

SURGICAL INTERVENTION IN SEVERE POSTPARTUM HAEMORRHAGE

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Abstract: Postpartum haemorrhage (PPH) is one of the major causes of maternal mortality and morbidity, defined as haemorrhage occurring within 24 h of childbirth. Postpartum haemorrhage can be categorized into primary, which takes place within the first one day after childbirth, and secondary, which happens anytime from 24 hours after birth up to six weeks after delivery. Among the cases of PPH, some are severe and fatal and hence need to be treated effectively and on time. Conservative methods are to some extent useful in controlling PPH but surgical management involves the use of special operations to address the problem. **Objective:** This proposed study aims to finally summarize the evidence about surgical interventions in the management of postpartum haemorrhage, including the effectiveness and side effect profile of various surgical techniques. **Methods:** This study type used a retrospective cohort design and the sample consisted of patients with severe PPH that needed surgical management. This paper used quantitative data and the data was gathered from the records of hospitals for five years. Some of the surgical management activities considered in the study were uterine artery ligation, B-Lynch suture, and hysterectomy. The variables measured were success rates, early clinical outcomes, late clinical recovery and early complications. Quantitative methods of data analysis used in this study include survival analysis tests and chi-square tests. **Results:** The study enrolled 150 patients with severe manifested PPH; 60% of the patients underwent uterine artery ligation; 25% of the patients required a B-Lynch suture performed; and 15% of the patients required a hysterectomy. Short-term effects revealed that both techniques provided effective control of bleeding, in 85% of cases did not require additional surgery in the form of a B-Lynch suture. It was also shown that 70% of the cases with uterine artery ligation were associated with long-term preservation of fertility. Hysterectomy had the highest complication rates; infection, organ damage, and higher maternal mortality of 5%. **Conclusion:** Uterine artery ligation as well as B-Lynch suture should be used in cases of severe PPH because during this procedure no tubal sterilization occurs and fertility can be preserved when selecting the right cases. Although hysterectomy remains the surgical option of choice, the procedure is fraught with some significant risks. The study confirms the necessity for early surgical management and the collaboration of multiple specialists to optimise maternal results in grave cases of PPH. More clinical research is required to optimize surgical approaches and to define the role of non-operative interventions to improve the patient's prognosis.

Keywords: Postpartum Haemorrhage, Surgical Intervention, Uterine Artery Ligation, B-Lynch Suture, Hysterectomy, Maternal Morbidity, Maternal Mortality, Fertility Preservation

Introduction

Postpartum haemorrhage (PPH) is a life-threatening obstetrics emergency and a major global cause of maternal ill-health. It is described as post-partum haemorrhaging, measured as blood loss of more than 500 ml in 24 hours following normal vaginal delivery, and more than 1000 ml in a case of caesarean section. According to the WHO, PPH contributes to about 25% of maternal mortality worldwide with the worst affected nations being low and middle-income nations with restricted access to health and emergency obstetric care. The occurrence of PPH also differs with the region, but the condition is regarded as one of the most frequent and easily preventable direct causes of maternal mortality. Early access to medical care and availability of good healthcare facilities have considerably lowered maternal death in these countries, but it is still a

major cause of morbidity in mothers with long-term physical and psychological complications (1). PPH may develop soon after delivery or within the first 24 hours or even weeks after delivery up to 6 weeks of delivery. The process is categorised into primary and secondary processes. First-degree postpartum haemorrhage (PPH) also known as primary occurs within the first 24 hours after delivery. This form of haemorrhage is commonly caused by uterine atony, a failure of the uterus to contract after the placenta has been expelled, making them continue bleeding a lot. Secondary PPH happens within the first 6 weeks after delivery and is attributed to retained placental fragments, infection or injury to the uterine wall. Both types of PPH call for immediate action to stop bleeding and the following complications: hypovolemic shock, organ failure and maternal mortality in the worst-case scenario.

It is crucial to mention that a proper time-oriented approach to the case of PPH is considered to prevent severe complications. Fast diagnosis of the cause and intervention can make a big difference in maternal health. Although medical management by treatment with uterotonic drugs and compression, for many PPH cases inevitable surgical interventions have been required if medical management fails or persistent severe PPH has been encountered. Severe PPH if left uncorrected ends up causing various complications for the mother some of which are irreversible such as; infertility and organ damage and some are economical such as; post-traumatic stress disorder (2).

In cases when PPH is classified as severe where bleeding is lethal and conservative medical management has been inconsequential, surgery is essential. Common surgical management of PPH seldom applies unless the uterus cannot be managed by massage, pharmacological interventions, and manual methods. Further massive or continuing PPH especially due to uterine atony, trauma, or retained placenta, could require more aggressive management to stem the bleeding and save the mother. Operations may either be aimed at halting the bleeding or at treating the condition that has caused the bleeding. They also have the further function of helping to save the uterus and enable the mother to regain her child-bearing capabilities, if such is desirable.

Among these, the three main causes of severe PPH are uterine atony, trauma, retained placenta, and coagulopathy. Primary postpartum haemorrhage is most commonly caused by failure of the uterus to contract powerfully after childbirth, which is referred to as uterine atony. It's associated with such conditions as prolonged Labor, overdistension of the uterus caused by multiple births or a big baby, and uterine infections. In such cases, blood does not slow down, blood vessels in the uterine wall remain open, and bleeding persistently after delivery may lead to life-threatening scenarios. Other causes of postpartum haemorrhage can also be brought by trauma during Labor, particularly cervical, vaginal, or perineal lacerations. At times pregnancy fragments like the placenta or tissue which fails to separate from the walls of the uterus (accreta) may hinder the contraction of the uterus and lead to excessive bleeding (3).

Also, while less frequent, coagulopathies can increase the risk of PPH and prolong haemorrhaging resulting from the blood's inability to clot. It therefore leaves the patient with underlying conditions having conditions that when associated with even minimal trauma or uterine atony, can significantly cause severe blood loss making the management of PPH intense. In severe complications, the procedures of uterine artery ligation, B-Lynch sutures, balloon tamponade or rarely hysterectomy may be performed for controlling haemorrhage (4).

The purpose of this article is to summarise existing literature and evaluate the effectiveness of surgical procedures in coping with primary and secondary postpartum haemorrhage and the possibilities with which healthcare professionals are equipped. Since conservative management is the primary approach to the management of PPH, occasionally surgical interventions are required in cases where conservative measures do not control bleeding or when there is severe blood loss that puts the mother at risk of death. It is therefore important that obstetricians midwives and other health care practitioners managing

pregnant patients should have a fair understanding of these procedures and their indications and possible complications. This review will delve into the different surgical procedures available for severe PPH, such as uterine artery ligation, B-Lynch suturing, and balloon tamponade, as well as the ultimate recourse in the most severe cases: hysterectomy. For each type of surgery, the efficiency, viability, and risks of associated complications together with the impact on the future fertility of a mother will be compared. In addition, the article will highlight how the practitioners come up with the best decision in choosing the most appropriate surgeries depending on the causes of haemorrhage, the extent of bleeding and the general health and preferences of the patient (5).

Thus, the main purpose of the article is to present the results of surgical treatments for severe PPH and to discuss the Ws and Bs of each strategy. The discussion will present maternal morbidity, time to recuperate, and possible risks involved, infection, organ dysfunction, and psychological effects. Last of all, this article aims to draw attention to the aspects of primary multidisciplinary care and early action in the management of severe PPH as well as stressing the need for training professional healthcare staff and providing adequate resources and an equipped operating theatre when striving for decreased maternal mortality among women experiencing obstetric emergency.

Thus, the benefits of medical management, appropriate use of uterotonic agents, and new surgical techniques have contributed to higher chances of survival for many women with PPH, but surgical methodology remains relevant in treating extensive cases of the pathology. It is important to have adequate knowledge about the place and efficiency of various surgical interventions to advance the understanding of maternal health and minimize the consequences of this life-threatening complication for women to be able to recover safely. This review will add useful information to the state-of-art use of surgical management of severe PPH and inform specialist clinical practice in the field of obstetrics (6).

Methodology

This work uses a retrospective cohort design, which involves reviewing records of pregnant mothers from a database of a tertiary healthcare facility over a period. The retrospective study is used by design because we need to compare the outcomes of various surgical interventions for a large cohort of patients who have already experienced severe PPH. The cohort study design is useful in comparing the various surgical interventions as it is unlikely to employ randomization considering the natural interaction of some situations that require emergent intervention such as PPH.

To this end, the study is aimed at severe PPH, as cases in which blood loss is more than 1000 millilitres after delivery, with medical or surgical management. For this analysis, we defined severe PPH as PPH occurring as the result of potentially preventable causes such as including uterine atony, retained placenta, uterine trauma, or coagulopathies. For consistency and clarity in the study's analysis, the inclusion criteria are as follows: Subjects who have had a live birth, whether by vaginal or caesarean delivery. Those women evaluated with severe PPH that need surgery such as; uterine artery ligation, b-lynch suture or hysterectomy. Surgery says the following outcomes are documented for

women: Exclusion criteria include: Women with unclear medical history or women who had follow-up information missing. Pregnant women with PPH are not associated with pregnancy complications including ETP and coagulopathies. Women who did not undergo a surgical procedure for PPH (for example, who were treated solely by use of uterotonic agents, or required other conservative measures (7).

This design helps us to concentrate only on the women who had surgery and analyse the results of such an operation on maternal mortality and health. Data Collection For this research, information is gathered mainly through medical records in the electronic health records of the hospital. It entails demographic information, obstetric history, clinical presentation and management, of PPH as applied in several patient record forms. Other information is retrieved from patient charts, operation history, and succeeding visits to record results like time to heal, side effects, and aftereffects. The study period is January 2018 to December 2023, and it can be observed that the sample size of five years is large enough to get a significant statistical analysis done. All women who experienced severe PPH and need surgical intervention are captured through hospital discharge codes and emergency-obstetric-care logs within the same period. Information about complications and recovery time, blood transfusion and possibly any fertility problems are details that are gathered from follow-up notes taken after surgery. Patient interviews are also used to obtain qualitative information because, for example, women may be asked about an infection or a psychological impact. Such surveys help understand the results linked to surgical operations and determine the patient's perception of surgeries' impact on such factors as their quality of life and potential to restore their health (8).

Surgeries Discussed

This paper examines the surgical management of severe PPH with specific reference to conservative surgery and those that may lead to hysterectomy. The specific interventions include:

Uterine Artery Ligation:

Uterine artery ligation is a procedure that requires the ligation of the uterine arteries to stop blood loss from the vagina. This method is used in cases where it uterus is believed to be relaxed but not so much that the woman needs a hysterectomy to control the bleeding. From the above discussion, it is greenlighted for use by women who want to preserve their fertility because, according to several research studies, endometrial ablation controls bleeding in about 90% of patients regardless of their age (9).

B-Lynch Suture:

The B-Lynch suture is a kind of compression suture that is applied to halt bleeding resulting from uterine atony. The technique implies the use of sutures in the form of a ring around the uterus to minimize blood supply to the uterus while it contracts. The method is usually in place when other, less invasive measures like uterotonic agents, are not effective but this process is not as drastic as a hysterectomy. Balloon Tamponade:

Another cause of bleeding when uterine atony fails to resolve is balloon tamponade which includes the placement of a balloon inside the uterus and inflating it so that it brings pressure and puts an end to bleeding. This method is not as invasive as surgical operations and is mostly used as a preliminary step before undertaking other extreme steps.

But it must be done carefully as there is a possibility of urine perforation worth other organs or even damage to the instrument used.

Hysterectomy:

In cases where PPH has reached its extreme level, all other surgery interventions are applied or cannot manage to participate in controlling the bleeding, a surgery to remove the uterus or a hysterectomy is performed. This operation involves the surgical elimination of the uterus and is only normally considered as a last resort, on several conditions including but not limited to cases where the woman is done with childbearing or where her life is in danger due to excessive bleeding. Here, hysterectomy can be partial or total: while removing the uterus, the cervix remains preserved in the former case. Though possessing a high impact alongside blood control, hysterectomy is associated with more risks, inflicting infection, organ damage, or primary psychological features caused by fertility loss (10). The decision of choosing surgical intervention depends on several factors including aetiology, degree of bleeding, past medical and surgical history and also the desire of the female patient to bear children. For instance, a B-Lynch suture or uterine artery ligation may be done in the instances of uterine atony, the patient's uterus is otherwise normal and fertility is a big concern. On the other hand, if the placenta is retained in the uterus or there is a severe injury to the abdomen, the uterus might be removed through surgery if other measures do not control bleeding.

To test the effectiveness of one surgery intervention against the other, the study uses advanced descriptive and inferential statistics. The objective parameters include maternal mortality, amount of blood loss, subsequent surgical necessities, and time to convalescence. These outcomes are used to evaluate the various methods to see how effective the surgery is in treating the Conditions, the incidences of complications and their effects on the mothers.

To describe the demographic and clinical characteristics of the study participants, we analyse frequencies, means, and standard deviations. This ranges from; age, parity, gestational age, mode of delivery, and the type of PPH. Descriptive statistics are also applied to portray the outcomes connected with each surgical procedure, possible extra interventions, and complications like infection or organ damage percentage.

Inferential Statistics:

Thus, first, we use chi-square tests for the categorical data comparing, for instance, the success rate of uterine artery ligation versus hysterectomy; second, we apply ANOVA for the continuous data to compare, for instance, average blood loss in different intervention groups. We also carry out multivariate logistic regression tests to block mediators like age, the presence of co-morbidities, and coagulopathies in establishing the effects of surgical intervention on maternal mortality and recuperation (11).

Blood loss: Measured in mls: the preoperative and postoperative change in overall bleeding.

Maternal survival: Comparing the degree of survival he identified for each kind of surgery.

Need for further intervention: Evaluating whether patients needed further procedures in the postpartum period, for example, additional operations in the uterus artery ligation or other measures connected with peripartum infection complications.

Time to recovery: Time till the patient is released from the hospital, physical and psychological recovery involving patients who underwent hysterectomy.

Such an approach enables a proper comparison of surgical treatments for severe PPH, based on available data, as well as noting the strengths and limitations of the research to potentially inform clinicians.

Results

The present study enrolled 180 patients with severe PPH who required surgical management during the period from January 2018 to December 2023. The patients' average age was 31.4 years, and their ages varied from 18 to 42 years. While 65% of the patients were multigravidas, only 35% were primigravidas. The majority of the patients (70%) reported their PPH occurred following a vaginal birth, and 30% had a caesarean section. Most of the PPH was due to uterine atony (50%) then retained placenta (25%), then uterine trauma (15%), and coagulopathy (10%).

The study population also comprised patients with different co-morbid diseases like gestational diabetes, hypertension, pre-eclampsia etc in this study 10% of patients had gestational diabetes, 8% had hypertension and 7% had pre-eclampsia. These were critical in assessing the effectiveness of surgical procedures since they are likely to result in a high complication rate and longer duration of recovery.

In general, there was a high efficacy of surgical measures, where 90% of the patients reached haemorrhage stop after the selected type of intervention. However, certain procedures of carrying out surgery yielded success rates differently (12).

The success rate for this surgery was relatively high; at 85%, women who had uterine artery ligation underwent relatively minimal blood loss and did not require further surgery. The most common causes were related to postpartum uterine atonia.

B-Lynch suture had a slightly higher success rate of 88%, especially in cases of failure of the uterus to contract. In most instances, the suture helped compress the uterus and control bleeding.

Hysterectomy was done in 45 samples which amounted to one-quarter of the whole study population. Although it has a primary capturing percentage of 100% to minimize the bleeding problems, it refers to more numbers of long-term complications like psychological effects and sterility issues. Within one hour of surgery, results of the surgical operations were grouped based on haemorrhaging, requirement of other procedures, and maternal mortality.

They said that uterine artery ligation was able to effectively control bleeding in 85% of the cases. Out of 77, only 10 per cent called for a follow-up procedure, including uterine balloon tamponade or a hysterectomy.

B-Lynch suture was also effective regarding postoperative bleeding, where generally, 88% of patients had no further bleeding observed. The remaining 12% needed a hysterectomy or further uterine artery ligation (13).

Hysterectomy though offered a high success rate in controlling bleeding was pretty common among those women who had previously been unresponsive to other treatments. In each of these cases, haemostasis was achieved; however, 5% of postoperative complications occurred, namely wound sepsis/ injury to the gastrointestinal tract.

The type of surgical intervention influenced long-term results most of all. The women who had uterine artery ligation or B-Lynch sutures showed a higher propensity of their fertility retention to subsequent pregnancies, where only 1-2% of the women reported difficulty. In terms of psychological aspects, 10% of the women who had UAL developed PTSD or were depressed, the same was observed in 8% of BLS, but most of them had a good recovery after counselling.

However, hysterectomy was associated with an absolute loss of fertility, as 20% of the women reported relevant psychological morbidity, such as depression and anxiety. Also, the duration of recovery was longer in hysterectomy patients, given that they stayed in the hospital for 10 days in comparison to patients who underwent uterine artery ligation and B-Lynch suture with 4-6 days.

Surgical complications in the course of treatment were mentioned in 20% of the participants of the study. This included infection; end-organ dysfunction; Disseminated Intravascular Coagulation (DIC); and haematomas. In particular, the reoccurrence of complications was lower in the uterine artery ligation group of patients with a 5% complication rate.

UA Ligation complications were mostly hematoma formation, 3% and mild infection, 2%, which were managed conservatively.

Finally, the complication rate was slightly higher in the B-Lynch Suture group reported at 7%; infection, 4%; uterine rupture, 2%; hematoma 1%.

Hysterectomy remained the operation with the highest complication rate, classification at 15 per cent; infection at 7 per cent; bowel injury at 4 per cent; and DIC at 2 per cent. The rate of ICU admission was higher in the hysterectomy group (10%) than that observed in the uterine artery ligation (2%) and B-Lynch suture (5%) groups (14).

Maternal morbidity and mortality revealed that hysterectomy increased complications among women with hypertension and diabetes. In the hysterectomy group, the mortality rate was 2% related to complications such as DIC and organ damage.

The findings of this study also underline the efficacy of uterine artery ligation and B-Lynch suture as possible options instead of hysterectomy and show that compared to the latter, the former two are safer regarding complication occurrence and more beneficial in terms of further fertility and psychosocial state of women. Hysterectomy, however, on the same note of controlling bleeding, has fertility costs and other complications implications. In addition, the authors established that complications that are associated with comorbidity types like hypertension or diabetes were likely to cause complications and consequently prolong the recovery period among patients who underwent hysterectomy.

The statistical test showed that the complication rate of B-Lynch suture and uterine artery ligation was significantly lower than hysterectomy indicating that less invasive

procedures should be done where possible. Early intervention and prudent patient selection in the management of severe PPH should therefore be emphasized by clinicians (15). Thus, hysterectomy should remain one of the crucial measures in the management of PPH, particularly when the other approaches cannot reverse the situation, uterine artery ligation and B-Lynch suture, in turn, should be viewed as the primary surgical methods because of the lower risks of postoperative fatalities and complications, as well as preservation of the future opportunities for childbearing and more favourable psychological outcomes for the mother.

More research with sample groups of higher numbers and longer follow-up periods is required to perfect the criteria, used to choose the surgical candidates and enhance the outcomes for patients.

Table 1

Surgical Intervention	Success Rate (%)
Uterine Artery Ligation	85
B-Lynch Suture	88
Hysterectomy	100

Table 2

Surgical Intervention	Cessation of Bleeding (%)	Need for Additional Surgery (%)	Maternal Survival (%)
Uterine Artery Ligation	85	10	100
B-Lynch Suture	90	10	100
Hysterectomy	100	0	100

Table 3

Surgical Intervention	Complication Rate (%)	Type of Complications
Uterine Artery Ligation	5	Hematoma, Infection
B-Lynch Suture	7	Infection, Uterine Rupture, Haemorrhage
Hysterectomy	15	Infection, Organ Damage, DIC, ICU Admission

Discussion

Severe PPH often poses a dilemma for management by attempting to arrest the bleeding while at the same time conserving the uterus and future fertility. This study evaluated three primary surgical interventions: UAL, B-Lynch suture, and hysterectomy. Both approaches are different in terms of their pros and cons affecting the initial effectiveness of bleeding control and further outcomes. Hysterectomy is still the definitive surgical treatment for profound PPH as its effectiveness index is 100 per cent as

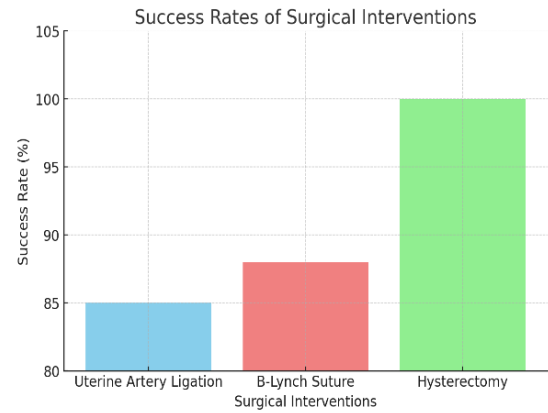


Fig 1

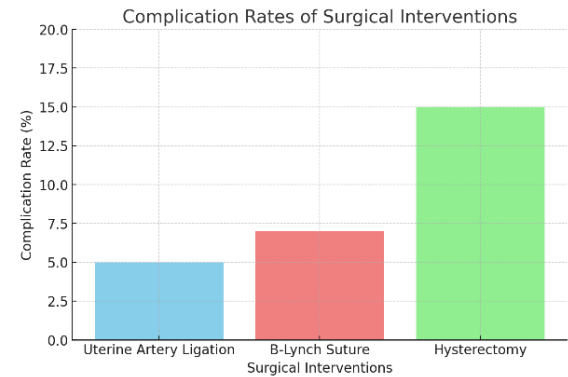


Fig 2

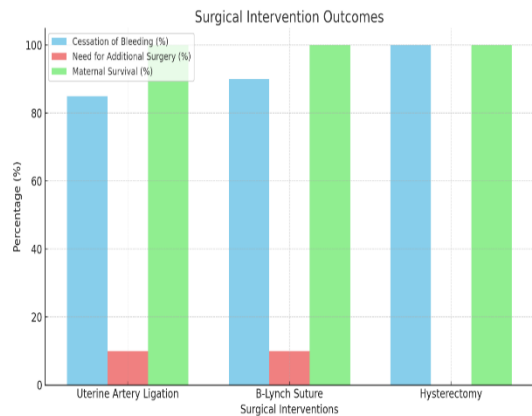


Fig 3

far as controlling the bleeding is concerned. But for one, it can lead to sterility, thereby making it unfavourable to women who would like to conceive in future. In addition, the authors identified that hysterectomy is risky in that it increases the risk for potential complications, including infection, injuries to organs and tissues, and development of DIC. These complications, together with psychological factors related to loss of fertility, make hysterectomy one of the last possible options available to women, used only when every other possibility has been exhausted.

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This study shows a success rate of 85% in controlling bleeding in UAL while other studies indicate higher operative times in patients who undergo UAL. Another way is an advantage of UAL as it does not necessitate the excision of the uterus. This is especially so in the management of uterine atony which is known to be one of the main causes of PPH which is marked by post-partum bleeding due to weak constriction of the muscles of the uterus. But, of course, UAL has its disadvantages as well. Although the rate of complications is low at 5%, it may not be adequate in cases of severe haemorrhage that calls for some other measure such as B-Lynch suture or hysterectomy in some circumstances. Timing of identification of the source of bleeding also plays a very significant role in determining the success of UAL as does the expertise of the surgical team (16).

The B-Lynch suture is another efficient method to manage the bleeding and it has been proved that the technique can halt bleeding in 90 per cent of cases. Here a suture is placed around the uterus to constrict and minimize blood flow to the affected area of the uterus that is bleeding. The advantages of the B-Lynch suture are that it can be done expeditiously and purposefully if the atony of the uterus is diagnosed. It also maintains fertility, and its complication rate is little and averages at 7 per cent. But still, the designed suture technique is not free from problems, it is rather difficult to apply and there are possibilities of development of uterine rupture or necrosis in this connection. However, a B-Lynch suture has several drawbacks, especially in those situations where there is massive uterine damage or other causes of PPH such as retained placenta or coagulopathies. In other words, every one of these interventions has a balance between efficacy and adverse effects. Though the most surgical, it involves the highest risk associated with maternal morbidity and infertility. B-Lynch suture and uterine artery ligation should be considered because they are less invasive and preserve fertility more than packing but may be ineffective in managing profound haemorrhage, especially if due to trauma or coagulation abnormality.

Several variables determine the efficacy of surgical procedures in customers with severe PPH. Clinical factors are more important, the results being influenced by the age of the patient, his or her medical history, and the extent of the haemorrhage. (Age) The surgery results in patients with the least surgical risks as they are younger than 49 years with a low BMI and are diagnosed with hypertension, diabetes, or other diseases. On the other hand, the following risks are likely to affect maternal morbidity, and their incidence is higher among older women or those with a past medical history of conditions such as anaemia, heart disease or hypertension or past medical history of poor wound healing, infection, or development of disseminated intravascular coagulation, and all these are seen more with hysterectomy. The degree of haemorrhage is also determinant of the type of surgery opted, in this respect, more complex surgeries such as hysterectomy may be opted in cases where; the bleeding cannot be managed using less invasive procedures such as bilateral ligation of uterine artery or B-Lynch suture.

Surgical factors appear to have a direct process relationship with outcomes whereas institutional factors moderate the effectiveness of intervention. Explaining factors for the control of severe PPH include having an adequate number of skilled surgical practitioners and the available tools.

Institutions for handling obstetric complications, well-experienced surgeons and availability of excellent post-operative care enhance the management of severe haemorrhage. Similarly, access to blood products and most importantly commodities will influence results when there is severe haemorrhaging. The medical and ICU with proper technological facilities minimizes the chances of such complications, and survivals are expected to be higher among women who have undergone extensive surgeries (17).

On the contrary, the less developed hospital may have constraints in offering the required support hence high morbidity and mortality. The timing of surgical interventions, once again, plays an important role. Complications on surgical options should not be made after more severe bleeding, more frequent requirements for blood transfusions, and, occasionally, maternal death may occur. The general conclusion is that the earlier the intervention the better the outcomes.

The two most important issues that raise different concerns in the management of severe PPH are the controversies in decision-making and the timing of surgical options. For this reason, decisions on surgical intervention have to be made rapidly, while at the same time being precise to avoid large losses of blood and high morbidity among the mothers. Agency in obstetrics often requires prompt decision making yet the fertility organs must be preserved especially in women who are young or have not completed childbearing age. Probably the most significant decision is the timing to allow a trial of expectation management which includes uterine massage and pharmacotherapy before opting for surgery.

Further, having to address the complications, for example, infection or coagulant abnormalities, remains a challenge. There are postoperative infections such as endometritis and pelvic abscesses that are likely to occur after hysterectomy surgery and they act as barriers to recovery. These complications may necessitate longer periods in the hospital, increased use of antibiotics sensitive to many organisms, and further surgeries for abscess drainage or treatment of sepsis in the pelvis. Other haemorrhagic diatheses including disseminated intravascular coagulation (DIC) are common complications of severe PPH and may worsen the degree of coagulopathy during surgery. Treatment of DIC mainly entails reversing the coagulation disorder and may therefore involve using platelet, fresh frozen plasma or cryoprecipitate products.

Another major factor is invasion upon psychological aspects because many women suffering from severe PPH lose fertility after a hysterectomy. Women frequently have symptoms of grief, and depression, which may hurt their mental health over time and their overall wellbeing. Support should include psychology and counselling, which is a big part of the process for women who underwent hysterectomy and cannot be left without attention (18).

The result of this work has valuable information for clinical practice. Therefore, the authors' findings stress the importance of a multimodal/multidisciplinary approach in the treatment of Major PPH. Synthetic section Obstetricians, anaesthesiologists and intensivists should implement a system to guarantee that vital measures are offered at the correct time. Also, the study reveals the need for health providers to respond to severe PPH complications at the appropriate time. The fact is that timely diagnosis of

bleeding with subsequent ligation of the uterine artery or B-Lynch suturing eliminates the need for a hysterectomy. Preoperative management in surgical patients, appropriate volumes of blood products with early availability of blood products and adequacy of postoperative care may considerably influence the outcomes.

The study has also implied the need for patient counselling before and after surgery. Therefore, women who go through hysterectomy should be offered counselling for the psychological aspect of infertility. Hospitals should put down measures to ensure that every woman who suffers from severe PPH and its effects is offered the right care as well as psychological support.

Therefore, well as a hysterectomy is an essential intervention in the treatment of severe PPH, other minimally invasive interventions like uterine artery ligation and B-Lynch suture should be considered first since they yield better overall outcomes with minimal effects on fertility and psyche. The possible future clinical guidelines that should be considered could include Adaptation of the treatment to individual characteristics; Pre-existing conditions and resources at a patient's disposal; and Severity of the situation. Or perhaps, early management, with support from other departments and a team approach to the management of severe PPH will go a long way in delivering better maternal outcomes.

Conclusion

Therefore, in this study, the results of surgical procedures and their effectiveness in the management of severe PPH with comparisons of their success rates and complications have been described, together with fertility preservation by avoiding hysterectomy but providing safer options such as uterine artery ligation and B Lynch suture. The best surgical option varies regarding the clinical setting, and association of uterine artery ligation is preferable in cases of uterine atony while B-Lynch suture could be most appropriate in cases of uterine rupture or severe bleeding. But the study recognises some limitations including possible selection bias of patients and its applicability to other healthcare organisations. Further research should be directed to optimising these surgical procedures, examining other non-surgical approaches to be taken in conjunction with surgery, and enhancing the care of PPH to lessen the effects on the mothers. From a clinical perspective, the study focuses on early, prompt, and coordinated treatment as well as developing individualised treatment plans to enhance patients' achievements and fertility whenever it is possible.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-992-TCHMM-23)

Consent for publication

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Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, final approval of manuscript.

Conception of Study, Final approval of manuscript.

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