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Coming Back from A Severe Postpartum Hemorrhage (PPH)

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ABSTRACT

Globally, severe postpartum hemorrhage (PPH) continues to be a major factor in maternal mortality and morbidity. Beyond the immediate life-threatening complications of hypovolemic shock, organ failure, and potential death, survivors of severe PPH may endure a profound and prolonged journey marked by both physical and psychological anguish. The neurobiological sequelae following severe bleeding, including potential cognitive impairment and abnormal brain activity patterns, underscore the gravity of this condition's impact on mental health. Survivors were frequently seen to have depression, psychological disorders such as Tokophobia (fear of childbirth), and post-traumatic stress disorder (PTSD), affecting maternal bonding and family dynamics. Furthermore, drastic reproductive health consequences, such as Asherman and Sheehan syndromes, may result in infertility, menstrual irregularities, and hormonal imbalances, profoundly altering a woman's sexuality, marital connexions, and future fertility desires. Effective management of PPH, including uterotonics, bleeding control measures, and advanced surgical interventions, is essential to mitigate immediate risks; however, the enduring impact on physical, psychological, and reproductive health warrants comprehensive long-term care and targeted psychosocial support. This review emphasizes the need for multidisciplinary strategies to enhance recovery outcomes and improve women's quality of life when managing the severe PPH consequences.

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Introduction

Postpartum hemorrhage (PPH) is characterized by bleeding excessively during childbirth that could constitute a threat to mothers' lives. The prevalence of PPH lies between 1% and 6% in developed countries, while in low-income countries, it can reach 18% [1,2].

The pathophysiology of PPH includes a combination of factors such as early uterine atony, uterine overdistension or prolonged labor, retained placenta, and cervical or vaginal lacerations [3-5].

Several complications are associated with PPH, ranging from hypovolemic shock to death. Particularly transfusion, resuscitation, infertility, and thromboembolism were the most reported risky complications.

Effective management of PPH may require uterine compressive suturing such as the B-Lynch technique and others to preserve the uterus and maintain fertility. Unfortunately, uterine integrity has been reported to be compromised by such techniques, leading to subfertility, pelvic pain, and menstrual disturbance [6-9].

This review provides an overview of a woman's life after being saved from a severe PPH. Studies in literature have discussed PPH management, immediate recovery, and life-saving procedures for such deadly insults. However, few studies have examined women's life PPH. This review will provide more details on the long-term consequences of PPH, the impact of this potentially fatal condition, and how treatment procedures affect women's lives later.

Postpartum Hemorrhage (PPH) Risk Factors

Several risk factors contribute to PPH and are classified into three types: low, medium, and high risk. Low-risk factors include the absence of a past uterine incision, a pregnancy with a single fetus, less than four past vaginal deliveries, unknown bleeding disorders, and no PPH history. Medium-risk factors include past uterine surgery or C-section delivery, multiple gestations, more than four past vaginal deliveries, chorioamnionitis, a history of PPH, large uterine fibroids, fetal demise, a fetal weight exceeding 4000 grams, and severe obesity. High-risk factors include placenta previa, placenta accreta, levels of hemoglobin below 10 g/dL, counts of platelets below 100,000/μL, active bleeding upon admission, and known coagulopathies [10].

Consequences of Severe Postpartum Hemorrhage (PPH)

Severe postpartum hemorrhage (PPH) can lead to a broad spectrum of consequences that have an impact on a woman's psychological well-being and physical aspects. Physically, PPH may result in life-threatening conditions such as Sheehan syndrome and Asherman syndrome, which have lasting impacts on hormonal balance, fertility, and reproductive health. Psychologically, survivors may endure psychological anguish, including anxiety, depression, and Tokophobia, due to the trauma of the experience. Cognitive impairments and neurobiological changes can further complicate recovery, affecting memory, concentration, and daily functioning. Moreover, PPH can significantly impact marital relationships, sexual health, and family planning decisions, creating enduring challenges that extend beyond the immediate postpartum period. Figure 1 shows the spectrum of these consequences, providing a comprehensive overview of the physical, emotional, and relational impacts discussed in detail in the following sections.

Postpartum Hemorrhage (PPH) Psychological Consequences on Patient, Spouse, and Children

There has been no extensive research regarding the long-term outcomes of PPH and its association with the psychosocial and emotional well-being and reproductive performance of women with their partners. It is worth noting that PPH was accompanied by the tendency to use contraception for a long while. A systematic review documented the incidence of higher anxiety levels after PPH and difficulties in concentration and flashbacks. In addition, among parents, three studies reported the occurrence of mental health outcomes in partners. PPH has a major psychological effect that interrupts mother and child bonding. This is attributed to the physical separation between mother and child following their referral to the intensive or neonatal intensive care units. Post-traumatic distress has also been experienced by partners who encountered this event. Thus, fear of loss of family was observed among women as they felt loss concerning future childbearing following PPH. In addition, relationship stress within the partner and loss of female identity has also been experienced [11-19].

Another systematic review revealed that out of nine studies, seven studies showed that females with PPH had ongoing mental and physical health conditions after PPH. The issues consist of symptoms of post-traumatic stress disorder (PTSD) and heart disease, which could be severe and long-lasting following a severe PPH. Regarding partners who encountered PPH, conflicting evidence of the association between PTSD and PPH was observed [20].

Additionally, in one study, semi-structured interviews were performed among women who experienced a severe hemorrhage of ≥2.5 L in a period ranging between four to fourteen months after giving birth. In this study, women reported demanding more data in the initial postpartum phase after the PPH, and several questions remained unanswered when they were interviewed months later. The majority of the women did not get the proper support emotionally from the obstetric nurses, resulting in early release from the hospital upon their request to acquire emotional support from their families [21].

Effect on Sexuality and Fertility

Research has shown that if PPH is managed appropriately using reliable methods, fertility can be preserved. In 2016, a review of 56 cases demonstrated the safety of uterine compression sutures, hypogastric ligation, and uterine devascularization in managing PPH. It is worth noting that these procedures helped preserve fertility and maintain menstrual regularity [22].

Another systematic literature review published in 2013 showed that compressive sutures and vessel embolization could be life-rescue procedures that achieve hemostatic efficacy for subsequent fertility after PPH. High restoration rates of normal menstrual cycles and successive gestations were linked to pelvic vessel embolization and compressive sutures. The three modalities using pelvic vessel ligation, uterine compressive sutures, and angiographic selective embolization were associated with fertility rates of 50%-100%, 10%-100%, and 12%-100%, respectively, as shown in Table 1. This wide range of reported rates implies that sometimes, saving the woman a hemostatic hysterectomy does not guarantee fertility salvation [23].

Table 1: Fertility Rate after Surgical Management Of PPH

	Success range
Pelvic Vessels Ligation	50 – 100%
Uterine Compressive Sutures	10 – 100%
Angiographic Selective Embolization	12 – 100%

Effect on the Menstrual Pattern and the Utility of Contraception Methods, and Fertility Desire

PPH has affected the clinical outcomes of women. Methods applied for managing PPH have also affected females' well-being. A prospective cohort study was performed in a tertiary obstetric unit in Hong Kong among 80 women who were followed up for two years. In this study, women with primary PPH were successfully managed by uterine compression sutures. The return of menstruation was observed in 87.9% of women within six months after delivery. The majority of women indicated that they experienced regular monthly cycles (95.6%), had similar menstrual flow (75%), experienced the same duration of menstruation (85.3%), and reported no change in their dysmenorrhea status (88.2%). However, 73% did not wish to get pregnant again, suffering from Tokophobia. A third of them said that this occurred due to concern for a PPH relapse. In addition, 27% tried conception, and 90% got pregnant. The study also revealed that 39% were still bringing up painful memories, particularly fear of suffering and death. Regarding partners, 54.4% recalled painful memories, and 51.5% refused any future pregnancy [24].

Effect on Career

PPH may affect females' cognitive function, which could be related to hormone level changes associated with PPH, such as progesterone, estrogen, and glucocorticoid levels. However, little is known about the exact neuropathological pathway of postpartum cognitive impairment [25,26].

A study was conducted to detect brain abnormalities in postpartum women and their relation with cognitive impairment. It revealed a reduction in the spontaneous neural functions, mostly in the left posterior cingulate and prefrontal cortex, associated with specific impaired cognitive activity in postpartum females. This cognitive effect could impair females' memory, thoughts, and sensory information, as well as decision-making and planning. These neurobiological aspects of the PPH may affect females' performance at work, thus influencing their careers [27,28].

Critical Consequences of PPH

Asherman Syndrome

The term "intrauterine adhesion" (IUA) describes scar tissue present inside the endometrial cavity, or so-called synechiae. These scar tissues have been linked to many symptoms, including multiple pregnancy losses, irregular menstrual cycles, and infertility, which is mentioned as Asherman syndrome [29].

Infertility and pregnancy issues can result from different causes, including IUA. A retrospective comparative study was performed, including two groups that comprised women who had IUAs following open myomectomy and after uterine trauma caused by uterine surgical tools. The study showed that open myomectomy was the prior causative factor in a higher number of women with IUA in the study. In situations where the pregnancy was sought following an open myomectomy, particularly when the synechiae was disrupted, it was advised to perform a postoperative hysteroscopy to rule out IUAs and release them if present [30].

Furthermore, a systematic review revealed that IUAs are associated with compromised fertility. Intrauterine scarring affects reproductive performance and outcomes, as well as fertilization. IUAs can also affect cervical-utero-tubal sperm transport, resulting in a lack of blood supply to the endometrium and dysfunctional endometrium with reduced receptivity and thickness. In addition, IUA cases may increase the risk of early delivery, restricted fetal growth within the uterus, and fetal abnormalities [31].

In addition, two incidences of Asherman's syndrome were identified in women who reported experiencing hypomenorrhea after uterine compression sutures. In the additional 23 pregnancies, there were no marked differences in outcome except hemorrhage recurrence (68.8% vs. 7.5%), more omental or bowel adhesions (37.5% vs. 8.8%), and multiple compression sutures.

Sheehan Syndrome

Postpartum pituitary necrosis or Sheehan Syndrome, which means necrosis of the anterior pituitary gland cells after severe postpartum bleeding, shock, and hypovolemia. It happens among 1–2% of live births. The prognosis could be dangerous if no immediate diagnosis is made. It is worth noting that conception is difficult with Sheehan Syndrome. Progress in obstetrical care in developed countries has decreased the prevalence of this condition. However, it was found to be significant in undeveloped countries [32].

In response to the physiological adaptation of pregnancy, the anterior pituitary enlarges in size due to cellular overgrowth, which renders this organ sensitive to blood supply towards the end of pregnancy. Hypovolemia associated with PPH may affect the anterior pituitary to a major degree, causing necrosis that leads to the full-blown picture of Sheehan syndrome, or a lesser degree, with partial compromise in its function, which can be categorized as chronic Sheehan syndrome (Figure 2). In chronic Sheehan syndrome, symptoms may last for years following the initial insult of the pituitary vascularity. In addition, hair loss, fatigue, constipation, weakness, asthenia, cold intolerance, problems with attention or span focusing, and weight gain are prevalent among patients. In addition, healthcare providers could observe during the clinical examination bradycardia or low blood pressure. The Lab values could reflect hypoglycaemia, hyponatremia, and anaemia, and the initial treatment is composed of hormone replacement therapy, growth hormones, and Steroids [33].

Since 1950, Sheehan syndrome has been seen in 27 patients who reported 32 pregnancies. Of these pregnancies, 59.4% were spontaneously conceived, while 34.4% were the result of ovulation induced by egg donation, which accounts for one case. The case by Zhan et al. reported successful conception through in vitro fertilization and embryo transfer [34,35].

A systematic review in 2019 showed that the mean pregnancy rate was 67%, while 81% was the mean live birth rate. The complication of this case may be manifested as hypothyroidism, Addisonian crisis, or even lead to death [36-38].

After having Sheehan syndrome, women are at greater risk for perinatal complications if they get pregnant. This may be related to hormone deficiency. In previous studies, four out of 32 pregnancies experienced PPH (12.50%). In five pregnancies, the fetus had an abnormal presentation (15.63%), and one case of intrauterine growth restriction (3.13%) was observed among these studies. Therefore, continuous monitoring of maternal complications, as well as the growth and development of the fetus, is essential throughout the whole patient's pregnancy with this rare condition [39-47].

Summary and Conclusion

In maternal healthcare, PPH is a significantly challenging condition. This review discussed the journey of a woman with PPH, starting from its risk factors and immediate management to its long-term consequences on female physical and mental health. Unfortunately, such women left the hospital with unanswered questions related to this major trauma. They suffered a great deal of consequences that were new to them and affecting their daily lives. Postpartum care following PPH should be integrated into a multidisciplinary team involving psychological assessment and extended medical home care. PPH morbidity does not end upon patient discharge from the hospital but can be spotted months later after the insult. Long-term effects on social and sexual life, fertility, menstrual profile, and mental well-being require caution. Future research should concentrate on enhancing the long-term outcomes concerning developing strategies to aid women and their families who have experienced PPH.

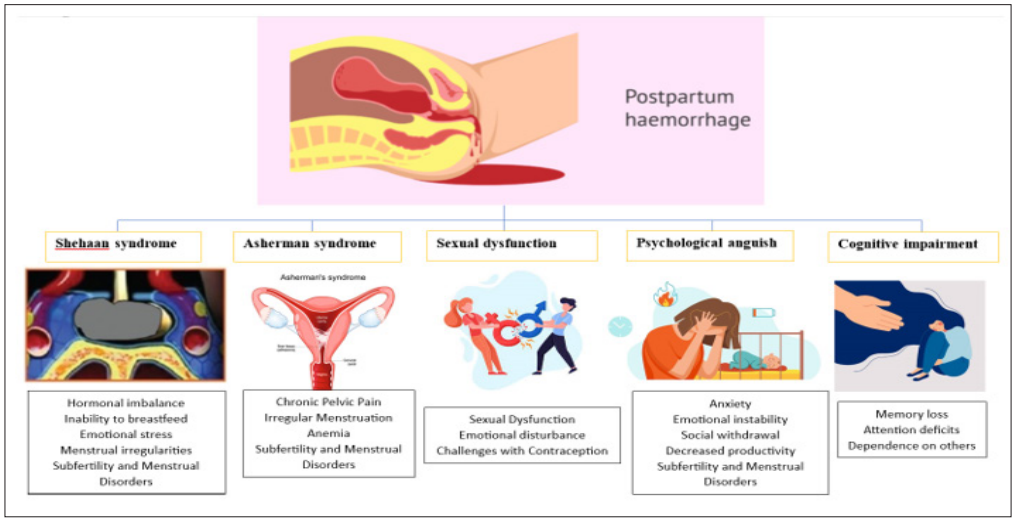

Figure 1: Coming Back from a Severe Postpartum Hemorrhage (PPH)

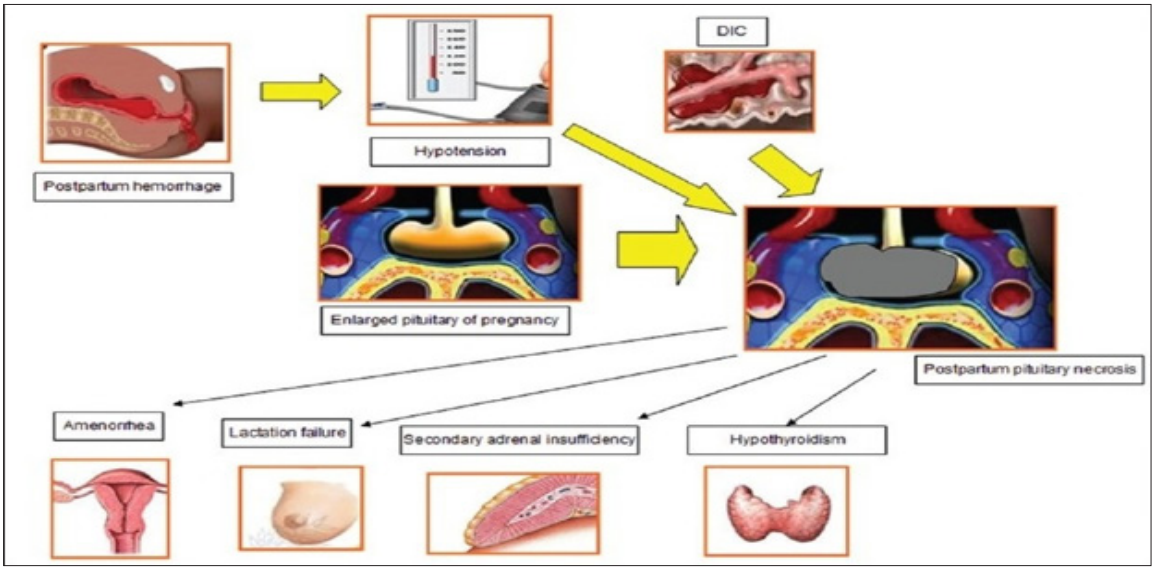

Figure 2: Pathophysiology of Sheehan's Syndrome. Figure adapted from Shivaprasad C [48].

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