Original Research Article

The Incidence and Risk Factors of Peripartum Hysterectomy at the Georgetown Public Hospital Corporation (GPHC).

ABSTRACT

Title: The incidence and risk factors of peripartum hysterectomy at the Georgetown Public Hospital Corporation (GPHC).

Aim: To assess the incidence and risk factors of peripartum hysterectomy at the Georgetown Public Hospital Corporation over a period of five years.

Background/Introduction: Peripartum hysterectomy is defined as a hysterectomy performed at the time, or within 24 hours, of delivery (WHO). Postpartum hemorrhage (PPH) is a life□threatening condition which can lead to death if not corrected immediately. Various drugs and surgical techniques have been developed over time, especially to preserve the uterus. However, in some circumstances, an emergency peripartum hysterectomy has to be performed often as the last resort in saving a woman's life[1]. The most important risk factors that lead to emergency peripartum hysterectomy (EPH) are: uterine atony, abnormal placental implantation (accreta, previa, etc.), uteroplacental apoplexy, uterine rupture due to cicatricial uterus, advanced maternal age, increased parity, birth weight ≥ 4,000 gr and previous uterine surgery.

Objectives: This study aimed to provide insight of the incidence of peripartum hysterectomy after medical and surgical management was exhausted for the management of bleeding during or after delivery, to determine the risk factors and indications for peripartum hysterectomy at GPHC and, to analyze the complications and outcome of peripartum hysterectomy performed in GPHC from January 2016 to January 2020.

Method: This study was designed as a retrospective chart review of patients who underwent peripartum hysterectomy in the Department of Obstetrics and Gynecology at Georgetown Public

Hospital Corporation over a five-year period from January 2016 to January 2020. Records of all women who underwent peripartum hysterectomy were collected from medical record department. Each case file was studied in detail for risk factors, intrapartum and peri-partum notes, operative notes and findings, complications, duration of surgery, blood loss and outcomes.

Results: During the study period a total of 6,130 caesarean deliveries were registered in GPHC. The total number of peripartum hysterectomies performed during the study period was 26; the incidence of peripartum hysterectomy was thus 4.2 per 1,000 deliveries. The major risk factors associated with peripartum hysterectomies were maternal age >30, women who had previous caesarean section deliveries and multiparity. The major indication for peripartum hysterectomy was noted to be early pregnancy loss with prolonged bleeding (31%) and abnormal placentation which accounted for 27% of patients who had peripartum hysterectomy done.

Conclusion: The data identify abnormal adherent placentation as the primary cause for peripartum hysterectomy. The data also illustrate how the incidence of emergency peripartum hysterectomy rises significantly with increasing parity, especially when influenced by a current placenta previa or a prior caesarean section and multiparity. Although maternal morbidity remained high no maternal deaths occurred.

Keywords : Peripartum hysterectomy; Postpartum hysterectomy; Hemorrhage; GPHC.

Introduction

Peripartum hysterectomy is usually performed at the time of delivery or in the immediate postpartum period in women with life-threatening obstetric hemorrhage that fails to respond to conservative treatment. Peripartum hysterectomy is one of the most severe complications in obstetrics and is associated with significant maternal mortality and morbidity during the intra-operative and postoperative period [(1)]. Several studies have described a number of complications associated with this procedure, including massive blood transfusion, coagulopathy, injury of the urinary tract, the need for further surgery due to persistent bleeding, renal failure, and respiratory distress [(2,3)]. In addition, besides precluding other pregnancies and therefore with a potential impact on the quality of life of the women, the procedure has an impact on length of hospitalization [(3,4)]. Recent studies suggest that peripartum hysterectomy is associated with

cesarean delivery [1,5-8]. This finding is particularly worrying given the steady increase of cesarean section deliveries in many countries, such as Italy, where the proportion of cesarean deliveries is one of the highest in the world (38% of all deliveries) [9]. It is especially important to quantify the problem of peripartum hysterectomy because it differs from other populations by having not only a high cesarean section delivery rate, but also an older average age of childbearing mothers and a low fertility rate [10].

Some studies show that the incidence of peripartum hysterectomy ranges from 13.1 cases per 10,000 births to 4.1 cases per 10,000 births [1-3]. The most important risk factors that lead to EPH are: uterine atony, abnormal placental implantation (accreta, previa, etc.), uteroplacental apoplexy, uterine rupture due to cicatricial uterus, advanced maternal age, increased parity, birth weight $\geq$ 4,000 gr and previous uterine surgery [2-4]. Interesting studies related to the northern countries found Finland with the highest (5.1) and Norway with the lowest (2.9) prevalence, the delivery mode being cesarean section in nearly 80% of cases [3]. A special category is represented by patients whose current delivery was vaginal, and had a cesarean section (CS) in their history: they can have a six-fold risk for EPH [5]. The median maternal age is reported to be from 31 years to 35.5 years [2,6]. The average blood transfusion can be as high as 4.79 (1–14) units [6]. Maternal mortality can be as much as 4.5 % in some studies [7,8]. The main complications of EPH are often described as febrile morbidity: 12 (21%), wound infection: 8 (14%) and bladder or ureteric injury: 8 (14%). A difference in the incidence of EPH is noted following vaginal delivery and cesarean section, sometimes up to tenfold more for the latter. The incidence by parity increased from 1/143 deliveries in nulliparous women with placenta previa to 1/4 deliveries in multiparous women with placenta previa [9,10]. Nowadays, protocols can provide a standardized approach to evaluating and monitoring the patient, how to notify a multidisciplinary team, and adequate treatment.

Literature Review

The most common medical causes of maternal death have remained the same for hundreds of years and include hypertensive disease, infection, obstructed labor, complications of (mostly illegal) abortion, and bleeding [1] Primary postpartum hemorrhage is consistently one of the top

five causes of maternal mortality, with the risk of maternal death from primary postpartum hemorrhage in developed countries estimated as approximately 1 in 100,000 deliveries [3].

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 hemorrhage that cannot be controlled by conservative measures [4]. Peripartum hysterectomy is a "near-miss" maternal event - an intervention performed in life threatening obstetric situations to prevent death [5]. It results in the loss of fertility and is associated with

significant maternal morbidity and mortality [6]. Worldwide, the rate of peripartum hysterectomy varies widely. In high income countries less than one in 1000 deliveries is complicated by peripartum hysterectomy [7-13], whereas in Nigeria [14] and Pakistan [15] the incidence is 4 and 11 per 1000 deliveries, respectively. The rate of emergency peripartum hysterectomy has been increasing over time [10-12), (16-18]. In USA, it increased by 12% between 1998 and 2003[12] and by 15% between 1995 and 2007 [16]. The risk factors for post-partum hemorrhage include coagulopathies, uterine atony, retained products of conception, precipitate or prolonged labor, fetal macrosomia or multiparity, maternal obesity and previous primary post-partum hemorrhage [18-23, 24-30]. Other factors that have been associated with emergency peripartum hysterectomy (EPH) include advanced maternal age, multiple gestations, and gestational diabetes. Traditionally uterine atony was the most common indication for EPH. Recent studies however have indicated a change in the trend towards abnormal placentation [18,20,22,24,26].

Peripartum hysterectomy can cause significant morbidity and mortality. Most studies of peripartum hysterectomy are from high income countries. A cohort study was used to examine risk factors for peripartum hysterectomy using data from Africa, Asia, Europe and the Americas. Data was used from the World Maternal Antifibrinolytic (WOMAN) trial carried out in 193 hospitals in 21countries.

Peripartum hysterectomy was defined as hysterectomy within 6 weeks of delivery as a complication of postpartum hemorrhage. Postpartum hemorrhage (PPH) is the leading cause of maternal mortality, accounting for about 35% of all maternal deaths. These deaths have a major impact on the lives and health of the families affected. Between 1990 and 2010, there was a global reduction in maternal deaths and the maternal mortality ratio (MMR) from 543 000 and 400 per 100 000 live births to 287 000 and 210 per 100 000 live births respectively. However,

developing countries continue to experience higher numbers of maternal deaths compared to developed countries. In 2010, the MMR in developing countries was 240 per 100 000 live births (284 000 maternal deaths) compared to 16 (2 200 maternal deaths) in developed countries. Thirty-five countries have been identified as either making insufficient or no progress towards achieving the Fifth Millennium Development Goal (MDG5), which aimed to reduce the global maternal mortality rate by 75% from 2000 to 2015. (WHO, 1990 to 2010). In 2015 the Sustainable Development Goals was introduced and had identified that 94% of maternal deaths occurred in low- and middle-income countries while the maternal mortality ratio is 14 times higher in developed countries. Goal #3 which is to Ensure healthy lives and well-being for all ages has a projection for improve maternal healthcare and decrease morbidity and mortality by the year 2030[34].

Hemorrhage from placenta praevia/accreta carried a higher risk of hysterectomy (17%) than surgical trauma/tears (5%) and uterine atony (3%). The adjusted odds ratio (AOR) for hysterectomy in women with placenta praevia/accreta was 3.2 (95% CI: 2.7–3.8), compared to uterine atony. The risk of hysterectomy increased with maternal age. Caesarean section was associated with fourfold higher odds of hysterectomy than vaginal delivery (AOR 4.3, 95% CI: 3.6–5.0). Mothers in Asia had a higher hysterectomy incidence (7%) than mothers in Africa (5%) (AOR: 1.2, 95% CI: 0.9–1.7). That study concluded that placenta previa/accreta is associated with a higher risk of peripartum hysterectomy. Other risk factors for hysterectomy are advanced maternal age, caesarean section and giving birth in Asia [(30)]

Peripartum hysterectomy can be a life-saving procedure for women with obstetric hemorrhage. In the United States, it is estimated that peripartum hysterectomies are performed in approximately 0.08% of all deliveries [(32)]. Cesarean delivery is the most important risk factor for peripartum hysterectomy; those women who undergo abdominal delivery are more than six times more likely to require hysterectomy than are patients who undergo vaginal delivery [(32)]. The risk of peripartum hysterectomy increases with the number of prior cesarean deliveries. Among women who undergo peripartum hysterectomy, the most common indication for the procedure is obstetric hemorrhage. In most series, placenta accreta and uterine atony are cited as the most frequent inciting factors for hysterectomy. A large study from the United Kingdom noted that more than half of the peripartum hysterectomies performed were for uterine atony, whereas 38%

were secondary to placenta accreta. Other reported indications for peripartum hysterectomy include uterine rupture, extension of a uterine incision, leiomyoma, infection, genital lacerations, and cervical cancer. When peripartum hysterectomy is required, it is often an emergent situation, frequently in the background of substantial bleeding. These factors, along with the large size of the gravid uterus, lead to substantial perioperative morbidity and mortality for the procedure. Most of the previously reported data on peripartum hysterectomy are from small series of patients.

Conservative treatment of postpartum hemorrhage includes uterotonics (oxytocin, ergotamine), uterine massage, uterine artery embolization, uterine packing, pelvic vessel ligation, B-Lynch suture, multiple square sutures, and recombinant-activated factor VII [(17)]. The most severe complication of hemorrhage is maternal death, whose risk is estimated to be approximately 1 in 100,000 deliveries in developed countries and has been increasing. This risk is as high as 1 in 1,000 deliveries in developing countries. Other maternal complications of postpartum hemorrhage include hypovolemic shock, disseminated intravascular coagulopathy, renal failure, hepatic failure, and adult respiratory distress syndrome (ARDS) [(18,19)]. The objectives of this retrospective study are to examine the incidence, risk factors, indications, outcomes and complications of EPH performed in a Georgetown Public Hospital Corporation, from 2016 to 2020, and to compare the results with other reports in the literature. This would help highlight the lack of availability and utilization of antenatal services, identify avoidable factors, and stress the need to organize health care services so as to improve maternal and fetal outcome.

Rationale

Peripartum hysterectomy can be defined as the removal of the corpus uteri alone or with the cervix at the time of a caesarean section or within the puerperium. The removal of the uterus at caesarean section is referred to as caesarean hysterectomy, while the removal after a vaginal delivery is called postpartum hysterectomy.

Although uncommon in modern obstetrics, peripartum hysterectomy is one of the most devastating complications in obstetrics. It represents a catastrophic end to a pregnancy to all women in general and to those wanting to maintain their fertility in particular.

Despite evidence in medicine and surgery, peripartum hysterectomy is associated with high rates of morbidity, near miss and mortality. It is mostly preformed as an emergency procedure to control torrential life-threatening hemorrhage and remains a life-saving procedure.

The OBGYN department of GPHC sees a substantial number of patients with eclampsia, preeclampsia with severe features, placental abruption among others and it is of utmost importance to detect these patients and commence initial medical resuscitative measures (MgSo4, FeSo4, trihemics, tranexamic acid etc.) before resorting to surgical management (partial hysterectomy or total abdominal hysterectomy).

To date, no research has been conducted on the incidence and risk factors of peripartum hysterectomy at GPHC. This lack of studies makes it difficult for health care professionals to identify management areas which need to be strengthened, in order to provide the best care in line with international recommendations and prevent further hysterectomies from happening after a cesarean section was performed.

With this effect, the researcher's utmost wish is for the study to provide insight into the number of persons who underwent peripartum hysterectomy, the indications, risk factors, complications and outcome of patients who underwent peripartum hysterectomy at GPHC.

GPHC being the main hub of medical and surgical management in Guyana, it is the prime place for such a study to be undertaken. It is under this assertion that the researcher sought to assess the incidence and risk factors of peripartum hysterectomy in the OBGYN department at GPHC over a 5 years period.

Study Goals and Objectives

Goals:

To assess the incidences and risk factors of peripartum hysterectomy at the OBGYN Department at Georgetown public hospital corporation over a period of 5 years.

Objectives*:*

The objectives of this retrospective study are;

- To determine the incidence of peripartum hysterectomy after medical and surgical management were exhausted.
- To identify the risk factors for peripartum hysterectomy.
- To determine indications for peripartum hysterectomy at GPHC.
- To analyze the complications and outcome of peripartum hysterectomy performed in Georgetown Public Hospital between January 2016 to January 2020.

METHODOLOGY

Study Design/Setting/Sampling:

This study was designed as a retrospective chart review of patients who underwent peripartum hysterectomy in the Department of Obstetrics and Gynecology at Georgetown Public Hospital Corporation over a five-year period from January 2016 to January 2020. Records of all women who underwent peripartum hysterectomy were collected from medical record department. Each case file was revised in detail for risk factors, intrapartum and peripartum notes, operative notes and findings, complications, duration of surgery, blood loss and outcomes.

The following inclusion and exclusion criteria were used to determine the patients eligible for this study.

Inclusion criteria:

- Patients who did not respond to medical/ pharmacological and surgical methods for management of PPH during or within 24 hours after delivery.
- All patients who have underwent a peripartum hysterectomy between the period of January 2016 to January 2020 at GPHC.

Exclusion criteria:

- Patients who had no indications for peripartum hysterectomy.
- Patients with PPH after 24 hours postpartum that did not resolve with medical or surgical management.

This investigation was qualitative, quantitative and descriptive in nature since it sought to assess the incidence and risk factors of peripartum hysterectomy at GPHC. The study employed a cross sectional design to suit the time allotted to it.

This study was done in the Obstetrics and Gynecology department of Georgetown Public Hospital Corporation (GPHC) which is the main referral hospital in Guyana. Information was sought from the department; the main operating theater and the maternity theater of GPHC.

Procedure and Data Collection*:*

The following methods were utilized for data collection; review of Obstetrics surgery log book from maternity theater, review of Obstetrics surgery log book from Main Operating Theater (MOT), review of patients' charts via the medical records department which included the treatment options, operation notes and outcomes.

Quality Assurance

Information used for statistical analysis did not provide identification of patients. A patient who was entered in the table was given a unique identification code known only to the researcher which assisted in chart verification. Nevertheless, a separate list that included only the patient's unique identification code was compiled and stored on another computer during data processing. This list was used only for testing inconsistencies that occurred when entering data. This was removed once the analysis was complete. All aspects of this study were overseen by the clinical supervisor.

Ethical Considerations

- **Seek for approval**: Efforts were made to ensure adherence to ethical standards. Request and approval by GPHC Head of Medical and Professional Services was obtained to access patient records from GPHC records office prior to the beginning of this investigation. Approval from the Ministry of Public Health (MOPH) Institutional Review Board (IRB) was granted.
- **Fair subject selection**: All qualifying patients were used as a study sample, thus freeing the analysis process from ethnic, sexual, cultural or other prejudices.

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Results

A total of 26 women underwent peripartum hysterectomy during this study period. The total numbers of caesarean deliveries were 6130. Thus, the incidence of peripartum hysterectomies was 4.2 per 1000 deliveries. The mean maternal age was 30 years. Majority of patients (20/26) were in the age group 31-45 years, while the remainder (6/26) was in the range of 19-30 years [Figure 1]. Of these 26 women, 9 (35%) were primigravida and 17 (65%) were multigravida (Figure 2). Sixteen were between 37 weeks to 39 weeks gestation while two were <40 weeks [Figure 3]. In table 1 we present obstetric data in relation to the indications of delivery. The indications were categorized into 5 categories which includes; 1. Hypertensive disorders which comprises of eclampsia, preeclampsia with severe features and HELLP syndrome, 2. Abnormal placentation which comprises of low-lying placenta and placenta previa, 3. Placental abruption, 4. Uterine atony and 5. Early pregnancy loss. After analyzing these charts, it was concluded that among booked patients, two (8%) patients for uterine atony, seven (27%) patients had an abnormal placentation (low lying placenta and placenta previa), one (4%) patient for HELLP syndrome, three (11%) patients had indications of placental abruption, four (15%) for Eclampsia, one (4%) patient had indication of preeclampsia with severe features and eight (31%) had an indication of early pregnancy loss with prolonged bleeding (1 patient had a blighted ovum, 1 patient had a molar pregnancy, 1 patient had a molar pregnancy with a malignancy and 5 patients had abortion/ miscarriages with prolonged bleeding after). All hysterectomies were performed due to intractable obstetric hemorrhage that was unresponsive to conservative management, representing an incidence of 4.2 per 1,000 caesarean deliveries. All patients were followed up in the Gynecology outpatient clinic and they all recovered.

Figure 1: Maternal Age Range at Time of Delivery

Figure 2: Parity of patients who underwent Peripartum Hysterectomy.

Figure 3: Gestational Age at Delivery.

Figure 4: Indications for Emergency Peripartum Hysterectomy.

Figure 5: Type of Hysterectomy done for patients.

Figure 5 above represents the type of hysterectomy that was performed on these patients. Nineteen (73%) of the patients underwent subtotal hysterectomy, while seven (27%) patients had a total abdominal hysterectomy done.

Complications	
Intra Op Complications n(%)	**Post Op Complications** n(%)
Bowel/ Bladder Injury 1 (4%)	Disseminated Intravascular Coagulation (DIC) 1 (4%)
Uterine Artery rupture 1 (4%)	Anemia 17 (65%)
Surgical Trauma/Tear 1 (4%)	

Table 1: Intra Op and Post Op complications of Peripartum Hysterectomy.

The operative complication and postoperative conditions are shown in Table 1. There was one case of intraoperative bladder/bowel injury. This patient had a previous cesarean section. There was one case of re-laparotomy because of persistent intra-abdominal bleeding, with good resolution. All patients received blood transfusions and >98% of them had over 2 units of blood with a maximum of 5 units transfused to 1 patient. We had 1 case of disseminated intravascular coagulopathy where the patient was transferred to the intensive care unit but reversed with prompt management. There were 17 patients became anemic after the hysterectomy was performed. The median postoperative hospital stay was 6 (range 5–25) days. There was no maternal death. There were no cases of neonatal morbidity or mortality.

Figure 6: Intra Op and Post Op complications of Peripartum Hysterectomy.

Treatment options at GPHC
Uterotonics (oxytocin, misoprostol & ergometrine)
Tranexamic Acid
Antifibrinolytics
Uterine Massage
Uterine packing
B- Lynch suture
Foley Balloon Tamponade/Glove Tamponade

Table 2: Treatment Options during Surgery for management of Bleeding at GPHC.

Table 2 above demonstrates the treatment options used during surgery to abate the persistent bleeding present. Uterine massage, uterine packing and B-Lynch suture was the most frequently used options for most cases, while tranexamic acid and an antifibrinolytic were used to manage postpartum hemorrhage (PPH).

Medical management after peripartum Hysterectomy
Iron Sulphate (FeSo4)
Folic Acid
B Complex
Vitamin C
Iron Dextran
Blood and Blood Products (Pack Red Blood Cells, Platelets, FFP, Cryoprecipitate)

Table 3: Medical Management post operatively.

Table 3 above represents the medical management used after the patient had peripartum hysterectomy. All 26 patients were treated with Trihemics (iron sulphate), folic acid, B complex and vitamin C. Three patients were treated with all the above medications with the exception of iron dextran, while one patient was treated with all of the above mention medication.

Discussion

Emergency hysterectomy is the surgical removal of the uterus following an unexpected and sudden event, which must be dealt with urgently by carrying out the procedure. When it is carried out in a woman with a pregnant uterus less than 24 hours after delivery, it is termed emergency peripartum hysterectomy (EPH). This life-saving obstetric procedure has been in use for more than 100 years, since Edward Porro in 1876 published the first case report of a successful procedure in which both mother and baby survived [(1).]

Despite advances in medicine and surgery, postpartum hemorrhage remains one of the leading causes of maternal morbidity and mortality. Peripartum hysterectomy is performed in the treatment of a life-threatening obstetric hemorrhage that cannot be controlled by conventional methods. The reported incidence of emergency peripartum hysterectomy varies from 0.24 to 5.09 per 1,000 deliveries in the literature. The incidence of this study is 4.2 per 1,000 deliveries is in agreement with the recent studies. Zeteroglu et al. reported the incidence of EPH in a teaching hospital as 5.09/1,000 deliveries, which is higher than that of other studies [(10)]. This is similar to institutional rates in other studies from developing countries, where a variable rate of 2 to 6 per 1000 deliveries has been reported [(3,5-7).] However, it is higher than the rate of 0.2 to 2.7 per 1000 deliveries reported from developed countries [(8,9,17,18).] This may be because in developing countries there is a high prevalence of risk factors for PPH, such as multiple pregnancy, grand multiparity, cephalopelvic disproportion and prolonged labor, previous Caesarean section or myomectomy scar, and placenta previa.

The incidence of peripartum hysterectomy is increasing in this era not because of improperly managed third stage of labor or obstructed labor but most likely because of increasing incidence of cesarean sections. Chances of repeat cesarean sections thus increase. This ultimately increases the incidence of abnormal placentation (placenta previa and accreta) [(26)].

In our study, majority of patients who underwent EPH were in age group ≥30 years and were multiparous women. Similar trend was observed by Amad and Mir [(20)] and Barclay et al [(21)]. Other risk factors for EPH, like previous cesarean birth, current cesarean delivery, and abnormal placental implantation and invasion, were similar to the literature [(22)].

In this study, it was found that the major indication for EPH was Early pregnancy loss with prolonged bleeding which was in contrast to Lovina S.M. Machado et al in their study where they found uterine atony as the major indication for EPH in 20.6% to 43% of the cases [1-6,7-8,21]. While this was traditionally the leading cause for EPH the incidence has reduced due to the use of newly developed pharmacologic treatment strategies including prostaglandins. Multiparity and oxytocin use for uterine stimulation were found to be the risk factors for uterine atony requiring EPH [1-6]. Combs et al in their large case control study of patients with postpartum hemorrhage reported that pre-eclampsia, nulliparity, twins, induction, prolonged labor and augmentation were all identified as independent risk factors for uterine atony [23].

Conservative measures to arrest bleeding are initially tried before considering EPH. The measures include uterotonic drugs, uterine packing, B-Lynch suture, Foley catheter balloon and uterine massage [4,5,21,22]. Conservative management is of particular importance in patients who are young, have low parity and who are hemodynamically stable [4,5,21,22]. However, while there are reports of 96% success rate following uterine artery ligation [21] there are others who have achieved success in only 39.4% of these cases [5]. The choice between conservative management and EPH should be individualized. In situations where conservative treatment is likely to fail or has failed, there should be no further delay in performing EPH as delay leads to increase in blood loss, transfusion requirement, operative time, DIC, and increased possibility of admission to ICU [1-6]. In addition, on rare occasions, concealed abruptio placentae may be associated with extravasation of blood into and through the full thickness of the myometrium (Couvelaire uterus) to such an extent as to make it unresponsive to oxytocic drugs, thus necessitating hysterectomy. It must be emphasized, however, that in the majority of cases of abruptio placentae with Couvelaire uterus, the response to oxytocic drugs is appropriate and the hemorrhage is due to DIC rather than failure of the uterus to contract [28].

Traumatic rupture, that is, perforation or laceration of the uterus, can occur with a variety of obstetric manipulations, including internal version and breech extraction, especially in obstructed labor; instrumental manipulation, such as the classical application of the anterior blade of Kielland's forceps; manual exploration of the uterus and manual removal of the placenta or its

fragments after obstructed labor with a ballooned and thin lower uterine segment; and during curettage for secondary postpartum hemorrhage.

Cesarean section in the second stage of labor with the fetal head deeply impacted in the vagina may be associated with lateral extension of the lower uterine segment incision into the major vessels [32]. This is more likely if the surgeon has used a straight line as opposed to a curved or 'smile' incision. On rare occasions, the extent of this tear may necessitate hysterectomy, especially if one or both uterine arteries are lacerated and a hematoma obscures the surgical repair [32].

In this study it was noted that all patients were managed post operatively with medications which included; iron sulphate, vitamin C, B complex, Folic acid, whole blood and blood products. Majority of these patients developed anemia after EPH. However, with the above mention medication this complication was quickly resolved with patients only requiring a short hospital stay and no further complications arising. This is keeping in agreement with previous studies where patients who developed complications resolved with same management options [20-24,28,32,33].

Although fortunately a rare condition, peripartum hysterectomy nevertheless represents a catastrophic (and sometimes fatal) end to a pregnancy for any woman, regardless of whether she considers her family to be complete.

Limitations

The information used in this study was obtained from the medical records of patients who underwent peripartum hysterectomy from 2016 to 2020. This study was meant to highlight the incidence and risk factors associated with peripartum hysterectomy in the Obstetrics and Gynecology department of Georgetown Public Hospital Cooperation.

There were a lot of difficulties encountered during this process. Such as;

- There was poor documentation on the operation notes for these patients, all complications and challenges intra operatively were not clearly stated.

- The legibility of the doctor's handwriting was not very clear and thus difficult to read and comprehend.

Recommendations

1. The medical records of all patients should be digitalized. This will eliminate paper storage and damage or missing data, allow for faster data search and collection for future researcher and allow for better documentation of patient's data and storage.
2. The risk factors associated with emergency peripartum hysterectomy should be identified antenatally.
3. The high-risk group of women should be delivered by skilled birth attendants and following protocols of action, measures that can contribute to reduce the high maternal morbidity and mortality associated to EPH.
4. Cesarean delivery should be performed only when exclusively necessary, in appropriate clinical settings and by experienced surgeons when such risk factors are identified.
5. Obstetric emergency training and guidelines for massive hemorrhage should be established in any delivery department.
6. Besides that, anticipation of such complication by classifying those patients in the risk group, along with protocols that can provide a standardized approach to evaluating and monitoring the patient, notifying a multidisciplinary team, and treatment, will greatly improve the final outcome.

Conclusion

It was concluded that the incidence of peripartum hysterectomy at Georgetown Public Hospital Corporation was found to be 4.2 /1000 cesarean deliveries. It was found that the major risk factors for peripartum hysterectomy were multiparous women, a maternal age >30 and patients who had a previous caesarean delivery or is currently having a caesarean delivery. The major indications for peripartum hysterectomy of this study were noted to be early pregnancy loss with prolonged bleeding which accounted for 31% of patients followed by abnormal placentation which

accounted for approximately 27% of all patients who had a peripartum hysterectomy done. The complications that were encountered intra operatively and post operatively were managed with medical interventions and all patients recovered successfully. All patients were followed up in the Gynecology outpatient clinic with no recorded post op complications. There were no recorded maternal deaths or neonatal deaths during this study period.

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