

# Emergency peripartum hysterectomy in a tertiary teaching hospital in Northern Jordan: a 15-year review

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## Original Article

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## Abstract

## Background

Emergency Peripartum hysterectomy is a major operation performed when conservative measures fail to stop life-threatening postpartum haemorrhage. It is associated with a high rate of maternal morbidity among survivors. The aim of this work is to evaluate the incidence, indication, and complications of peripartum hysterectomy at King Abdulla University Hospital over a 15-year period.

## Methods

A retrospective cohort study of emergency peripartum hysterectomy. The incidence was calculated. Risk factors for abnormal placentation were explored. A comparison between total and subtotal hysterectomy in terms of morbidity outcomes was conducted. The Chi-square test, Fisher's exact and Independent Sample T-Test were used for analysis. Statistical significance was declared at  $\alpha < 0.05$ .

## Results

The incidence of peripartum hysterectomy was 1.46 per 1000 births. Sixty-three were performed after caesarean section and three were performed after vaginal delivery ( $P < 0.001$ ). Abnormal placentation (accreta, increta and percreta) was the main indication (46.03%). The strongest risk factor for abnormal placentation was placenta previa with previous caesarean section ( $P < 0.001$ , OR 17.33, 95% CI 2.09–143.14). One maternal and three neonatal deaths were recorded. Urinary bladder injury was the most frequent complication (26.98%). No difference in morbidity noted between total and subtotal hysterectomy.

## Conclusions

The incidence of emergency peripartum hysterectomy is increasing steadily over the last two decades in the north of Jordan. Abnormal placentation is the commonest indication for emergency peripartum hysterectomy. There is no significant difference between total and subtotal hysterectomy in terms of complications' development, admission to the ICU, and estimated blood loss. The morbidity associated with emergency peripartum hysterectomy is significant.

## Introduction

Emergency Peripartum Hysterectomy (EPH) is a major operation performed almost always when conservative measures fail to stop life-threatening postpartum haemorrhage. Apart from the dramatic loss of future fertility, EPH has the potential to be associated with a high rate of maternal morbidity among survivors.[1–4]

The worldwide incidence of emergency peripartum hysterectomy is around 1 per 1000 deliveries, being higher among low-income countries.[1, 5] Nationally, the exclusive couple of studies conducted on EPH were derived from the north of Jordan. They have shown a demonstrable rise in the incidence of emergency peripartum hysterectomy from 0.5 to 0.87 per 1000 deliveries between 1998 and 2002, respectively.[6, 7] The incidence in other parts of Jordan is largely unknown.

The indications for peripartum hysterectomy have altered significantly over the last four decades where abnormal placentation has escalated rapidly over sterilization, fibroid tumors, and uterine atony, which were the most frequent indications, to become the far leading indication for all peripartum hysterectomy cases.[1, 8, 9]

The objective of this study was first to evaluate the incidence, indication, and complications of EPH at a tertiary obstetric referral hospital in the north of Jordan. Then, we assessed whether total or subtotal hysterectomy procedures have produced different outcomes. Finally, we looked for risk factors for abnormal placentation among this cohort of patients.

## Materials And Methods

All cases of emergency peripartum hysterectomy performed at King Abdulla University Hospital (KAUH), a tertiary referral teaching university hospital in the north of Jordan, between January 2004 and December 2019 were reviewed retrospectively. The ICD-10 coding system, histopathology reports, and operating theater records were used to identify the cases. Further details were recruited from the patients' medical records after removing duplicate entries.

Emergency Peripartum Hysterectomy (EPH) was defined as hysterectomy performed after 20 weeks of gestation, within 48 hours of delivery for catastrophic postpartum hemorrhage uncontrolled by medical and surgical therapies. A total of 66 women were identified over the 15 years. Out of the 66 entries, 3 women had incomplete medical records and they were included only during measuring the incidence. 63 women had complete medical records, and their data were used for full analysis.

Maternal characteristics including demographics, past obstetric history, details of the current pregnancy and delivery, and details of the hysterectomy and complications were obtained.

The patients were divided into two groups according to the type of hysterectomy they had whether total and subtotal and the outcomes were compared between both groups.

Furthermore, the patients were divided into two other groups according to the histologic type of placentation whether normal or abnormal placentation to assess the risk factors for its development. Abnormal placentation was defined as placenta accrete, increta, and percreta.

The incidence of EPH was presented as the number of hysterectomies per 1000 births. Descriptive statistics were calculated and represented as frequency (%), mean (standard deviation (SD)), or median (interquartile range (IQR)) as appropriate. Data were expressed as categorical variables. The Chi-square test or Fisher's exact test, as appropriate, were used to test for association between categorical factors. The odds ratio (OR) was also reported. Independent Sample T-Test was used for parametric continuous factors. Statistical significance was declared at  $\alpha < 0.05$  (two-sided).

Ethics approval was granted from the Institutional Review Board (IRB) committee at KAUH.

## Results

Over the 15 years of the study, there were 44905 total number of deliveries at KAUH. 21077 (46.9%) were caesarean deliveries, while 23828 (53.1%) were vaginal deliveries. 66 of them required EPH, yielding an incidence of 1.46 per 1000 deliveries. 63 EPH were performed after caesarean section giving an incidence of 2.9 per 1000 deliveries, while only 3 EPH were performed after vaginal delivery giving an incidence of 0.12 per 1000 deliveries suggesting that caesarean delivery has an extremely significant association with EPH ( $P < 0.001$ ).

Table 2 demonstrates that the mean maternal age was  $36 \pm 4.35$  ranging from 21 to 47 years and the mean BMI was  $31 \pm 4.63$ . Regarding their obstetric history, all women were multiparous with a median parity of 4 and ten of them were grand multiparous, while the median gravidity was 6. The median number of previous caesarean section for the cohort was 3. Most of them (58 cases, 92.06%) had at least one caesarean section and fifty-one (80.95%) had 2 or more caesarean sections.

With regard to the last delivery, the mean gestational age at delivery was  $35+5 \pm (3+2)$  ranging from 25 to 39 weeks. The majority of the deliveries (32 cases, 50.79%) were elective caesarean section, while only 4.76% had vaginal deliveries, as shown in Table 2.

### Abnormal placentation.

Operation notes and histopathology reports were reviewed to determine the main indication of EPH. Abnormal placentation was the main indication for EPH in this cohort representing (29 cases, 46.05%), as shown in Table 1. However, placenta previa was dominant in 79.36% of all cases and it was a concomitant finding in all cases of abnormal placentation except one. This indicates that placenta previa is a major risk factor for abnormal placentation ( $P = 0.001$ ), as Table 5 illustrates. The association between previous caesarean section and abnormal placentation was not statistically significant ( $P = 0.056$ ) despite the fact that all women with abnormal placentation had a previous caesarean delivery. On the other hand, having 2 or more caesarean sections was a significant risk factor for abnormal placentation ( $P = 0.02$ ). The strongest risk factor for abnormal placentation was placenta previa with previous caesarean section ( $P < 0.001$ ). Furthermore, being 35 years old and above was found to be a risk factor, while grand parity, previous history of evacuation, and preterm delivery were not.

### Total versus subtotal hysterectomy outcome.

Regarding the type of hysterectomy procedure performed, 45 (71.42%) were total while 18 (28.57%) were subtotal. No significant difference noticed between both groups in terms of complications' development, admission to the ICU, estimated blood loss, and the number of packed RBCs or total blood products transfused, as demonstrated in Table 4.

### Complications.

There were 3 (4.76%) cases of neonatal deaths and one case of maternal death (1.58%) for a patient who had placenta previa complicated by placenta increta after 4 previous caesarean sections. This patient had developed Disseminated Intravascular Coagulopathy (DIC) and multiple organ failure. 37 women (58.73%) experienced no complications after EPH. The remaining 26 women (41.26%) have experienced at least one complication where inadvertent injury to the adjacent structures mainly the urinary bladder was the commonest, while febrile illness was the second most common complication affecting 25.39% of them, as shown in Table 3. The mean blood loss for all women was  $3395 \text{ mL} \pm 288$ . The mean number of hospital stay in days was  $5.2 \pm 0.5$ .

## Discussion

The most recent systemic review has shown that the incidence of EPH for low-income countries was 2.8 per 1000 deliveries.[5] The incidence of our institution (1.46 per 1000) is nearly half the overall incidence for places with a similar income. Although our number is comparable to others and looks reassuring, it is actually alarming when we compare it with the earlier studies conducted in a nearby hospital (Princess Badeea Teaching Hospital) in Northern Jordan. The numbers are showing a steady increase in the incidence of EPH from 0.5 in 1998 to 0.87 in 2002 ending by 1.46 in 2020.

There is no national database in Jordan for EPH and for caesarean section yet. Therefore, it is difficult to generalise the finding in one place to the whole country. However, the available studies for the caesarean section rate in Jordan are showing similar trends of rising rates especially among apparently low-risk mothers.[10, 11] For example, one study has shown that the rate has jumped from 18.2% in 2002 to 30.3% in 2012. [12] This steady increase in the caesarean section rate can explain, by itself, the gradual rise of EPH incidence since a direct association between caesarean section and EPH was described by the United Kingdom Obstetrics Surveillance System (UKOSS).[13] Moreover, another explanation can be made as the rise in the caesarean section rate in the past

two decades has created a new population of scarred uteruses where the risk of EPH will be significantly higher when placenta previa complicates it, as Shamsa et al suggested.[4]

Our finding of an extremely significant association between placenta previa and previous caesarean section with abnormal placentation ( $P > 0.001$ ) in our population was similar to other studies in different populations suggesting that the finding is genuine and universal. [4] Therefore, women with this risk factor should be referred to a tertiary centre where ICU facilities and blood bank services are available.

Similar to other studies that looked for differences in the outcomes between total and subtotal hysterectomy, we found no statistically significant difference in maternal morbidity.[3] Hence, we recommend to leave the decision to the operating surgeon according to the surgical situation during the procedure.

Our limitation in the study is that our institution (KAUH) is a referral centre receiving high-risk cases. Therefore, the numbers of EPH and caesarean section might not represent the actual number when general obstetric practice is not the usual daily activity.

Based on the above evidence, we are concerned that the rate of EPH will continue to rise in the future threatening mothers' lives and wellbeing, if no real actions taken to prevent unnecessary first caesarean sections. Thus, we strongly advice decision-makers to create a national registry for caesarean section and EPH which will guide clinicians to monitor the trends and start applying appropriate policies.

## Conclusions

The incidence of emergency peripartum hysterectomy is increasing steadily over the last two decades in the north of Jordan. Abnormal placentation is the commonest indication for emergency peripartum hysterectomy. There is a strong association between placenta previa and previous caesarean section with abnormal placentation.

We recommend to work on lowering the rate of caesarean section, in order to stop the steady rise of peripartum hysterectomy. As this will lower the incidence of abnormal placentation which is the main cause of peripartum hysterectomy. Also, a clear guideline has to be distributed to all peripheral hospitals to refer all patients with placenta previa on top of previous caesarean scars to tertiary hospitals since the risk of abnormal placentation and the need for peripartum hysterectomy is high.

There is no significant difference between total and subtotal hysterectomy in terms of complications *develo ± ent, admission → theICU, and estimated blood loss. Therefore, we do not recommend a specific approach in favour of the second decision and expertise should be the main guide in these situations.*

The morbidity associated with emergency peripartum hysterectomy, apart from loss of fertility is significant. Thus, a careful psychological assessment and emotional support is crucial in these cases.

## Abbreviations

- **EPH:** Emergency Peripartum Hysterectomy.
- **DIC:** Disseminated Intravascular Coagulopathy.
- **RBCs:** Red Blood Cells.
- **ICU:** Intensive Care Unit.
- **SD:** Standard Deviation.
- **IQR:** Interquartile Range.
- **UKOSS:** United Kingdom Obstetrics Surveillance System.

## Declarations

### Ethics approval and consent to participate

Ethical approval for this retrospective study was granted by the IRB committee at King Abdulla University Hospital. Reference number: (89/132/2020), on 13.04.2020.

### Consent for publication

Not applicable.

### Availability of data and material

The data that support the findings of this study are available from King Abdulla University Hospital (KAUH) [Third party]. Restrictions apply to the availability of these data, which were used under license for this study. Data are available [From the corresponding author] with the permission of the IRB committee at KAUH [Third party].

### Competing interests

The authors declare that they have no competing interests.

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## Authors` contribution

- **R.:** Suggestion of the idea, data collection, data analysis, reviewing the literature, and writing and editing the manuscript.
- **O.:** Data collection, data analysis, reviewing the literature, and editing the manuscript.
- **M.:** Data collection, data analysis, reviewing the literature, and editing the manuscript.

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## Tables

Table 1. Histopathological Indications for peripartum hysterectomy.

<b>Indications.</b>	<b>n</b>	<b>(%)</b>
Abnormally adherent placenta	29	(46.03)
Placenta accreta	8	(12.69)
Placenta increta	15	(23.80)
Placenta Percreta	6	(9.52)
Placenta Previa	20	(31.74)
Uterine atony	8	(12.69)
Uterine rupture	4	(6.34)
Extension during Caesarean section.	2	(3.17)

Table 2. Characteristics of women, deliveries and peripartum hysterectomies.

<b>Clinical features</b>	
Maternal age in years, mean (SD)	36 (4.35)
BMI, mean (SD)	31 (4.63)
Gravidity, median (IQR)	6 (4-7)
Parity, median (IQR)	4 (2-5)
Previous Caesarean section, median (IQR)	3 (2-4)
Previous caesarean section, n (%)	58 (92.06)
≥ 2 previous caesarean section, n (%)	51 (80.95)
Previous uterine curettage, n (%)	23 (36.50)
<b>Delivery</b>	
Gestational age in weeks, mean (SD)	35+5 (3+2)
Vaginal delivery, n (%)	3 (4.76)
Elective Caesarean section, n (%)	32 (50.79)
Emergency Caesarean section, n (%)	28 (44.44)
<b>Peri partum hysterectomy</b>	
Total hysterectomy, n (%)	45 (71.42)
Subtotal hysterectomy, n (%)	18 (28.57)
Elective (planned) hysterectomy, n (%)	4 (6.34)
Hysterectomy performed during Caesarean section, n (%)	52 (82.53)
Reopening after caesarean section to perform hysterectomy, n (%)	8 (12.69)

Table 3. Complications encountered with peripartum hysterectomy.

Complications.	n (%)
Febrile illness	16 (25.39)
Infection (Positive Culture)	13 (20.63)
Septicaemia	2 (3.17)
Urinary tract infection	8 (12.69)
Wound	2 (3.17)
Chest	1 (1.58)
Injury to adjacent structures	19 (30.15)
Urinary bladder	17 (26.98)
Ureter	1 (1.58)
Bowel	1 (1.58)
Acute renal failure	2 (3.17)
Disseminated intravascular coagulopathy	10 (15.87)
TRALI	1 (1.58)
Maternal death	1 (1.58)
Neonatal death	3 (4.76%)

Table 4. Outcomes of total hysterectomy versus subtotal hysterectomy.

outcomes	Total hysterectomy (n=45)	Subtotal hysterectomy (n=18)	P- value
Encountered complications			0.8
No	26 (57.8%)	11 (61.1%)	
Yes	19 (42.2%)	7 (38.9%)	
Urinary tract injury			0.92
No	32 (71.1%)	13 (72.2%)	
Yes	13 (28.9%)	5 (27.8%)	
ICU admission			0.8
No	26 (57.8%)	11 (61.1%)	
Yes	19 (42.2%)	7 (38.9%)	
Packed RBC, unit (IQR)	6 (4-9)	6 (2.5-8)	0.65
Total blood product, unit (IQR)	14 (7-23)	9.5 (7.75-20.75)	0.99
Estimated blood loss, mL (IQR)	3000 (2000-4000)	2500 (2100-3375)	0.97

Descriptive provided as either frequency (%) or median (IQR).

Table 5. Risk factors for developing abnormally adherent placenta.

Risk factor	Normal placentation (%) (n=34)	Abnormal placentation (%) (n=29)	Odds ratio	95% CI	P-value
<b>Previous caesarean section</b>			11.00	(0.58 – 208,02)	0.056
No*	5 (100%)	0 (0.0%)			
Yes	29 (50%)	29 (50%)			
<b>≥ 2 previous caesarean section</b>			5.60	(1.11 – 28.27)	0.02
No*	10 (83.3%)	2 (16.7%)			
Yes	24 (47%)	27 (53%)			
<b>Placenta previa</b>			15.27	(1.84 – 126.61)	0.001
No*	12 (92.3%)	1 (7.7%)			
Yes	22 (44%)	28 (56%)			
<b>Previous caesarean section and placenta previa</b>			17.33	(2.09 – 143.14)	<0.001
No*	13 (92.8%)	1 (7.2%)			
Yes	21 (42.8%)	28 (57.2%)			
<b>Age (Years)</b>			3.78	(1.16 – 12.30)	0.03
< 35*	15 (75%)	5 (25%)			
≥ 35	19 (44.2%)	24 (55.8%)			
<b>Previous evacuation</b>			2.59	(0.90 – 7.43)	0.07
No*	25 (62.5%)	15 (37.5%)			
Yes	9 (39.1%)	14 (60.9%)			
<b>Grand parity</b>			0.75	(0.26 – 2.09)	0.58
No*	20 (51.3%)	19 (48.8%)			
Yes	14 (58.3%)	10 (41.7%)			
<b>Gestational age at delivery (weeks)</b>			1.50	(0.53 – 4.16)	0.43
≥37*	15 (60%)	10 (40%)			
<37	19 (50%)	19 (50%)			

\* Reference group. CI, Confidence Interval