A 11-YEAR REVIEW OF

EMERGENCY OBSTETRIC HYSTERECTOMY (EOH)

IN HOSPITAL UNIVERSITI SAINS MALAYSIA

KUBANG KERIAN, KELANTAN

JANUARY 2007 – DECEMBER 2017

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1.1 DISCLAIMER

DISCLAIMER

I declare that this dissertation records the results of the study performed by me and that it is of my own composition.

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Dr Noor Adibah Hanum Binti Che Hashim

30th November 2020

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"In the name of Allah, the Most Gracious, the Most Merciful"

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Dr Noor Adibah Hanum Che Hashim

November 2020

1.4 LIST OF ABBREVIATIONS

BMI	body mass index
BSO	bilateral salphingoophorectomy
CRHD	chronic rheumatic heart disease
CS	caesarean section
DIVC	disseminated intravascular coagulation
EBL	estimated blood loss
e.g	example
ERPOC	evacuation of retained product of conception
EOH	emergency obstetric hysterectomy
FSB	fresh stillbirth
G	gravida
GDM	gestational diabetis mellitus
Hb	haemoglobin
HUSM	Hospital Universiti Sains Malaysia
ICU	intensive care unit
IJRCOG	International Journal of Reproduction, COntraception, Obstetrics and Gynaecology
IM	intramuscular
INR	international normalized ratio
IV	intravenaous
km	kilometer
kg	kilogram
LSCS	lower segment caesarean section

MAP	morbidly adherent placenta
ml	milliliters
MRI	magnetic resonance imaging
MRP	manual removal of placenta
MTP	massive transfusion protocol
No	number
P	parity
PAS	placenta accrete spectrum
PC	packed cell
POA	period of amenorrhea
POG	period of gestation
PP	placenta previa
PPH	postpartum haemorrhage
PT/APTT	prothrombin time/activated partial thromboplastin time
RBC	red blood cells
RCOG	Royal College of Obstetricians and Gynaecologists
SVD	spontaneous vaginal delivery
USG	ultrasound
VBAC	vaginal birth after caesarean
WHO	World Health Organisation

ABSTRAK

A 11-YEAR REVIEW OF EMERGENCY OBSTETRIC HYSTERECTOMY (EOH) IN HOSPITAL UNIVERSITI SAINS MALAYSIA, KUBANG KERIAN, KELANTAN (JANUARY 2007 – DECEMBER 2017)

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Pendahuluan: Histerektomi obstetrik kecemasan (EOH) adalah salah satu prosedur menyelamatkan nyawa yang dilakukan dalam kes pendarahan yang banyak kerana rahim yang tidak mengecut, rahim pecah dan perlekatan plasenta yang tidak normal dan biasanya dilakukan pada situasi di mana langkah-langkah konservatif gagal mengawal pendarahan. Ia kadang-kadang dikaitkan dengan morbiditi dan kematian ibu dan bayi.

Objektif: Untuk menilai prevalensi, indikasi, kesan kepada ibu dan bayi yang berkaitan dengan histerektomi obstetrik kecemasan di hospital rujukan.

Metodologi: Kajian retrospektif yang dilakukan di Jabatan Obstetrik & Ginekologi di Hospital Universiti Sains Malaysia (HUSM) selama 11 tahun dari Januari 2007 hingga Disember 2017 yang melibatkan seramai 43 wanita yang menjalani histerektomi obstetrik kecemasan. Semua rekod kes histerektomi obstetrik kecemasan dianalisis termasuk profil pesakit, riwayat obstetrik, perincian kelahiran sekarang, indikasi untuk

histerektomi obstetrik dan morbiditi dan kematian fetomaternal yang berkaitan dengan histerektomi obstetrik kecemasan.

Hasil: Di antara 79.777 kelahiran, terdapat 43 kes histerektomi obstetrik kecemasan, yang menunjukkan prevalensi histerektomi obstetrik kecemasan adalah 0.29 bagi setiap 1000 kelahiran. Ciri-ciri demografi ibu menunjukkan bahawa rata-rata usia adalah 36 tahun pada kumpulan histerektomi caesar manakala rata-rata usia bagi kumpulan histerektomi postpartum adalah 33 tahun. Kumpulan pariti yang paling banyak ditemui dalam histerektomi obstetrik kecemasan adalah para dua hingga para lima. Wanita yang menjalani pembedahan caeser sebelum ini dikenal pasti dan 30 wanita (69.77%) mempunyai sejarah pembedahan caesar sebelumnya. Dari 30 wanita yang mempunyai riwayat obstetrik kelahiran caesar, 15 (50%) mempunyai lebih daripada dua kelahiran caesar. Plasenta accreta adalah indikasi yang paling utama ditemui untuk histerektomi obstetrik kecemasan (30 wanita, 69.8%) diikuti oleh rahim yang tidak mengecut (10 wanita, 23.3%), rahim pecah (2 wanita, 4.7%) dan luka yang panjang (1 wanita, 2.3%). Kira-kira 93.33% (28 dari 30 pesakit) dengan plasenta yang melekat mempunyai riwayat pembedahan caesar sebelumnya. Tidak ada kematian ibu yang dilaporkan dalam kajian ini. Komplikasi ibu yang paling ketara selepas operasi merangkumi koagulopati (12 dari 43 wanita), di mana 27.91% memerlukan protokol transfusi besar-besaran, diikuti dengan re-laparotomi (4 wanita, 9.3%), dan demam (3 wanita, 6.98%). Hampir semua bayi dilahirkan dengan skor Apgar yang baik. Komplikasi perinatal termasuk kematian perinatal, 2 dari 43 bayi, 4.65% kelahiran mati yang baru dan kedua-dua kes adalah kes yang dirujuk ke pusat kami untuk abruptio plasenta.

Kesimpulan: Bahagian caesar, terutamanya bahagian caesar berulang pada wanita dengan plasenta previa dan rahim yang tidak mengecut, secara signifikan meningkatkan risiko histerektomi obstetrik kecemasan. Histerektomi obstetrik kecemasan selamat dengan mengurangkan komplikasi berbanding sebelumnya dengan peningkatan rawatan obstetrik dan amalan klinikal yang baik. keputusan awal untuk melakukan histerektomi obstetrik kecemasan adalah penting sebelum keadaan pesakit bertambah buruk.

Kata kunci: *Histerektomi obstetrik kecemasan, plasenta previa, plasenta accreta, kegagalan pengecutan rahim, koagulopati*

ABSTRACT

A 11-YEAR REVIEW OF EMERGENCY OBSTETRIC HYSTERECTOMY (EOH) IN HOSPITAL UNIVERSITI SAINS MALAYSIA, KUBANG KERIAN, KELANTAN (JANUARY 2007 – DECEMBER 2017)

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Introduction: Emergency obstetric hysterectomy (EOH) is one of the life saving procedure performed in cases of intractable hemorrhage due to uterine atony, rupture uterus and placental disorders and it is usually reserved for the situations where conservative measures fail to control the hemorrhage. It is sometimes associated with both maternal and perinatal morbidity and mortality.

Objective: To evaluate the prevalence, indications, maternal and perinatal outcome associated with emergency obstetric hysterectomy in a tertiary care hospital.

Methodology: A retrospective study conducted in the Department of Obstetric & Gynaecology in Hospital Universiti Sains Malaysia (HUSM) for 11 years from January 2007 until December 2017 involving a total of 43 women who underwent emergency obstetric hysterectomy. The records of all cases of emergency obstetric hysterectomy were analyzed included patient profile, obstetric history, details of present labour,

indications for obstetric hysterectomy and the fetomaternal morbidity and mortality associated with emergency obstetric hysterectomy.

Results: Among 79,777 deliveries, there were 43 cases of emergency obstetric hysterectomy, giving the prevalence of emergency obstetric hysterectomy was 0.29 per 1000 deliveries. Maternal demographic characteristics showed that mean age was 36 years old in caesarean hysterectomy group while mean age for postpartum hysterectomy group was 33 years old. The most common parity group encountered in emergency obstetric hysterectomy was para two to para five. Whether or not women underwent prior uterine surgery was investigated and 30 women (69.77%) had history of previous caesarean section. Of the 30 women with an obstetric history of caesarean delivery, 15 (50%) had more than two caesarean deliveries. Placenta accreta was the most common indication for emergency obstetric hysterectomy (30 women, 69.8%) followed by uterine atony (10 women, 23.3%), uterine rupture (2 women, 4.7%) and extended tear (1 woman, 2.3%). Futhermore, about 93.33% (28 out of 30 patients) with adherent placenta had history of caesarean section prior. No maternal mortality reported in this study. The most significant maternal complications postoperatively include coagulopathy (12 out of 43 women), where 27.91% required massive transfusion protocol, followed with re-laparotomy (4 women, 9.3%), and febrile illness (3 women, 6.98%). Most of the babies were born with good Apgar score. The perinatal complication include perinatal death, 2 out of 43 babies, 4.65% were fresh stillbirth were both cases were referred to our center for abruptio placenta.

Conclusions: Caesarean section, especially repeat caesarean sections in women with placenta previa and uterine atony, significantly increased the risks of emergency

obstetric hysterectomy. Emergency obstetric hysterectomy is safe with reduce complications compared to before with advancement of obstetric care and good clinical practice. Early decision to perform emergency obstetric hysterectomy is essential before the patient's condition deteriorates.

Keywords: *Emergency obstetric hysterectomy, placenta previa, placenta accreta, morbidly adherent placenta, uterine atony, coagulopathy*

2.0 INTRODUCTION

2.1 TERMINOLOGIES

Emergency Obstetric Hysterectomy (EOH)

Emergency obstetric hysterectomy (EOH) is defined as extirpation of the uterus either at the time of caesarean section, or following vaginal delivery, or within the puerperium period, or for complications following pregnancy termination such as perforation and sepsis and it is usually performed in the face of unrelenting and life-threatening obstetric hemorrhage (Behera R et al, 2019).

Storer performed the first caesarean hysterectomy in the United States in 1869. Soon thereafter, Porro of Milan described the first caesarean hysterectomy in which the infant and mother survived. As a mark of honor, the procedure is frequently referred to as the Porro operation (Durfee RB, 1969).

Primary Postpartum Haemorrhage (PPH)

Primary postpartum haemorrhage (PPH) is defined as the loss of 500ml or more of blood from the genital tract within 24 hours of the birth of baby. PPH can minor (500-1000ml) or major (more than 1000ml). Major could be divided to moderate (1000-2000ml) or severe (more than 2000ml). (RCOG, 2011).

Placenta Previa (PP)

The term placenta praevia should be used when the placenta lies directly over the internal os. For pregnancies at more than 16 weeks of gestation the term low-lying placenta should be used when the placental edge is less than 20 mm from the internal os on transabdominal or transvaginal scanning (TVS). (RCOG, 2018)

Placenta Accreta Spectrum (PAS)

Placenta accreta spectrum (PAS) (formerly called morbidly adherent placenta) is a general term used to describe abnormal trophoblast invasion into the myometrium of the uterine wall. It results from placental implantation at an area of defective decidualization typically caused by preexisting damage to the endometrial-myometrial interface. Clinically, the placenta does not spontaneously separate at delivery and attempts at manual removal result in hemorrhage, which can be life-threatening.

Peripartum Hysterectomy

Peripartum hysterectomy is performed at the time of delivery or at any time from delivery to discharge from the same hospitalization. The main indication for peripartum hysterectomy is severe uterine haemorrhage that cannot be controlled by conservative measures.

Peripartum hysterectomy is a ‘near-miss” maternal event – an intervention performed in life threatening obstetric situations to prevent death. It results in the loss of fertility and is associated with significant maternal morbidity and mortality. (Sumaya et al, 2018)

Caesarean Hysterectomy

Cesarean hysterectomy refers to removal of the uterus at the time of cesarean delivery. It is a technically challenging procedure due to the anatomic and physiologic changes of pregnancy, including a massive increase in blood flow to the uterus at term. The surgery's dramatic nature stems from the fact that it is frequently performed in emergency, unplanned situations when a mother's life is in danger and because it permanently ends future fertility. (Meredith LB et al, 2015)

2.2 INTRODUCTION

Emergency obstetric hysterectomy (EOH) is defined as removal of the uterus at the time of caesarean section, or following vaginal delivery, or within the puerperium period, or for complications following pregnancy termination such as perforation and sepsis (Behera R et al, 2019). Storer performed the first caesarean hysterectomy in the United States in 1869, but the patient survived for only 78 hours after the surgical procedure. Soon thereafter, Porro of Milan described the first successful caesarean hysterectomy in which the infant and mother survived. As a mark of honor, the procedure is frequently referred to as the Porro operation (Durfee RB, 1969).

EOH is one of the life saving procedure performed (i.e. after vaginal delivery or caesarean birth or in the immediate postpartum period) in cases of intractable haemorrhage due to uterine atony, rupture uterus and placental disorders and it is usually reserved for the situations where conservative measures fail to control the haemorrhage.

Emergency obstetric hysterectomy remains as an essential weapon in any obstetrician's armory and a significant practice in modern obstetrics because the technique can save women for certain death. Hence, it is important to know the general indices, changing trends and indications of this particular surgery. EOH is generally performed as a life saving procedure in cases of rupture uterus, postpartum haemorrhage, morbid adherent of placenta and uterine sepsis. The surgery is by nature unplanned and performed expeditiously.

On one hand, it is used as a last resort to save the lives of mothers but women's reproductive capability is sacrificed. Often it is a difficult decision and requires a good clinical judgement. Most often, it needs to be carried out when the mother's condition is too critical to withstand the risks of surgery and anesthesia.

In modern obstetrics, the overall incidence of emergency hysterectomy is 0.005% but there are considerable differences in incidence in different parts of the world, depending on modern obstetric services, standards and awareness of antenatal care and the effectiveness of family planning activities of a given community. In developed countries, the reported incidence of emergency hysterectomy is below 0.1% of total deliveries performed while in developing countries, the incidence rates are as high as 1-5/1000 of all deliveries performed.

EOH is usually undertaken for life threatening obstetric hemorrhage and is therefore considered as a 'near miss' event. The four main causes of primary postpartum hemorrhage (PPH) which may requires EOH are related to "4 Ts" that is tone (uterine atomy), tissue (retained placenta including morbidly adherent placenta), trauma (cervical, vaginal and uterine tears) and thrombosis (disorders of coagulation e.g. placental abruptio, HELLP syndrome, intrauterine fetal demise or amniotic fluid embolism).

In the past, the most common indications of EOH were uterine atony and uterine rupture. However more recent reports shows that abnormal placental adherence/placenta previa is emerging as the major indication for EOH and is most likely related to increase in number of caesarean delivery observed over the past two

decade. Some studies showed that subtotal hysterectomy is commonly performed because it is technically easier and requires less operative time, resulting in less blood loss and fewer postoperative complications.

One of the challenges faced by surgeons while performing the EOH procedure is the termination of the mothers' reproductive career. Besides, the procedure is frequently undertaken when the condition of the patient is too critical to withstand the risk of surgery (Nwobodo El, Nnadi DC 2012). Increase in blood supply to the uterus and alteration in pelvic anatomy during pregnancy predispose to excessive primary haemorrhage and potential injury to the bladder and ureter, respectively. Hence, prompt decision-making and competent surgical skills are required to save the patients who most of the times have come in shock.

2.3 LITERATURE REVIEW

2.3.1 HISTORICAL BACKGROUND OF OBSTETRIC HYSTERECTOMY

Emergency hysterectomy remains a significant practice in modern obstetrics because the technique can save women with major PPH from certain death. However, the surgery is by nature unplanned and performed expeditiously. The procedure of obstetric hysterectomy was originally devised more than 200 years ago as a surgical attempt to manage life threatening obstetric hemorrhage and infection. EOH is the last resort for any obstetrician who faces the complications of atonic postpartum hemorrhage or uterine rupture (Shobha M et al. 2015).

Horaito Storer performed the first elective Caesarean hysterectomy on 21st July 1868 but his patient died 78 hours post-operatively. In this particular case, abdominal delivery was necessary because the patient's birth canal was obstructed by a large pelvic tumour. A subtotal hysterectomy was performed to control the life-threatening haemorrhage. In 1876, Eduardo Porro, from Pavia was the first surgeon who succeeded in performing an elective hysterectomy after a Caesarean section on a 25 years old primiparous dwarf with pelvic configuration was markedly distorted by rickets who survived after a stormy 40 days post-operative course (Chua, 1988).

The first series of caesarean hysterectomy was reported by Robert P. Harris of the United Sates in 1880. From the 50 cases of subtotal caesarean hysterectomy reviewed, maternal mortality was 58%, however fetal survival rate was 86%. During 1880s, the operation was performed with limited anaesthetist support, antibiotics,

blood transfusion system and intravenous access. Joseph Cavallini of Florence in 1768 developed concept that uterus removal is a life saving procedure on obstetric emergency condition.

The first total caesarean hysterectomy was described by Spencer Wells of Great Britain in 1881. The operation was performed as the patient had an invasive cervical carcinoma. In 1884, Gordon performed the first successful caesarean hysterectomy in Great Britain and presented the first report of a transverse lower uterine incision. In the United Kingdom, Professor Lawson – Tait of Birmingham University became the pioneer of the procedure and by 1890 had performed seven operations, six of which were successful. (Donald, 2007)

Some years later, other less serious clinical indications, such as sterilization, were included, which gave the procedure a bad reputation (Naureen Javed, Sumera Tahir. 2010). Based on Ekachai Kovavisarach MD (2006), obstetric, including caesarean and postpartum hysterectomy is uncommon but important obstetric operation. It is very often associated with a relatively high morbidity and mortality rate, especially when performed under emergency life-threatening situations.

The rate of caesarean hysterectomy was increasing because of the increasing rate of caesarean delivery. Because of the increasing caesarean section rate worldwide, and the concomitant rise in placenta praevia and placenta accrete, the incidence of EOH is rising in many countries. The rate of caesarean delivery was progressively increased all around the world during 1970s and early 1980s. In 1984,

the caesarean delivery rate was 21% in the United States and it was about 25% few years later (Gilsstrap 2002).

In HUSM, the caesarean section rate was 10.8% in 1984 and slowly increasing. In 1989, 1990 and 1991, the caesarean section rate was 14.8%, 13% and 14.8% respectively. The caesarean section rate in 2005 was 17.2% (Yusmadi 2006).

2.3.2 PREVALENCE OF OBSTETRIC HYSTERECTOMY

Emergency obstetric hysterectomy is a marker of severe obstetric morbidity. From studies during the last 20 years, the incidence varies from one in 331 deliveries to one in 6978. The maternal mortality ranges from 0 to 29.8%. The higher incidence and mortality tend to be in reports from developing countries (T. F. Baskett 2003).

Afaf R. A. et al (2000) reported in their study, there were 29 cases of emergency hysterectomy during 8 years review, giving an incidence of 1/2559 births. The incidence of placenta previa was also significantly higher in patients of the hysterectomy group compared to patients with repeated CS that did not end in hysterectomy.

J. Rahman et al. (2008) reported 43 cases of obstetric hysterectomy were performed from 67,668 deliveries giving an incidence of 1:1,574 deliveries (0.64/1,000 deliveries). Based on Nwobodo and Nnadi (2012), in their study during the 6-year period, 83 EOH were performed out of 16,249 deliveries giving the rate of the former as 0.51%, i.e. 1 in 196 deliveries.

Based on Meena Pradhan and Yong Shao (2014), the prevalence of peripartum hysterectomy reported in the literature varies widely from 0.2 per 1000 deliveries in Turkey, 0.48 per 1000 in London, 6.2 per 1000 in Nigeria. 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, placenta accreta, scar pregnancy and even maternal death.

Jaya Chawla, et al. (2015) reported in their study, the incidence of EOH was 0.083% (83 hysterectomies per 100,000 deliveries) where 0.03% (30 hysterectomies per 100,000 deliveries) following vaginal delivery and 0.27% (270 hysterectomies per 100,000 deliveries) following caesarean section. Nwobodo and Nnadi (2012) reported 83 EOH were performed out of 16,249 deliveries giving the rate of the former as 0.51% (1 in 196 deliveries).

Anjali Gupta et al. (2016) reported the incidence of previous cesarean section ranges between 59.8% in patients with adherent placenta and 75% in patients with placenta previa. A difference in the incidence of emergency peripartum hysterectomy is noted following vaginal delivery and cesarean section. While the incidence of EOH after vaginal delivery varies from 0.1 to 0.3/1000 deliveries and the incidence of EOH following cesarean section varies widely between 0.17 and 8.7/1000 deliveries.

Recent study done by Zhang et al (2017) mentioned that out of 152,023 deliveries at Fujian Provincial Maternity and hildren's Hospital between January 2004 and June 2016, 96 women (0.063% of all deliveries) underwent emergency hysterectomy. Of these, 19 (0.207%) underwent hysterectomy following vaginal delivery and 77 (1.28%) underwent the procedure following caesarean delivery ($p < 0.001$).

Based on two studies that had been done in HUSM previously, Wan Abu Bakar (1995) reported the incidence of emergency caesarean hysterectomy ranges from 1:960 to 1:2778 deliveries and Yusmadi (2006) reported the prevalence rate of

caesarean hysterectomy was 0.92 in 1000 deliveries. Based on Yusmadi (2006), out of 70,842 total deliveries, 84 patients complicated with EOH which carried the prevalence of 0.8 per 1000 deliveries.

In 1980s, total hysterectomy was done for massive obstetric haemorrhage however the trend of operation is changed since 1990s as many obstetricians prefer to do subtotal hysterectomy rather than total hysterectomy (Kastner et al. 2002). Subtotal hysterectomy is technically easier, faster and less complication compared to total hysterectomy. One randomized controlled trial done by Gimbel et al (2003) showed that there was less complication of subtotal hysterectomy compared to total hysterectomy.

The risk of development of cervical stump cancer is very low. Gilstrap et al (2002) mentioned in his study between 1976 to 1988, only 2 cases of cervical stump carcinoma with patient undergone subtotal hysterectomy, given the overall risk is only 0.3%. Not much literature reviewed the long term of these patients who underwent EOH.

2.3.3 ASSOCIATED RISK FACTORS AND INDICATION FOR OBSTETRIC HYSTERECTOMY

There are associated risk factors that can be identified which can lead to EOH. Based on Y. Mesbah et al. (2012) rapid and equitable access to skilled birth attendance and basic and comprehensive emergency obstetric care including blood transfusions and or emergency peripartum hysterectomy is a key principle underlying strategies to reduce maternal mortality and to achieve the Millennium Development Goal (MDG) 5 which was agreed in 2000.

Jaya Chawla et al. (2015) mentioned there was association of prior caesarean delivery with the three major indictions of EOH. History of prior caesarean section was associated with atony in 41.6% of cases, with morbidly adherent placenta in 81% of cases and with uterine rupture in 56% of cases. The study also emphasized that morbidly adherent placenta was associated with a previous caesarean sections in 36% of cases and with two previous caesarean in 45% of cases.

Bateman et al (2012) also found that the rate of EOH for atony increased four-fold following repeat caesarean section, 2.5-fold following primary caesarean section and 1.5-fold following primary vaginal delivery. With the increase in caesarean section rate the number of scarred uterus with prior uterine incision is increasing making the uterus more susceptible to many serious complications such as uncontrollable haemorrhage.

Y. Mesbah et al. (2012) also mentioned that multiple pregnancies had a sixfold increased risk of emergency peripartum hysterectomy compared to singleton pregnancies and higher-order multiple pregnancies (triplets and beyond) had an almost 24-fold increased risk of hysterectomy. In developed countries, the incidence is approximately one in 2000 deliveries.

Conservative methods like misoprostol, oxytocin drip, condom catheter balloon and no inflatable anti shock garment for the management of hypovolemic shock have all been advocated to manage obstetric hemorrhage effectively in low resource settings. On the other hand advance modalities like uterine artery embolization in intervention radiology has also been demonstrated to prevent severe PPH.

But as reported by Bhawna Sharma et al. (2016), sometimes in life threatening condition emergency obstetric hysterectomy remains the main stay of management of massive haemorrhage. The indications of obstetric hysterectomy can be divided into indication related to obstetric emergency and non emergency. It also be done as elective cases e.g carcinoma of cervix (Gilstrap et al. 2002). It was stated that planned hysterectomy reduce the risk related to surgery.

During 1980s, the main indication for caesarean hysterectomy was uterine atony. However in 1990s, the abnormalities of placentation was the main indication (Selo-Ojema et al. 2005). T. F Baskett (2003) mentioned the leading indication for EOH is placenta praevia accreta due to increasing number of women previously delivered by caesarean section. Many cases of placenta previa accreta can be

identified or highly suspected before labour and delivery in patients with previous caesarean section and anterior placenta previa.

The other major indication for hysterectomy is atonic postpartum haemorrhage unresponsive to oxytocic drugs. In Netherland, Kwee A. et al. (2005) reviewed the caesarean hysterectomy cases in 89 hospital and the data showed placenta accreta contributed about 50% of the cause of caesarean hysterectomy followed by uterine atony. However, the indication for the procedure for uterine atomy is less common in these days due to availability of potent uterotonic agents together with the advent of less invasive surgical alternatives such as uterine tamponade, B Lynch suture and uterine artery/internal iliac artery ligation (Incerpi M. H. 2007 and Paterson-Brown S. 2007)

In previous studies done in HUSM by Wan Abu Bakar (1995), the leading indication for caesarean hysterectomy was uterine atony (45%) while by Yusmadi (2006), 46.2% were done for placenta accreta, 33.8% for uterine atony and 16.9% for uterine rupture. The changing trend of the risk factor was probably due to the improvement of uterine contractility agent and the introduction of surgically made brace suture for uterine atony.

Placenta accreta is a condition in which all or part of the placent is adherent to the uterine wall because of the myometrial invasion by chorionic villa (James D. K. et al. 2005). The incidence of placenta accreta was 1 in 30,000 deliveries in 1930-1950, however the prevalence has increased into 1 in 2500 recently (Gielchinsky 2001). The

rise is attributed by increase in the caesarean section rate. Usta et al. (2005) reported that placenta accreta is associated with placenta previa and advanced maternal age.

Placenta accreta is account about 80% of abnormal placenta implantation. Placenta increta is a condition when extensive villous invasion into the myometrium and its account about 15% of the cases. Placenta percreta is the worst form of abnormal placenta implantation and account about 5% of the cases. In this condition villous invasion extend to the serosal covering of the uterus. The obstetrician must alert the possibilities of placenta accreta in patient with placenta previa and previous uterine surgery. These cases must be managed in tertiary hospital and senior obstetricians must handle the operation.

The reported incidence of placenta accreta varies between 1:540 to 1:93,000 deliveries. Geilchinsky et al (2000) reported the incidence of placenta accreta was 0.9% of all deliveries. Most of the cases of placental accreta have no preceding symptom, thus higher degree of suspicious when dealing with the patient who has risk factors (placenta previa, scarred uterus, multiparity, previous uterine surgery and advanced maternal age).

2.3.4 OUTCOMES OF OBSTETRIC HYSTERECTOMY

EOH is well known to be associated with severe blood loss, risk of transfusion, intra-operative complications and significant postoperative morbidity and mortality. Based on Y. Mesbah et al. (2012), the maternal mortality rates associated with EOH range from 0 to 30%, with the higher rates in regions with limited medical and hospital resources.

Caesarean hysterectomy is associated with extensive blood loss and usually need massive blood transfusion and blood products. Chestnut et al (1985) reported the mean volume of blood transfusion range from 1140 mls to over 4000 mls. In other study by Ahnn JJ 1987 stated that the average blood transfusion for caesarean hysterectomy was 4 units.

During EOH, bleeding usually from injuries of uterine or adnexal vessels or due to loose ligature. Retraction of vessels within a ligature around thick pedicles is the common cause of late post operative bleeding. Bleeding may be within abdominal cavity or in the retroperitoneal spaces. Ghourab S et al (1999) reported the intra abdominal bleeding following caesarean hysterectomy was 3.3%.

M. H. Sebitloane and J. Moodley (2001) mentioned caesarean hysterectomy, however is still associated with significant morbidity. Initially, caesarean hysterectomy was associated with high rates of maternal mortality but the introduction of modern anaesthesiology, potent antibiotics and improved surgical techniques and suture materials has led to a decline in maternal mortality.

Caesarean hysterectomy also associated with urinary tract injury which includes bladder laceration, ureteric injury, vesicovaginal fistula or uterovaginal fistula. The risk of ureteric injury following caesarean hysterectomy is 1.7% (Vakili B, et al. 2004). Paralytic ileus is also one of the complication of caesarean hysterectomy. Plauche (1992) reported that 0.33% of the patient developed intestinal obstruction after caesarean hysterectomy.

Alka S. et al. (2006) mentioned the decision to perform the surgery in young women especially with low parity poses a dilemma for the obstetrician but timely intervention may be the difference between life and death and greatly improve the outcome. In study by J. F. Carvalho et al. (2012) concluded that postpartum hemorrhage is one of the leading causes of maternal mortality and morbidity and represents the most challenging complication that an obstetrician will face. Thus, It is important to study also regarding emergency peripartum hysterectomy.

There were also associations between maternal morbidity and mortality with EOH. Haleema Yasmin et al. (2017) mentioned the maternal morbidity was 50% and most of the complications seen were sepsis, urinary tract damage and DIVC. The maternal mortality was up to 15.6% where the most common reasons were mishandling by poorly trained birth attendants and doctors at homes or inadequately equipped clinic, late presentation and non-availability of proper transport or ambulances for such patients.

Isaac Taylor of New York performed the successful caesarean hysterectomy in 1880. However the patient died 3 weeks after operation complicated with pulmonary

embolism. In 1880, the maternal mortality rate of caesarean hysterectomy was 50% and fetal survival rate was 86%. In 1884, Clement Godson of England reviewed 134 cases of caesarean hysterectomy and the maternal mortality rate is about 48% and the common cause of death was due to peritonitis, shock and septicaemia. (Durfee RB, 1969). In previous study done by Wan Abu Bakar (1993), there were two maternal mortality following caesarean hysterectomy.

Based on Haleema Yasmin et al. (2017), there was 59.3% perinatal mortality as mostly of them from cases of ruptured uterus. Maija Jakobsson et al. (2015) mentioned EOH was associated with increased risk of a very low 5 minutes Apgar score by over threefold and also increased risk of low pH. The risk was most frequently associated with uterine rupture.

As for the studies done in HUSM previously, Yusmadi (2006) reported that 23.1% of the babies in caesarean hysterectomy group complicated with fresh stillbirth (FSB), majority of them were due to abruptio placenta as compared to Wan Abu Bakar (1993), there were 21% of the babies complicated by FSB. Yusmadi (2006) also mentioned 56.9% of the babies had good Apgar score.

2.4 STUDY JUSCTIFICATION

Emergency obstetric hysterectomy (EOH) is one of the life saving procedure performed (i.e. after vaginal delivery or caesarean birth or in the immediate postpartum period) in cases of intractable haemorrhage due to uterine atony, rupture uterus and placental disorders and it is usually reserved for the situations where conservative measures fail to control the haemorrhage.

Emergency obstetric hysterectomy remains as an essential weapon in any obstetrician's armory. Hence, it is important to know the general indices, changing trends and indications of this particular surgery.

So much has changed in the past 10 to 20 years in obstetric practice. The increasing rate of caesarean section, advancement in obstetric practice with the use of radiology especially interventional imaging and anaesthetic care, contributing the reduction of number of maternal death. This study aims to review the prevalence, indications and outcome of emergency obstetric hysterectomy over the past 11 years to reflect these changes.

The aim of this study is to increase awareness to the practicing obstetrician to the possibility of hysterectomy in those high risk cases. Hence, this study will help in recognizing certain factors that can help our current practice and improve patient's outcome.

This is a retrospective study with the aim to identify all the risk factors and complications associated with emergency obstetric hysterectomy. Every case will be analyzed in details with special emphasis on indication, demographic data (age, parity, booked or emergency case etc.), type of operation performed, problems encountered during operation, morbidity and mortality.

3.0 OBJECTIVES OF THE STUDY

3.1 GENERAL OBJECTIVES

To review the patients who underwent emergency obstetric hysterectomy (EOH) in Hospital Universiti Sains Malaysia (HUSM), between January 2007 to December 2017

3.2 SPECIFIC OBJECTIVES

The aims of this study includes the following:

1. To determine the prevalance of emergency obstetric hysterectomy (EOH) in Hospital Universiti Sains Malaysia (HUSM).

2. To determine the indications of emergency obstetric hysterectomy (EOH).

3. To determine the outcome (maternal and perinatal outcome) of emergency obstetric hysterectomy (EOH).

4.0 METHODOLOGY

4.1 STUDY DESIGN, SETTING AND DURATION

This is a retrospective study (retrospective record review). All cases of emergency obstetric hysterectomy which done in Hospital Universiti Sains Malaysia, Kubang Kerian from January 2007 to December 2017 were included in this study.

The cases of emergency obstetric hysterectomy are identified from the maternity and general operation theatres log. Labour room records and patients folders will be scrutinized with regards to age, parity, indication and complications.

All the data is gathered by using a well and complete data analysis sheath (Appendix). The details about the relevant information is recorded and analysed by using statistical package of SPSS version 24.

4.2 STUDY POPULATION

4.2.1 REFERANCE POPULATION

All pregnant women who admitted to HUSM for delivery and also included women who delivered outside the hospital and were referred for obstetric complications

4.2.2 SOURCE POPULATION

All pregnant women who have complication of primary postpartum haemorrhage or placenta previa that underwent emergency obstetric hysterectomy in HUSM

4.2.3 STUDY PARTICIPANTS

All pregnant women who have complication of primary postpartum haemorrhage or placenta previa that underwent emergency obstetric hysterectomy in HUSM and fulfilled the inclusion and exclusion criteria