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Wilda Rinehart, Diann Sloan, Clara Hurd

NCLEX®-PN Exam Prep

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Dedications

We would like to thank our families for tolerating our late nights and long hours. Also, thanks to Gene Sloan for his help without pay. Special thanks to all the graduates who have attended Rinehart and Associates Review Seminars. Thanks for allowing us to be a part of your success.

We are also delighted that Jessica Rinehart Wentz, RN, Whitney Hurd, RN, and Brad Sloan, RN, chose nursing as their profession above so many other professions.

Acknowledgments

Our special thanks to our editors, support staff, and nurse reviewers for helping us to organize our thoughts and experiences into a text for students and practicing professionals. You made the task before us challenging and enjoyable.

We Want to Hear from You!

As the reader of this book, *you* are our most important critic and commentator. We value your opinion and want to know what we're doing right, what we could do better, what areas you'd like to see us publish in, and any other words of wisdom you're willing to pass our way.

As an associate publisher for Pearson IT Certification, I welcome your comments. You can email or write me directly to let me know what you did or didn't like about this book—as well as what we can do to make our books better.

Please note that I cannot help you with technical problems related to the topic of this book. We do have a User Services group, however, where I will forward specific technical questions related to the book.

When you write, please be sure to include this book's title and author as well as your name, email address, and phone number. I will carefully review your comments and share them with the author and editors who worked on the book.

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Reader Services

Visit our website and register this book at www.pearsonitcertification.com/register for convenient access to any updates, downloads, or errata that might be available for this book.

Introduction

Since the first day of your nursing program, you have accumulated stacks of notes and materials that you were asked to learn. There is no way that you can study all of those materials. For this reason, we have developed a concise text that will help you organize your knowledge. This book will help you to prepare for the NCLEX PN using tried-and-true techniques used by the experts. This Introduction discusses the changes that have occurred in the NCLEX exam. You will learn about the future of the exam and how you can be a successful candidate. Whether you are taking the exam for the first time or have taken the exam several times, this book is designed for you.

The *Exam Prep* books help you to understand and appreciate the subject material that you need to know to pass nursing school and the exam. This book includes an in-depth discussion of all topics covered on the NCLEX. We take you on a self-guided tour of all of the areas covered on the NCLEX test plan and give you tips for passing. This book also contains practical tips for your nursing practice. You will find a user-friendly “Fast Facts” quick reference sheet containing lab values, normal fetal heart tones, and much more. Study tips, exam prep tips, case studies, math review, and test banks will help you practice those difficult pharmacology questions and help you manage the questions and alternative items that you will encounter on the exam. This book also includes chapters on the cultural aspects of nursing care and legalities. Each chapter concludes with a series of practice questions to help reinforce your understanding of the topics within the chapter and to help you prepare for the exam.

The licensed practical nurse is a valued member of the healthcare team. The PN is responsible for providing skilled nursing care for the client with a predictable outcome, PN candidates will be tested on their knowledge and application of how to care for the client. The National Council of State Boards of Nursing (NCSBN) is responsible for allocating the number and type of questions that the nurse must answer as well as the percentage of questions in each category. The differences between the test questions for a PN and RN are often subtle. Some examples of the responsibilities of the practical nurse are:

- ▶ The PN is expected to be able to monitor IV lines and medication and know how to recognize problems and the steps to take to correct them.
- ▶ The PN is expected to know the signs of a transfusion reaction and the action to be taken if such a reaction occurs.
- ▶ The PN is expected to know how to care for the central line site and be aware of signs of an air emboli.
- ▶ The PN can perform infection control measures, apply principles of sterile asepsis, and carry out a wide variety of procedures.

- ▶ The PN can administer medications topically, orally, intramuscularly, subcutaneously, sublingually, vaginally and rectally.
- ▶ The PN can administer enemas.
- ▶ The PN can perform tracheostomy care.
- ▶ The PN can perform colostomy care.
- ▶ The PN can administer nasogastric feeding.
- ▶ The PN can assist with feeding and ambulation.

The licensed practical nurse should visit his/her board of nursing site for a thorough list of duties and responsibilities included in the nurse practice act of his/her state of licensure.

Each chapter in the *Exam Prep* is extremely useful to the nurse seeking licensure as a practical nurse or registered nurse.

Organization

This book is organized by body systems. This method uses a format that most students find helpful for learning material quickly and easily.

- ▶ Each chapter begins with an outline of topics—this is a list of subtopics covered in the chapter.
- ▶ Each chapter has helpful notes, tips, and cautions that will help you study for the exam.
- ▶ Each chapter includes an in-depth discussion of the topics in that unit.
- ▶ Each chapter includes pharmacological agents used in the care of the client.
- ▶ Each chapter includes diagnostic studies used to determine client needs.
- ▶ Each chapter ends with a case study. This allows the student to use critical-thinking skills in the treatment of the client.

Instructional Features

This book provides multiple ways to learn and reinforce the exam material. Following are some of the helpful methods:

- ▶ **Study strategies:** Study strategies are discussed in a chapter called “Study and Exam Preparation Tips.”
- ▶ **Notes, tips, and cautions:** Notes, tips, and cautions contain various kinds of useful or practical information such as tips on nursing practice.
- ▶ **Apply Your Knowledge:** Questions covering the material in that particular chapter are included at the end of each chapter. There are three test banks, each with 166 items, and an additional test bank of management and pharmacology

questions. You will also find a CD of test questions to help you practice the NCLEX format. These help you to determine what you need to study further and what you already know.

- ▶ **Suggested Readings and Resources:** At the end of each chapter, this section directs you to additional resources for study. This book is also designed to be a tool used by nursing students and nurses in practice.

Extensive Practice Test Options

This book provides you with many opportunities to assess your knowledge and practice for the exam. The test options are as follows:

- ▶ **Exam questions:** Each chapter ends with a series of questions relevant to the chapter material.
- ▶ **Case studies:** Each chapter includes a case study in which you can practice applying all the information to a real-life scenario.
- ▶ **Practice exams:** This book includes three complete practice exams that reflect the type of questions you will see on the NCLEX exam. Use them to practice and to help you determine your strengths and weaknesses so that you can return to your weakest areas for further study.
- ▶ **CD exam:** The exam engine included on the CD includes questions from the book as well as additional questions for your review. Be sure to use the study mode first and then try the exam mode. The CD allows you to repeat the exam as often as you need, so don't hesitate to try again and again if you need to.

Final Review

The final review section of the book provides you with two valuable tools for preparing for the exam:

- ▶ **Fast Facts:** This is a condensed version of the information contained in the book and is an extremely useful tool for last-minute review.
- ▶ **Exam questions:** Three complete practice exams are included in this book plus more on the CD-ROM. All questions are written in the style and format used on the actual exam. Use these exams to prepare for the real exam until you are comfortable with your level of knowledge.

Other Valuable Tools

This book also includes several other valuable tools for preparing for the NCLEX exam:

- ▶ Appendix A, "Things You Forgot," contains a list of information commonly used by nurses.

- ▶ Appendix B, “Need to Know More?” includes a list of websites and organizations that are helpful resources for the nurse in practice.
- ▶ Appendix C, “Calculations,” provides you with a quick-and-easy guide to medication administration.
- ▶ Appendix D, “Most-Prescribed Medications in the United States,” is a list of commonly prescribed drugs with the generic and brand names and common nursing implications for use.
- ▶ Appendix E, “Alphabetical Listing of Nursing Boards in the United States and Protectorates,” is a useful list for nurses.
- ▶ An index provides a complete source of the location of specific information.

About the NCLEX Exam

The Computer Adaptive Test (CAT) provides a means for individualized testing of each candidate seeking licensure as a professional nurse. Selecting from a large test bank, the computer chooses questions based on the candidate’s ability and competence as demonstrated on the prior question.

For the PN exam, the minimum number of questions is 85 with a maximum of 205. The average candidate’s exam comprises approximately 160 items. These questions consist of multiple choice and alternative items. Alternative items may consist of drag and drop (place in sequence), multiple response (check all that apply), diagrams (hotspot), streaming video, audio, fill in blanks, and exhibits. Please read all instructions prior to making your decisions. You must answer the question that appears on the screen before another question is given, and you cannot skip questions or return to a previous question. It is imperative that you read each question carefully before you select a response. We suggest that you cover the answers with your nondominant hand and read the stem before looking at the answers. PN candidates are allowed five hours to take the exam.

The NCLEX consists of questions from the cognitive levels of knowledge, comprehension, application, and analysis. The majority of questions are written at the application and analysis levels. Questions incorporate the five stages of the nursing process:

- ▶ Assessment
- ▶ Analysis
- ▶ Planning
- ▶ Implementation
- ▶ Evaluation

There are also questions from the four categories of client needs (noted in bold in Table I.1). Client needs are divided into subcategories (noted in italics in Table I.1) that define the content within each of the four major categories tested on the NCLEX. Table I.1 outlines the categories and subcategories of client needs.

TABLE I.1 NCLEX PN Exam Categories and Subcategories

Client Needs	Percentage of Items from Each Category/Subcategory
Safe, Effective Care Environment	
<i>Coordinated Care</i>	13%–19%
<i>Safety and Infection Control</i>	11%–17%
Health Promotion and Maintenance	7%–13%
Psychosocial Integrity	7%–13%
Physiological Integrity	
<i>Basic Care and Comfort</i>	9%–15%
<i>Pharmacological and Parenteral Therapies</i>	11%–17%
<i>Reduction of Risk Potential</i>	9%–15%
<i>Physiological Adaptation</i>	9%–15%

The percentage of questions allotted to each category is determined by the National Council and depends on the results of a survey the council sends out every three years to new graduates. Based on the activity statements, the percentages change accordingly. It is safe to say that as the patient population changes, these categories will also change. This book reflects those changes particularly as they relate to the need for nurses in management roles, cultural diversity, and client criticality.

Computerized adaptive testing offers the candidate several advantages over the former paper-and-pencil exam. The test questions are stored in a large test bank and classified by test plan areas and level of difficulty. Depending on the answer given by the candidate, the computer presents another question that is either more difficult or less difficult. This allows the computer to determine the candidate's knowledge of the subject matter more precisely.

The pass/fail decision is not based on how many questions the candidate answers correctly, but on the difficulty of the questions answered correctly. Even though candidates might answer different questions and different numbers of questions, the test plan remains the same. All NCLEX examinations conform to this test plan. Each time you answer a question correctly, the next question gets harder until you miss a question; then an easier question is given until you answer correctly. This way the computer concludes whether a candidate has met the passing standard. If you are clearly above the passing standard at the minimum number of questions, the computer stops asking questions. If you are clearly below the passing standard, the computer stops asking questions. If your ability estimate is close to the passing standard, the computer continues to ask questions until either the maximum number of questions is asked or time expires. Should time expire, the last 60 questions are reviewed. To pass, the candidate must remain above the passing standard on the last 60 items.

The CAT exam offers another advantage. The candidate can schedule the exam at a time that is convenient and usually receives test results in 7 days or sooner. The candidate can retake the exam after 45 days in most states. We suggest that you review this text and others, and, if needed, take a review seminar prior to taking the NCLEX. Allow at least one week to study and prepare for the exam. Remember: You want to take the

exam only one time. You should visit the National Council's website at www.ncsbn.org for information regarding how to schedule your test. We suggest that you read the application process thoroughly to learn how you can register to take the exam.

Advice for Preparing for the Exam

Judicious use of this book, either alone or with a review seminar such as the one provided by Rinehart and Associates, will help you achieve your goal of becoming licensed to practice nursing. We suggest that you find a location where you can concentrate on the material each day. A minimum of two hours per day for at least two weeks is suggested. This book provides you with tips, notes, and sample questions. These questions will acquaint you with the types of questions you will see during the exam. The mock exam is formulated with those difficult management and delegation questions that you can score to determine your readiness to test. Pay particular attention to the notes, tips, and warnings throughout the book as well as the "Fast Facts" chapter. Using these elements will help you gain knowledge and reduce your stress as you prepare to take the test.

Advice for Test Day

From our years of experience in nursing and teaching, we have this advice for you:

- ▶ **Remember to know where you are going:** Be sure that you know the exact location of the exam. It is easy to get caught in traffic, and if you are late, you forfeit the exam time and your money. You will have to reschedule your exam and pay again.
- ▶ **Have your authorization number and forms of ID with you:** If you forget to take your identification, you will have to reschedule and will forfeit your testing time. Remember you will be photographed and fingerprinted prior to entering the testing site, so do not let this upset you.
- ▶ **Eat a high-protein meal prior to the exam:** You want good food for thought prior to taking the exam. Studies have shown that a meal high in vitamins such as B9 help us think more clearly during stressful times.
- ▶ **Take your time during the test:** Remember, you do not have to complete all the questions.
- ▶ **If you need to take a break, get up and walk around:** The clock will continue to tick, so don't take too much time.
- ▶ **Dress in layers:** The testing site might be cold or warm.

Hints for Using This Book

Each *Exam Prep* book follows a regular structure, along with cues about important or useful information. Here's the structure of a typical chapter:

- ▶ **Outline of topics:** Lists the topic headings within the chapter.
- ▶ **Headings and subheadings:** These are the main chapter topics and ancillary subtopics, designating the core content for study within the chapter.
- ▶ **Case studies:** This allows the student to use critical thinking skills in a specific client situation. The answers and complete explanations for the case study are included.
- ▶ **Key Concepts:** This section of the chapter includes the following three components for you to review and study to ensure your understanding of the chapter topics:
 - ▶ **Key Terms:** A list of the key terms from the chapter that you should be able to define.
 - ▶ **Diagnostics:** When appropriate, this section lists diagnostics used in the care of the client with a condition covered within the chapter.
 - ▶ **Pharmacological agents used in the care of the client with disorders found in the chapter:** This information is found in a table form and includes the generic name and brand name of the drug by category, the action of the drug, the potential side effects, and the nursing implications and care of the client taking that category of drugs.
- ▶ **Apply Your Knowledge:** Exam questions about the chapter content with answers and explanations are included in each chapter.
- ▶ **Suggested Reading and Resources:** Each chapter concludes with a supplementary resource list (including books, websites, and journals) relevant to the chapter content.

We suggest that you study from the front of the book and proceed in a logical sequence. When you have completed the case study and questions at the end of each chapter, you might feel the need to research using the resource list.

Contact the Author

We are interested in your study and success, and want you to pass on the first attempt. If after reviewing with this text, you would like to contact us, you can do so at Rinehart and Associates, PO Box 124, Booneville, MS 38829 or visit our website at www.nclexreview.net.

Remember, knowing the material is important, but being able to apply that knowledge is a must. When you understand the material, passing the NCLEX exam will be easy.

Good luck!

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Study and Exam Preparation Tips

There are many ways to approach studying for the NCLEX exam. The following tips have been found useful in helping the candidate study more quickly and retain more information.

Study Tips

Although individuals vary in the ways they learn, some basic principles apply to everyone. Adopt a study strategy that takes advantage of these principles:

- ▶ Learn the detailed information first.
- ▶ After you master the small details, look at the big picture.
- ▶ Devote at least one to two hours per day to studying the information.
- ▶ Don't try to pull out all your notes from nursing school. Focus on this book and the suggested resources.
- ▶ Learn from your mistakes. If you miss a question, look at the answer explanation carefully and look up information you don't understand.
- ▶ Talk out loud if you like. Others might think you're odd, but hearing the material spoken could help you to concentrate and remember.
- ▶ Study with a friend. If your study group focuses on success, it will help you to concentrate. But if they do not, don't waste your time with an ineffective group.
- ▶ Attend a live review like that offered by Rinehart and Associates. Participating in a live review where the instructors are dedicated to helping you succeed is immeasurable in value.
- ▶ When you feel ready to take the test, schedule a time. Don't put off taking the test too long because you might start to forget what you have learned.

As you can see by looking at the outline of this book, we organized the material in a logical sequence. Follow the outline and focus on learning the details as well as the big picture. Memorizing is not fun, but it is necessary when dealing with things such as laboratory values, conversion factors, and nutrition. First look at the details and then master the major concepts. Understanding "why" helps you to remember, so be sure you master the concept before you move on to the next topic.

Research has shown that attempting to assimilate both overall and detailed types of information at the same time can interfere with the overall learning process. For best performance on the exam, separate your study time into learning the details and then the big picture.

Exam Prep Tips

After learning the materials, you might want to use a number of testing tips:

- ▶ Read the questions carefully.
- ▶ Look for keywords.
- ▶ Watch for specific details.
- ▶ Eliminate options that are clearly wrong or incorrect.
- ▶ Look for similar options.
- ▶ Look for opposite answers.
- ▶ Use common sense.

These strategies provide you with additional skills, but do not consider them a substitute for good study habits or adequate knowledge of the content. Most questions that appear as test items above the pass point require the candidate to pull together information from a variety of sources. If you have thorough knowledge of the content, use good testing skills, and can apply your knowledge, you will pass the exam. Remember that testing skills, like any other skill, improve with practice.

Before discussing each strategy for successful test-taking, you should be familiar with the following terms:

- ▶ **Test item:** This is the entire question.
- ▶ **Stems:** Within a test item, these are the portions that ask a question or propose a problem.
- ▶ **Options:** These are the potential answers.
- ▶ **Alternative item:** These are the items that require the candidate to use a diagram, list in order of priority, check all that apply, calculate math or intake and output, or fill in blanks.

The candidate might be asked to read a graph or to put on earphones and listen to heart or breath sounds. He might also be asked to view a video and make an interpretation of the information given. You will want to practice listening to rales, rhonchi, and wheezing to review for the audio portion of the exam.

Read the Question Carefully

Reading ability and careful reading of exam questions often affect exam scores. Before selecting an answer, ask the following questions:

1. What is the question asking?
2. Does the question include keywords?

3. Is there relevant information in the stem?
4. How would I ask this question (in my own words)?
5. How would I answer this question (in my own words)?

After answering these questions, see whether there is an option similar to your answer. Is this option the best or most complete answer to the question?

Look for Keywords

Keywords in the stem should alert you to use care in choosing an answer. Avoid selecting answers that include keywords such as *always*, *never*, *all*, *every*, *only*, *must*, *no*, *except*, and *none*. Answers that contain these keywords are seldom correct because they limit and qualify potentially correct answers.

Watch for Specific Details

Careful reading of details in the stem can provide important clues to the correct option. For example, if the item seeks information on a short-term goal, look for something accomplishable within the hospital stay; if the item seeks information on a long-term goal, look for something accomplishable in the home or community.

Eliminate Options That Are Clearly Wrong or Incorrect

By systematically eliminating distracters that are clearly incorrect, you increase the probability of selecting the correct option. With the elimination of each distracter, you increase the probability of selecting the correct option by 25%.

Look for Similar Options

If a test item contains two or more options that could feasibly be correct or are similar in meaning, look for an umbrella term or phrase that encompasses the other correct options. The following list gives you hints about how to read the question and its options to identify the correct answer accurately:

- ▶ **Look at the parts of the options:** If an answer contains two or more parts, you can reduce the number of possible correct answers by identifying one part as incorrect.
- ▶ **Identify specific determiners:** Look for the same or similar words in the stem and in the options. The word in the stem that clues you to a similar word in the option or that limits potential options is a *specific determiner*. The option with a specific determiner is often the correct answer.

- ▶ **Identify words in the option that are closely associated with, but not identical to, words in the stem:** The option that contains words closely associated with words appearing in the stem is often the correct answer.
- ▶ **Be alert for grammatical inconsistencies:** The correct option must be consistent with the form of the question. If the item demands a response in the singular, an option in the plural would be incorrect, so look for an option in the singular.
- ▶ **Use relevant information from an earlier question:** Test writers often provide information that you can use in subsequent questions. For example, the test might ask several questions on the topic of diabetes mellitus. Write information that you remember about this topic on the paper or slate provided in the testing area. That information can help you later in the test when you encounter a similar question.
- ▶ **Look for the answer that differs from the other options:** This testing strategy is called *odd answer out*. An example of this type of question follows:

The nurse is attempting to evaluate the client's knowledge of diabetes. Which statement made by the client indicates a need for further teaching?

- A. The client states that he will check his blood glucose levels before meals.
- B. The client selects a 10-ounce steak from his menu.
- C. The client demonstrates how he will give himself insulin.
- D. The client verbalizes understanding of ways to improve circulation.

Answer B is correct. Answers A, C, and D all indicate knowledge of diabetes.

Answer B indicates that the client lacks understanding because the portion size for steak is 3 ounces.

Look for Opposite Answers

When you see opposites, one of these options is usually correct. Here is an example of this testing strategy:

A client with hemophilia is admitted with bleeding. Which action by the nurse indicates an understanding of hemophilia?

- A. The nurse applies heat to the joints.
- B. The nurse applies ice to the joints.
- C. The nurse offers to perform passive range of motion.
- D. The nurse elevates the extremity.

Answer B is correct. Hemophilia is a genetically obtained disorder in which there is an absence of clotting factor. Applying heat vasodilates and causes increased bleeding. This answer is the opposite of the correct choice, which is answer B. Answer C is incorrect

because range of motion should not be performed during bleeding episodes; doing so potentiates further bleeding. Perform range of motion after controlling the bleeding. In answer D, elevating the extremity is good, but it will not stop active bleeding.

CAUTION

Remember that when dealing with the legality questions on the NCLEX exam, the most critical client will be cared for by the RN. Nursing assistants only assist with activities of daily living when caring for the stable client. If the client has multiple lines, the licensed practical nurse or RN should care for that client. The term self-assign indicates the client that you would take care of yourself.

Finally, follow common sense practice when studying. Study when you are alert, reduce or eliminate distractions, take breaks when you are tired, and focus on the goal. Remember, you want to take the NCLEX exam only one time.

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10

CHAPTER TEN

Care of the Client with Hematological Disorders

The hematologic system consists of blood, blood cells, and blood forming organs. Because the circulation of blood provides oxygen and nutrients to all body systems, a functioning hematological system is essential to health and well-being. A disorder in the system might result from a lack of function, a reduction in production, or an increase in the destruction of blood cells. This chapter reviews common disorders affecting the blood.

Anemia

When anemia occurs, people have a decrease in the number of red blood cells or a decrease in the capability of these red blood cells to carry oxygen. Anemia is not a disease but is a symptom of other disorders, such as thalassemia and iron deficiency anemia. The causes of anemia are as follows:

- ▶ Increased red blood cell destruction
- ▶ Blood loss
- ▶ Poor dietary iron intake
- ▶ Poor absorption
- ▶ Parasites

The symptoms of anemia are as follows:

- ▶ Fatigue
- ▶ Pallor (skin might be waxy)
- ▶ Tachypnea
- ▶ Cardiac changes (heart murmur, cardiomegaly)
- ▶ Dyspnea
- ▶ Headaches
- ▶ Dizziness
- ▶ Depression
- ▶ Growth retardation
- ▶ Late sexual maturation

CAUTION

Children with persistent anemia might experience frequent bouts of otitis media and upper respiratory infections.

Pernicious Anemia

The intrinsic factor is missing in pernicious anemia, resulting in an inability to absorb vitamin B12. Pernicious anemia is common in the elderly and clients who have had a gastric resection. It can also occur from poor dietary intake of foods containing B12, especially in vegetarian diets or those lacking dairy products. Symptoms of pernicious anemia include

- ▶ Pallor
- ▶ Jaundice
- ▶ Smooth, beefy red tongue (glossitis)
- ▶ Fatigue
- ▶ Weight loss
- ▶ Paresthesia
- ▶ Diarrhea
- ▶ Problems with proprioception (sense of position in space)

The treatment for pernicious anemia is the administration of injections of cyanocobalamin (vitamin B12). The injections are given weekly until adequate levels are reached, and then monthly for maintenance. The nurse should be aware of the following points when giving this drug:

- ▶ Do not mix in a syringe with other medications.
- ▶ Administer IM or deep subcutaneously.

Aplastic Anemia

Aplastic anemia is a rare disorder that occurs when there is depression of the blood-forming elements of the bone marrow. The cells are replaced with fat. Symptoms associated with aplastic anemia include

- ▶ Decreased erythrocytes
- ▶ Leukopenia
- ▶ Thrombocytopenia

Aplastic anemia can be either primary (congenital) or secondary (acquired). Approximately half of all acquired cases are from unknown causes. Several factors can contribute to the development of aplastic anemia and can include

- ▶ Drug toxicity, especially chemotherapeutic agents and the antibiotic chloramphenicol
- ▶ Multiple blood transfusions
- ▶ Radiation exposure
- ▶ Autoimmune states
- ▶ Sickle cell syndrome
- ▶ Leukemia
- ▶ HIV
- ▶ Hepatitis B

Treatment of acquired aplastic anemia is accomplished by first identifying that something is preventing the bone marrow from carrying out its basic function. The focus of treatment is on the identification and removal of the offending agent. The client might also receive immunosuppressive therapies, including

- ▶ Antilymphocyte globulin (ALG) or antithymocyte globulin (ATG)
- ▶ Androgens
- ▶ Cyclosporine (Sandimmune)
- ▶ Methylprednisolone

Because of the possible fatal course that can develop from this disease, a bone marrow transplantation is also a treatment for consideration early in the disease.

Sickle Cell Anemia

Sickle cell anemia is the most common genetic disease found in the United States. It is more common in the African-American population. This disorder is inherited as autosomal recessive. A disease inherited in this manner is characterized by each parent having the sickle cell trait, resulting in a 25% chance of producing offspring with sickle cell anemia with each pregnancy.

A client with sickle cell anemia has red blood cells that have an abnormal crescent shape, as illustrated in Figure 10.1. Because they cannot flow easily through tiny capillary beds, they can become clumped, cause obstruction, and become an impairment in tissue perfusion. Red blood cells containing Hgb S are prone to sickling when exposed to decreased oxygen in the blood. After they become sickled, they are more fragile, rigid, and rapidly destroyed.

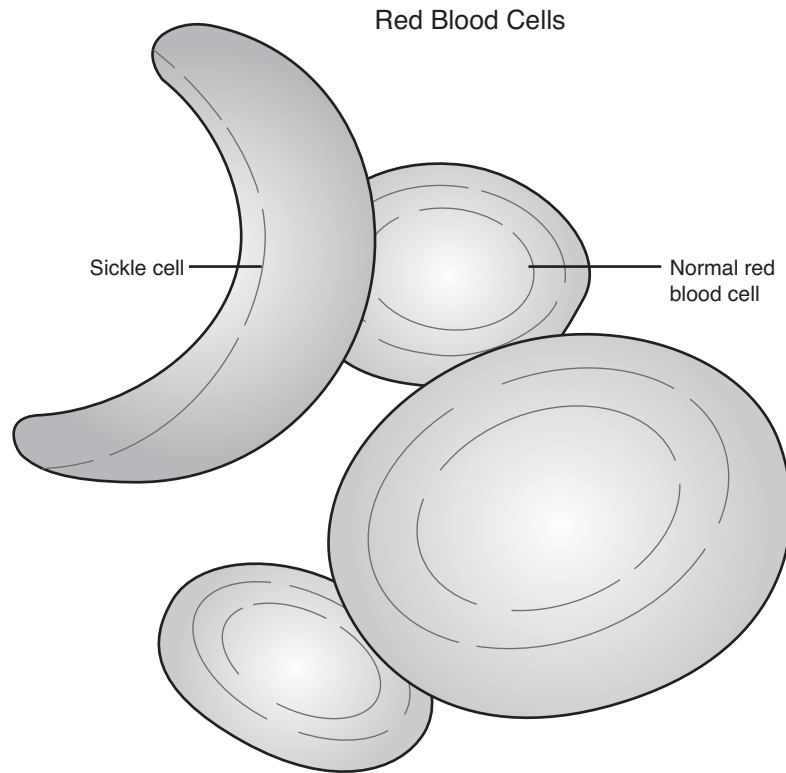


FIGURE 10.1 Normal and sickled red blood cells.

The most common forms of this disease in the United States are

- ▶ **Sickle cell anemia:** Homozygous form (Hgb S). This is the most severe form; there is no cure.
- ▶ **Sickle cell-C disease:** Heterozygous (Hgb S and Hgb C).
- ▶ **S thalassemia disease:** A combination of sickle cell trait and B+–thalassemia trait (patients can still produce normal hemoglobin).

Some clients might have *sickle cell trait*. When this occurs a child inherits normal hemoglobin from one parent and hemoglobin S (the abnormal hemoglobin) from the other. The same defect exists as in sickle cell anemia, but only portions of the hemoglobin are Hgb S. The majority of the blood is Hgb A (normal hemoglobin). These clients might not exhibit symptoms. If these clients are exposed to low oxygen levels, symptomology and severe anemia can occur. Non-painful gross hematuria is the major complication that might occur with sickle cell trait.

The defect in sickle cell anemia can result in an obstruction in blood flow due to sickling or increased destruction of red blood cells (RBCs). Clinical manifestations of the disease are related to these defects and include

- ▶ Splenomegaly
- ▶ Hepatomegaly
- ▶ Hematuria

- ▶ Dilute urine
- ▶ Enuresis
- ▶ Skeletal deformities
- ▶ Headaches
- ▶ Aphasia
- ▶ Seizures
- ▶ Stroke
- ▶ Cardiomegaly
- ▶ Anorexia
- ▶ Exercise intolerance
- ▶ Hemosiderosis
- ▶ Gallstones
- ▶ Leg ulcers
- ▶ Growth retardation

Several crises or exacerbations happen with sickle cell anemia. Table 10.1 outlines the types of crises associated with sickle cell anemia. The basic pathophysiology for most of the crises involves circulatory compromise in the micro circulation caused by the sickled cells. You should study this table, differentiating the types and placing primary focus on the most common type of crisis: vaso-occlusive.

TABLE 10.1 Sickle Cell Anemia Crises

Type of Crisis	Description	Associated Symptoms Include
Vaso-occlusive	Usually appears after the age of five. Sickling of cells results in obstruction of blood vessels, leading to a lack of oxygen to the area, which causes localized hypoxia and necrosis. It's usually not life-threatening. Hand-foot syndrome can be a result of this crisis. It is a skeletal problem that occurs in children six months to two years of age. Swelling is found in the hands and feet but usually resolves itself in two weeks.	Severe pain: Bone, abdominal, muscular, or thoracic. Jaundice, dark urine, priapism, fever, leukocytosis, lethargy, fatigue, sleepiness.
Sequestration	Occurs between the age of two months and five years. There is massive pooling of RBCs in the liver and spleen.	Lethargy, pale skin, hypovolemia (tachycardia, decrease in urinary output, and so on).

(continues)

TABLE 10.1 *Continued*

Type of Crisis	Description	Associated Symptoms Include
Aplastic	Results from bone marrow depression, is associated with viral infections (especially human parvovirus), and leads to RBC lysis and severe anemia.	Lethargy, pale skin, shortness of breath, altered mental status.
Hyperhemolytic	Rare; the result of certain drugs or infections. RBC destruction occurs.	Abdominal distention, jaundice, dark urine, reticulocytosis. If reticulocytosis occurs, it suggests some other associated problem (for example, a deficiency in glucose-6 phosphate dehydrogenase [G6PD]).
Stroke	Sickled cells block major blood vessels in the brain leading to an infarction.	Neurological impairments (see Chapter 11, “Care of the Client with Disorders of the Neurological System,” for clinical manifestations of a stroke).
Chest Syndrome	Similar to pneumonia; due to sickling in lung blood vessels.	Chest pain, fever, cough, anemia.
Overwhelming Infection	Especially streptococcus pneumonia, Haemophilus influenzae. It is due to a defect in spleen function. Alert: This is the number one cause of death in children under the age of five!	Symptoms of infection and septicemia (high fever, tachycardia, tachypnea, and so on).

*Sickle cell crises might be preceded by a recent infection or stressor, dehydration, strenuous activity, or high altitudes.

NOTE

The vaso-occlusive crisis is the primary crisis type that causes the client to have pain.

The treatment for sickle cell anemia is twofold. The goals are to prevent sickling and treat sickle cell crises. This is accomplished by several measures, including

- ▶ Decrease energy needs by the use of bedrest during exacerbations or crises.
- ▶ Provide frequent rest periods during everyday activities.
- ▶ Provide hydration.
- ▶ Avoid contact sports due to splenomegaly.
- ▶ Replace missing electrolytes.
- ▶ Administer prescribed antibiotics.
- ▶ Provide vaccination with HIB, pneumococcal, and meningococcal immunizations.
- ▶ Administer oxygen as prescribed.
- ▶ Monitor the administration of ordered short-term blood transfusions:
 - ▶ Packed RBC in aplastic crises, hyperhemolytic, splenic sequestration, chest syndrome, and stroke.

- ▶ Blood is also given before major surgery to prevent anoxia and to suppress sickle cell formation.

CAUTION

When multiple transfusions are given, reduce iron overload and hemosiderosis with subcutaneous chelating injections of deferoxamine (Desferal).

- ▶ A splenectomy might be performed for splenic sequestration.
- ▶ Manage pain; apply heat to painful areas, if appropriate.
- ▶ Assist with teaching the client to seek medical attention with signs of infection and instruct when to seek medical attention.
- ▶ Reinforce teaching that the client should avoid high altitudes.
- ▶ Assess vital signs.
- ▶ Monitor intake and output.
- ▶ Pharmacological interventions include
 - ▶ Pain medication including morphine sulfate, patient-controlled analgesia, oxycodone, Tylenol with codeine, and NSAIDs
 - ▶ Hydroxurea (Droxia)
- ▶ Participate in reinforcing genetic counseling, including the following information:
 - ▶ Sickle cell anemia is an autosomal-recessive disorder.
 - ▶ There is a 25% chance of passing the disease to a child.
 - ▶ If a child acquires one gene, the child is also a carrier.

TIP

An easy way to remember general nursing care for clients with sickle cell anemia is to remember the following:

- ▶ H—Heat
- ▶ H—Hydration
- ▶ O—Oxygen
- ▶ P—Pain relief

Iron Deficiency Anemia

There is a simple lack of iron in this disorder. It is the most prevalent nutritional disorder in the United States. The cause could be the result of poor dietary intake of iron sources. Age and financial status have an influence in this disorder with 25% of children 6–24 months of age in the low socioeconomic population having a diagnosis of anemia. Adolescents are at risk due to rapid growth needs and inadequate nutritional

eating practices. Premature and multiple birth babies have reduced fetal iron supplies, making them at risk of iron deficiency anemia. Other causes are associated factors include

- ▶ People on vegetarian diets
- ▶ Maternal iron deficiency
- ▶ Malabsorptive disorders
- ▶ Diarrhea
- ▶ Hemorrhage
- ▶ Parasite infestations
- ▶ B12 and folic acid deficiency

The symptoms of iron deficiency anemia are the same as general anemia. There are a few symptoms for severe, prolonged anemia that are different (included here):

- ▶ Brittle nails
- ▶ Cheilosis (ulcers in the corner of the mouth)
- ▶ Sore tongue
- ▶ Koilonychia (concave or spoon-shaped fingernails)
- ▶ Pica (craving to eat unusual substances such as clay or starch)

The management of iron deficiency anemia is conservative. The cause of the anemia is explored. The healthcare provider will focus on determining the source of the blood loss. A stool specimen for occult blood and endoscopic exam might be ordered to rule out these common GI sources of bleeding. A thorough menstrual history is obtained from female patients with anemia to determine whether blood loss might be the source of the anemia.

The treatment for iron deficiency anemia includes treating the underlying cause of the anemia, medications for iron replacement, client education, and administration of blood transfusions in severe cases of depletion. The drugs used during therapy include ferrous sulfate (Feosol) and iron dextran injection (Imferon).

TIP

IM iron is called IMferon.

The examinee should remember the following teaching and administration points when giving iron:

- ▶ Administer iron preparations with orange juice to enhance absorption.
- ▶ If giving an iron elixir, it should be administered through a straw to prevent staining the teeth.

- ▶ When administering iron IM, it should be given through the IM Z track method.
- ▶ Instruct the patient that her stools might be dark green or black when taking iron preparations.
- ▶ When administering IM or IV, monitor closely for anaphylaxis.
- ▶ Client education should focus on drug administration and side effects. The client should be instructed to increase dietary iron intake (good sources of iron include egg yolk; green, leafy vegetables; iron-fortified cereals; peanut butter; raisins; molasses; beans; oatmeal; dried fruit; and organ meats).

Thalassemia

Thalassemia is an autosomal-recessive group of hereditary blood disorders that is found mostly in the African-Americans, Asians, and the Middle East populations. The most common forms are

- ▶ **Heterozygous**
 - ▶ Thalassemia minor or thalassemia trait (mild microcytic anemia occurs)
 - ▶ Thalassemia intermedia (splenomegaly and severe anemia are manifested)
- ▶ **Homozygous**
 - ▶ Thalassemia major or Cooley's anemia (severely anemic), where patients cannot live without blood transfusions.
 - ▶ The client's red blood cells are destroyed prematurely.

The signs and symptoms associated with thalassemia are frequently associated with anemia and include

- ▶ Pallor
- ▶ Loss of weight
- ▶ Hepatosplenomegaly
- ▶ Severe anemia
- ▶ Folic acid deficiency
- ▶ Osteoporosis and associated fractures
- ▶ Heart murmurs
- ▶ Darkening of skin
- ▶ Headache
- ▶ Epistaxis
- ▶ Gout

- ▶ Bone pain
- ▶ Hemosiderosis (excess iron in body tissues)
- ▶ Hemochromatosis (excess iron storage resulting in cell damage)

The treatment of thalassemia revolves around maintenance of adequate hemoglobin that will allow oxygenation of tissues and prevention and treatment of complications. The following objectives will be accomplished by the nurse:

- ▶ Monitoring ordered blood transfusion
- ▶ Monitoring for excess hemosiderosis and hepatitis
- ▶ Observing for signs and symptoms of infection
- ▶ Administering ordered folic acid
- ▶ Reinforce teaching to prevent fractures: no contact sports, slippery rugs, and so on
- ▶ Implementing iron chelation treatment with deferoxamine (Desferal)
- ▶ Supporting the patient and family during bone marrow transplantation

Polycythemia Vera

The polycythemia vera disorder is characterized by thicker than normal blood. With polycythemia vera, there is an increase in the client's hemoglobin to levels of 18 g/dL, RBC of 6 million/mm, or hematocrit at 55% or greater and increased platelets.

The clinical manifestations that are assessed in clients with polycythemia vera relate to the increased viscosity of the blood. The following list describes some of the symptoms that are associated with polycythemia vera:

- ▶ Enlarged spleen
- ▶ Ruddy or flushed (plethoric) complexion
- ▶ Angina
- ▶ Thrombophlebitis
- ▶ Dizziness
- ▶ Tinnitus
- ▶ Fatigue
- ▶ Paresthesia
- ▶ Dyspnea
- ▶ Pruritus
- ▶ Burning sensation in fingers and toes (erythromelalgia)

If polycythemia vera is not treated, few patients will live longer than two years. Treatments revolve around reducing the thickness of the client's blood and providing an easier flow of blood through the blood vessel. This is accomplished by

- ▶ Repeated phlebotomies (2–5 times per week)
- ▶ Increasing hydration (3 liters of fluid a day)
- ▶ Promoting venous return through
 - ▶ Elevation of legs when sitting
 - ▶ Use of support hose
- ▶ Pharmacological interventions, including the following:
 - ▶ Anticoagulant therapy
 - ▶ Allopurinol for increased uric acid levels
 - ▶ Persantine for ischemic symptoms
 - ▶ Hydroxurea (Droxia)
 - ▶ Low-dose aspirin
 - ▶ Agrylin

CAUTION

With polycythemia, the client is at risk for cerebrovascular accident (CVA), myocardial infarction (MI), and bleeding due to dysfunctional platelets.

Hemophilia

In hemophilia, there is a deficiency of one of the factors necessary for blood coagulation. An abnormal clotting pattern occurs, resulting in an ineffective clot. Hemophilia is inherited as a sex-linked disorder. It is an x-linked recessive disorder. The mother passes this disorder to her male children. When a female inherits the gene from her father, she has a 50% chance of transmitting it to her son. Approximately 40% of patients with hemophilia have no hereditary genetic links. Clients lacking factor VIII have hemophilia A (Classic hemophilia); clients lacking factor IX have hemophilia B (Christmas disease). The discussion that follows focuses on Factor VIII deficiencies because they are the most common (75% of cases).

There are varying degrees of severity associated with hemophilia that relate to the amount of Factor VIII activity. Severe hemophilia occurs when there is 1% of Factor VIII activity. This client can have spontaneous bleeding without trauma. Moderate hemophilia happens with 1%–5% of Factor VIII activity and bleedings occurs with trauma. The last degree of severity is the mild form that occurs with 5%–50% of Factor

VIII active. Clients with mild hemophilia bleed with severe trauma or when surgery is performed. Signs or symptoms of hemophilia include

- ▶ Bleeding and bruising easily.
- ▶ Prolonged bleeding from any orifice or anywhere in the body.
- ▶ Hemorrhaging from minor cuts or with teeth eruption.
- ▶ Joint hemorrhages or hemarthrosis. Early signs are stiffness, tingling or aching in the joint, and inability to move the joint. Other symptoms are warmth, redness, swelling, and pain.
- ▶ Post-operative hemorrhaging.
- ▶ Epistaxis.
- ▶ Hematuria.
- ▶ Internal bleeding. Spinal cord hematomas can lead to paralysis.
- ▶ Intracranial bleeding.

CAUTION

Intracranial bleeding is the major cause of death in clients with hemophilia.

The primary goals of treatment for clients with hemophilia are to promote adequate blood clotting and to prevent and treat complications or problems associated with the disease. Nursing measures for goal accomplishment include the following:

- ▶ Administration of prescribed Factor VIII concentrate (monoclonal) and recombinant Factor VIII concentrate (sold as a drug, not a drug product); factor replacement might be administered prophylactically

CAUTION

Cryoprecipitates are no longer used for treatment of hemophilia because HIV and hepatitis cannot be removed.

▶ **Control localized bleeding**

- ▶ Topical coagulants
- ▶ Institute R-I-C-E (rest, ice, compression, elevation) treatment
- ▶ Manage pain (ibuprofen is used with caution due to its platelet inhibition properties)
- ▶ No rectal temperatures
- ▶ Monitor the administration of blood transfusions as ordered

- ▶ Administer prescribed desmopressin acetate (DDAVP) for mild hemophilia (increases Factor VIII by releasing factors from storage sites)
- ▶ Consult with physical therapy after bleeding under control for muscle and joint strengthening; no passive range of motion due to possibility of rebleed
- ▶ **Reinforce teaching both the family and client on prevention of injuries**
 - ▶ Medic-Alert bracelet
 - ▶ Padding of furniture corners, if toddler
 - ▶ Avoid contact sports (suggest swimming or golf)
 - ▶ Signs and symptoms of hemarthrosis
 - ▶ Use of soft toothbrush and regular dental visits
 - ▶ Avoid aspirin
 - ▶ Genetic counseling

Transfusion Reactions

When clients lack blood or blood components, it might be necessary for these components to be replaced. Possible causes of the need for a transfusion include trauma, red blood cell destruction disorders, and bone marrow depression. Table 10.2 outlines types of reactions associated with blood transfusions. Study the symptoms extensively and expect to see items related to reactions on your nursing exams.

TABLE 10.2 Blood Transfusion Reactions

Type of Reaction	Symptoms	Treatment
Hemolytic (due to blood type or Rh incompatibility)	Headache, chest pain, anxiety, lower back pain, hypotension, tachycardia, tachypnea, hemoglobinemia, bronchospasm, vascular collapse	Stop blood transfusion. Send tubing and blood to laboratory. Maintain blood volume and renal perfusion.
Febrile reaction	Chills, tachycardia, fever, hypotension	Antipyretic administration; pretreat with future transfusions or give washed RBCs.
Allergic reaction (patient usually has a history of allergies)	Urticaria, itching, respiratory distress, anaphylaxis	Pretreat with antihistamine.
Bacterial reaction due to contaminated blood (not a common occurrence)	Tachycardia, hypotension, fever, chills, shock	Same treatment as septic shock.
Circulatory overload (more likely in elderly, children, and clients with multiple transfusions of whole blood)	Symptoms of congestive heart failure: hypertension, bounding pulse, distended neck veins	Monitor intake and output. Infuse blood slowly. Administer ordered diuretics.

Case Study

Joey is a 5-year-old boy admitted to the pediatric unit with a diagnosis of sickle cell anemia. He is in pain, and his parents reported that he had been running a temperature for three days due to bronchitis. The doctor diagnoses vaso-occlusive crisis. Joey's temperature is 101.8° F and you assess edema of the right knee.

1. What events could have triggered this crisis? Give a description of vaso-occlusive crisis, as well as signs and symptoms associated with the disorder.
2. Recommend three priority nursing diagnosis on admission of the child.
3. Which plans do you expect to be included in the physician's prescription?
4. This is Joey's first admission with this diagnosis. Name five teaching plans you will recommend to educate Joey's parents prior to discharge.

Answers to Case Study

1. Triggers of a crisis include low oxygen levels, stress, infection, and dehydration. A probable cause of Joey's crisis is the infection and fever noted in the client history.

Vaso-occlusive crisis occurs when sickling cells cause occlusion of vessels, decreasing the amount of oxygen to the localized site causing pain and necrosis. Signs and symptoms include fever, pain, and tissue engorgement.

2. Priority nursing diagnoses include
 - ▶ Risk for injury
 - ▶ Infection
 - ▶ Pain
 - ▶ Impaired tissue perfusion
3. The nurse would expect plans to include
 - ▶ Hydration implementation PO or IV
 - ▶ Oxygen orders and/or blood products to improve tissue perfusion and prevent further sickling
 - ▶ Pain medication around the clock
 - ▶ A heating pad to involved areas to improve comfort
4. Education needs are related to the disease process and include
 - ▶ Preventing crisis (adequate hydration, avoiding altitudes and low oxygen levels, avoiding stress)
 - ▶ Signs to observe that indicate a crisis episode
 - ▶ Signs and symptoms of infection
 - ▶ Resumption of age-appropriate activities that are no contact; for example, swimming
 - ▶ Explanation of the disease process and genetic factors
 - ▶ Explanation of the healthcare regimen prescribed by the physician

Key Concepts

This chapter discussed the most common types of hematological disorders. The key concepts will help the nursing graduate on the NCLEX exam by focusing on the most commonly used key terms, diagnostic exams, and pharmacological agents used to treat these disorders. This section is covered on the NCLEX exam in the area of physiological integrity.

Key Terms

- ▶ Dyspnea
- ▶ Enuresis
- ▶ Fatigue
- ▶ Hemarthrosis
- ▶ Hemolysis
- ▶ Jaundice
- ▶ Leukopenia
- ▶ Otitis media
- ▶ Pallor
- ▶ Paresthesia
- ▶ Priapism
- ▶ Pruritus
- ▶ Sequestration
- ▶ Tachypnea
- ▶ Thrombocytopenia
- ▶ Tinnitus
- ▶ Upper respiratory infections

Diagnostic Tests for Review

The diagnostic tests for a client with hematological disorders are the same as any other routine hospitalization of a client (CBC, urinalysis, and chest x-ray). Specific tests, such as the Schilling test for B12 deficiency, and sickledex and Hgb electrophoresis, are used to diagnose sickle cell anemia and thalassemia. Review these tests prior to taking an exam for a better understanding of the disease process:

- ▶ Schilling test
- ▶ CBC with differential
- ▶ Hemoglobin electrophoresis

Pharmacological Agents Used in Hematological Disorders

A client with a hematological disorder will receive a number of medications to stimulate red blood cell production and replace needed vitamins or nutrients. Analgesics are also a requirement for the pain associated with some diseases. You'll need to review the drugs listed in Table 10.3 prior to an exam for knowledge of their effects, side effects, adverse reactions, and nursing implications. These medications are not inclusive of all the agents used to treat gastrointestinal disorders; therefore, you will want to keep a current pharmacology text handy for reference.

TABLE 10.3 Hematological Pharmacological Agents

Name	Action	Side Effects Include	Pertinent Nursing Implications
Vitamin B12 (cyanocobalamin)	Necessary for metabolic processes and required for RBC formation. Prevents B12 deficiency and treats pernicious anemia.	Diarrhea, itching, rash, hypokalemia, anaphylaxis, pain at IM site.	Available IM, subcutaneously, intranasal (useful by this route only if need is due to a nutritional deficiency). Teach foods high in vitamin B12: meats, seafood, egg yolk, and fermented cheese. PO can be administered with meals or mixed with fruit juice. Intranasal (use within an hour of hot food or liquid). Instruct of lifelong need after gastrectomy.
Ferrous sulfate (Femiron, Feostat) Imferon Tip: IM iron is Imferon	An essential mineral found in hemoglobin. Prevents and treats iron deficiency.	IM and IV: dizziness, seizures, tachycardia, hypotension. IM: skin staining, arthralgia, myalgia, anaphylaxis. PO: constipation, dark stools, diarrhea, pain in epigastric region, staining of teeth with liquid preparations.	Assess for signs of anaphylaxis (rash, itching, laryngeal edema with wheezing). Monitor Hgb and Hct levels. Monitor for overdose: stomach pain, fever, nausea and vomiting, bluish lips and fingernails, seizures, and tachycardia. Avoid antacids, coffee, tea, dairy products, or whole grain breads when on PO iron. Dilute liquid iron in water or fruit juice. Administer with a straw or place drops at back of throat. Give iron with citrus fruit or juice to enhance absorption (can also be taken with vitamin C pill).
Hydroxyurea (Droxia)	Reduces painful crises in sickle cell anemia. An anticancer agent.	Anorexia, nausea, vomiting, constipation, hepatitis, alopecia, rashes, pruritus, leukopenia, anemia, thrombocytopenia.	Monitor laboratory values for signs of leukopenia, anemia, and thrombocytopenia in the client. Assess for side and adverse effects.

Apply Your Knowledge

This chapter provided information regarding the care of clients with hematological disorders. The following questions test your knowledge regarding the safe, effective care and management of these clients. The nurse should also refer to the chapter content, key terms, diagnostics, and pharmacological agents sections to assist in answering these questions.

Exam Questions

1. The nurse can best promote hydration in a 4-year-old with sickle cell anemia by which of the following?
 - A. Telling the child how important it is to drink fluids
 - B. Forcing fluids of bottled water every two hours
 - C. Providing soup on the lunch and dinner meals
 - D. Offering flavored ice pops or iced Slurpees
2. The nurse administering a blood transfusion suspects a reaction has occurred. Which signs and symptoms would the nurse expect with an allergic reaction to blood?
 - A. Fever and chills
 - B. Hypotension and tachycardia
 - C. Rash and hives
 - D. Decreased urinary output and hypertension
3. The nurse is caring for an adult with hemophilia. Which clinical manifestation causes the nurse the most concern?
 - A. Hemarthrosis of the elbow
 - B. Bruise of the ankle
 - C. Oozing of blood at the IV site
 - D. Unilateral numbness and lack of movement of arm
4. The nurse is contributing to a parent education program about sickle cell anemia. Which of the following information should the nurse recommend including?
 - A. Apply cold to painful areas
 - B. Limit fluid intake
 - C. Increase activity during exacerbations
 - D. Avoid high altitudes

5. Which should the nurse observe for as a complication of Factor VIII administration?
 - A. Fluid volume excess
 - B. Sepsis
 - C. Blood transfusion reaction
 - D. Thrombus formation
6. Which of the following is not a named sickle cell anemia crisis?
 - A. Aplastic
 - B. Vaso-occlusive
 - C. Splenic sequestration
 - D. Erythropoiesis
7. A client receiving a blood transfusion exhibits lower back pain, fever, and dyspnea. What is the nurse's initial action?
 - A. Stop the blood transfusion and keep the vein open with normal saline
 - B. Administer epinephrine per unit protocol
 - C. Notify the physician
 - D. Obtain a set of vital signs
8. A client has been admitted with sickle cell anemia in crisis. Which physician prescription would the nurse anticipate?
 - A. Restrict fluids 200mL/shift
 - B. Ice to painful joints
 - C. Start O₂ at 3 L/min
 - D. Ambulate in hall every two hours
9. A child is in the hospital with a diagnosis of thalassemia major. Multiple blood transfusions have been ordered along with a chelating agent. The father asks the nurse, "Why does my son get this drug every time he gets blood?" What does the nurse explain as the purpose of chelating drugs?
 - A. Stabilize clots in the vascular system
 - B. Decrease the chance of a blood reaction
 - C. Eliminate iron excess
 - D. Boost oxygen delivery to the cells

10. Which does the nurse recognize as the most accurate in diagnosing sickle cell anemia?
- A. Sickledex
 - B. Hemoglobin electrophoresis
 - C. Partial thromboplastin time
 - D. Complete blood count

Answers to Exam Questions

1. Answer D is correct. A child will likely accept the fluids in this answer better than the others listed. The child is too young to understand the statement in answer A, so it is inappropriate. Answers B and C are good sources of fluids but would not be best or acceptable for a 3-year-old, so they are incorrect.
2. Answer C is correct. Other symptoms include respiratory distress and anaphylaxis. Answer A describes febrile nonhemolytic reaction, so it is incorrect. Answer B occurs with hemolytic reaction and answer D is not associated with a blood transfusion reaction, so they are incorrect.
3. Answer D is correct. The neurological symptoms could mean an intracranial bleed has occurred. The answers in A, B, and C are reasons for concern, but they are not the priority, so they are incorrect.
4. Answer D is correct. High altitudes can increase oxygen consumption and trigger a crisis. The client should apply heat to painful areas, increase hydration, and rest during crisis making A, B, and C incorrect options.
5. Answer C is correct. Factor VIII is a blood product, so the nurse would monitor for a transfusion reaction. Answer A is unlikely due to the small volume of fluid administered, so it is wrong. Answers B and D are not immediate concerns for this short-term infusion, so they are incorrect.
6. Answer D is correct. Erythropoiesis is the formation of RBCs not related to sickle cell crisis. The answers in A, B, and C are types of sickle cell anemia crises, so they are incorrect.
7. Answer A is correct. The nurse would first ensure that the patient doesn't get any more of the wrong blood due to displaying symptoms of a hemolytic blood reaction. Answers B, C, and D are proper actions with a blood transfusion reaction, but none is the initial action, so they are incorrect.
8. Answer C is correct. It is not unusual for patients to receive oxygen to prevent additional sickling of cells. The answers in A and B are incorrect because these are contraindicated in sickle cell anemia. Answer D is not recommended for patients in sickle cell crisis, so it is incorrect.
9. Answer C is correct. A chelating agent such as deferoxamine (Desferal) is given to eliminate excess iron. The answers in A, B, and D are not the action of chelating agents, so they are incorrect.

10. Answer B is correct. Hemoglobin electrophoresis is the test that verifies the diagnosis of sickle cell and is the most accurate because it separates the different hemoglobins. Answer A is a screening tool that lacks the accuracy of electrophoresis, so it is incorrect. The answers in C and D are not directly related to sickle cell, so they are incorrect.

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