

Emergency peripartum hysterectomy at Jordan University hospital – a teaching hospital experience

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Abstract

Introduction: Emergency peripartum hysterectomy (EPH) is a foremost operation and is perpetually implemented in the presence of life intimidating hemorrhage during or immediately after abdominal or vaginal deliveries. The aim of this study was to review cases managed at the Department of Gynecology and Obstetrics at Jordan University Hospital (JUH).

Material and methods: All women who underwent EPH due to any cause in the period from January 2010, to December 2017 were included in the study. Data were collected retrospectively using the patients' files namelessly. Main measures: age, gravidity, parity, number of previous cesarean sections, previous uterine surgeries, indication for hysterectomy, complications, antepartum bleeding and the need for blood transfusion.

Results: In total, 74 cases of EPH were managed during the study period. The incidence of EPH ranged from 0.24 to 8.7 per 1000 deliveries. EPH was found to be more common following cesarean sections than vaginal deliveries. The prime indication was abnormal placentation, uterine atony, and uterine rupture. The risk factors included previous cesarean sections, scarred uteruses, multiparity, older age group. Maternal morbidity ranged from 26.5 to 31.5% and mortality from 0 to 12.5% with a mean of 4.8%.

Conclusions: EPH is the most demanding obstetric surgery performed in very tiresome circumstances of life threatening hemorrhage. The indication for EPH in recent years has changed from outdated uterine atony to abnormal placentation. Antenatal eagerness of the risk factors, engrossment of proficient obstetricians at an early stage of management and a prompt hysterectomy after adequate resuscitation would go a long way in tumbling morbidity and mortality.

Key words: peripartum hysterectomy, postpartum hemorrhage, abnormal placentation, uterine atony, uterine rupture.

Introduction

Emergency peripartum hysterectomy (EPH) is rather an uncommon surgical procedure performed as a life saving measure in cases of intractable obstetric bleeding [1-3]. Although, modern obstetrics as part of the technological scientific revolution have showed massive advances both medically and surgically, hemorrhage remains universally to be the leading cause of maternal mortality [4, 5]. Peripartum hysterectomy is defined as the removal of uterus at the time of delivery and/or the immediate postpartum period, mostly due to stubborn bleeding [6]. Recently, it is estimated that the incidence of EPH is 0.05%, however, this varies across different studies; it is about 0.24/1000 in Denmark as reported by Sakse *et al.* [7], 0.77/1000 in the United States as reported by Whiteman *et al.* [8], 2.3/1000 in South Korea as reported by Bai *et al.* [9], and 5.09/1000 in Turkey as

reported by Zeteroglu *et al.* [10]. This discrepancy may be attributed to many factors inclusive of; obstetric education, adequacy of antenatal care, contraception methods, national awareness programs, development of medical competencies and surgical skills [11, 12]. In recent publications comparing the recent reports of the Middle Eastern Region, it showed a percentage of EPH ranging from 0.39 to 5.38 per 1,000 deliveries [13-15].

Intractable obstetric hemorrhage is a life intimidating ailment caused by uterine pathology; uterine atony, uterine rupture, and abnormal placentation [16]. Previously, the leading cause of intractable obstetric hemorrhage was uterine atony [3, 5, 8], whereas recently, reports showed that uterine atony is an uncommon cause of such conditions due to advent in prostaglandin therapy [17, 18]. On the other hand, in modern obstetrics, the leading cause of life threatening obstetric

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hemorrhage is abnormal placentation [19, 20]. Not only has a flawless connection between abnormal placentation and cesarean sections (CSs) been demonstrated by multiple reports, but also a strong overtone between repeated cesarean deliveries and abnormal placental location [21-23]. To illustrate, the incidence of placenta previa was found to be 1.9/1000 after one previous CS, and 91/1000 in women with four previous CS, implying a 47 fold increase, which is alarming to the occurrence of in full EPH [2, 5]. Of note, the need for EPH in women having placenta previa accreta was substantially higher than those diagnosed with placenta previa per se [21, 23]. Other risk factors in the occurrence of abnormal placentation includes advanced maternal age, previous uterine curettage, and high parity as well [8, 10].

EPH has become a focal point in obstetric research. Nevertheless, to the authors' knowledge, only one study about EPH has been conducted in Jordan, and very few in the region [24]. The study in Jordan adopted a retrospective design which examined the indications, risk factors, incidence and complications associated with peripartum hysterectomy. It also assessed its relationship with a set of anthropometric factors (age, parity, type of labor, indication for CS, complications). Although this study provided important empirical data, it has been conducted more than a decade ago in a peripheral hospital.

The present study addresses EPH in a tertiary referral university hospital located in the heart of the capital, Amman, which serves patients from all over Jordan, hence, we believe that the study sample reflects most of the strata in Jordan. We aim to identify the incidence, risk factors, its association with the number of previous CSs, need for blood transfusion, and complications.

Material and methods

This is a retrospective study conducted at Jordan University Hospital (JUH), in Amman, Jordan. The study was carried out after the approval of the Institutional Review Board, the Ethics Committee and the Scientific Research Committee at our hospital. A written consent signed by every patient included in the study after proper and clear explanation of the aim of the study was obtained. The inclusion criteria for this study were all women who underwent EPH due to any cause at the Department of Obstetrics and Gynecology at JUH in the period from January 2010, extending to December 2017. Patients' sociodemographic data such as age, gravidity and parity were obtained from the records. Other anthropometric data and previous medical history, the number of previous CSs, previous uterine surgeries, and indication for hysterectomy, complications, antepartum bleeding and the need for blood transfusion were also recorded. Statistical analysis was carried out using the Statistical Package for Social Science – SPSS, ver-

sion-21. Descriptive statistics were used to describe the socio-demographic variables, frequency table was built for categorical variables and mean (SD) was obtained for continuous factors. The direction and the strength of relationship between the study variables including final diagnosis, number of previous CSs, complications, gestational age, parity, and need for blood transfusion were examined using bivariate correlation statistics. The primary outcome measurement was the main indication for the performance of cesarean hysterectomy. Secondary outcome measurements were the following: risk factors, rate of complications associated with the procedure and the need for blood transfusion.

Results

During the study period, a total number of 74 patients underwent EPH at the Department of Obstetrics and Gynecology at Jordan University Hospital (JUH). Their average age was 35.76 (SD \pm 4.56) years. Gravidity ranged from 0 to 9, while Parity ranged from 1 to 8. Around 45% of the study population sample had more than 3 previous deliveries. Average gestational age at the time of delivery was 33.62 (SD \pm 5.32) weeks. More details are exemplified in Table 1. The estimated blood loss was 2210 ml, the average number of blood units transfused was 3.93 (SD \pm 3.43); ranging between 0-12 units. About 17.6% of the study sample bled more than 3000 CC during the operation as illustrated in Table 2. The most frequent intraoperative complication reported was bladder injury in 16 (22%) patients, bowel injury in one (1.4%) patient, while the most frequent post-operative complication reported was fever in 4 (5.6%) patients. More than 50% of the study group had more than two previous CSs, and 43.2% were diagnosed as placenta accreta intraoperatively as illustrated in Table 3. The indication for EPH was placenta accreta in 32 (43.2%) patients, placenta percreta in 20 (27%) patients, placenta previa centralis in 8 (10.8%) patients, and placenta increta in 6 (8.1%) patients, ranking placental problems in 68 (91.89%) as illustrated in Table 4. In Table 5, the correlation between the variables of the study were reported.

Discussion

This current study is the largest retrospective population based study of EPH performed in the region. This study aimed to examine the trends in the rate of this imperative lifesaving procedure. The associated risk factors, maternal characteristics and complications at JUH, a tertiary teaching hospital in Jordan were clearly explained. The study consisted of 74 Jordanian women from all over the country. Our study is one of a kind in the region to identify cases of EPH from among all

Table 1. Socio-demographic characteristics (n = 74)

Socio-demographic variables	Mean	Range
Age (years)	35.76	26-45
26-35 years	34 (45.9)	
> 35 years	40 (54.1)	
Parity	3.75	1-8
0-3 parity	40 (54.1)	
> 3 parity	34 (45.9)	
Gestational age (weeks)	33.62	16-38
16-30 weeks	11 (14.9)	
> 30weeks	63 (85.1)	

Table 3. Main intraoperative/postoperative complications

Blood variable	Number	Incidence (%)
Bladder injury	16	21.6
Bowel injury	01	1.4
Cardio-pulmonary	09	12
Fever	04	5.4
Wound infection	04	5.4
Surgical exploration	03	4.05
DIC	03	4.05
Vaginal cuff bleeding	02	2.7

DIC – disseminated intravascular coagulation

Table 5. Bivariate correlation; correlations between the study variables

Variables	1	2	3	4	5	6	7
Previous cesarean section	1						
Diagnosis	0.383**	1					
Parity	0.515**	-0.190	1				
Gestational age	0.119	-0.420**	0.003	1			
Blood Transfusion	-0.008	-0.406**	0.097	0.059	1		
Packed RBCs	-0.042	-0.172	0.116	-0.178	0.508**	1	
Complications	-0.197	0.276*	-0.201	-0.058	-0.261*	-0.469**	1

1 – previous cesarean section, 2 – diagnosis, 3 – parity, 4 – gestational age, 5 – blood transfusion, 6 – packed red blood cells (RBCs), 7 – complications, *correlation is significant at the 0.05 level (2-tailed), **correlation is significant at the 0.01 level (2-tailed)

Table 2. Indication for emergency peripartum hysterectomy

Indication	Number	Incidence (%)
Placenta accreta	32	43.2
Placenta percreta	20	27
Placenta previa centralis	8	10.8
Placenta increta	6	8.1
Uterine atony	4	5.4
Abruption placenta	2	2.7
Ovarian cancer	2	2.7
Total	74	100

Table 4. Blood loss and transfusion

Blood variable	Mean	Range
Estimated blood loss (ml)	2210.13	500-6000
Less than 3000 ml in → 61 (82.4%) patients		
More than 3000 ml in → 13 (17.6%) patients		
Number of blood units transfused	3.93	0-12

the births that took place during the study period at JUH. The EPH is a lifesaving procedure done as a last resort for intractable bleeding [1, 8, 12, 13]. Globally, EPH has been declining recently [3]. Our study yielded EPH with an incidence of 0.91, a rate consistent with global figures as currently, the incidence of peripartum hysterectomy varies from 0.2/1000 in Denmark [7] to 1-3/1000 in the USA [2]. Indications and outcome of EPH have also improved dramatically for many reasons; outstanding surgical skills, advances in antenatal care, accurate diagnosis of abnormal placentation, availability of blood banking and the widespread presence of uterotonic agents [3]. Although peripartum hemorrhage is still one of the worst emergencies in modern obstetrics, uterine atony and intractable bleeding are no longer primary indications for the procedure, on the

contrary, abnormal placentation has become the top reason behind it as seen in our study as The results of our study confirm this fact, as we found that 70 patients out of 74 (94.59%) were suffering from abnormal placental localization and invasion, which goes parallel to the results of others [3-5]. And in this series it was the primary indication in 68 (91.89%) patients. The reason for this shift was attributed to increased awareness of medical personnel, successful and due time use of treatment with uterotonic agents, uterine artery embolization, and the application of other surgical procedures such as the B-Lynch technique [25].

The growing incidence of abnormal placentation's mostly due to increased incidence of uterine injury; increased rates of primary and repeated caesarean deliveries, which may be indorsed to the restricted skills

expanded by the new generations of residents due to changes in the linear curve of teaching, the curettage in the last decade or to decreased need for hysterectomy for uterine atony [26]. In our study, the rate of placental migration abnormality has also been linked to parity and previous caesarean sections as shown in our results, which is similarly reported by others [3, 20]. This observational measure was also concluded by Qyelese *et al.* [22].

In our study, and evident by a clinical experience, we noticed that uteruses previously scarred due to any procedure are more likely to result in abnormal placentation in next pregnancies, a problem mostly related to the application of artfully skills of uterine closure. The solicitation of EPH has also showed parallel linkage with maternal age [26], and multiparity [27], both factors are significantly evident in our data as well. The CS rate jumped dramatically at JUH from 5% in the 1980s to approach 30% starting 2010 and has been increasing steadily since then to score more than 50% in 2017, which flashed another alarming signal among the decision makers to review the current status. The risk of placenta previa was 0.25% with a virgin uterus and 1.22% in patients with one previous CS as reported by Chawla *et al.*, Rehman *et al.* and Nielson *et al.* [6, 28, 29] respectively. The presence of placenta previa along with a history of a previously scarred uterus's association to the occurrence of placenta accreta are well documented in literature [29, 30]. In the current study, in the ten year period time (2010-2017), we found a definite rise in the incidence of placenta accreta as the primary indication for EPH (43.2%), which should signal a red alarm to review our practice. In fact, it has been shown that the risk of placenta accreta goes parallel with the number of previous CSs, and is as high 67% in uteruses scarred three or more times previously [20, 26], and a similar results to our analysis of 54.1% of placenta accreta in women with 3 or more CSs. This conclusion was reported by Bakshi and Meyer who mentioned clearly that CS for placenta previa increased the risk of hysterectomy 18-fold with the risk being increased as high as 110-fold [31]. On the other hand, Khan *et al.* [32] reported that the risk of placenta previa increased from 0.26% with an unscarred uterus to more than 10% with four or more previous CSs [32].

In the current study, the ten year period time (2007-2017), we found a definite rise in the incidence of placenta accreta as the primary indication for EPH (43.2%), which signals a red alarm. We have tried hard to find the reasons for this unwarranted rise, to conclude with the results that societal reasons significantly contribute to this increase; In the Middle East, families of four or more children are not peculiar, and low health education could be the reason women attempt pregnancy regardless of the number of previous CSs they had or the cost on her life/wellbeing [33].

As the incidence of CS continues to be on the rise, both in Jordan and worldwide, the problem of abnormal placentation is likely to become more common. Not only that; women with previous CSs are more prone to many life threatening complications including lengthy operative deliveries, uterine rupture/dehiscence, shock, transfusions, and death [3, 9]. Drastic measures need to be established to lower the rate of CSs in the region and worldwide. To decrease the incidence of EPH, it is essential to decrease the primary CS rate and encourage trials of birth after CS with close supervision [34, 35]. Although EPH is a lifesaving procedure, it has been associated with considerable morbidity and mortality. In fact, its morbidity scores as high as 56% [27], and found out to be 27.1% in our study. We also need to keep in mind the impact EPH has on the population as it targets youngsters; mothers during their childbearing years. In our study age of participants ranged between 26 and 45 years old, with a mean age of 35.76 years. The immediate as well as the late surgical complications of EPH in our study were addressed carefully. The most encountered ones during surgery were the need for blood transfusion of 62 (83.78%) patients, bladder injury in 16 patients, with a rate of (21.6%). These two main concerns were the core focus of attention in all related studies. Bladder injury has been widely reported as a complication of EPH. Most reported data stressed upon a valid points that are the major urologic complications of EPH mostly urinary bladder and ureteric injuries [2, 36, 37]. Placenta accreta per se has also been attributed to be an independent risk factor for bladder damage [2, 37]. However, bladder injury was significantly higher in our study; a possible explanation would be that none of our patients underwent subtotal hysterectomy; instead they all underwent total abdominal hysterectomies. Although a meta-analysis has not previously found any advantage of subtotal over total hysterectomy [38], unsurprisingly as a teaching hospital; JUH has an unblemished strategy for performing total instead of subtotal hysterectomies attended by at least two senior consultants. In fact, subtotal hysterectomy vintages to lower risks of bladder/bowel injuries and blood loss, less lengthy operative time and hospital stay. However, it has been associated with cervical stump bleeding, and possible future pathology. On the contrary, we totally agree with others that total hysterectomy is the approach of choice in cases of massive bleeding as there is no evidence of adverse effects on women future life [39] and the subtotal one left to inexperienced surgeons.

We are aware about the fact that EPH as expected is associated with extensive blood loss and thus the need for transfusion of large volumes of blood and blood products. Our study showed that 70.2% of our patients needed massive blood transfusions. The availability of a central blood bank on campus of JUH

along with adequate cross-matching blood preparation and cannulation are key factors behind the nearly 0% mortality rate associated with EPH noted at our institution. To further improve the diagnostic accuracy; Magnetic resonance imaging (MRI), in conjunction with ultrasound has been used for all the study patients suspected to have bladder involvement as clearly diagnosed in 70.2% as reported by Hernandez JS [40]. Placenta accrete can be diagnosed based on the visualization of lacunar flow and the absence of the hypoechoic zone at the placental margin [41, 42]. Prediction is the key to overcoming all the complications associated with abnormal placentation. In our study, late postoperative complications included postpartum pyrexia noticed in 4 (5.4%) patients, wound infection in 4 (5.4%) patients, disseminated intravascular coagulation in 3 (4.05%) patients, vaginal cuff bleeding in 2 (2.7%) patients, surgical re-exploration in 3 (4.05%) patients, and cardio-pulmonary complications in 9 (12%) patients as seen with others [10].

Limitations

We believe that our study yielded valuable results. However; there is no study without limitations. This study used the retrospective design; hence we should approach the generalizability of this study with caution. With the application of retrospective design in research, it remains difficult to establish a cause effect relationship. The humble codification of medical information on patients' files contributed to some difficulty in carrying out our mission.

Conclusions

Thinking about the rationale for the first caesarean section should dwell in the priorities of decision-makers by finding treatment protocols that not subject to personal industriousness. The linear curve of obtaining surgical skills by the residents must be reviewed to insure obtaining a proper closure techniques. The surgical decision must be imperiled to careful evaluation by service care providers. We noticed that previous one caesarean section is the main indication for the second one; either by itself or hiding behind CS under maternal request. A previous CS gives a narrow window for a trial of birth after CS, and will likely force the obstetrician to search for a justification for a repeat caesarean section. Spreading health education and awareness on the risks of repeated deliveries, especially caesarean deliveries, should be a national priority because it targets the age group in the reproductive years. This is perplexing in Jordan where culture is concomitant with large families; high gravidity and high parity.

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Disclosure

The authors report no conflict of interest

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