Learning Outcomes

Upon completion of this activity, the learner will be able to:

1. Identify the risk factors and clinical presentation of postpartum hemorrhage.
2. Define the indications and nursing considerations for the use of tranexamic acid.
3. Apply the concepts of nursing assessment and intervention to the plan of care in a case study format.

Continuing Nursing Education (CNE) Credit

A total of 1.2 nursing contact hours may be earned (of which 0.6 may be applied toward pharmacology) for reading "The Role of Perinatal Nurses in the Use of Tranexamic Acid During Postpartum Hemorrhage" and for completing an online posttest and participant feedback form. A score of 80% or higher on the posttest is required to receive nursing contact hours.

This learning activity is free for AWHONN members and available for purchase by nonmembers. To access it, visit the AWHONN store at https://www.awhonn.org/awhonn-store/ and type NWH into the search box.

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Disclosures

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Tranexamic acid is an antifibrinolytic agent that is FDA-approved for heavy menstrual bleeding or for prevention of bleeding in people with hemophilia. At the time of this writing, the use of this medication to treat postpartum hemorrhage is considered off-label.

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The Role of Perinatal Nurses in the Use of Tranexamic Acid During Postpartum Hemorrhage CNE

Sarah Obermeyer, Ruth T. Mielke & Heidi L. Lederhos

ABSTRACT: Postpartum hemorrhage (PPH) is a leading cause of maternal morbidity and mortality worldwide. Mitigation of PPH is dependent on identification of risk, readiness, timely identification of hemorrhage, accurate determination of blood loss, and effective treatment. Perinatal nurses must be prepared to participate in all these aspects of care, including the use of tranexamic acid, an antifibrinolytic agent that has more recently been added to the pharmacologic agents used to reduce blood loss associated with hemorrhage. The purpose of this article is to identify the nurse's role in the management of PPH and to introduce the use of tranexamic acid in PPH management as part of the nurse's role in implementing best practices for PPH.

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Hemorrhage is a leading cause of maternal morbidity and mortality worldwide. In the United States, 10.7% of pregnancy-related deaths between 2014 and 2017 were due to obstetric hemorrhage (Centers for Disease Control and Prevention, 2020). Obstetric hemorrhage occurs during pregnancy (e.g., antepartum bleeding related to abnormal placentation or abortion) or after birth, but more than 80% of cases are in the postpartum period (Cunningham et al., 2018; McLintock & James, 2011). National and statewide initiatives have emerged that provide the infrastructure for protocols to improve care and diminish the morbidity of women experiencing obstetric hemorrhage and, more specifically, postpartum hemorrhage (PPH; Alliance for Innovation on Maternal Health, 2015; California Maternal Quality Care Collaborative [CMQCC], 2017a). Perinatal and postpartum nurses are frontline caregivers in the

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CLINICAL IMPLICATIONS

- Perinatal nurses should be able to identify risk factors for postpartum hemorrhage (PPH), assess signs of PPH, and clearly communicate findings to the care team to decrease risk for maternal morbidity.
- Measurement of quantitative blood loss is essential for more accurate identification and management of PPH.
- Administration of tranexamic acid (TXA) is considered when PPH is not responsive to uterotonic agents. Perinatal nurses must be familiar with the pharmacologic principles of TXA.
- TXA (1 g) should be initiated, in conjunction with interventions to stop the cause of PPH, within 3 hours after birth and administered as an intravenous infusion over 10 minutes.

periods leading up to and after birth, so it is essential that they be able to (a) identify risk factors for PPH; (b) assess and communicate findings indicative of PPH; and (c) actively participate in the management of PPH, including appropriate use of the newer agent, tranexamic acid (TXA), as supported by the World Health Organization (2017). See Box 1 for a case example.

The terminology related to PPH is based on the quantity of blood loss and the proximity of the blood loss to the birth. Historically, PPH has been defined as a volume of blood loss greater than or equal to 500 ml after vaginal birth or greater than or equal to 1,000 ml after cesarean birth. This definition persists in many clinical settings and in research designs today. However, in 2011, the American College of Obstetricians and Gynecologists (ACOG) recognized the need for uniform, clinically germane terminology and convened a multidisciplinary collaboration to standardize women's health definitions (Menard et al., 2014). Termed the reVITALize Initiative, the first set of obstetric data definitions have been formally endorsed by ACOG; the American College of Nurse-Midwives; the Association of Women's Health, Obstetric and Neonatal Nurses; and the Society for Maternal-Fetal Medicine (Menard et al., 2014). *Early PPH* is most common and occurs within 24 hours of birth, typically when most individuals are in the hospital. The reVITALize definition of early PPH is shown in Box 2.

Risk Identification and Assessment of PPH

Perinatal nurses must be able to articulate an individual's increased risk for PPH to the care team in an effort to optimize outcomes and minimize the potential for morbidity and mortality. Early and ongoing identification of risk for PPH is necessary to ensure the availability of resources if PPH occurs. Interest in risk identification for PPH is robust in nursing, midwifery, and obstetric research. Problematic in such research is that, beyond the identification of individual risk factors for PPH, there is no reliable metric to identify those at greatest risk by combining multiple risk factors (Neary et al., 2021). Table 1 presents one tool that can be used to assess for PPH risk factors based on preexisting conditions, maternal history, obstetric factors, and intrapartum characteristics. Although risk factor identification can help identify those with greater risk of PPH, hemorrhage may occur in any parturient person. Therefore, the entire perinatal team should always plan for PPH prevention and management.

Best practice for the prevention of PPH is active management of the third stage of labor, with the use of uterotonics as the most critical element (ACOG, 2017; Association of Women's Health, Obstetric and Neonatal Nurses, 2021; Dahlke et al., 2015; World Health Organization [WHO], 2017). Active management of the third stage of labor consists of three preventive interventions meant to help facilitate early delivery of the placenta: (a) uterotonics (specifically oxytocin), (b) umbilical cord clamping, and (c) controlled cord traction are used to assist in placental expulsion. However, the WHO guidelines encourage delayed cord clamping unless immediate neonatal resuscitation demands separation of the mother and newborn (WHO, 2017). When PPH occurs despite preventive efforts, nurses should be attentive to the changes in an individual's status and interventions available to manage hemorrhage.

Timely nursing assessments can improve the prompt recognition of PPH and reduce the need for excessive interventions and undesired outcomes (Gabel & Weeber, 2012; Kahr et al., 2018). The assessment indicators of PPH include recognizing and discriminating objective and subjective data. Subjective data that may be present during PPH include reported feelings of doom, visual changes, or feeling faint. After experiencing PPH, women have reported ongoing psychological distress, including overwhelming feelings of fatigue and exhaustion, disorientation, anxiety, and frustration due to the delay in being able to bond with their newborn, as well as feeling that their traumatic experience is viewed as routine to health care providers (Beck, 2004; Finlayson et al., 2019). Therefore, in the case of a woman with a history of PPH who is admitted for a subsequent birth, it is important to acknowledge her fear of recurrence and to assert the readiness of the obstetric team to prevent if possible and to respond to PPH.

Performing frequent assessments from admission for labor to throughout the postpartum period enhances the timely recognition and treatment of PPH. A nurse's response to PPH is dependent on the accuracy of assessing blood loss and accessibility of resources (e.g., a hemorrhage cart supplied with equipment and medications to rapidly treat PPH).

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BOX 1 CASE EXAMPLE

L.M., a 32-year-old gravida 5 para 2113 at 41 3/7 weeks gestation, was admitted for a late-term induction of labor with a Bishop score of 9. Her admission laboratory test findings were as follows: hemoglobin/hematocrit of 12.2 g/dl/34.0% and platelets of 112,000/µl (normal range, 140,000–450,000/µl). Vital signs on admission were blood pressure of 122/68 mmHg, heart rate of 89 beats/minute, and temperature of 36.7 °C. The nurse discussed L.M.'s platelet count with the physician and identified that L.M. had a medium risk of postpartum hemorrhage. With L.M.'s consent, a late-term oxytocin induction of labor was initiated. Labor was 13 hours, with second-stage fetal bradycardia that resulted in a vacuum-assisted vaginal birth of a 3,152-g infant. Prophylactic postplacental oxytocin (20 units) was delivered in 1 L of lactated ringers intravenous (IV) solution after a 5-minute third stage. No perineal or vaginal lacerations were initially noted, and after 90 minutes of recovery in the labor and delivery unit, she was transferred to the postpartum unit with an IV in place and a second bag of oxytocin in IV fluids running. The initial estimated blood loss by the provider was 150 ml, and the quantitative blood loss (QBL) at the time of transfer was 228 ml.

Two hours after birth, L.M. reported feeling wetness in the bed, and the postpartum nurse noted the bed pad soaked with blood and three clots 3 to 5 cm in size. The fundus was 2 cm above the umbilicus, midline and boggy. Immediate nursing care consisted of fundal massage and straight catheterization for 200 ml of urine per standing order. The nurse reported these actions and L.M.'s status to the provider and that although the fundus was now firm and midline, her bleeding continued, and the current QBL was 460 ml. Methylergonovine (0.2 mg intramuscularly) was administered per provider order after the blood pressure was determined to be 108/76 mmHg, and the in-house obstetrician was called for evaluation.

Five minutes after the methylergonovine was administered, the nurse notified the obstetrician that the bleeding continued with a firm fundus and that the QBL was now 528 ml. An order for tranexamic acid 1 g was initiated to run over 10 minutes. Meanwhile, bedside ultrasonography was done by the obstetrician, and no placental tissue was noted in the uterus. After another examination of the perineum and vagina, a deep vaginal laceration was noted and repaired with consent under local anesthesia.

The bleeding resolved, and the final QBL was 784 ml. Thirty minutes after resolution of the bleeding, vital signs were stable. The 24-hour laboratory test findings were as follows: hemoglobin/hematocrit of 10.1 g/dl/26.9% and platelets of 124,000/µl (normal range, 140,000–450,000/µl). L.M. was discharged after a 48-hour stay with no signs or symptoms of hypovolemia. She was given instructions for a high-iron diet and continued use of a daily prenatal vitamin.

Quantitative blood loss (QBL), the objective measurement of weight and/or volume, is a more accurate predictor of the amount of blood loss and is associated with timely recognition of PPH, leading to fewer interventions and blood transfusions (Al Kadri et al., 2011; Hire et al., 2020; Jones, 2015; Kahr et al., 2018; Katz et al., 2020). As shown in the case example (see Box 1), QBL should be assessed at the time of birth and continue throughout the postpartum period to identify the total cumulative QBL. Perinatal nurses must be aware of their institutions' policies of direct measurement of QBL and use these, along with situation, background, assessment, recommendation (SBAR), to effectively communicate the cumulative QBL and severity of blood loss to the obstetric provider.

Management of PPH

Approaches to PPH management should be based on the identification of the cause of bleeding and be determined based on resource availability. Management options include pharmacologic agents, mechanical means (e.g., bimanual compression, tamponade, uterine ligation, antishock garments), replacement of fluid and use of blood products, and uterine artery embolization. Nursing interventions used in the management of PPH include bladder catheterization to prevent uterine displacement, fundal massage after atony is identified, and establishing or maintaining intravenous (IV) access for fluid replacement and the administration of pharmacologic agents.

In the United States, uterotonic agents are most often used for the treatment of PPH. The first-line agent is oxytocin, and supplemental uterotonics include methylergonovine and prostaglandin agents such as carboprost tromethamine and misoprostol (ACOG, 2017; CMQCC, 2017b). Perinatal nurses practicing in the United States are most familiar with agents for PPH with uterotonic properties because uterine atony is most often the underlying cause. If atony is determined to be present, uterotonics are used to address the source of bleeding and stop further volume loss. However, nurses must also be knowledgeable and prepared to use agents that address other pathophysiologic mechanisms that occur with PPH. For instance, as in the case study, PPH can occur from tissue trauma (vaginal lacerations or hematoma) after rapid birth or vaginal operative birth (vacuum or forceps), so it is beneficial to use an agent with antifibrinolytic properties, such as TXA.

> Perinatal nurses must be able to articulate an individual's increased risk for PPH to the care team in an effort to optimize outcomes and minimize the potential for morbidity and mortality

BOX 2 EARLY POSTPARTUM HEMORRHAGE

Definition	Clinical Notes
Cumulative blood loss of ≥1,000 ml or blood loss accompanied by signs/symptoms of hypovolemia within 24 hours after the birth process (includes intrapartum blood loss)	Signs/symptoms of hypovolemia may include tachycardia, hypotension, tachypnea, oliguria, pallor, dizziness, or altered mental status. Cumulative blood loss of 500–999 ml alone should trigger increased supervision and potential interventions as clinically indicated.

Source: Menard et al. (2014).

TXA: Indications, Pharmacology, and Nursing Considerations

TXA is a synthetic derivative of the amino acid lysine that blocks plasminogen-binding sites and inhibits the proteolytic function of plasmin, thereby preventing fibrin degradation (Okamoto & Okamoto, 1962; Pacheco et al., 2017). When fibrinolysis (breakdown of the clot) is inhibited, overall bleeding is reduced. In 2010, investigators for the Clinical Randomisation of an Antifibrinolytic in Significant Haemorrhage 2 (CRASH-2) study reported that early administration of TXA in adult trauma patients decreased death due to bleeding (CRASH 2 Trial Collaborators, 2010). Subsequently, clinical applications for TXA use include trauma and surgery; gastrointestinal bleeding; and, more recently, PPH (Myles et al., 2017; Roberts et al., 2014; World Maternal Antifibrinolytic [WOMAN] Trial Collaborators, 2017).

The recommended dose of TXA to treat PPH is 1 g administered over 10 minutes. TXA should be administered as soon as possible and within a 3-hour window after birth (CMQCC, 2017b; WHO, 2017). Very little of the total dose of TXA is metabolized, resulting in more than 95% of the dose being excreted through the renal system unchanged. The half-life of TXA is approximately 2 hours, and 90% of the drug is excreted within 24 hours of administration (Pilbrant et al., 1981). TXA may be given in conjunction with uterotonics and has no documented interactions with ibuprofen, which is often used for discomfort in the postpartum period. There is limited evidence about the outcomes of newborn exposure to TXA during breastfeeding; however, the evidence available has not demonstrated adverse effects (Gilad et al., 2014).

In 2017, the findings of the WOMAN trial resulted in the WHO changing its conditional recommendation to use TXA when uterotonics fail to control bleeding or when bleeding is thought to be due to trauma to initiating TXA regardless of the etiology of bleeding (WHO, 2017). In contrast, U.S.-based recommendations state that TXA should be used as

TABLE 1 EXAMPLE OF POSTPARTUM HEMORRHAGE RISK ASSESSMENT TOOL

Low Risk	Medium Risk	High Risk
Singleton pregnancy	Prior cesarean or uterine surgery	History of postpartum hemorrhage
Fewer than four previous births	More than four previous births	Hematocrit < 30%
Unscarred uterus	Prolonged use of oxytocin	Known coagulation defect
Absence of postpartum hemorrhage history	Chorioamnionitis	Bleeding on admission
	Magnesium sulfate use	Previa, accreta, increta, percreta
	Large uterine fibroids	Abnormal vital signs (tachycardia and hypotension)
	Multiple gestation	
	Mild thrombocytopenia (100,000–149,000/µl)	

Note. Adapted with permission from Lyndon, A., Lagrew, D., Shields, L., Main, E., & Cape, V. Improving Health Care Response to Obstetric Hemorrhage. (California Maternal Quality Care Collaborative Toolkit to Transform Maternity Care). Developed under contract #11-10006 with the California Department of Public Health; Maternal, Child and Adolescent Health Division; Published by the California Maternal Quality Care Collaborative, 3/17/15.
Sources: Govindappagari et al. (2020); Lyndon et al. (2015).

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TABLE 2 GUIDELINES FOR THE USE OF TXA FOR PPH

Organization	Indication	Timing	Dosing
World Health Organization	• TXA should be used in all cases of PPH, regardless of whether the bleeding is due to genital tract trauma or other causes. • TXA should be part of the standard comprehensive PPH treatment package, including medical (uterotonics), nonsurgical, and surgical interventions according to WHO guidelines or adapted local PPH treatment guidelines.	• Use TXA within 3 hr and as early as possible after the onset of PPH. • Do not initiate TXA more than 3 hr after birth, unless being used for bleeding that restarts within 24 hr of completing the first dose.	• Fixed dose of 1 g in 10 ml (100 mg/ml) IV at 1 ml/min (i.e., administered over 10 min). Second dose of 1 g IV if bleeding continues after 30 min or if bleeding restarts within 24 hr of completing the first dose.
American College of Obstetricians and Gynecologists	• TXA should be considered in the setting of PPH when initial medical therapy fails.	• Earlier use is likely to be superior to delayed treatment; benefits are primarily seen in women treated sooner than 3 hr from the time of birth.	• Dosage not specified but refers to that used in the WOMAN trial (1 g administered IV).
California Maternal Quality Care Collaborative	• TXA is an adjunctive treatment and not a primary treatment for PPH. • The placement of TXA in the facility's hemorrhage guideline will depend on local resources.	• Timing is not specified, but guideline refers to the WOMAN trial, which clearly demonstrated that TXA is most effective when given within 3 hr of hemorrhage diagnosis—hence the recommendation that it be considered relatively early in the hemorrhage guideline.	• 1 g IV over 10 min with a second 1-g dose administered at 30 min if the bleeding persists; may be repeated once.

Note. IV = intravenously; PPH = postpartum hemorrhage; TXA = tranexamic acid; WHO = World Health Organization; WOMAN = World Maternal Antifibrinolytic. Sources: American College of Obstetricians and Gynecologists (2017); California Maternal Quality Care Collaborative (2017b); World Health Organization (2017).

adjunctive therapy and should not preclude the primary steps in the management of PPH (CMQCC, 2017b; Shields et al., 2017). In greater-resource settings such as the United States, TXA use during PPH decreases blood loss and, therefore, is potentially transfusion sparing and hysterectomy sparing. In individuals deemed to be at extremely high risk for PPH based on multiple risk factors, prophylactic use of TXA is increasingly being considered for the prevention of and mitigation of PPH; however, at present, this is not routine practice (Franchini et al., 2018; Mielke & Obermeyer, 2020). A summary of current professional organization guidelines is presented in Table 2.

As key clinicians in the use of TXA, perinatal nurses must understand the drug's action in the context of pregnancy. Pregnancy is a hypercoagulable state that continues through labor and increases into the postpartum period (Anderson & Avery, 2019; Coad & Dunstall, 2012). During labor, clotting factors increase, while fibrinolytic activity decreases as a physiologic means of hemorrhage protection. With the delivery of the placenta, myometrial contractions continue, platelet aggregation occurs at the placental site, coagulation factors are released, maintaining an intact vascular system and further decreasing the risk of PPH (Anderson & Avery, 2019).

Given the action of TXA in preventing the breakdown of clots, the potential risk for thromboembolism is a key concern about its use in the postpartum period. More broadly, the potential adverse effects of TXA include venous thromboembolic events, such as deep vein thrombosis and pulmonary embolism, stroke, myocardial infarction, seizures, renal dysfunction or failure, and mild gastrointestinal symptoms (nausea, vomiting, diarrhea; Yates et al., 2019). However, in studies using TXA in trauma and PPH, an increased incidence of thromboembolism has not been found (CRASH 2 Trial Collaborators, 2010; Myles et al., 2017; Roberts et al., 2014; Yates et al., 2019). Perinatal nurses play a key role in identifying and communicating venous thromboembolic events risk factors as part of the obstetric team's collaborative decision-making about TXA use. Additionally, nurses should continually monitor for signs and

symptoms of side effects and counsel individuals to observe and report any changes they experience.

Once the decision to use TXA has been made, perinatal nurses must ensure that the woman receives the correct timing, dose, and method of TXA administration (see Table 2). Because treatment delay in the use of TXA appears to reduce the benefit by approximately 10% for every 15-minute delay (WHO, 2017), nurses must be knowledgeable as to the most expeditious means to procure it. TXA must be given within a 3-hour window after the onset of bleeding, and if uterine atony is suspected, uterotonic medication should be used in conjunction with TXA (CMQCC, 2017b; Shields et al., 2017; WHO, 2017). TXA should be readily available; however, if not directly available on the unit, the process from the provider order, to the pharmacy, to unit delivery needs to be delineated and disseminated to the obstetric team.

Implications for Practice

Perinatal nurses must have ongoing awareness of PPH risk and update an individual's risk assessment throughout the postpartum period. Nurses must be trained in quantitative and visual blood loss estimation to support clear communication with the obstetric provider. Hospital administrators should ensure that adequate equipment is readily available for QBL measurement.

Perinatal nurses have a critical role in identifying individuals at risk for PPH, accurately assessing a person's blood loss and status, communicating findings to the obstetric team, and administering pharmacologic agents to treat PPH. In the case example presented here (see Box 1), the woman was deemed stable for transfer from the labor and delivery unit to the postpartum unit. In her report to the postpartum nurse, the labor and delivery nurse communicated that the immediate postpartum care included administration of oxytocin and the woman's risk factors for PPH (thrombocytopenia and vacuum-assisted vaginal birth).

> Best practice for the prevention of PPH is active management of the third stage of labor, with the use of uterotonics as the most critical element

Shortly thereafter, the postpartum nurse reported to the obstetrician that the vaginal bleeding continued even though the uterus was firm, which prompted investigation for a cause of hemorrhage other than atony. In this case, the individual had risk factors suggesting that hemorrhage could be occurring due to some of the four "T"s, or etiologies, of PPH: tone, tissue, trauma, and thrombin (coagulopathies). Uterine tone was not the issue, nor was tissue (e.g., retained placental fragments, of which there were none per bedside ultrasonography). However, the patient did have mild thrombocytopenia, and a deep vaginal laceration (trauma) was identified.

The postpartum nurse's expeditious assessment was critical and incited investigation of an alternate etiology for the woman's persistent bleeding. Because it was within the 3-hour postpartum window, the woman was able to benefit from the antifibrinolytic properties of TXA while the vaginal laceration was repaired. Later, the postpartum nurse provided health education to the woman about the increased risk of PPH in a future birth and possible need for postpartum support should signs of trauma related to the PPH arise. When bleeding occurred, appropriate assessment and communication by the postpartum nurse led to prompt interventions inclusive of TXA to address the bleeding etiology and reduce overall blood loss.

Conclusion

The timely use of uterotonics and, more recently, the antifibrinolytic agent TXA is effective in reducing the blood loss associated with PPH. Because the use of TXA has more recently been added to PPH management, it is critical that perinatal nurses be knowledgeable about the use of TXA and prepared to administer it expeditiously to prevent a delay in treatment and to reduce the risk for maternal morbidity and mortality associated with PPH.

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Posttest Questions

Instructions: This learning activity is free for AWHONN members and available for purchase by nonmembers. To access it, visit the AWHONN store at https://www.awhonn.org/awhonn-store/ and type NWH into the search box.

1. Which of the following is the most current definition of early postpartum hemorrhage?

   a. Any blood loss occurring 24 hours after birth
   b. Blood loss between 500 ml and 1000 ml occurring in the intrapartum period
   c. Cumulative blood loss ≥ 500 ml or blood loss accompanied by signs/symptoms of hypovolemia within 24 hours following the birth process
   d. Cumulative blood loss ≥ 1000 ml or blood loss accompanied by signs/symptoms of hypovolemia within 24 hours following the birth process

2. Match each risk factor for postpartum hemorrhage in the top list to its correct corresponding category of risk in the bottom list.

   a. Abnormal maternal vital signs including tachycardia and hypotension
   b. Previous history of PPH
   c. Prolonged use of oxytocin
   d. Unscarred uterus
   e. Use of magnesium sulfate

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   a. Low risk
   b. Medium risk
   c. High risk

3. Of the following interventions for active management of the third stage of labor, which is considered most critical to preventing postpartum hemorrhage?

   a. Administration of uterotonics specifically oxytocin
   b. Controlled cord traction
   c. Delayed cord clamping

4. What are examples of subjective data that nurses should consider when assessing an individual's risk for postpartum hemorrhage? (Select all the apply)

   a. Changes in vision
   b. Estimated blood loss
   c. Feelings of doom
   d. History of traumatic birth

5. In which of the following scenarios would the use of tranexamic acid be indicated to treat postpartum hemorrhage?

   a. When the underlying cause is tissue trauma
   b. When the underlying cause is retained placental fragments
   c. When the underlying cause is uterine atony

6. When and how should tranexamic acid be administered after diagnosed tissue trauma from birth?

   a. As early as possible but not more than 10 minutes after birth, and always with uterotonics
   b. As early as possible but not more than 3 hours after birth, with or without uterotonics
   c. As early as possible but not more than 3 hours after birth, and always with uterotonics
   d. As early as possible but not more than 24 hours after birth, with or without uterotonics

7. Why is thromboembolism a key concern in the use of tranexamic acid in the context of the hypercoagulable state of pregnancy?

   a. Tranexamic acid causes the blood to clot.
   b. Tranexamic acid has been found to increase the incidence of thromboembolism in the postpartum period.
   c. Tranexamic acid prevents the breakdown of blood clots.

8. What is a clinical care consideration in the use of tranexamic acid for postpartum hemorrhage?

   a. Expeditious procurement of tranexamic acid is vital because its potential efficacy may wane as time passes.
   b. Nurses should anticipate the use of tranexamic acid after birth for all individuals with a history of clotting disorders.
   c. Individuals identified as high-risk for postpartum hemorrhage should have a standing order for tranexamic acid.

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9. Consider the case scenario with patient L. M. Which of the four "Ts" of postpartum hemorrhage did L.M. experience? (Select all the apply)

    a. Thrombin
    b. Tissue
    c. Tone
    d. Trauma

10. In the case example, which critical action initiated by the nurse influenced the positive outcome?

    a. Educating the woman about her potential risk for postpartum hemorrhage with future pregnancies
    b. Prompting investigation into a cause of bleeding other than uterine atony
    c. Receiving a standardized SBAR report from the labor & delivery nurse