Bleeding Disorders: Achieving Optimal Therapeutic Outcomes in the Acute-care Setting

Presented as a Live Webinar
Tuesday, October 29, 2013
1:00 p.m. – 2:00 p.m. EDT

Planned and conducted by ASHP Advantage and supported by an educational grant from Novo Nordisk Inc.
WEBINAR INFORMATION

How do I register?

Go to http://www.ashpadvantagemedia.com/bleedingdisorders/disorders.php and click on the Register button. After you submit your information, you will be e-mailed computer and audio information.

What is a live webinar?

A live webinar brings the presentation to you – at your work place, in your home, through a staff in-service program. You listen to the speaker presentation in “real time” as you watch the slides on the screen. You will have the opportunity to ask the speaker questions at the end of the program. Please join the conference at least 5 minutes before the scheduled start time for important announcements.

How do I process my Continuing Education (CE) credit?

Continuing pharmacy education for this activity will be processed on ASHP’s new eLearning system and reported directly to CPE Monitor. After completion of the live webinar, you will process your CPE and print your statement of credit online at http://elearning.ashp.org/my-activities. To process your CPE, you will need the enrollment code that will be announced at the end of the webinar.

View full CE processing instructions

What if I would like to arrange for my colleagues to participate in this webinar as a group?

One person serving as the group coordinator should register for the webinar. That group coordinator will receive an e-mail confirmation with instructions for joining the webinar. A few minutes before the webinar begins, the group coordinator should launch the webinar link. Once the webinar has been activated, the coordinator will have the option to open the audio via VoIP (Voice Over IP) on the webinar toolbar or use a touch tone phone with the provided dial-in information. At the conclusion of the activity, the group coordinator will complete a brief online evaluation and report the number of participants at that site. Each participant will process his or her individual continuing education statement online.

What do I need in order to participate in the webinar?

1. Computer with internet access and basic system requirements. When you register, the webinar system will assess your system to ensure compatibility.
2. Telephone to dial the toll-free number and listen to the presentation (if you choose not to use Voice Over IP [VoIP] via your computer).

Webinar System Requirements

Be sure to view the webinar system requirements for Windows, Mac, iOS, and Android prior to the activity.
William E. Dager, Pharm.D., BCPS (AQ-Cardiology)
Pharmacist Specialist
UC Davis Medical Center
Sacramento, California

William E. Dager, Pharm.D., BCPS (AQ-Cardiology), is a pharmacist specialist at UC Davis Medical Center in Sacramento, California, where he is responsible for managing challenging cases in anticoagulation, pharmacokinetics, and critical care. He also is clinically active with the cardiology service and serves as the director of the postgraduate year two (PGY-2) residency in cardiology at UC Davis. In addition, Dr. Dager holds three academic positions. He is Clinical Professor of Pharmacy at the University of California, San Francisco (UCSF) School of Pharmacy and Clinical Professor of Medicine at the University of California, Davis (UC Davis) School of Medicine. He also serves as Clinical Professor at Touro School of Pharmacy in Vallejo, California.

Dr. Dager earned his Doctor of Pharmacy degree at UCSF and completed a residency at UC Davis Medical Center in Sacramento. In addition, he completed the University of Pittsburgh Nephrology Pharmaceutical Care Preceptorship. He is a board-certified pharmacotherapy specialist and fellow of the American College of Clinical Pharmacy (ACCP), American Society of Health-System Pharmacists (ASHP), California Society of Hospital Pharmacists, and Society of Critical Care Medicine (SCCM).

Dr. Dager’s research interests focus on anticoagulation, critical care medicine, cardiovascular disease, and pharmacokinetics and pharmacodynamics. He has authored numerous articles, book chapters, and scientific reviews, and he coauthored “Anticoagulation Therapy: A Point-of-care Guide” published by ASHP in 2011. He also regularly makes presentations at national and international educational conferences.

Dr. Dager serves as a reviewer and editorial board member for several medical journals, and he currently is chair of the Editorial Advisory Board Panel on Anticoagulation for The Annals of Pharmacotherapy. He has served as a site coordinator for the ASHP Research and Education Foundation Antithrombotic Pharmacotherapy Traineeship.

Dr. Dager has received multiple teaching and professional awards, including the 2008 ACCP Best Practice Award.
Mark T. Reding, M.D.
Director, Center for Bleeding and Clotting Disorders
University of Minnesota Medical Center, Fairview
Associate Professor
University of Minnesota Medical School
Minneapolis, Minnesota

Mark T. Reding, M.D., is Director of the Center for Bleeding and Clotting Disorders at University of Minnesota Medical Center in Minneapolis. In this role he is responsible for providing and coordinating patient care in the clinic and hospital for all adult patients followed by the Center, which is a hemophilia treatment center supported by the Centers for Disease Control and Prevention. Dr. Reding also serves as Medical Director of the Inpatient Hematology/Oncology Unit at University of Minnesota Medical Center. In addition, he is Associate Professor of Medicine in the Division of Hematology, Oncology, and Transplantation at the University of Minnesota.

Dr. Reding received his Bachelor of Science degree in Microbiology and Biology at South Dakota State University in Brookings. He then earned a Doctor of Medicine degree at University of Minnesota Medical School in Minneapolis. He is board certified in hematology.

Dr. Reding’s clinical interest is the treatment of non-malignant hematologic disorders with particular emphasis on disorders of hemostasis and thrombosis, including hemophilia. His current research efforts focus on the immune response to factor VIII, the cellular mechanisms involved in the synthesis of factor VIII inhibitors, and the immunologic consequences of gene therapy. He has also served as the local principal investigator for multi-center clinical trials. His research has been published in peer-reviewed journals.

Dr. Reding considers teaching to be the most important and rewarding aspect of his career, and he twice was awarded the Outstanding Clinical Mentor Award from his division at the Medical School. In addition to teaching responsibilities at the University, he frequently speaks at educational programs for physicians and other health care professionals.

Dr. Reding is a member of American Society of Hematology, Hemostasis and Thrombosis Research Society (HTRS), and International Society for Thrombosis and Hemostasis. He recently completed a two-year term on the board of directors for HTRS.
DISCLOSURE STATEMENT

In accordance with the Accreditation Council for Continuing Medical Education’s Standards for Commercial Support and the Accreditation Council for Pharmacy Education’s Guidelines for Standards for Commercial Support, ASHP Advantage requires that all individuals involved in the development of activity content disclose their relevant financial relationships. A commercial interest is any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients. A person has a relevant financial relationship if the individual or his or her spouse/partner has a financial relationship (e.g., employee, consultant, research grant recipient, speakers bureau, or stockholder) in any amount occurring in the last 12 months with a commercial interest whose products or services may be discussed in the educational activity content over which the individual has control. The existence of these relationships is provided for the information of participants and should not be assumed to have an adverse impact on presentations.

All faculty and planners for ASHP Advantage education activities are qualified and selected by ASHP Advantage and required to disclose any relevant financial relationships with commercial interests. ASHP Advantage identifies and resolves conflicts of interest prior to an individual’s participation in development of content for an educational activity.

Mark T. Reding, M.D., declares that he has been a consultant, member of advisory board or speakers bureau, and/or recipient of research funding from Baxter; Bayer HealthCare; Biogen Idec; Novo Nordisk Inc.; and Octapharma USA, Inc.

The following faculty and planners report no relationships pertinent to this program:

- William E. Dager, Pharm.D., BCPS (AQ-Cardiology)
- Carla J. Brink, M.S., B.S.Pharm.
- Susan R. Dombrowski, M.S., B.S.Pharm.

ASHP staff have no relevant financial relationships to disclose.

Additional Educational Opportunities on this Topic

- **Second live webinar in this series**: “Clinical Case Scenarios: Recognition and Treatment of Rare Bleeding Disorders in Emergency Situations”
  - November 7, 2013, 1-2 p.m. EST
- Both webinars available as on-demand activities in early 2014

www.ashpadvantage.com/bleedingdisorders
ACTIVITY OVERVIEW

Patients with hemophilia and other bleeding disorders who are at risk for bleeding are a challenge to treat. It is important that all members of the health care team understand the scope of bleeding disorders so that they can devise strategies for treatment. This activity will provide an overview of the epidemiology and pathophysiology of selected bleeding disorders and discuss pharmacologic treatment strategies, including dosing and monitoring plans for successful management of these patients.

Time for questions and answers from the webinar audience will be provided at the end of the presentation.

LEARNING OBJECTIVES

At the conclusion of this application-based educational activity, participants should be able to

- Discuss the epidemiology and pathophysiology of selected common or atypical bleeding disorders.
- Describe the clinical presentation of a patient who is bleeding and may have a bleeding disorder, including laboratory test results that should trigger clinicians to suspect the diagnosis.
- Examine rational pharmacologic approaches to treatment of patients with a bleeding disorder, taking into account patient-specific factors.
- Develop a hematologic assessment plan for treating patients with bleeding disorders in emergent situations.

LIST OF ABBREVIATIONS

For a list of abbreviations used in this activity, please see page 16.

CONTINUING EDUCATION ACCREDITATION

The American Society of Health-System Pharmacists is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education. This activity provides 1.0 hour (0.1 CEU) of continuing pharmacy education credit (ACPE activity # 0204-0000-13-472-L01-P).

Attendees must complete a Continuing Pharmacy Education Request online and may immediately print their official statements of continuing pharmacy education (CPE) credit following the activity.

Complete instructions for processing CE can be found on the last page of this handout.
Bleeding Disorders: Achieving Optimal Therapeutic Outcomes in the Acute-care Setting

William E. Dager, Pharm.D., BCPS (AQ-Cardiology)
UC Davis Medical Center
Sacramento, California

Mark T. Reding, MD
Center for Bleeding and Clotting Disorders
University of Minnesota Medical Center, Fairview
Minneapolis, Minneapolis

Bleeding in the Acute-care Setting

- Often multifactorial in etiology
- Need to think broadly, beyond the coagulation system
- Combined together, minor risk factors can cause major bleeding

Risk Factors for Bleeding

- Clotting System
  - Platelet problem
  - Factor deficiency
  - Congenital vs. acquired defects
- Medications
  - Anticoagulants
  - Antiplatelet drugs
  - NSAIDs, SSRIs, herbals, etc.
- Anatomic Factors
  - Surgery
  - Trauma
  - Tumor
  - AVMs
  - Gastric ulcer
- Systemic Disease
  - Liver failure
  - DIC
  - Vitamin K deficiency
  - Renal failure
  - Hypertension

Assess the Situation

- Assess severity of bleeding or risk with pending procedure
  - Ask key questions to understand what the management goal is. Examples:
    - How urgent is the situation
    - Active bleeding vs. planned procedure
    - Is an invasive intervention being considered
    - What is driving bleeding
  - Review medical record
    - Laboratory assay
    - Medication history
- Identify potential additional or related therapies

Potential Interventions

- Blood products
  - Packed red blood cells, cryoprecipitate, fresh frozen plasma, platelets
  - Fluids
  - Concentrated clotting factors
- Recombinant factor VIIa (rFVIIa)
- PCC3 or PCC4 (3-factor or 4-factor prothrombin complex concentrate)
- Activated prothrombin complex concentrate (aPCC)
- Reversing anticoagulants
  - Protamine, vitamin K, hemodialysis
- Hemodynamic support

Managing Acute Bleeding in Acute-care Setting: Challenges for Pharmacists

- Depends on the assigned responsibility
  - Assuring correct product is ordered and provided
  - Clinical assessment of the therapy
    - Bedside presence
    - Identifying who is involved in management
    - Identifying your role and the role of other pharmacists
Which of the following is true for using concentrated clotting factors for bleeding patients in emergent situations?

a. Not associated with thrombosis risk
b. Requires PCC infusion over several hours
c. Low-dose rFVIIa may be effective in factor VII deficiency
d. Not associated with rebound coagulopathy because long acting

Hemostatic Agent Considerations
- Dosing: Onset rapid – Can titrate dose upward if time permits
  - Identification of bleeding disorder
  - Dose situation dependent
  - Clotting factors low or impaired (hemophilia/inhibitors)
  - Platelets not functioning
- Administration
  - Bolus
  - Continuous infusion
  - Hemophilia/inhibitors - Inhibitors (rFVIIa or aPCC)
- Single or combined therapies
- Rebound effect


Adjunctive Therapies
- Antifibrinolytic agents
- Desmopressin
- Topical agents
- Plasma exchange
- Steroids
- Cytotoxic immunosuppressants
- Single or combined therapies

Look at the Big Picture
Do not think in a silo
Drivers and therapy can be multifactorial

Example Case
- 55 yo admitted with pneumonia
- Hx of CAD on antiplatelet therapy
- Pharmacologic VTE prophylaxis
- INR 1.6 on admission
- Platelets dropped from 200,000 to 70,000 over 2 days
- Stress-induced gastritis

Bleeding Risk Factors
- Clotting system: low platelets, prolonged INR
- Medications: ASA, heparin
- Systemic: low vitamin K
- Anatomic: gastritis

How Blood Clots
1. Primary hemostasis
   - Platelets activated, form a plug
   - Von Willebrand factor (vWF)
   - Phospholipid surface
2. Secondary hemostasis
   - Coagulation factors generate thrombin
   - Fibrin mesh forms
   - Holds plug in place
3. Hemostasis stops
   - Regulatory proteins
   - Shut off thrombin generation
   - Controls clot size
4. Fibrinolysis
   - Clot dissolves when injury healed
Formation of platelet plug  
(Primary hemostasis)

Fibrin clot  
(Secondary hemostasis)

Bleeding Patterns Are Distinct

<table>
<thead>
<tr>
<th>Problem with Primary Hemostasis</th>
<th>Problem with Secondary Hemostasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prolonged initial bleeding</td>
<td></td>
</tr>
<tr>
<td>Delayed bleeding</td>
<td></td>
</tr>
</tbody>
</table>

Differentiating Congenital from Acquired Bleeding Disorders

**Congenital**
- Life-long history of bleeding problems
- Often family history of bleeding tendency
- Bleed with most hemostatic challenges, unless treated
- Range from common to rare, mild to severe

**Acquired**
- “Recent” onset of bleeding problems
- No family history of bleeding tendency
- History of previous hemostatic challenges, without bleeding
- Aside from drug-induced platelet dysfunction, these are rare and severe

Factor Deficiencies
- Hemophilia A – factor VIII
- Hemophilia B – factor IX
- Rare factor deficiencies – Factors II, V, VII, X, XI, XIII
- Fibrinogen disorders

Platelet Disorders
- Glanzmann thrombasthenia
- Bernard-Soulier Syndrome
- Storage pool deficiency
- Many others (very rare)

Von Willebrand Disease
- Type 1 (mild to severe)
- Type 2 (several variants)
- Type 3 (severe)
Hemophilia A
- Factor VIII deficiency
- Classical hemophilia
- 1 in 5,000 to 10,000 male births

Hemophilia B
- Factor IX deficiency
- Christmas disease
- 1 in 30,000 male births

Rare Deficiencies
- Factor VII most common
- Males and females

• Clinical features
  - Delayed bleeding
  - Joint and deep soft tissue hemorrhages
  - Females - severe menorrhagia and postpartum bleeding
  - Postoperative bleeding can be life threatening

Glanzmann
- Fibrinogen receptor
- No aggregation

Bernard – Soulier
- vWF receptor
- Abnormal adhesion
- Low number, large platelets

Others
- Defects in granules, signaling pathways, other receptors
- May be part of multi-system syndromes

• Clinical features
  - Prolonged initial bleeding
  - Muco-cutaneous bleeding (epistaxis, menorrhagia, GI tract)
  - Bleeding ranges from mildly annoying to life threatening
  - Rare disorders – require specialized testing, often overlooked

Congenital Factor Deficiencies

Von Willebrand Disease
- Von Willebrand factor
  - Important in platelet adhesion (primary hemostasis)
  - Plasma carrier of factor VIII (secondary hemostasis)

Type 1
- Most common (70%)
- Partial quantitative deficiency
- Ranges from mild to severe

Type 2
- Qualitative abnormalities of vWF
- Several distinct subtypes

Type 3
- Virtual complete absence of vWF
- Rare (1 in 1,000,000)
- Autosomal recessive inheritance pattern

• Clinical features
  - Clinical presentation depends on severity
  - Prolonged initial bleeding
  - Bruising, epistaxis, dental bleeding, menorrhagia
  - Severely affected individuals - joint and soft tissue bleeds

Acquired Bleeding Disorders

Factor Deficiencies
- Acquired hemophilia
- Other factor inhibitors
- Thrombin exposure
- Monoclonal gammopathies
- Autoimmune disorders

Platelet Dysfunction
- Drug induced
- Uremia
- Bone marrow diseases (CMPD, MDS)

Acquired vWD
- Heart valves
- LVADs
- Hematologic malignancies
- Autoimmune disease

• Quite rare, except for acquired platelet dysfunction (primarily drug induced)
• Most common: acquired hemophilia
  - Acquired vWD increasingly recognized in centers with mechanical circulatory support programs

Acquired Hemophilia
- Auto-antibody directed against factor VIII (1 in 1 – 5 million/yr)
• Common mistakes: delayed diagnosis and not understanding risk

Clinical Features
- Median age mid 60s
- Muco-cutaneous bleeding (epistaxis, GI, GU)
- Severe intramuscular bleeding
- Postoperative and postpartum bleeding

Associated Conditions
- 50 – 60% of cases: idiopathic
- 40 – 50% associated with
  - Pregnancy / postpartum
  - Malignancy
  - Autoimmune disease

Why you should care about acquired hemophilia
- Morbidity: > 80% have serious bleeding
- Mortality: As high as 20%


Liver Disease
Associated with defects in both primary and secondary hemostasis, and abnormalities in the fibrinolytic system

- Thrombocytopenia
- Decreased synthesis of clotting factors
- Dysfunctional fibrinogen
- Excess fibrinolysis

Liver Disease

“On paper,” patients with liver disease look like bleeders . . .
(low platelets, prolonged INR and aPTT, low fibrinogen)
However,
Some of them actually clot!

Normal Hemostatic Balance

Procoagulant
Endothelium
Platelets
Clotting factors
Fibrinolytic inhibitors

Anticoagulant
Protein C
Protein S
Antithrombin
Plasmin

Liver Disease

► Reduced synthesis of both procoagulant and anticoagulant factors → more tenuous hemostatic balance
► Liver disease → prone to bleeding and clotting

Laboratory Evaluation: Disorders of Primary Hemostasis

1. CBC (platelet count)
2. Peripheral smear (verify platelet count and morphology)
3. Platelet function testing
4. Von Willebrand panel
   – Von Willebrand antigen (ELISA)
   – Ristocetin cofactor activity (functional assay)
   – Factor VIII activity

Laboratory Evaluation: Disorders of Secondary Hemostasis

1. INR, aPTT
2. Mixing studies
3. Factor levels
   Does it correct?
   YES → factor deficiency
   NO → inhibitor

- Long INR only → factor VII
- Long aPTT only → factors VIII, IX, XI, XII
- Long INR and aPTT → factors X, V, II, fibrinogen

Vitamin K deficiency tends to prolong INR more than aPTT

A prolonged INR and normal aPTT is associated with

a. Low factor VII and factor X
b. Low factor VII
c. Heparin therapy
d. Low factors VIII, IX, XI, and XII
Treatment of Bleeding in the Acute-care Setting

- Use multi-pronged treatment approach
- Identify all contributing factors
- Differentiate surgical or anatomic bleeding from coagulopathic bleeding
  - Location(s), laboratory values
- Withhold and consider reversing effect of medications that may be contributing
- Replace what is missing or defective
  - RBCs, platelets, frozen plasma, cryoprecipitate, factor concentrates

Treatment of Factor Deficiencies

- Hemophilia A and B
  - Plasma-derived and recombinant factor concentrates available
  - Established dosing guidelines
  - Follow factor levels, generally aim to correct to normal
- Von Willebrand disease
  - Plasma-derived concentrates available
  - Contain both vWF and factor VIII (ratio varies)
  - Follow factor levels, generally aim to correct to normal
- Rare factor deficiencies
  - Concentrates available for factors VII, XI*, XIII, and fibrinogen
  - Use prothrombin complex concentrates for factors II, V, and X
  - Hemostatic levels vary, generally well below the normal range

* Not currently available in the United States.

Treatment of Platelet Disorders

- Transfusion
  - Increases number of functionally normal platelets
  - Used for both congenital and acquired platelet disorders
  - Antibody formation a concern for some congenital disorders (Glanzmann thrombasthenia)
- Enhance platelet function
  - Desmopressin, vWF/factor VIII concentrates, rFVIIa
  - Antifibrinolytic agents help stabilize clots (also used as adjunctive therapy in treatment of factor deficiencies)
  - Largely empiric, not FDA-approved indications

Treatment of Acquired Hemophilia

1. Stop bleeding
   - Factor VIII (if inhibitor titer low enough)
   - Prothrombin complex concentrates
   - Recombinant factor VIIa
2. Eradicate inhibitor
   - Plasma exchange
   - Immunosuppression (steroids, cyclophosphamide, rituximab)

Other considerations
- Similar approach for other factor inhibitors
- IVIG sometimes effective
- Treat underlying disease, if present

What Follow Up Should the Pharmacist Consider?

- Understanding the management plan
  - Is it working?
- Effective communication
- Feedback to decision makers
  - Assay results (correct blood draw time)
  - Changing dose, continuous infusion vs. bolus
  - Stopping or withholding therapy

Therapy Assessment

- Do we have adequate hemostasis?
  - Onsite expert
  - Risk for undesirable clotting
- Severity of bleeding
  - Wound (site, packing removed, etc.)
  - Hemoglobin level for internal bleeding
  - Improved or limited/no progress
- Thrombosis risks
Monitoring Hemostatic Agent

• Titrating infusion
  – Time assessment with revised dose
  • Change rate or dosing interval just prior to physician assessment
• Factor levels
  – Establish targets
  – Inhibitors developing?

Key Pharmacy Considerations

• Is the right agent being dispensed?
• Is the dose correct?
• Who is determining the dose, and how is the dose being determined?
• Is it safe?
• Is it working?
• Do we have enough clotting factor concentrates available?
• Is a change in therapy being considered?
• Is the dose going to be adjusted?
• How can we minimize cost and wastage?
• Was the correct pre-authorization obtained or billing done?

Example Case Revisited

• 55 yo admitted with pneumonia
• Hx of CAD on antiplatelet therapy
• Pharmacologic VTE prophylaxis
• INR 1.6 on admission
• Platelets dropped from 200,000 to 70,000 over 2 days
• Stress-induced gastritis

Bleeding Risk Factors

- Clotting system: low platelets, prolonged INR
- Medications: ASA, heparin
- Systemic: low vitamin K
- Anatomic: gastritis

In ICU - Upper GI Bleed
REFERENCES AND SELECTED READINGS

SELF-ASSESSMENT QUESTIONS

1. Which of the following bleeding patterns are associated with defects in secondary hemostasis?

   a. Prolonged initial bleeding, mucosal bleeding, bruising, ecchymoses.
   b. Prolonged initial bleeding, hemarthroses, mucosal bleeding, soft tissue bleeding.
   c. Delayed bleeding, hemarthroses, soft tissue bleeding, ecchymoses.
   d. Delayed bleeding, hemarthroses, petechiae, bruising.

2. CG, a 72-year-old man with heart failure who has a left ventricular assist device (LVAD), was transported to the emergency department (ED) after a fall. He has two lacerations not requiring stitches that are bleeding profusely, and severe bruising is noted on the left side of his body where he fell. He denies any history of a bleeding disorder but noted that he had quite a bit of bleeding immediately following a tooth extraction two weeks ago. He recently stopped flossing because his gums seemed tender and bled easily. The team suspects a bleeding disorder. Based on CG’s history and current experience in the ED, which of the following bleeding disorders should be suspected?

   b. Glanzmann’s thrombasthenia.
   c. Hemophilia A.
   d. Bernard-Soulier syndrome.

3. A 55-year-old woman presents with severe gastrointestinal bleeding, and it is determined that she has acquired hemophilia. Which of the following would be an appropriate approach for managing the acute bleeding in this patient?

   a. Eradicate inhibitor with immunosuppression (steroids) and follow up with recombinant factor VIIa three days later if bleeding persists.
   b. Stop the bleeding by administering factor IX and then eradicate inhibitor with plasma exchange.
   c. Stop the bleeding by administering cyclophosphamide and then eradicate inhibitor with factor VIII.
   d. Stop the bleeding by administering recombinant factor VIIa and then eradicate inhibitor with immunosuppression (steroids).

4. When monitoring patients with a bleeding disorder who are receiving hemostatic agents for acute bleeding, when should changes be made in the rate of administration or dosing interval of the selected factor product so that the effect of these changes on bleeding can be assessed?

   a. Just prior to physician assessment.
   b. Immediately after physician assessment.
   c. Without regard to physician assessment.

Answers

1. c  2. a  3. d  4. a
**LIST OF ABBREVIATIONS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>aPCC</td>
<td>activated prothrombin complex concentrate</td>
</tr>
<tr>
<td>aPTT</td>
<td>activated partial thromboplastin time</td>
</tr>
<tr>
<td>ASA</td>
<td>aspirin</td>
</tr>
<tr>
<td>AVM</td>
<td>arteriovenous malformation</td>
</tr>
<tr>
<td>CAD</td>
<td>coronary artery disease</td>
</tr>
<tr>
<td>CBC</td>
<td>complete blood count</td>
</tr>
<tr>
<td>CMPD</td>
<td>chronic myeloproliferative disorder</td>
</tr>
<tr>
<td>DIC</td>
<td>disseminated intravascular coagulation</td>
</tr>
<tr>
<td>ELISA</td>
<td>enzyme linked immunosorbent assay</td>
</tr>
<tr>
<td>FDA</td>
<td>Food and Drug Administration</td>
</tr>
<tr>
<td>GI</td>
<td>gastrointestinal</td>
</tr>
<tr>
<td>GU</td>
<td>genitourinary</td>
</tr>
<tr>
<td>Hx</td>
<td>history</td>
</tr>
<tr>
<td>ICU</td>
<td>intensive care unit</td>
</tr>
<tr>
<td>INR</td>
<td>International Normalized Ratio</td>
</tr>
<tr>
<td>IVIG</td>
<td>intravenous immunoglobulin</td>
</tr>
<tr>
<td>LVAD</td>
<td>left ventricular assist device</td>
</tr>
<tr>
<td>MDS</td>
<td>myelodysplastic syndrome</td>
</tr>
<tr>
<td>NSAID</td>
<td>nonsteroidal anti-inflammatory drug</td>
</tr>
<tr>
<td>PCC3</td>
<td>3-factor prothrombin complex concentrate</td>
</tr>
<tr>
<td>PCC4</td>
<td>4-factor prothrombin complex concentrate</td>
</tr>
<tr>
<td>RBC</td>
<td>red blood cell</td>
</tr>
<tr>
<td>rFVIIa</td>
<td>recombinant factor VIIa</td>
</tr>
<tr>
<td>SSRI</td>
<td>selective serotonin reuptake inhibitor</td>
</tr>
<tr>
<td>VTE</td>
<td>venous thromboembolism</td>
</tr>
<tr>
<td>vWD</td>
<td>von Willebrand disease</td>
</tr>
<tr>
<td>vWF</td>
<td>von Willebrand factor</td>
</tr>
<tr>
<td>yo</td>
<td>year old</td>
</tr>
</tbody>
</table>
Bleeding Disorders: Achieving Optimal Therapeutic Outcomes in the Acute-care Setting

Instructions for Processing CE Credit with Enrollment Code

Pharmacists and Technicians:

All ACPE accredited activities which are processed on the eLearning site will be reported directly to CPE Monitor. To claim pharmacy credit, you must have your NABP e-profile ID, birth month, and birth day. If you do not have an NABP e-Profile ID, go to www.MyCPEMonitor.net for information and application. Please follow the instructions below to process your CPE credit for this activity.

1. The ASHP eLearning site allows participants to obtain statements of continuing education conveniently and immediately using any computer with an internet connection. Type the following link into your web browser to access the e-Learning site: http://elearning.ashp.org/my-activities

2. If you already have an account registered with ASHP, log in using your username and password. If you have not logged in to any of the ASHP sites before and/or are not a member of ASHP, you will need to set up an account. Click on the Register link and follow the registration instructions.

3. Once logged in to the site, enter the enrollment code for this activity in the field provided and click Redeem.

   Note: The Enrollment Code was announced at the end of the live activity. Please record the Enrollment Code in the grid below for your records.

4. The title of this activity should now appear in a pop-up box on your screen. Click on the Go button or the activity title.

5. Complete all required elements. A green check should appear as each required element is completed. You can now claim your credit.

6. Available credit(s) will appear beneath the completed required activities. Look for your profession in the list of available credits and click the appropriate Claim button. You might have to click to see more credit options if you don’t see your profession listed.

   CPE Credit for Pharmacists and Technicians: To claim continuing pharmacy education (CPE) credit, you will need to enter your NABP e-Profile ID, birth month, and birth day. Once you have entered this information the first time, it will auto fill in the future. Please note: All CPE credit processed on the eLearning site will be reported directly to CPE Monitor.

7. Review the information for the credit you are claiming. If all information appears to be correct, check the box at the bottom and click Claim. You will see a message if there are any problems claiming your credit.

8. After successfully claiming credit, you may print your statement of credit by clicking on Print. If you require a reprint of a statement of credit, you can return here at any time to print a duplicate. Please note that for CPE credit, printed statements may not be necessary because your credit will be reported directly to CPE Monitor.

<table>
<thead>
<tr>
<th>Date of Activity</th>
<th>Activity Title</th>
<th>Enrollment Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 29, 2013</td>
<td>Bleeding Disorders: Achieving Optimal Therapeutic Outcomes in the Acute-care Setting</td>
<td>_ _ _ _ _</td>
<td>1.0</td>
</tr>
</tbody>
</table>

NEED HELP? Contact eLearning@ashp.org.