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Original Article

Peripartum Hysterectomy for Massive Obstetrics Haemorrhage in a Southern Nigerian Tertiary Hospital: A 10 Year Retrospective Review

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Abstract

Background and Objective: Severe Obstetric Haemorrhage is a leading cause of maternal and perinatal mortality and morbidity. Emergency peripartum hysterectomy (EPH) is usually performed as the last resort to prevent maternal death due to massive obstetric bleeding. The aim of this review was to document the incidence, indications, and risk factors for EPH and to evaluate the maternal and perinatal outcomes in the tertiary hospital. **Methods:** This was a 12-year retrospective facility-based study. Cases of EPH were identified from the maternity register and the obstetric theater register. Their case notes were retrieved for in-depth analysis. Data were analyzed with SPSS version 24. **Results:** The prevalence of EPH was 2.47 per 1000 deliveries. Abnormal placentation was the commonest indication. The median blood loss was 3000 ml. The procedure fatality rate was 10.6%. Non utilization of intensive care unit (ICU) services and delayed involvement of experienced surgeons were positively associates with higher procedure fatality rate (OR. 1.595, 95%CI: 1.310 – 1.941, P=0.049) and (OR. 2.810, 95%CI: 1.722 – 4.584, P=0.04) respectively. The perinatal mortality rate was 264.7 per 1000 live births. Uterine rupture (OR 12.65, 95%CI: 3.08 – 51.98) and lack of prior antenatal care (OR. 4.6, 95%CI: 2.06 – 8.96) were significant predictors of perinatal mortality. **Conclusion:** Severe obstetrics haemorrhage necessitating EPH is a major risk factor for maternal and perinatal mortality and morbidity. Utilization of ICU services and timely involvement of highly skilled surgical personnel may improve maternal outcome, while antenatal services and safe delivery practices may prevent perinatal deaths.

Key words: Postpartum haemorrhage, placenta previa/accreta, uterine rupture, uterine atony, maternal mortality.

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Introduction

Massive Obstetric haemorrhage is a major cause of maternal mortality and severe maternal morbidity.[1] Obstetric haemorrhage is still a leading cause of direct maternal deaths accounting for about 20% of the 295,000 maternal deaths in 2017 reported by WHO.[2] Massive Obstetric haemorrhage (MOH) is defined as blood loss during childbirth in excess of 2000ml or greater than 40% of total blood volume of the individual or rapid blood loss resulting in sudden drop in haemoglobin concentration by 4g/dl or requiring massive blood transfusion of Four pints or more.[3] It is often classified as antepartum (after 24 weeks gestation and before delivery process), intrapartum (during labour and delivery), postpartum (from delivery to 6 weeks post natal period).[4-6] In one series severe PPH was responsible for more than 50 percent of severe maternal

morbidity.[4] It is thus, an indicator for quality of obstetrics care in health institutions.

Mortality from obstetric haemorrhage is often preventable but delay in recognition, correction of hypovolemic shock and initiation of definitive treatment to stop the bleeding is the main reason for the high mortality rates from this life- threatening pregnancy event.[7,8] Surgical procedures for treatment of severe obstetric genital tract bleeding include ligations of major pelvic arteries, B-Lynch sutures, multiple brace sutures, radiological guided arterial embolization and placement of catheter balloons.[9,10] Peripartum hysterectomy is usually performed as a last resort sometimes when these conservative approaches have failed to control the bleeding.[11,12,] It is a life-saving procedure and often described as a marker or an entry point to "Obstetric Near Miss". [13]

Peripartum hysterectomy is defined as surgical removal of the uterus about the time of delivery, during the hospitalization or within 6 weeks postnatal period for reason(s) related to the index pregnancy complication(s).[14,15,] It may be total or sub-total depending on if the cervix is removed or spared respectively. It may be performed as an emergency (EPH) to save the life of a woman with persistent bleeding, or as a planned procedure, often in conjunction with caesarean delivery.[16] Planned hysterectomy at the time of delivery is controversial because of increased morbidity related to surgery on the highly vascular pelvic organs.[16] However, it has been advocated for parturient with co-existing gynaecological disorders such as high- grade cervical intraepithelial neoplasia or other genital tract malignancies in pregnancy.[16,17]

The incidence of EPH varies from one region to another. The reported incidences seem higher in low resource settings. An incidence of 1.14 and 2.24 per 1000 deliveries were reported in a Taiwanese and a Middle East study respectively. [11,18] A multicenter study in Western Nigeria reported an incidence of 2.6 per 1000 deliveries[19] while the incidence in North America ranges from 0.24 to 8.7 per 1000 deliveries.[20]

The most common indications for EPH are abnormal placentation such as placenta previa and accreta/increta spectrum, uterine rupture due to dysfunctional or prolonged obstructed labour and atonic uterus not responsive to uterotonics.[21,22] These conditions which are often regarded at the three Ts (Tissue, Trauma and Tone) are major causes of life-threatening bleeding during childbirth.[22] The relative frequency of these conditions varies among series and is dependent upon the patients population and the practice patterns.[23,24]

Delay in taking decision to perform EPH may cost the life of a woman with intractable obstetric haemorrhage.[2] Other surgical procedure like bilateral ligation of internal iliac (hypogastric) arteries (HAL) may result in reduction of blood flow to pelvic organs but does not completely occlude blood supply to the uterus because of the collateral blood supply[25]. The reported effectiveness of HAL in avoiding EPH for postpartum haemorrhage is 50%. [25] Complications associated with EPH include unplanned loss of fertility profile, poor mother to infant bonding and puerperal depression.[26]

Considering that obstetric haemorrhage is a major threat to women survival during pregnancy and childbirth, it is therefore important for specialist obstetric units to be equipped with skills and resources to always perform this life-saving procedure. The main objective of this study was to determine the incidence, risk factors, indications, morbidity, and mortality associated with EPH and to suggest factors that may be considered and modified to improve safe motherhood.

Materials And Methods

Study Design and Setting.

This was a facility based retrospective study. The period under review spanned from 1st January 2010 and 31st December 2021. The study was conducted in the maternity unit of the University of Calabar Teaching Hospital. The hospital is among the 2nd generation tertiary health facility situated in Southern Nigeria. At the time of the review the facility was the only tertiary health institution in Cross River State of Nigeria. The facility also received referral from neighboring states and southern Cameroon. The hospital is an accredited center for training of medical students and specialist doctors.

Data Collection

Cases of EPH were identified from the delivery register in the maternity unit and the operation register in the labour ward theater. The case records were retrieved from the health record department for in-depth study. Also, information for each patient was sought from the anaesthetic charts, summary of the partographs for significant outcome, and estimated blood loss. The perioperative nurses' notebooks were also reviewed for data triangulation. Information was also obtained from intensive care unit of the hospital for patients who were admitted for obstetric complications. Data on postpartum complications and delayed pregnancy events were also obtained from postnatal ward records.

Methods of Estimation of Blood Loss

Estimation of blood loss during caesarean section in the hospital is usually done by the obstetricians and the

anaesthetists with input from the perioperative nurses in attendance to minimize measurement bias. The total estimated blood loss takes into consideration the quantity of blood in the calibrated suction cylinders, numbers of fully or partially soaked abdominal mops and swabs, and visual assessment of blood stains on the linens and other materials. Severe postpartum haemorrhage is considered when the estimated blood loss is up to 2000ml or findings on patient's clinical state such as marked conjunctival palor, persistent drop in the systolic blood pressure and low volume of radial pulse. Packed cell volume is routinely estimated for patients who are under-going caesarean section. When there is a drop in haematocrit value of ≥ 4g/dl, the blood loss is considered severe. Visual estimation and quantitative gravimetric methods are among the most utilized methods of estimating surgical blood loss globally as other methods like the colorimetric are still at experimental stage.[27]

Maternal and Perinatal Outcome

Information was obtained on maternal socio-demographic, medical and obstetric profile. The indications for the procedure, estimated blood loss, cadre of surgeon, type of surgery, type of anaesthesia and the cadre of anaesthetists, post-operative care including ICU care, numbers of pints of blood transfused and other areas of interest were also noted. Perinatal data were obtained from the delivery register and neonatal intensive care units.

The primary outcome was maternal survival or mortality and infant survival or mortality. The secondary outcome included maternal complications such as febrile morbidity and duration of hospital stay as well as infant morbidity.

Data Management

Data were analyzed using SPSS version 24. Descriptive information such as demographic characteristics, indications and procedures were presented as proportion, percentages and mean. Values were summarized where applicable. Multivariate analyses were done to determine independent predictors of maternal and perinatal mortality. The level of significant was set at 5%.

Ethical Consideration:

A formal approval was obtained from the institution health research ethics committee (HREC) before the research was conducted. The study was a continuation of the research on antenatal obstetrics hospitalization and pregnancy outcome. The health research ethics assignment number is UCTH/HREC/33/491. Confidentiality was maintained in data extraction and analysis. No patient's identity was disclosed.

Results

Prevalence, Demographic, and Obstetric Characteristics:

Table 1: Demographic Profile

Variable		Frequency(N=66)	Percentage
Marital status;	Married	59	86.4%
	Single/divorced	9	13.6%
Parity;	Primiparity	28	42.4%
	Multiparity	38	57.6%
Booking status;	Booked for ANC	42	63.6%
	Unbooked	24	36.4%
Mode of delivery;	Vaginal births	6	9.1%
	Cesarean section	47	71.2%
	Laparotomy	13	19.7%
Indication;	Uterine rupture	13	19.7%
	Abnormal placentation	29	43.9%
	Atonic uterus	24	36.4%

Table 2: Procedures & Personnel

PERSONNEL/ PROCEDURES		FREQUENCY	PERCENTAGE (100%)
Procedure;	TAH	18	27.3%
	STAH	48	72.7%
Blood transfusion;	None	4	6.1%
	1-3 units	23	34.9%
	≥4 units	39	59.0%
ICU Admission;	Admitted	24	36.4%
	Not admitted	42	63.6%
Anaesthesia;	Regional	29	43.9%
	General	37	56.1%
Cadre of surgeons;	Consultants	44	66.7%
	Senior registrars	22	33.3%
Cadre of anesthetists;	Consultants	13	19.7%
	Senior registrars	53	80.3%
Additional care;	None	61	92.4%
	Bowl resection	1	1.5%
	Ureteric repair	2	3.05%
	Dialysis	2	3.05%

TAH- Total Abdominal Hysterectomy, STAH- Sub-Total Abdominal Hysterectomy

A total of 66 women with life threatening obstetric hemorrhage underwent the procedure (EPH) in the hospital. When considering the total number of deliveries within the period under review, 26,721, we found that the prevalence of EPH was 0.247 percent of all deliveries (prevalence rate of 2.47 per 1000 deliveries). The age of the women ranges from 17 to 49 years with average age of 29.73± 4.477 (SD) years. The median age was 29.50 and the modal age was 29 indicating that their ages were normally distributed (mean, median and mode-similar). The parity of the women ranged from 1 to 7 with mean parity of 2.98. Forty- two (63.6%) of them were booked (received prior ANC) at the tertiary center while the remaining were referred to the hospital

when life threatening hemorrhage was encountered during childbirth.

Table 3: factors affecting maternal mortality.

PERSONNEL/PROCEDURE	MM N=7	Survival N=59	P value	OR	95% CI Lower, Upper	
Surgeons; Consultants	1(14.3%)	41(69.5%)	0.04	2.810	1.722	4.584
Senior registrars	6(85.7%)	18(30.5%)				
Anaesthetists; Consultants	3(42.9%)	10(17.0%)	0.131	0.688	0.359	1.320
Residents	4(57.1%)	49(83.0%)				
Anaesthesia; Regional	3(42.9%)	26(44.1%)	0.637	1.022	0.517	2.017
General	4(57.1%)	33(55.9%)				
ICU Care; Yes (24)	1(14.3%)	23(39.0%)	0.049	1.595	1.310	1.941
No (42)	6(85.7%)	36(61.0%)				
Blood Transfusion ≤ 3	3(42.9%)	27(45.8%)	0.603	1.054	0.523	2.066
≥ 4 units	4(57.1%)	32(54.2%)				
ANC; Booked	3(42.9%)	39(66.1%)	0.211	1.086	0.808	3.512
Unbooked	4(57.1%)	20(33.9%)				

MM– Maternal Mortality; OR– Odd Ratio; CI– Confidence Interval; ANC– Antenatal Care; ICU-Intensive care unit.

A vast majority, 57(86.4) were married. The mode of childbirth in the index pregnancy was cesarean delivery in 46 (71.2%) of them while 13 (19.7) had their delivery by laparotomy due to uterine rupture (table 1).

FIGURE 1: S-TAH Specimen (uterine rupture and extrusion of fetus through the old CS scar)

The commonest indication for EPH was massive haemorrhage due to abnormal placenta spectrum (major type placenta previa, morbidly adherent placenta and retained placenta) which accounted for 48.5% of the indications. Atonic uterus with severe postpartum haemorrhage and antepartum haemorrhage such as abruption placentae accounted for 36.4%. Uterine rupture (UR) due to prolonged obstructed or dysfunctional labour accounted for 15.2% (table 1).
Scared uterus from previous cesarean surgery were noted in 21 (31.8%) of them. Apart from previous caesarean sections, many of the patients, (34 (51.5%), had history of previous induced abortions mostly by method of dilatation and curettage (31; 91.2%) and such patients (75.9%), also were more likely to be diagnosed with placenta previa or morbidly adherent placenta (placenta accreta/increta spectrum).

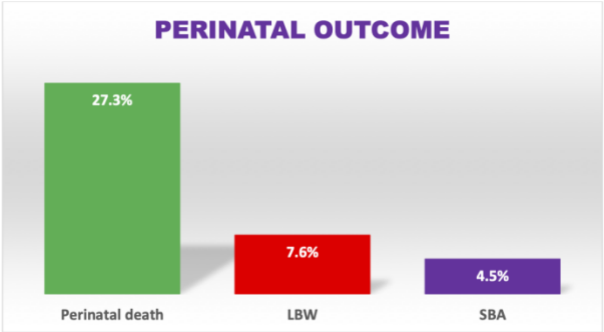

Figure 2: Perinatal outcome (LBW – Low Birth Weight; SBA – Severe Birth Asphyxia)

Most of the EPHs were performed at term pregnancy, 53 (80.5) while less than 20% were preterm deliveries (gestational age of less than 37 weeks). Extreme of maternal parity (para 1 and ≥ para 5) were more related to uterine rupture and uterine atony respectively. Almost all, 64 (97%) of the procedures were performed as emergency when massive uncontrolled bleeding occurred during delivery. The remaining two were planned procedures for major type placenta previa with accreta diagnosed with ultrasound colour Doppler during the antennal period.

Procedures

In 42 (63.6) of the cases, total abdominal hysterectomy (TAH) was performed while the remaining 24 (36.4) of them had sub-total hysterectomy (S-TAH). Total abdominal hysterectomies were mostly done for abnormal placentation such as previa and accrete spectrum (27 out of 42, 64.3%) while S-TAH were often performed in women with uterine rupture (10 out of 13 cases of UR). In terms of the cadre of the surgeons, consultants performed 41 (62.12%) of the cases while the remaining were performed by resident doctors (senior registrars). Consultant anesthetists were involved in 13 (19.7%) of the cases while most of the cases were anaesthesized by specialist registrars in anaethesiology. Twenty-two (33.33) of these women with life-threatening hemorrhage were admitted to intensive care unit (ICU) of the hospital during the immediate postoperative period. Five of the women needed additional procedures such as bowel resection (1),

ureteric injury repairs and dialysis (2 each). Febrile morbidity and wound sepsis were recorded in 7 patients while severe maternal anaemia with imminent or clinical heart failure was recorded in 5 cases. Two women required psychiatric attention due to puerperal psychosis and depression. Almost all of them, except four received blood transfusions. The indications for blood transfusion were for correction of hypovolemic shock, disseminated intravascular coagulopathy and treatment of severe anaemia. Four women declined blood transfusion on religious grounds. The median blood loss was 3000ml. blood loss range from 1500ml to 4400ml.

Maternal and Perinatal Outcome

Maternal mortality was recorded in 7 of the 66 women giving case/procedure fatality rate of 10.6%. Of the 59 (89.4%) women who survived, some of them sustained serious complications such as urinary tract injury. The median duration of stay in the hospital was 9 days. Five women left against medical advice (LAMA). Sixty-eight babies were delivered including two set of twins. The perinatal condition is shown in fig 2. The perinatal mortality rate was high 264.7 per 1000 live births. Uterine rupture carried the highest stillbirth rate of over 80%. On multivariate analysis, we found that the cadre of the surgeon (non-consultant) and non- utilization of ICU services during the immediate postoperative period were independent predictors of maternal mortality (table3). Lack of prior ANC (OR, 4.6, 95%CI, 2.06 – 8.96) and uterine rupture (OR, 12.65, 95%CI, 3.08 – 51.93) were major factors associated with perinatal deaths.

Discussion

Our study simulates a clinical audit on a major life saving procedure usually indicated to avert an obstetric disaster and it is always a symbol of a "near miss" obstetric event.[13] The EPH of 2.47 per 1000 deliveries in this study indirectly reflects the high incidence of life-threatening obstetric haemorrhage and perhaps, failure or inadequacy of conservative and less invasive alternatives in confronting such acute emergency. Similar prevalence (2.6%) had been reported in South-west Nigerian study. [20] A high prevalence of 11% was reported from Pakistan[22] in contrast to a very low prevalence of less than 1% in high income countries.[18] The most common indication for EPH within the period under review was abnormal placentation such as placenta previa and morbidly adherent placenta which accounted for 43.9% of the cases. This finding is in keeping with other reports.[19,20,22] While massive bleeding from atonic uterus and uterine dehiscence may respond to conservative procedures, bleeding due to placenta accreta spectrum often necessitates excision of the uterus.

The high vascularity of the placental bed/ retro-placental space, with potential for massive haemorrhage is due to physiological and anatomical changes associated with these conditions, Placental detachment during childbirth, results in the disruption of the spiral arteries and bleeding. In the ideal situation contraction of the inter-lacing muscle layers occlude the arterioles and prevent excessive blood loss. However, the lower uterine segment is less contractile depending on the differential distribution of "Gap Junction" thus the risk of continuous oozing of blood in the placental bed seen in low-lying placenta. In addition, placenta previa is commonly associated with morbidly adherent placenta.[28] In low resource setting, this condition is often not diagnosed during the antenatal period and usually manifest as failure to deliver the placenta using the conventional method following delivery of the baby. It may cause retained placenta following vaginal birth.[23] Massive haemorrhage may occur when the placenta is partially detached necessitating EPH. When placenta accrete spectrum (PAS) is diagnosed during the antenatal period, planned caesarean hysterectomy is the standard of treatment.[29]

Like previous reports,[22,30] our study found close association between scared uterus and PAS. Almost all the women who had EPH for abnormal placentation had had previous caesarean section or multiple induced abortions by dilatation and curettage for unwanted pregnancy. Implantation of the blastocysts at such scared areas of the endometrium carries risk of extension of the trophoblastic penetration/invasion beyond the 'decidua basalis' of the endometrium into the myometrial muscles.

The high procedure fatality rate of 10.6% among the patients is an indication of the devastating effect of massive obstetric haemorrhage in women. A similar high fatality rate of 10.5% was reported among women who underwent EPH in Pakistan.[31] Also, a case fatality rate of 16 per 100 hysterectomies has been reported from analysis of data from WOMAN trial.[22] The immediate causes of death were hypovolemic shock, respiratory failure and disseminated intravascular coagulation (DIC) among other causes. The median blood loss was 3000ml indicating a loss of more than 50% of a woman's total blood volume.

Women who were managed in ICU had better survival rate. A previous study had suggested that ICU admission is a marker for severe obstetric complications such as massive postpartum bleeding.[32] Development of management protocol involving ICU care and multidisciplinary team may improve outcome in treating

life-threatening pregnancy complication. Intensive care unit offers opportunity for close skilled or automated and continuous monitoring of patient, early detection of immediate post-operative complications and timely institution of intervention including airway intubation and mechanical ventilation. However, in developing countries, ICU admission may depend on factors such as availability of bed space and the cost.

While the study found better survival rate among women who were operated by experienced consultants compared to resident doctors, the personnel and choice of anaesthesia (GA or Neuraxial) did not significantly affect maternal outcome. Proficiency of surgeons depends on training acquired and years of experience on the job.[33,34] Furthermore, previous studies did not show any superiority in the methods of anaesthesis on surgical outcomes.[35-37]

The high perinatal mortality rate was contributed majorly from uterine rupture. The still birth rate from this condition was almost 100%. Similar findings have been reported by other studies.[38-40] This finding indicates that neglected obstructed labour leading to uterine rupture is a serious threat to infant survival in developing countries. Women who did not receive prior antenatal care had worse perinatal outcome. This is consistent with a previous report.[41]

Limitation of the Study

The major limitation of this study is its retrospective nature due to the possibility of improper documentation. Thus, in this study data was extracted from different units, maternity register, theatre and anaesthetist register. Perioperative notes were also assessed to verify information for each patient (data triangulation).

Conclusion

This study analyzed major obstetric complication and EPH treatment outcome that pregnant women with massive obstetric haemorrhage experience. Such complication is also a major treat to the survival of the women and their infants.

Specialist ANC and early institution of multidisciplinary care including, ICU admission, as well as early involvement of experienced surgeon may improve maternal and perinatal outcome.

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