Natural Resources for Human Health
eISSN: 2583-1194

Original Research

Received 05 June 2026
Revised 15 July 2026
Accepted 12 Aug 2026

Natural Resources for Human Health 2026, Vol.6(6):686–694

KEYWORDS:
Severe Postpartum Hemorrhage, Emergency Management, Nursing Management, Uterine Massage, Uterotonics.

Emergency and Nursing Management of Severe Postpartum Hemorrhage: A Comprehensive Review

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ABSTRACT: Severe postpartum hemorrhage (PPH) remains a leading cause of maternal morbidity and mortality worldwide. It is defined as a blood loss of more than 1000 mL following childbirth, necessitating immediate and effective intervention. The initial management involves the prompt identification of the condition through precise clinical assessments, including vital signs and uterine tone checks. The nursing management plays a critical role in the rapid implementation of emergency measures such as uterine massage, administration of uterotonics (like oxytocin), and intravenous fluid therapy to stabilize the patient's condition. Healthcare professionals must be trained to recognize the signs of PPH early and initiate the appropriate protocols, which are vital in preventing the progression from severe to critical hemorrhage. Further, comprehensive nursing care encompasses ongoing monitoring and support, as well as preparing for possible surgical interventions if medical management fails. Fluid resuscitation and blood product administration are integral parts of management, requiring collaboration among obstetricians, anesthesiologists, and nursing staff. Emotional support and counseling for the patient and family members are also essential in the aftermath of severe PPH to address psychological distress. Education and training for nursing staff regarding the latest evidence-based practices in PPH management, along with clear communication within multidisciplinary teams, can significantly enhance outcomes for affected patients, ensuring they receive timely and effective care.

INTRODUCTION:

Postpartum haemorrhage is one of the most time-sensitive emergencies in obstetric practice, and is a major cause of maternal death, severe maternal morbidity, admission to intensive care unit and peripartum hysterectomy in both high income and low

resource countries [1]. Postpartum hemorrhage is not only important because of the amount of blood loss, but also because rapid progression to hypovolemia, coagulopathy and organ dysfunction can occur if not recognized and escalated quickly [2]. While a large proportion of severe haemorrhages can be predicted, there are also a significant number of cases that arise in women who were deemed low risk prior to delivery, therefore, preparedness needs to be universal, not relying on risk assessment alone [3]. In conclusion, severe PPH is a concern that needs to be addressed through a coordinated emergency management system that includes early recognition, prompt alerting to help, use of uterotonics, mechanical and surgical control of the bleeding, hemostatic resuscitation and ongoing nursing surveillance [4, 5]. Nursing management is pivotal in this system as it is nurses and midwives who are most likely to identify excessive bleeding, changes in uterine tone, abnormal vital signs and early signs of shock [4, 6]. In the present, review, severe PPDH is described as definitions, causes, pathophysiology, early recognition, team activation, pharmacological management, transfusion, mechanical management, surgical management, nursing surveillance, psychosocial management, quality improvement, and ethical issues are highlighted. The goal is to provide a clinically useful and evidence-based approach to clinicians who have to make rapid and safe decisions when PPH is so severe as to be emergent.

Definitions, classification and severity

Postpartum hemorrhage is classically described as blood loss of ≥ 500 mL after vaginal delivery or ≥ 1,000 mL after cesarean delivery or as blood loss with signs and symptoms of hypovolemia in the first 24 hours of birth [4]. Severe postpartum hemorrhage is defined as a bleeding amount of more than 1,000 to 1,500 mL, as ongoing bleeding with hemodynamic instability, or bleeding that needs blood transfusion, invasive procedures, intensive monitoring or surgical intervention [5]. Primary postpartum hemorrhage refers to bleeding that occurs within the first 24 hours after delivery, and is responsible for the majority of severe postpartum hemorrhage emergencies, while secondary postpartum hemorrhage is bleeding that happens after 24 hours until 6–12 weeks after delivery, and is frequently a result of retained placenta, infection or delayed uterine involution [7]. The severity classification should be based on the volume loss rather than measured blood loss – there is often no correlation between the two, and young healthy women may have a normal blood pressure until a significant amount of their blood volume has been lost [8]. The severity should be determined based on measured or estimated blood loss, uterine tone, vital signs, shock index, mental status, urine output, skin perfusion, and response to initial treatment [9]. The traditional "Four Ts" classification (tone, trauma, tissue, and thrombin) is still a helpful framework to use at the bedside and should encourage clinicians to think of uterine atony, genital tract injury, retained products or coagulopathy in all cases [5]. In practice, however, postpartum hemorrhage is frequently multifactorial and when postpartum bleeding is prolonged, mixed causes are to be taken into account [7].

Epidemiology and Global Burden

Postpartum hemorrhage (PPH) is the single most important direct cause of maternal death in many LMICs, and it makes a significant contribution to maternal near-miss cases and maternal morbidity in the long term [2]. The gaps in outcomes between the two (high and low income countries) can be attributed to variations in antenatal care, skilled birth attendance, referral systems, blood availability, access to surgery and critical care capacity [1]. Severe postpartum haemorrhage is a common obstetric complication, and is a significant cause of maternal intensive care admission and blood transfusion, even in well resourced health systems [3]. Increasing cesarean delivery, older maternal age, multiple gestation, obesity, and placental abnormalities have been shown to be risk factors for severe hemorrhage, but many cases still occur in the absence of conventional risk factors [4]. Epidemiological surveillance is crucial as it helps detect preventable delays such as delay in recognition of blood loss, delay in seeking senior medical assistance, delay in obtaining blood products and delay in definitive surgical control [9]. Audit of severe maternal morbidity and near-miss at the hospital level can identify systemic weaknesses not identified through individual cases [10]. Prevention of severe PPH requires both clinical skill and organizational preparedness, such as protocols, drills, stock management and ongoing education, at a global level [11].

Pathology and Risk Factors

Primary postpartum haemorrhage is most often due to uterine atony, which is when the uterus does not contract after the placenta has been born [5]. Atony is a risk factor with prolonged labour, augmented labour, high parity, uterine overdistension, multiple gestation, polyhydramnios, chorioamnionitis and previous postpartum haemorrhage [6]. In addition to uterine atony, genital tract trauma (cervical and vaginal lacerations, perineal tears, episiotomy extensions, uterine rupture and pelvic hematoma)

must also be excluded, as it can complicate the diagnosis of atony. Manual exploration and evacuation, balloon tamponade or surgical management may be necessary if retained placental tissue, retained blood clots, or placental abnormalities such as placenta previa or placenta accreta spectrum cause severe bleeding [8]. Coagulopathy can be either inherited, acquired or dilutional, and can be exacerbated by large blood loss, hypothermia, acidosis, and inadequate fibrinogen replacement [9]. Other risk factors are: hypertension disorders, induction of labour, operative delivery, use of anticoagulants and obesity in the mother [3]. Risk assessment must be carried out antenatally and at admission to the birth unit, but it must be accompanied by universal vigilance as there is imperfect risk prediction and many severe cases in women without any recognised risk factor [4].

Pathophysiology of Hemorrhage and Shock

Severe postpartum hemorrhage results in a rapid decrease in blood volume, a decrease in venous return, a decrease in cardiac output, and a compensatory sympathetic response [7]. First line of compensation may help maintain a stable blood pressure, later on, a tachycardia, decreasing pulse pressure, cold limbs, and delayed capillary refill develops. As the bleeding continues, the compensatory mechanisms are inadequate and hypotension, poor tissue perfusion, anaerobic metabolism, lactic acidosis, and end-organ dysfunction occur [9]. Blood volume increases and hypercoagulability occur during pregnancy and can make blood loss difficult to recognize, especially in the early stages [10]. Severe postpartum haemorrhage is associated with a multitude of contributing factors such as consumption of clotting factors, crystalloid resuscitation, hypothermia, acidosis and fibrinolysis [11]. Low fibrinogen has been linked to worsening towards severe postpartum hemorrhage and the need for transfusion and may be seen early in severe bleeding [20]. The pathophysiology is the basis for the need to treat bleeding, fluid resuscitation, oxygen delivery, hypothermia, and coagulopathy at the same time rather than just one of them [12]. This also accounts for the fact that delayed escalation is a bad idea; after the compensatory phase has passed, the path to shock and coagulopathy can be rapid and not easily reversed [13].

Early Recognition and Systematic Assessment.

The basic component of emergency management is early recognition, as delayed diagnosis will be a significant factor in the development of severe morbidity and mortality [8]. Weighing of swabs and drapes and periodic clinical reexamination are recommended, along with quantitative measurement of blood loss, in women at risk or those who continue to bleed, due to the inaccuracy of visual estimation of blood loss [9]. The shock index (heart rate/systolic blood pressure) is a parameter that has been assessed as an early indicator of hemodynamic compromise in cases of postpartum haemorrhage and could also alert the woman before her vital signs are compromised [10]. Early warning systems and structured observation charts may be of assistance in escalation, but should not be used in lieu of clinical judgement [11]. Airway, breathing, circulation, mental status, skin color, temperature, capillary refill, urine output, uterine tone and examination for retained tissue and trauma should be part of a systematic assessment [12]. Furthermore, the obstetric team should evaluate the pattern of blood loss, response to the initial uterotonics, and intravenous access and the necessity for blood products [13]. Changes of bleeding, vital signs, pain, anxiety or level of consciousness are often the first signs noticed by nurses and structured maternal early warning systems can help to escalate timely [18]. Failure to improve or deteriorate with initial efforts should prompt an escalation instead of a wait and see approach [19].

Emergency Team activation and communication.

A multidisciplinary team (obstetrics, midwifery, nursing, anesthesia, blood bank, hematology, critical care, operating room) is required to be activated for severe postpartum bleeding [10]. Assigning roles will minimise duplication and omission and a dedicated team leader should be responsible for making clinical decisions and communicate with the family [11]. The indications for emergency activation are: continued bleeding after the administration of uterotonics, hemodynamic instability, and/or an estimated blood loss exceeding a predetermined amount, or transfusion requirements [12]. Closed loop communication, brief handovers and standardized, structured tools like SBAR can enhance performance of the team during stressful situations [13]. The nurse is often responsible for coordinating supplies, medications and blood products, as well as documenting and communicating with the blood bank and laboratory [18]. Consistent simulation and drills enhance teamwork, minimise the delay to intervention, and boost confidence among staff [23]. If the deterioration is serious, early notification of the operating room and blood bank is preferred before patient's instability occurs, as time would be lost if it waited until the patient was definitely deteriorating [11].

Initial Resuscitation and ABC Priorities.

Initial resuscitation is structured around airway, breathing and circulation, and obstetric evaluation and hemorrhage control is ongoing [12]. The patency and oxygenation of the airways should be evaluated and supplemental oxygen should be administered to keep the oxygen saturation of the mother at satisfactory levels [13]. Ventilation of the breathing should be assessed and judged by the adequacy of breathing and circulation should be assessed by the pulse, blood pressure, capillary refill, urine output and mental status [14]. Blood samples taken for full blood count, coagulation profile, fibrinogen, renal function, electrolytes and crossmatch should be sent for as should the insertion of two large bore intravenous cannulas as soon as possible [12]. In severe hemorrhage, blood product replacement should be considered first; crystalloid should be used sparingly because excessive crystalloid may exacerbate coagulopathy and edema due to dilution. [17] In women with postpartum haemorrhage, tranexamic acid should be initiated as early as possible and because of the results of the WOMAN trial, there is evidence of the benefit in terms of decreased mortality if it is administered within 3 hours of the delivery.In women with postpartum haemorrhage, tranexamic acid should be started as early as possible; the WOMAN trial showed benefit in terms of mortality when started within 3 hours of giving birth. Warm the patient, monitor her continuously, and place her appropriately, and immediately commence uterine massage, uterotonic therapy [15]. Further fluid, blood and uterotonics administration should be reviewed as necessary as clinical response is assessed and the administration should continue until the requirement for mechanical or surgical interventions has been assessed.

Uterotonic Therapy and Pharmacological Emergency Management

Pharmacological treatment of uterine atony should start immediately after the suspicion of atony and should be initiated by the use of uterotonic therapy as the first line of treatment [14]. Oxytocin is generally administered as first-line treatment, typically intravenously or intramuscularly depending on setting and protocol (to be administered with uterine massage) [15]. Second-line agents are ergometrine, carboprost or misoprostol, depending on the contraindications, availability and local guidelines; if bleeding continues [16]. Women with hypertension or preeclampsia should not take ergot derivatives, and carboprost should be used with caution in women who have asthma [17]. Misoprostol is of special value in low-resource areas as it is stable and can be administered by a variety of routes, but can have some gastrointestinal and febrile and shivering effects [18]. Tranexamic acid is an adjuvant that is not a substitute for uterotonics or mechanical control, but should be administered early in severe hemorrhage [13]. The role of the nurse in the preparation and administration of these drugs, as well as in observing the response and side effects, is crucial, and the nurse must be ready to have the next drug on hand if needed [19]. Medication safety is imperative as some uterotonics can lead to hypertension, nausea, vomiting, diarrhea, fever or bronchospasm; the nurse should be alert for these effects and continue hemorrhage control [20].

Mechanical and Surgical interventions.

Mechanical or surgical procedures are necessary to stop bleeding if the bleeding is not controlled by pharmacologic means [16]. External aortic compression, bimanual uterine compression and balloon tamponade can be used as temporizing measures during the time it takes to prepare definitive care. [15] Uterine balloon tamponade should be used for cases where uterotonics fail and may be effective for uterine atony, but should be used with close attention to further bleeding and displacement of the balloon [16]. If bleeding continues, uterine artery ligation, B-Lynch suture or compression sutures and hysterectomy may be necessary to control the bleeding [17]. Surgery should be carefully planned, with experienced operators, and with blood products, in cases of placenta accreta spectrum or suspected uterine rupture [18]. Hemodynamically stable patients with persistent bleeding may be candidates for interventional radiology using arterial embolization that may be available in some centers [19]. The nurse's functions encompass preparing patient and equipment, sterile technique, time management and documentation of interventions, and the patient's need for blood products and postoperative critical care [20]. Post-procedure monitoring should consist of vital signs, bleeding, pain, urine output, temperature, and for complications, including hematoma, infection, and ischemia [21].

Massive transfusion and Hemostatic resuscitation

In severe postpartum haemorrhage (PPH), massive transfusion may be needed and should be based on a protocol that pre-emptively ensures that red blood cells, plasma, platelets, and fibrinogen containing products are available in a timely fashion [12]. The goal of hemostatic resuscitation is to reduce crystalloid, keep warm, neutralize acidosis, and administer balanced blood component therapy [17]. Clinically when coagulation testing is delayed, point-of-care testing (if available) can inform fibrinogen

replacement and/or component therapy [20]. Notifying the blood bank early is important and the nurse should arrange for samples to be taken, products to be retrieved, administered and monitored for transfusion reactions [18]. The complications of massive transfusion consist of hypothermia, hyperkalemia, hypocalcemia, dilutional coagulopathy, and transfusion related acute lung injury (TRAIL) [21]. To support future decision making and audit, it is crucial to document the product administration and the responses [19]. The massive transfusion protocol should be instituted early on in situations of clinically significant, rapid bleeding, not after a patient has become severely shocked [22]. The overall aim is to restore circulating volume and coagulation capacity as definitive control of the bleeding source is effected [23].

Nursing's role in rapid response and coordination.

Nursing care for severe PPH is complex and requires monitoring, advocacy, coordination, medication management, documentation, and emotional support [18]. The nurse may be the first person to call for an emergency, put together the equipment, secure intravenous access, provide oxygen, and ensure that there is access to uterotonics and tranexamic acid [19]. They also follow the woman's reaction to the treatment, keep the team informed and predict what is to come next, either balloon tamponade, transfer to the operating room, or massive transfusion [20]. Nurses in many units are responsible for the quantitative estimation of blood loss and use of maternal early warning criteria [21]. Clinical competency, situational awareness, and calm and organized under pressure are a requirement for effective nursing management [22]. Nursing leadership in drills and development of the protocol has been linked to greater readiness and promptness in response [23]. The nurse is also a patient advocate, listening to the woman's concerns, ensuring privacy where possible and communicating clearly and compassionately with the family [24].

Assessment and monitoring of nursing.

Assessment of nursing should be systematic, repeated, and documented, especially bleeding pattern, uterine fundal height and tone, vital signs, mental status, urine output and pain [19]. Continuous monitoring can involve blood pressure, pulse oximetry, respiratory rate, temperature and electrocardiography, depending on severity and setting [20]. The nurse should evaluate for shock (tachycardia, hypotension, cool skin, delayed capillary refill, restlessness, confusion and reduced urine output) [21]. If atony is suspected, fundal massage should be done and the type and quantity of lochia should be documented [22]. Intravenous lines, urinary catheter, oxygen delivery and administration of blood products should be monitored regularly [23]. Any deterioration or lack of response to initial measures, should lead to immediate escalation, not 'watchful waiting' [24]. Nursing documentation should be timely and should contain documentation of time of observation, interventions, and communication with other team members [25].

Nursing Management of Uterine Atony

Prompt uterine massage and bladder emptying and administration of uterotonics as prescribed is necessary in the event of uterine atony [14]. The nurse should make sure that oxytocin is given correctly, and that second line agents are ready if the bleeding persists [15]. The massage to the fundus should be gentle yet effective; the result should be recorded [16]. A full bladder will interfere with uterine contraction and urinary output should be monitored, so the bladder should be kept empty [17]. The nurse should monitor for persistent large blood loss, passage of large clots, and alterations in vital signs [18]. If atony persists, despite initial measures, the nurse will anticipate balloon tamponade or surgical intervention and prepare accordingly [19]. Post-procedure monitoring should involve checking for bleeding, pain, vital signs, and for signs of infection or device displacement [20].

Nursing Management of Genital Tract Trauma and Retained Placenta.

If bleeding persists despite a contracted uterus, genital tract trauma should be suspected, and the nurse should help the examiner carefully inspect and repair the site [16]. Perineal, vaginal and laceration of the vagina and cervix may need to be sutured and if the pain or swelling is out of proportion, hematoma should be suspected [17]. Heavy bleeding can occur if the placenta remains or is left behind and should be manually removed or surgically evacuated [18]. Preparing the instruments, ensuring adequate analgesia and anesthesia support, and monitoring for blood loss during the procedure should be done by the nurse [19]. Once removed, the uterus should be re-evaluated for tone and bleeding and uterotonics should be continued [20]. The amount of blood loss, mutilated tissue, condition of the genital tract, and patient's response should be documented [21]. If trauma or

retained tissue is suspected then the nurse should notify the obstetric team immediately and the patient monitored in a high visibility area [22].

Coagulopathy and shock management for the nurse.

In women who are still bleeding, who have oozing at puncture sites, or who do not form a clot, coagulopathy should be suspected and the nurse should ensure timely laboratory testing is done [20]. Nurse should monitor coagulation, fibrinogen and platelet, and watch for disseminated intravascular coagulation [21]. The shocked nurse should consider airway, oxygenation, intravenous lines, access of blood products, warming, and good I/O monitoring the priority considerations. [22] Positioning: Supine (with left uterine displacement) in pregnancy and/or postpartum, as appropriate; legs raised if not contraindicated [23]. For altered consciousness, oliguria, metabolic acidosis and hypothermia, the nurse should monitor for changes in these conditions [24]. When shock and/or coagulopathy is suspected, early critical care and hematology involvement is essential [25]. In addition, the nurse should be alert for complications from transfusion and should follow the proper protocol and monitor blood products [12].

Positioning, Warming and Comfort of Mother

The position of the mother should facilitate venous return, adequate ventilation and access for procedures and examination [17]. Maintaining the woman's temperature is important, as hypothermia exacerbates the coagulopathy and increases oxygen consumption [18]. Use of warmed blankets, warmed intravenous fluids and warmed blood products should be used if available [19]. Reassuring, explaining procedures and pain management should be incorporated into emergency care [20]. The nurse is responsible for communicating with the woman and family, describing what is occurring in simple terms and offering emotional support [21]. During emergency procedures, as much as possible, privacy and dignity should be observed [22]. Repeatedly remind the woman that the pain will get better and communication helps her to cooperate with emergency interventions, which may decrease her fear [23].

Document, Hand Over and Escalate.

Documentation is a crucial aspect for clinical continuity, medico-legal protection and quality improvement [18]. Vital signs, interventions, blood products, lab results, and patient response, along with time of birth, estimated and measured blood loss, uterine tone, medications and doses, should be documented [19]. Handover should be structured and contain the latest vital signs, bleeding status, interventions that have occurred, pending results and expected needs [20]. Escalation should occur in a logical sequence of events and nurses should be able to request support from senior colleagues if they are concerned [21]. Early calls for help becomes a normalised way to resolve severe morbidity which occurs frequently and is a recurring factor. Documentation audit and escalation can assist in uncovering system gaps and providing education [23]. Details of communication with the woman and family, consent (if applicable) and any delays in obtaining blood products or operating room facilities should also be documented [24].

Postpartum Hemorrhage Monitoring and Prevention of Secondary Hemorrhage

Once the patient has been stabilized, however, they will need continuing monitoring as there is a risk of bleeding and secondary bleeding will occur [21]. Vital signs, lochia, fundal tone, urine output and pain should be assessed frequently, as per protocol [22]. It is important for the nurse to check for anemia, infection, and retained products and educate patients about warning signs prior to discharge [23]. Women are advised to seek urgent help if they experience any of the following symptoms: heavy bleeding, blood clots, fever or foul-smelling lochia, if they experience any of these symptoms then the bleeding is secondary postpartum haemorrhage [24]. Follow up should include iron supplementation, contraception counseling and psychological support as necessary [25]. Active management of the third stage of labour is another aspect of prevention that helps to lower the incidence of PHE as compared to expectant management of third stage of labour [21]. Discharge teaching should provide information regarding the timing of return, who to contact, and signs that need assessment in an emergency [22].

Psychosocial Support and Family-Centered Care

Severe PPH is a traumatic event for mothers and families and women should be provided with psychosocial support as routine care [22]. Women can feel scared, out of control, uncomfortable and worried about the baby, breast-feeding and their future fertility [23]. The nurse should give clear information, recognize the distress and engage the woman in the decision making

process whenever possible [24]. Family members should be informed and supported, including culturally appropriate and respecting their privacy [25]. Severe hemorrhage can have psychological consequences, including post-traumatic stress symptoms, anxiety and depression, which should be identified and referred appropriately [22]. Debriefing following and continuity of care can be beneficial in assisting women and staff to process the event [23]. Family-centred care should not be at the expense of the immediate resuscitation needs and should be tailored to the clinical situation and the woman's preferences if known [24].

Quality Improvement, Simulation, and Education

Quality improvement is critical to help minimize the effects of severe postpartum hemorrhage [23]. Steps to be taken to prevent obstetric haemorrhage include: hospital protocols for obstetric haemorrhage; availability of an obstetric haemorrhage emergency kit; uterotonics and tranexamic acid; and availability of a massive transfusion protocol [24]. Simulations can highlight any latent system errors and enhance teamwork, communication, and technical performance. Education should cover blood loss, quantitative measurement, administration of uterotonics, escalation criteria and documentation [23]. Severe maternal morbidity and near misses can be audited to inform practice change [24]. Multidisciplinary review of cases should be non-punitive and systems focused [25]. There should also be training for nurses on emergency cart checks, blood product handling and maternal early warning systems as part of education, which should include a refresher.Education should also cover a refresher training for nurses on emergency cart checks, blood product handling, and maternal early warning systems [23].

Special Considerations in Low-Resource Settings.

In low-resource areas there are limited resources and preparedness at community level and PPTH may present later with less resources, so there is a need for preparedness and referral system at community level [24]. Active management third stage, uterine massage, use of misoprostol and early referral should be taught to CHWs and midwives [25]. Common barriers include transportation, communication and blood availability, and advance planning is essential for referral, which can save a life [24]. In some places simple measures like non-pneumatic anti-shock garments could be used during transfer, although evidence and availability is inconsistent [23]. Health facilities should carry a minimum supply of oxytocin, misoprostol, tranexamic acid, intravenous fluids, and sterile supplies [22]. It is imperative that the skills and adherence to the protocol be maintained through training and supportive supervision [21]. Task-sharing and good referral mechanisms can have a positive impact in such contexts, when specialist services are not readily available [20].

Ethical and Legal Aspects

Ethics and legal issues such as consent, confidentiality, resource allocation, and documentation arise in the management of severe postpartum hemorrhage in an emergency situation [25]. Treatment may be provided under emergency provisions in the event of a life-threatening situation where it is not possible for the woman to give consent, but where possible, family involvement and previously expressed wishes are respected. When blood products are limited, or hysterectomy is being considered, it is important that the clinician clearly document the decision, discuss, and rationale [23]. Equitable care means that the urgency and the respect that is given to woman equals and should be the same for everyone, irrespective of their background, and implicit bias needs to be tackled through education and audit [22]. Open communication with the woman and family and debriefing can decrease misunderstanding and maintain trust [21]. In cases of high morbidity, legal review might be required, but the focus should stay on patient safety and system learning [20]. Honesty about uncertainty, respect for dignity and attention to the woman's cultural and religious preferences when not in conflict with life saving treatment are also considered ethical care [19].

Future directions.

The goal of massive transfusion, the use of point-of-care coagulation testing, whether to use balloon tamponade or early surgical intervention, and how to monitor postpartum hemoabdominal bleeding after severe hemoabdominal bleeding are undecided areas. [17] There is growing interest in developing early warning systems, bundles of care, and implementation science to ensure the delivery of evidence-based interventions with fidelity in real-world settings [18]. Especially significant is nursing research, as nurses play a key role in the early recognition and escalation of obstetric hemorrhage, but there is no consistency in the measurement of nursing-sensitive indicators for obstetric hemorrhage [19]. Future directions involve improved risk stratification, increased availability of heat-stable uterotonics, increased use of tranexamic acid, and increased focus on long-

term psychological effects of severe hemorrhage [20]. Hospitals could benefit from quality improvement collaboratives and standardized data collection to compare performance and report best practices [21]. The principles of emergency care are always the same, though: recognize bleeding early; call for help; control bleeding; resuscitate hemostatically; monitor constantly until the woman is stable [22].

CONCLUSION

Postpartum hemorrhage (PPH) is an obstetric emergency that can be life threatening that requires immediate recognition, coordinated activation of the team, uterotonic treatment, mechanical and surgical control, hemostatic resuscitation and nursing skills. Evidence consistently favors protocol-based management, early use of tranexamic acid, judicious transfusion, and continuous monitoring. The nurse's role is critical to early detection, escalation, giving medications, documentation, and psychosocial support, and should be highlighted in emergency systems. In addition to clinical knowledge, simulation, audit, stock readiness, communication, and equitable care are all key to reducing severe morbidity. The whole-of-system, emergency obstetrics, nursing, anesthesia, hematology, blood bank and quality-improvement system is best positioned to save lives and minimize long-term damage.

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