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Research article

Peripartum Hysterectomy and its Relationship with Cesarean Section in the Kingdom of Bahrain: A Review of 25 Years

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Abstract

Background

Peripartum hysterectomy is a life-saving emergency procedure which is associated with considerable maternal morbidity and mortality. Different studies showed that as the number of cesarean deliveries continues to rise, the number of peripartum hysterectomy had increased.

Objectives

The first objective was to find out the incidence, indications and complication of peripartum hysterectomy in 25 years at Ministry of Health Hospitals of Bahrain. The second objective was to look into the relationship between the rise of cesarean section and peripartum hysterectomy.

Study Design

A retrospective cross-sectional study of all women who had peripartum hysterectomy at Ministry of health hospitals (MOH) between first of January 1991 up to 31st December 2015.

Method

All patients who had peripartum hysterectomy during the last 25 years were identified by reviewing labour room registry of MOH hospitals and morbidity and mortality files. The records were analyzed to find out the incidence and indication of peripartum hysterectomy. The morbidity and mortality associated with this procedure were studied. We analyzed whether the incidence or the indication has changed over the years of the study especially with the rise of cesarean section rate.

Results

There were 109 peripartum hysterectomies during the study period with an incidence of 0.4 per 1000 deliveries. The incidence has increased from 0.31 in the first period to reach 0.55 per 1000 deliveries in the last period of the study (P value 0.00001). There was a parallel rise in the incidence of cesarean delivery as it increased from 10% to reach 21% (P value 0.0000). The

main indication of peripartum hysterectomy in the first period in this study was uterine atony followed by placenta accrete, placenta Previa and uterine rupture while in the last decade most peripartum hysterectomies were due to uterine atony, placenta accrete and placenta Previa.

Peripartum Hysterectomy was associated with significant maternal morbidity and mortality. All of the patients in this study required blood transfusion. Disseminated intravascular coagulopathy occurred in 27 patients (24.8%) and urinary tract injuries in 9 patients(8.25%).There were 7 maternal deaths associated with Peripartum Hysterectomy (6.4%).

Conclusion

Peripartum hysterectomy has increased significantly over the years of the study with a parallel rise in the incidence of cesarean delivery. Placenta Previa and accreta as an indication has increased over the years of the study while uterine rupture has decreased.

Keywords: Peripartum Hysterectomy; Caesarean Section; Postpartum Haemorrhage

Introduction

Emergency peripartum hysterectomy was first performed in the nineteenth century to reduce maternal mortality and morbidity. It was originally introduced to manage life threatening obstetric hemorrhage and infection[1]. Peripartum hysterectomy remains a necessary tool for the consultant obstetrician. Knowledge of this operation and the skill in its performance can save the patients with uterine rupture or intractable postpartum hemorrhage. The procedure is associated with considerable morbidity and mortality [2-6]. Peripartum hysterectomy is a lifesaving emergency but to avoid serious complication it should be decided and done before clinical deterioration of the patients.

Peripartum hysterectomy is an uncommon operation in modern obstetrics with a reported incidence of 0.4 per 1,000 deliveries in Dublin and 0.77 per 1,000 deliveries in USA [7,8]. In the past, the most common indication of emergency peripartum hysterectomy was uterine atony and uterine rupture [9,10] but recent reports list placenta accreta as the most common indication and is most likely related to the increase of caesarean deliveries [7,11-13]. Several studies show that peripartum hysterectomy is strongly associated with previous caesarean delivery [3,8,11,14-16].

We have decided to investigate peripartum hysterectomy as there was no published study from our institute with special emphasis on its relationship with cesarean section. The objective of this study was to find out the incidence, indications and complication of peripartum hysterectomy in 25 years at Minis-

try of Health Hospitals of Bahrain. The second objective was to look for the relationship between the rise of cesarean section and peripartum hysterectomy.

Materials and Methods

This is a retrospective cross-sectional study of all women who had peripartum hysterectomy at the Ministry of Health Hospitals (MOH); which included Salmaniya Medical Centre and two peripheral hospitals; between first of January 1991 up to 31st December 2015. The patients were identified by reviewing labour room registry of MOH hospitals and morbidity and mortality files. The records were analyzed and reviewed by the authors. This study has been conducted in three phases. The first phase was conducted between 1.1.1991 up to 31.12.2000, the second phase was between 1.1.2001 till 31.12.2005 and the third between 1.1.2006 up to 31.12.2015. The incidence of peripartum hysterectomy was calculated in these three phases. The demographic data of the patients along with the indication of the procedure has been analyzed. The morbidity and mortality associated with peripartum hysterectomy was studied. We also looked whether the incidence or the indication has changed over the years of the study especially with the rise of cesarean section rate.

Ethical approval has been obtained from the secondary research committee at MOH prior conducting this study.

Data management and analysis plan

Descriptive statistics were reported as frequency and percentage for categorical data. Chi square test was used as appropriate to compare the study groups. The data was analyzed by using SPSS version 20.

Results

During the study period, there were 259837 deliveries and 109 peripartum hysterectomies at Ministry of health Hospitals (MOH). Cesarean hysterectomy was performed in 67 women (61.5%) and 42 patients had postpartum hysterectomy (38.5%)(Table 1). The incidence of peripartum hysterectomy was 0.4 per 1000 deliveries during the study period.

The number of peripartum hysterectomy was 31 during the period (1991-2000), 20(2001-2005) and 58 (2006-2016). The incidence of PH has increased from 0.31 in the first period to reach 0.55 per 1000 deliveries in the third period and the difference was significant (P value 0.0001). The incidence of cesarean delivery had increased significantly from 10% (1991-2000) to reach 21% (2006-2015)(P value 0.000). The rate of PH with prior cesarean section has increased significantly from 29 % to reach 60% in the last decade(P value 0.025)(Table 2). The three groups were similar in their age (the mean age ranged from 34 to 35 years).

	1991-2000	2001-2005	2006-2015	1991-2015
No. of Deliveries	100730	53420	105687	259837
No. of Vaginal Deliveries	90699	44661	83119	218479
No. of Cesarean Section	10031	8759	22568	41358
Cesarean hysterectomy	13	11	43	67
Postpartum hysterectomy	18	9	15	42
Peripartum Hysterectomy (Total)	31	20	58	109

Table 1. Number of deliveries and Peripartum Hysterectomy at Ministry of Health Hospitals (1991-2015).

Years	CS%	PH (Incidence /1000 deliveries)	PH with history of CS (%)
1991-2000	10	31 (0.31)	9 (29)
2001-2005	16	20(0.37)	11(55)
2006-2015	21	58(0.55)	34(60)
P value	0.000*	0.00001*	0.025*

PH(Peripartum Hysterectomy)

CS (Cesarean Section)

Table 2. Cesarean Section rate, Incidence of Peripartum Hysterectomy and Peripartum Hysterectomy with history of Cesarean Section% in 3 Phases at Ministry of Health Hospitals (1991-2015).

Eight patients were primigravidas (7.3%) and 101 were multigravidas (92.7%). On comparing the mode of delivery in women who had peripartum hysterectomy, we found that 72 women had cesarean delivery (67%), 29 (27%) had vaginal delivery and 7 (6%) had instrumental delivery (Table 3).

Type of Delivery	1991-2000	2001-2005	2006-20015	1991-20015	P value
Vaginal Delivery	9(29%)	8(40%)	12(21%)	29(27%)	0.22
Instrumental Delivery	2(6.5%)	1(5%)	4(7%)	7(6%)	0.956
Cesarean Section	20(64.5%)	11(55%)	42(72%)	72(67%)	0.34
Total	31	20	58	109	

Table 3. Type of Delivery in Women who has Peripartum Hysterectomy at Ministry of Health Hospitals between 1991-2015.

The main indication of PH in the first period (1991-2000) was uterine atony (12 patients; 38.7%), placenta accreta (7 patients; 22.5%), Placenta Previa(6 patients; 19.3%) and uterine rupture (5 patients; 16.1%). In the second period (2001-2006); the commonest indication was uterine atony 11 patients; 55%), followed by Placenta Previa (7 patients; 35%) and placenta accreta (6 patients; 30%). Uterine rupture was responsible of 15% of PH(3 patients).However, in the last decade most PH were due to uterine atony (22 patients; 37.9%), placenta accreta (19 patients; 32.8%) and placenta Previa (15 patients; 25.9%). There was no PH attributed to uterine rupture in the last period (Table 4).

	1991-2000	2001-2005	2006-2015	1991-2015	P value
Uterine tony	12	11	22	45	0.385
Placenta previa	6	7	15	28	0.46
Uterine rupture	5	3	0	8	0.016*
Placenta accreta	7	6	19	32	0.60
Placenta Abruption	2	2	2	6	0.52
Extension of uterine incision	2	3	1	6	0.77
Cervical &vaginal tear	2	3	2	7	0.19
Uterine fibroid	1	0	1	2	0.70

N.B: There was more than 1 indication of PH in some patients.

Table 4. Indication of Peripartum Hysterectomy Between 1991-2015.

Peripartum Hysterectomy was associated with significant maternal morbidity and mortality. All of the patients in this study required blood transfusion. The mean blood loss ranged from 3.6 to 4.4 Liters. Disseminated intravascular coagulopathy (DIC) occurred in 27 patients (24.8%). PH led to urinary bladder injuries in 6 patients(5.5%)and 3 patients had ureteric injuries(2.75%). Nine patients had hematoma in the broad ligament, the pelvis or the abdominal wall (8.3%) and 8 patients required re-explorative laprotmy (7.3%).Wound infection was reported in 4 patients (3.7%). Ten patients had cardiac arrest (9.2%) and 6 women developed thrombo-embolism (5.5%). Sheehan syndrome complicated one PH in the first period of

the study. There was no significant difference regarding maternal morbidity between the 3 different phases of the study with the exception of DIC (Table 5).

	1991-2000	2001-2005	2006-2015	P value	Total
DIC	10	8	9	0.047*	27
Urinary bladder injury	3	1	2	0.467	6
Ureteric injury	2	1	0	0.06	3
Re-laprotomy	1	2	5	0.57	8
Hematoma	2	2	5	0.89	9
Wound infection	1	2	1	0.25	4
Sheehan Syndrome	1	0	0	0.28	1
Renal Failure	2	0	4	0.49	6
Thrombo-embolism	3	0	3	0.33	6
Cardiac arrest	4	1	5	0.67	10
Maternal death	2	1	4	0.96	7

Table 5. Morbidity and mortality associated Peripartum Hysterectomy between 1991-2015.

Unfortunately, there were 7 maternal deaths associated with Peripartum Hysterectomy (6.4%). Two patients died as a result of severe placental abruptions which led to DIC. Two patients had sickle cell disease and developed acute chest syndrome and one of them had atonic postpartum hemorrhage at the time of cesarean section and the second developed abdominal wall hematoma post cesarean delivery. Two patients had amniotic fluid embolism with placenta accreta in one and uterine atony in the second patient.

Different procedures were performed to control the obstetric hemorrhage as 19 patients had internal iliac artery ligation (17.4%), 12 patients had Bakri Balloon (11%) and 2 patients had uterine artery ligation (1.8%). Three women required unilateral salpingo-oophorectomy to control the hemorrhage (2.8%) (Table 6).

	1991-2000	2001-2005	2006-2015	1991-2015	P value
Internal iliac artery ligation	5	6	8	19	0.25
Abdominal packing	1	2	0	3	0.06
Salpingo-oophorectomy	3	0	0	3	0.02*
Uterine artery ligation	0	0	2	2	0.41
Bakri Balloon	0	0	12	12	0.003*

Table 6. Additional procedures in Women who had Peripartum Hysterectomy Between 1991-2015.

Discussion

The incidence of peripartum hysterectomy in our study was 0.4 per 1000 deliveries. This figure is comparable to the reported rate of peripartum hysterectomy which varies from 0.29 up to 1.4 per 1,000 deliveries [2,5,8,11,12,14,17]. The incidence of peripartum hysterectomy in this study has increased significantly from 0.31 in the first period (1991-2000) to reach 0.55 per 1000 deliveries in the last period of the study (2006-2015). There was a parallel significant rise in the incidence of cesarean delivery as it increased from 10% to reach 21% (Table 2). This observation was similar to the findings of Bateman et al as the rates of peripartum hysterectomy in United States has increased by 15% during the study period from 1994 to 2007. The increase was attributed to the rising rates of cesarean delivery; which can result in to abnormal placentation or uterine atony [15]. On the other hand, Flood et al found that peripartum hysterectomy in Ireland has decreased from 0.9 to reach 0.2 per 1000 deliveries over 4 decades [7].

In this study, the rate of PH with prior cesarean section has increased significantly from 29 % to reach 60% in the last decade (Table 2). Different studies show that peripartum hysterectomy is strongly associated with previous cesarean delivery [3,8,11,14-16]. There was 13.5 fold rise of peripartum hysterectomy with previous cesarean delivery and the risk increases with the rise number of previous cesarean section (OR 18.6 with 2 or more CS) [16]. Flood et al found that all patients of PH had a history of at least 1 cesarean delivery [7].

The main indication of PH in the first period in this study was uterine atony followed by placenta accreta, placenta Previa and uterine rupture. However, in the last decade most PH was due to uterine atony, placenta accreta and placenta Previa. There was no PH attributed to uterine rupture in the last period. Placenta Previa and accreta as indication of PH has increased over the years of the study while uterine rupture has decreased (Table 4). This observation was similar to the findings of Flood et al who observed that the indications of PH have changed significantly over the years of their study as the uterine rupture as the indication for PH had decreased from 40.5 to reach 9.3% and placenta accreta had increased significantly from 5.4 to 46.5% [7]. Different studies showed that abnormal placentation is becoming the leading cause of peripartum hysterectomy [2,13,15,18]. Uterine atony was the commonest indication of PH in the 3 different phases of the study. This observation was in agreement with other studies [5,14,15,19,20]. Bateman et al found that the rate of PH for uterine atony following repeat cesarean section increased nearly 4 fold, 2.5 following primary cesarean section and 1.5 fold following vaginal delivery [15].

Different studies revealed that peripartum hysterectomy was associated with significant maternal morbidity and mortality [2-6,11,19,21]. All the patients in this study required blood transfusion as a result of massive hemorrhage. Disseminated intravascular coagulopathy, (DIC) was reported to be one of the most common immediate complications of PH and it var-

ies between 4.5 -22% [2,5,19,20]. In this study, 27 patients (24.8%) developed DIC. This can be attributed to the intractable massive obstetric hemorrhage and the delay in performing PH. The other frequent morbidity of PH is urinary bladder injury which had complicated 6 patients (5.5%) and 3 women had ureteric injury (2.75%). This complication was seen more frequently with placenta accreta and repeat cesarean delivery. The incidence of bladder injury varies from 5 to 15 % in different studies [2,4,6,18]. In a large study comparing 4,967 women who underwent peripartum hysterectomy with 578,179 patients who had a non-obstetric hysterectomy; bladder and ureteral injuries were significantly more common with peripartum hysterectomy [22]. Carvalho et al reported that urological injuries can be attributed to scarring and adhesion of the vesico-uterine space following previous cesarean section [20]. Eight patients (7.3%) required re-exploratory laprotomy for pelvic hematoma or persistent postoperative hemorrhage (Table 5). The rate of re-exploration ranged from 7 % up to 25% [18,20,23]. Six women developed thrombo-embolism in this study (5.5%). The reported incidence of thrombo-embolism associated with PH ranged from 1 to 2.3 % [6,22]. The risk of thrombo-embolism is increased in these patients as the pelvic surgery is usually prolonged and usually it is difficult to initiate thrombo-prophylaxis earlier when there is massive hemorrhage. Unfortunately, there were 7 maternal deaths associated with peripartum hysterectomy (6.4%). The reported maternal mortality varies from 0- 17% [2-6, 11, 21]. Wright et al 2010 found that the mortality associated with peripartum hysterectomy is more than 25 times that of non-obstetric hysterectomy [22].

Conclusion

This study shows that peripartum hysterectomy has increased significantly over the years of the study along with a parallel rise of cesarean section rate. The indication of peripartum hysterectomy has changed over the years as placenta Previa and accreta has increased while uterine rupture has decreased. Peripartum hysterectomy was associated with significant maternal morbidity and mortality.

All efforts should be made to avoid maternal death in these patients by early resort to hysterectomy before the patient goes into irreversible DIC and shock. A multidisciplinary team is required in dealing with complicated peripartum hysterectomy which includes senior obstetricians, anesthetist, ICU specialist, urologist and vascular surgeon. A blood bank should be available as these patients required extensive blood transfusion

Conflict of interest:

None

Sponsorship

none

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1. All authors share equal effort contribution towards Substantial contribution to conception and design, acquisition, analysis and interpretation of the data;
2. Drafting the article and revising it critically for important intellectual content.

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