led them to endure an emergency hysterectomy to save their life. Fever was the most common symptom that led patients to seek medical advice and it was present in 159 (79%) of cases. This finding does not agree with the study done by Waseeqa

Nigeen et al. [16]; 2017 in which he found that only fourteen (28%) of patients had a fever. This variation may be due to most of the patients not taking antibiotics even if needed after vaginal deliveries, increasing the incidence of endometritis; it is well known that fever is one of the symptoms that indicate infection. Maternal haemoglobin was low in most patients who presented with secondary PPH, and Waseeqa Nigeen et al.; 2017, [16] agree with the current study. This low level of haemoglobin is due to a massive amount of blood loss after vaginal delivery until the time of presentation. This study identified 98 (49%) who needed an admission of more than 5 days, in agreement with a study by Kamrun Nessa et al. conducted on 33 patients with a history of secondary PPH; 24 (73%) needed an admission of more than 5 days. This finding relates to surgical management and hysterectomies due to delays in seeking care rather than medical treatment, and this aggressive surgical intervention required longer hospitalizations [18]. We found a wide range of treatment modalities for the management of secondary PPH, ranging from medical to surgical, and about 33 (16.5%) patients responded to conservative management and 47 patients needed vaginal exploration after delivery. A study by Sheikh, Lumaan et al., 2011 [19] evaluated variable types of management protocols, which support our findings. This works described other management options and found that hysterectomy, as a lifesaving procedure, was required for 34.5% of patients, which was higher than a study done by Kittur et al., 2016 who found that the percentage of patients requiring a hysterectomy was only 6.9% [20]. This difference may be related to our study criteria, which included only vaginal deliveries, and to geographical variation and to the lack of other available facilities for controlling postpartum haemorrhage; such as embolization, an alternative to a hysterectomy, is not available in our radiological department. In this study, endometritis was the leading cause of secondary PPH among the patients (64%), followed by retained placental pieces (13.5%), which is not consistent with Kasap et al. [21] who did a retrospective descriptive study in North India for 6 months and found that retained products of contraception (RPOCs) was the leading cause (72% of patients) followed by endometritis (20%) [21]. This difference between our study and the other study might be due to a difference in sample size and our work included only women who delivered vaginally [22]. A limitation of the present study was that it was conducted in a single centre. Despite this limitation, this study presents new information from Iraq regarding secondary postpartum haemorrhage in unscarred uteri.

## CONCLUSION

Endometritis was the most common cause of secondary PPH, and emergency hysterectomy was the management option for most patients.

## RECOMMENDATIONS

Endometritis should be minimized in hospitals to decrease the risk of hysterectomies and the proper management of haemoglobin post-partum should be enforced.

### Conflict of interest

No author has any potential conflicts of interest.

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