Designed for recently graduated RNs and nurses transitioning to a new clinical area, this extensive clinical reference is the best resource to provide essential information on the critical care and emergency care specialty areas. Concise and practical entries provide fundamental coverage of the most common clinical problems and issues encountered in nursing practice today.

Alphabetized for easy access, each entry includes a definition and description of the clinical problem; etiology; clinical aspects, such as assessment, nursing interventions, management, and implications; and outcomes.

Each entry focuses on the role of the nurse throughout the treatment process, and discusses the role of other health care providers with a focus on multidisciplinary treatment. Handbook of Clinical Nursing: Critical and Emergency Care Nursing will be of value to nursing faculty, undergraduate and graduate-level nurses, and nursing students at all levels.

Entries from this text have been selected from the larger resource, A Guide to Mastery in Clinical Nursing: The Comprehensive Reference.

Key Features:
- Provides essential information on clinical topics pertinent to the critical care and emergency care specialties
- Offers key knowledge for nurses new to practice or working in an unfamiliar nursing area
- Presented in a consistent format for ease of use
- Includes an overview of each specialty area
- Focuses on the role of the nurse throughout the treatment process
- Written and edited by expert clinicians and educators
Handbook of Clinical Nursing: CRITICAL AND EMERGENCY CARE NURSING
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Handbook of Clinical Nursing: CRITICAL AND EMERGENCY CARE NURSING

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Preface

Each year, millions of Americans receive care in emergency departments (EDs) and intensive care units because of acute life-limiting conditions. Nurses working in the ED or intensive care unit are front-line providers who practice in fast-paced health care settings, where a delay in the formulation of a diagnosis or initiation of the plans of care can have damaging consequences for an acutely ill patient. The practice of emergency and critical care nursing requires rapid access to knowledge that spans disciplinary domains, such as the physiological, cognitive, psychosocial, environmental, and behavioral mechanisms, which influence the health and susceptibility to disease among patients requiring life-sustaining care measures in an ED or intensive care unit. The care of these patients and their family systems requires emergency and critical care nurses to maintain an up-to-date knowledge base that guides the formulation of a nursing diagnosis and initiation of evidence-based nursing actions to optimize the health and recovery of acutely ill patients while offering emotional and informational support to their family systems.

The knowledge base of ED and critical care nurses is wide ranging and reflects the diversity of care needs of patients and their family systems. For medical–surgical nurses, the health care environments in which they practice are dynamic, and the complexity of care needs of patients are steadily increasing. Adding to the complexity of providing medical–surgical nursing care, registered nurses are finding it more difficult to acquire and make use of an evolving knowledge base of evidence to guide their nursing practice. Although the challenges of a dynamic health care environment, increasing complexity of patients, and an expanding evidence base for nursing care are not unique, restricted to ED and critical care nurses, these challenges pose a significant threat to the quality of care delivered by novice and even expert nurses in EDs or intensive care units.

The Handbook of Clinical Nursing: Critical and Emergency Care Nursing was conceptualized to assist the novice or the expert nurse in accessing up-to-date content on a variety of clinical topics for patients and their families in the ED or the intensive care unit, and is included in A Guide to Mastery in Clinical Nursing: The Comprehensive Reference, a comprehensive reference for individuals across the life span. This handbook includes a compendium of clinical topics with a structured format to aid the comprehension and application of the content to nursing practice. The Handbook of Clinical Nursing:
Critical and Emergency Care Nursing has selected clinical topics curated by Dr. Theresa Campo and contributions from expert practitioners in specialty areas of emergency and critical care nursing. The objective of the Handbook of Clinical Nursing: Critical and Emergency Care Nursing is to provide detailed information on the most important topics in clinical nursing practice for both new registered nurses and those transitioning to a new clinical area.

For each clinical topic, there is an overview of the clinical problem, relevant clinical background, clinical aspects for the nurse (assessment, nursing management and clinical implications, and outcomes), and a summary. Key references are provided for each entry, including both classic references and current citations from clinical and research literature. Although there are a number of comprehensive textbooks, this handbook provides information that is both concise and practical for the students as they enter each clinical area, and for registered nurses searching for up-to-date content, it will guide their nursing practice.

In summary, the Handbook of Clinical Nursing: Critical and Emergency Care Nursing has particular relevance to several groups of nurses. Nurse faculty will find it useful because it provides concise synopses of clinical topics relevant to the care of a hospitalized patient. Clinicians transitioning to new clinical areas will have a ready resource for key clinical problems they may face in their new clinical populations. And, importantly, newly licensed registered nurses will find that this guide to clinical mastery will chart their way in addressing the important clinical problems that their patients experience.

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Handbook of Clinical Nursing: Critical and Emergency Care Nursing
ACUTE CORONARY SYNDROME

Andrea Efre

Overview

Acute coronary syndrome (ACS) is an umbrella term used to describe a range of coronary artery emergencies, including myocardial infarction (MI) and unstable angina (UA). It is caused by a sudden reduction or blockage of blood flow to the cardiac muscle, frequently caused by atherosclerosis, and most prevalent in older adults. The blockage limits blood flow to the myocardium (heart muscle) that usually causes chest pain. The treatment goal is to improve blood flow (revascularization) as quickly as possible and may be achieved with pharmacology or interventional cardiac catheterization depending on the available facilities. Rapid identification of diagnostic criteria and initiation of emergency treatment by the nurse is essential to save the coronary muscle, prevent further cardiac damage, and improve outcomes.

Background

ACS refers to a spectrum of conditions that are divided into three categories:

1. ST-elevation MI (STEMI), also known as acute myocardial infarction (AMI)
2. Non-ST elevation MI (NSTEMI)
3. UA

The latter two categories of NSTEMI and UA were combined into a new title of non-ST elevation ACS (NSTE) in the American Heart Association and American College of Cardiologists 2014 practice guidelines to emphasize the continuum between UA and NSTEMI (Amsterdam et al., 2014). Therefore, you may see the terms and treatment plans used interchangeably. Almost three quarters of all ACS patients present as NSTE-ACS (greater than 625,000 patients annually) in the United States (Amsterdam et al., 2014). As a common presentation of coronary heart disease, NSTE-ACS is the leading cause of global cardiovascular morbidity and mortality (Rodriguez & Mahaffey, 2016).

Risk factors associated with ACS are the same as those involved in coronary heart disease and include age, gender, family history, smoking, hypertension, dyslipidemia, physical inactivity, obesity, diabetes mellitus, and recreational drugs such as cocaine. An estimated 15.5 million Americans older than 20 years of age have CHD, and from that number 550,000 have MIs annually, and 200,000 have recurrent attacks (Mozaffarinini et al., 2016). The older adult is most at risk from ACS. In the United States, the average age at the first MI is 65 years for men and 72 years for women (Mozaffarinini et al., 2016).

The cause of ACS is typically related to the formation of a thrombus that occludes the coronary vessel and prevents blood flow to the myocardium. The STEMI suggests that the coronary artery is fully occluded and is the most life-threatening and time-sensitive presentation of ACS. In NSTEMI or...
UA, the thrombus may partially or intermittently occlude the coronary artery, which is why the symptoms may be less severe or difficult to determine. The limited coronary blood flow is most often characterized by sternal or central chest pain.

Diagnosis of ACS is determined by the 12-lead EKG findings and serum cardiac enzymes. A 12-lead EKG should be performed and interpreted in 10 minutes of symptom onset or arrival to the emergency facility (Amsterdam et al., 2014). The EKG determine whether there is an acute injury to the myocardium identified by ST-elevation, T wave changes, or a new onset of left bundle branch block. The STEMI has elevations of ST segment in grouped leads on the 12-lead EKG, which identify the location of the affected myocardium and the coronary artery most likely involved. No ST elevations are noted in NSTEMI or UA, but it should be noted that ST depression or T wave inversions may be present in either.

Cardiac biomarkers are released into the blood when myocardial tissue damage (necrosis) occurs, and are found in both STEMI and NSTEMI. The biomarkers of troponin, myoglobin, and creatine kinase may remain elevated in the circulation following the infarction, but troponin has a longer period of detection (up to 10 days) and is thought to be the more sensitive and specific of the other biomarkers (Roffi et al., 2015). No increase in serum biomarkers is found in UA.

Immediate identification and differentiation of STEMI or NSTEMI-ACS are needed to define the treatment plan. Rapid intervention is necessary to restore coronary blood flow with percutaneous coronary intervention (PCI) in a cardiac catheterization laboratory. Delays in treatment enhance the progression of the coronary blockage, which leads to the loss of myocardial muscle and a potential cardiac arrest or death.

Clinical Aspects

ASSESSMENT

Acute, central (substernal) chest pain is the typical primary symptom of ACS. The pain may radiate to the left arm, shoulders, back, neck, jaw, or abdomen. It is important to ask open-ended questions and ask the patient to describe the chest pain and any other symptoms. Establish the location, onset, duration, and characteristics of the pain. Both STEMI and NSTEMI-ACS are most commonly present as a pressure-type chest pain that typically occurs at rest or with minimal exertion, and lasting for more than 10 minutes, whereas angina is typically relieved in 5 minutes of stopping the offending activity or with short-acting nitroglycerin (Amsterdam et al., 2014).

Determine whether there are associated symptoms such as shortness of breath, diaphoresis, lightheadedness, nausea, vomiting, or apprehension. Also, ask the patient whether anything aggravates or relieves the symptoms, what they were doing at the time of symptom onset, and whether they have attempted any treatments before telling you about the pain. When a patient arrives in the

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emergency room it is common that he or she has attempted treatments at home (e.g., taking other people’s prescriptions, or using illicit drugs to self-medicate), they may not openly offer this information initially without probing questions being asked.

Women, older adults, patients with diabetes, or patients with a history of heart failure may present with more subtle symptoms often without severe chest pain, which makes the diagnosis much more challenging and may lead to delay in treatment. Symptoms include shortness of breath, fatigue, lethargy, indigestion, anxiety, or sleep disturbances. If chest pain is present, it may be atypical and be reported as numbness, burning, or stabbing pain.

The physical examination should remain relatively unchanged from before the onset of the symptom. It is advisable to reassess the heart and lungs to identify deterioration, for example, rales on lung examination and development of S3 heart sound (found in fluid overload) suggest pulmonary edema or heart failure. Finding new murmurs or S4 heart sound (related to a noncompliant ventricle) could be caused by cardiac ischemia and should be further evaluated.

A change in vital signs may be noted in ACS, such as tachycardia, hypotension, hypertension, tachypnea, and possibly decreased oxygen saturation. Continuous cardiac monitoring for dysrhythmias and ST or T wave changes identify lethal rhythms or evolution of the ischemia. EKG changes are related to the location of myocardial impairment and lack of blood flow. If the right coronary artery is occluded, then ST changes may be noted in the inferior leads (II, III, and AVF), plus atrial dysrhythmias may be seen because of the lack of blood supply to the right atria, the sinoatrial node, or atrioventricular node. These rhythms may include new-onset atrial fibrillation, tachycardia, bradycardia, or a heart block. If the circumflex artery is involved the ST changes are usually noted in the lateral leads (I, AVL, V5, and V6). If the left coronary artery is affected by occlusion, anterior changes are seen in the 12-lead EKG throughout the chest leads (V1–V4), plus the left ventricle may be affected causing ventricular arrhythmias, including the life-threatening ventricular tachycardia or ventricular fibrillation.

**NURSING INTERVENTIONS, MANAGEMENT, AND IMPLICATIONS**

The goal for the management of STEMI is PCI, which should be performed within 90 minutes of arrival to the emergency facility (or from the symptom onset if inpatient). If PCI is not available, arrangements should be made to transfer the patient to a facility that can perform PCI in 120 minutes. If the transfer takes longer than 2 hours, then a fibrinolytic agent (such as tenecteplase, reteplase, or alteplase) should be administered and arrangements made to transfer for PCI in 3 to 24 hours (O’Gara et al., 2013). Primary PCI is also considered reasonable in patients with STEMI if there is clinical or EKG evidence of ongoing ischemia between 12 and 24 hours after symptom onset (O’Gara et al., 2013).

Dual antiplatelet therapy with aspirin and platelet inhibitors (known as P2Y12 inhibitors) is used in the initial treatment of STEMI and remains the cornerstone for the treatment of NSTE-ACS (Rodriguez & Mahaffey, 2016).
An aspirin loading dose of 325 mg is given, followed by 81 mg daily, and loading doses of clopidogrel 300 mg to 600 mg followed by daily doses of 75 mg. If desired, prasugrel or ticagrelor may be used instead of clopidogrel.

Adjunct pharmacological treatments for ischemia to decrease myocardial oxygen demand and increase myocardial oxygen supply are considered. These include nitrates (sublingual or intravenous), antiplatelet therapy, morphine, and beta-blockers. Beta-blockers should be avoided if cocaine use is suspected, or in patients with vasospastic angina (Roffi et al., 2015).

Following a successful PCI, the expected outcome of the ACS patient is to be discharged home with education on lifestyle modifications, medication compliance, and committing to cardiac rehabilitation and continued care. Underlying disorders, such as hypertension, diabetes mellitus, or dyslipidemia, need to be controlled. Beta-blockers, ACE inhibitors, angiotensin receptor blockers (ARB), and statins are often prescribed. Lifestyle modifications to reduce overall cardiovascular risk include smoking cessation, regular physical activity, weight reduction in patients with high body mass index, and dietary changes to include reduced intake of salt and saturated fat, and increase in fruit, vegetables, wholegrain cereals, and fish (Amsterdam et al., 2014; O’Gara et al., 2013).

OUTCOMES
A rapid assessment by the nurse ensures early intervention and improved outcomes. Delays in assessment, diagnosis, or intervention can be prevented with the use of standing orders and algorithms to initiate care. Cardiogenic shock may occur in up to 3% of NSTE-ACS patients, for whom immediate PCI is most often used for revascularization (Roffi et al., 2015). Primary PCI is also indicated for cardiogenic shock or acute severe heart failure in STEMI patients, irrespective of time delay from onset (O’Gara et al., 2013). Revascularization with PCI is not always possible, such as in multiple vessel diseases, or difficult positioning of the coronary occlusion. For those who are not candidates for PCI or fibrinolytic therapy, emergency coronary artery bypass graft (CABG) in 6 hours of symptom onset may be considered in STEMI (O’Gara et al., 2013).

Summary
In summary, the priority of the nurse is to rapidly gather accurate information, including symptoms, vital signs, physical assessment, and a 12-lead EKG. Initial treatments should be started during the assessment period, including continuous cardiac monitoring, supplemental oxygen, dual antiplatelet therapy, and consideration of nitroglycerine administration if available and the patient is normotensive. Early intervention improves outcomes and therefore contacting the provider and transmitting a copy of the 12-lead EKG if the provider is not physically available speeds up the diagnostic process. Every effort should be made to reach the revascularization goal to undergo PCI within 90 minutes of symptom onset.

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ACUTE EXACERBATION OF A CHRONIC CONDITION

Brenda L. Douglass

Overview

Across the United States, chronic health conditions have escalated over the past decade. In 2016, about one in four Americans had more than one chronic health condition and for individuals aged 65 years and older, prevalence rises to three in four Americans (Centers for Disease Control and Prevention [CDC], 2016, November 14). According to the National Health Council (2016), a chronic condition is defined as a disease lasting 3 months or more. Chronic health conditions have a profound impact on quality of life, often leading to premature disability. Chronic conditions cause heightened rates of mortality and considerable economic burdens to the patient, family, and society (CDC, 2016a). An acute exacerbation of a chronic condition occurs when there is an increase in severity of the chronic condition over baseline symptoms and physiologic decline.

Chronic conditions and acute exacerbations are often preventable, thus presenting an opportunity for nursing professionals to intervene to restore an individual’s health status and provide education on the prevention of future exacerbations. One of the most common chronic conditions with episodes of acute exacerbations in the setting of emergency or critical care is chronic obstructive pulmonary disease (COPD). The recognition and management of patients with an acute exacerbation of COPD is the principal focus of this discussion.

Background

The clinical trajectory of adults with COPD is often marked with acute exacerbations requiring hospitalization. An acute exacerbation of COPD is an event characterized by worsening respiratory symptoms beyond the normal daily variations and lending to a change in the medication regimen (World Health Organization [WHO], 2017). Acute exacerbations of COPD are critical events that denote physiologic instability and worsening in the obstructive ventilation, which contributes to an increase in an individual’s risk of death (Global Initiative for Chronic Obstructive Lung Disease [GOLD], 2017; Wedzicha, 2015). Risk factors for COPD exacerbation include advanced age, duration of COPD, productive cough, chronic mucous hypersecretion, history of exacerbations and antibiotic use, COPD-related hospitalization in the prior year, and one or more comorbid conditions (Stoller, 2017). Comorbidities, such as cardiovascular disease, diabetes mellitus, and hypertension, are common in patients with COPD, further raising the risk of the need for hospitalization and mortality (GOLD, 2017; Stoller, 2017).

Acute exacerbations of COPD are typically classified by the range of the severity of dyspnea, from mild (e.g., increased dyspnea or cough), moderate
(e.g., chest tightness, wheezing), to severe worsening in dyspnea (e.g., hypoxemia, acute respiratory failure; GOLD, 2017; Stoller, 2017). In 70% of cases, COPD exacerbations are associated with acute respiratory infections (Stoller, 2017). COPD exacerbations are disabling, necessitate urgent medical care and hospitalizations, as well as heighten an individual’s risk of death (CDC, 2016b; GOLD, 2017). In addition to devastating personal costs, there is a significant societal burden associated with COPD exacerbations with direct costs estimated at $32 billion and indirect costs at $20.4 billion (CDC, 2016b).

According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines (2017), goals of therapy in the management of COPD exacerbations are directed at minimizing the negative impact of the current exacerbation and to prevent recurrent episodes. The severity of the exacerbation and underlying disease determines whether the patient can be managed in an inpatient or outpatient setting (GOLD, 2017). About 80% of patients experiencing COPD exacerbations can be managed in the outpatient setting with pharmacologic therapies (GOLD, 2017). Classification of the level of severity for the COPD exacerbation is crucial to optimal intervention. COPD exacerbations are classified into three categories: (a) mild (administration of short-acting beta agonist [SABA]), (b) moderate (administration of a SABA, antibiotic, and/or oral corticosteroid), and (c) severe (pharmacologic management and/or positive ventilation; GOLD, 2017). Acute respiratory failure associated with severe COPD exacerbations mandates aggressive intervention, such as those often delivered in the emergency and critical care settings.

Clinical Aspects

ASSESSMENT

To guide nursing care, a comprehensive assessment of signs and symptoms is recommended to determine the level of airflow limitation and presence of comorbid health issues during an acute exacerbation of COPD. Emphasis on assessing the severity of symptoms as changes from the individual’s baseline symptom profile is recommended. Specifically, nurses should assess for worsening dyspnea, wheeze, increased cough, sputum characteristics, work of breathing, mental status, and indications of an upper respiratory infection. This information should be used to classify the severity of the COPD exacerbation (e.g., mild, moderate, or severe), as well as the frequency of and time since last acute exacerbation: a thorough review of preexisting comorbid conditions (e.g., pneumonia, cardiovascular disease, obstructive sleep apnea, respiratory failure requiring mechanical ventilation) and assessment for symptoms of comorbid conditions (e.g. chest pain/pressure, peripheral edema), environmental factors (e.g., smoking history, exposure to smoke and other pollutants), and current medication regimen with attention to medications for the management of COPD, including medication dosages, devices, adherence, and responsiveness to these therapies. On physical examination, attention to vital signs (e.g., blood pressure, heart rate, respiratory rate, level of consciousness) may help to inform a nurse’s ability to specify the
severity of the COPD exacerbation. To further specify the severity of an acute exacerbation, pulse oximetry, arterial blood gas analysis, and a chest radiograph are useful objective and diagnostic measures that guide nursing care for individuals with a COPD exacerbation.

**NURSING INTERVENTIONS, MANAGEMENT, AND IMPLICATIONS**

Nursing interventions provide opportunities to set goals in the clinical management of chronic conditions manifested by an acute exacerbation. An emphasis is placed on prevention, early recognition, and engaging the patient through patient-centered care (CDC, 2016a; GOLD, 2017). Providing education to patients on self-management goals to include in early recognition of worsening symptoms and when to seek medical care is integral to prevent or minimize impairment. Key points to effective nursing management include assessment of severity and providing the level of intervention necessary according to evidence-based guidelines for the most optimal treatment strategy (GOLD, 2017).

**OUTCOMES**

Acute exacerbations of chronic conditions, such as COPD, are often intertwined with comorbid conditions, precipitated by triggers, and present complexities in care of the patient with chronic conditions (GOLD, 2017). The delivery of nursing care from a holistic perspective, blending in physical, emotional, and spiritual care with integration of evidence-based practices, presents an opportunity to improve the health outcomes of individuals experiencing an acute exacerbation of COPD.

**Summary**

An acute exacerbation of COPD is a leading cause of death in the United States (CDC, 2016a). COPD exacerbations have negative impact on an individual’s health and quality of life—leading to premature disability and shortened life spans (CDC, 2016a; GOLD, 2017). The cost of chronic conditions and acute exacerbations of chronic disease pose an economic burden to the nation. Acute exacerbation of COPD provides an illustration of a chronic health condition in which prevention and early intervention are key to improving health outcomes.


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ACUTE PANCREATITIS IN ADULTS

Virginia Mangolds

Overview

Acute pancreatitis (AP) is an inflammatory process of the pancreas involving the activation of intrapancreatic enzymes that further exacerbate pancreatic tissue injury and altered organ function. The diagnosis of AP is made using elevations in pancreatic enzymes, clinical symptoms, and a variety of diagnostic imaging. Nursing care for adults with AP is focused on hemodynamic monitoring, prevention of pancreatic stimulation, electrolyte monitoring, pain control, identifying and treating local complications in the pancreas, identifying and treating multisystem failure, emotional support, patient education and discharge preparation with outpatient support if necessary (Burns, 2014; Krenzer, 2016).

Background

AP is the most common gastrointestinal diagnosis for acute hospitalizations in the United States. In fact, more than 270,000 annual admissions were attributed to AP in 2012 and the estimated cost of these hospitalizations totaled $2.6 billion (Peery et al., 2012). Despite the need for inpatient care, the mortality rate of patients with AP is 2% to 10%, which is related to shock, anoxia, hypotension, or fluid or electrolyte imbalance. This high mortality rate may be attributed to the 10% to 30% of patients exhibiting severe AP associated with pancreatic and peripancreatic necrosis (Talukdar, Clemens, & Vege, 2012).

The diagnosis of AP is made by fulfilling two of the three following criteria: (a) abdominal pain; (b) elevated serum lipase or amylase (more than three times the upper limit of normal); and (c) characteristic findings of AP on imaging, usually contrast-enhanced CT (Banks et al., 2013). Gallstones and chronic alcohol abuse account for 90% of AP. Drug-induced causes have been linked to metronidazole, tetracycline, azathioprine, and estrogens. Other less common etiologies are vascular, genetic, infectious, autoimmune, traumatic, and idiopathic, and may include hyperlipidemia, hypercalcemia, and pancreatic neoplasms (Burns, 2014). Laboratory evaluation and treatment consist of obtaining and analyzing multiple laboratory values, including amylase, lipase, complete blood cell count with differential, electrolytes, blood urea nitrogen (BUN), creatinine, glucose, coagulation studies, lactate, calcium, magnesium, albumin, and liver enzymes (Van Leeuwen & Bladh, 2015).

Common diagnostic imaging consists of ultrasound, CT and CT angiography (CTA; Catanzano, 2009) and/or MRI (Tenner, Baillie, DeWitt, Vege, & American College of Gastroenterology, 2013). Imaging recommendations indicate that ultrasound should be the initial diagnostic study (Catanzano, 2009; Krenzer, 2016; Sarr, 2013), which is particularly sensitive to AP as a result of cholelithiasis. CT imaging is recommended for later in the course of the disease,
for patients whose symptoms do not improve or worsen (Catanzano, 2009; Sarr, 2013). Early in the course of the disease, CT findings may be minimal or absent. CT is used with contrast to confirm an unclear diagnosis and to evaluate the extent of damage to the pancreas and surrounding area. It can be used to separate the pancreatic parenchyma from the surrounding duodenum and to evaluate for pancreatic necrosis. It is also useful for identifying and evaluating a suspected or known pancreatic mass. CTA may be performed in cases of known pancreatic neoplasm; complicated pancreatitis, such as pancreatic necrosis, abscess, or hemorrhage; or evaluation of pseudocyst formation (Catanzano, 2009).

The classification of severity has been broken down to mild, moderately severe, and severe (Sarr, 2013). Mild AP is associated with nonorgan failure and lack of local or systemic complication. Moderately severe AP is associated with organ failure that resolves in 48 hours (transient) and local or systemic complications without persistent organ failure. Severe AP is associated with persistent single or multiple organ failure for more than 48 hours (Banks et al., 2013; Krenzer, 2016).

Clinical Aspects

According to Ackley, Ladwig, and Makic (2017), based on the North American Nursing Diagnosis Association International (NANDA International), patients being cared for in the inpatient setting may benefit from the following nursing diagnosis and treatment, based on the assess, diagnose, plan, implement care, evaluate the outcomes (ADPIE) plan and from making necessary improvements in (a) ineffective breathing pattern, (b) deficient fluid volume, (c) acute pain, (d) diarrhea, (e) nausea, and (f) ineffective denial.

ASSESSMENT

Ineffective breathing pattern occurs when inspiration and/or expiration does not provide adequate ventilation. Monitor respiratory rate, depth, and ease of respiration; note the amount of anxiety associated with dyspnea; attempt to determine whether the client’s dyspnea is physiological or psychological; note the rapidity of the development of dyspnea, which may be an indicator of the severity of the condition. Treatment of dyspnea includes positioning the patient in an upright or semi-Fowler’s position, and administering oxygen as ordered.

Deficient fluid volume occurs when there is decreased intravascular, interstitial, and/or intracellular fluid. Monitor for thirst, restlessness, headaches, and difficulty concentrating. Notify the provider of any indication of deficient fluid volume, and assist in adjusting the fluid replacement as indicated.

NURSING INTERVENTIONS, MANAGEMENT, AND IMPLICATIONS

To identify acute pain, perform a comprehensive assessment of pain, which includes location, characteristics, onset/duration, frequency, quality, intensity, and severity of pain. Work with the medical provider to ensure adequate pain control.
Diarrhea is the passage of loose, unformed stools. Document frequency and amount of stool. Follow dietary orders as written by the patient’s providers and notify them if the diarrhea continues, despite of their diet.

Nausea is a subjective, phenomenon of an unpleasant feeling in the back of the throat and stomach, which does not result in vomiting. Implement appropriate dietary measures, such as NPO (nothing by mouth) status as appropriate, small frequent meals, and low-fat meals.

Ineffective denial is the conscious or unconscious attempt to disavow knowledge or meaning of an event to reduce anxiety and/or fear, leading to the detriment of health. Assess the patient’s and family’s understanding of the illness, treatments, and expected outcomes. Aid the patient in making choices regarding treatment and actively invite him or her into the decision-making process.

OUTCOMES
Outcomes to aim for, using nursing diagnoses, are related to breathing patterns, urine output, pain control, diarrhea control, nausea and vomiting control, and active participation in outpatient treatment programs if the AP is related to substance abuse (Ackley et al., 2017). Specifically, the suggested outcomes include that (a) the patient demonstrates a breathing pattern that supports blood gas results within his or her normal parameters; (b) maintains urine output of 0.5 mL/kg/hour; (c) maintains normal blood pressure, heart rate, and body temperature; (d) maintains elastic skin turgor and moist mucous membranes and orientation to person, place, and time; (e) expresses satisfaction with pain control; (f) has solid, formed stool with defecation; (g) has the ability to tolerate normal oral intake without vomiting; (h) seeks out appropriate health care attention when needed; and (i) actively engages in a treatment program related to identified “substance abuse” if applicable (Ackley et al., 2017).

Summary
AP is the most common gastrointestinal cause for acute hospitalization with more than 270,000 annual admissions and an estimated cost of $2.6 billion. The classification of severity has been broken down to mild, moderately severe, and severe. The diagnosis includes clinical, laboratory, and diagnostic findings. Nursing outcome goals can be used to evaluate the patient’s progression toward reaching a normal functioning and a good health status.


ACUTE RESPIRATORY DISTRESS SYNDROME

Kathleen C. Ashton

Overview

In the spectrum of illnesses associated with the respiratory system, acute respiratory distress syndrome (ARDS) is one of the most life-threatening and potentially fatal acute respiratory conditions. Formerly known as adult respiratory distress syndrome, ARDS results from either direct or indirect trauma to the lungs and affects both children and adults who are hospitalized with other conditions. It can also occur following an acute medical problem or procedure. The nursing care for patients with ARDS is primarily supportive and includes monitoring positive pressure ventilation, avoiding fluid overload, as well as a careful assessment and evaluation of the patient’s treatment response. Based on the current literature, the mortality rate for ARDS is approximately 30%, and survivors of ARDS suffer high rates of morbidity (Mehta & Povoa, 2017; Sweeney & McAuley, 2016).

Background

Several conditions are implicated in the development of ARDS, including sepsis, smoke inhalation, near-drowning, severe pneumonia, major trauma, and any conditions resulting in a profound systemic inflammatory response. Sepsis is a leading cause of ARDS that tends to stimulate a systemic inflammatory response (Vidyasagar, 2016). In general, there are a variety of pathophysiologic conditions that activate the innate immune response, which in turn activates a physiologic reaction to that and, as a result, releases proinflammatory substances into the bloodstream to combat the infection or aid the recovery from a traumatic injury. An otherwise protective process, a systemic inflammatory response can have broad effects on the blood vessels, in particular the pulmonary vessels, which experience increased permeability. As the changes in the permeability of pulmonary vessels lead to the diffusion of fluid into alveoli, it reduces the affected alveoli’s ability to promote blood oxygenation effectively. As more alveoli are affected, hypoxemia can be captured on chest imaging as bilateral pulmonary infiltrates that are not fully associated with heart failure (Mehta & Povoa, 2017).

First described by Ashbaugh, Bigelow, Petty, and Levine (1967), ARDS is classified as noncardiogenic pulmonary edema that leads to decreased lung compliance and hypoxia (Vidyasagar, 2016). The American–European Consensus Conference (AECC) defined the syndrome in 1994, and the Berlin Definition was established in 2011 by a panel convened by the European Society of Intensive Care Medicine, the American Thoracic Society, and the Society of Critical Care Medicine (Raneri et al., 2012). The Berlin Definition was validated in more than 4,000 patients’ data (Sweeney & McAuley, 2016) and delineates the three
stages of ARDS, mild, moderate, and severe, based on the degree of hypoxemia with the associated mortality for each stage. The corresponding mortality rates are 27% for mild, 32% for moderate, and 47% for the severe stage (Fanelli et al., 2013).

Risk factors for the development of ARDS include numerous illnesses and injuries, both pulmonary and systemic with pneumonia being the most common risk factor (Sweeney & McAuley, 2016). Pneumonia and aspiration have the highest associated mortality in ARDS. There are currently about 200,000 cases of ARDS reported annually in the United States.

Over the past 50 years, there have been numerous studies addressing the pathogenesis and clinical aspects of the syndrome, including underlying mechanisms, biomarkers, genetic predisposition, risk factors, epidemiology, and treatment. Genetics is now recognized to play a role in the predisposition to the development of ARDS (Fanelli et al., 2013). Despite the plethora of research studies, there are currently very few effective therapies for ARDS, other than the use of protective lung strategies (Fanelli et al., 2013).

Clinical Aspects

ASSESSMENT

Critical care nurses are the frontline nurses regarding the surveillance of the progression of ARDS. The assessment of patients for changes in the respiratory status is an ongoing responsibility of the nurses to alert physicians and others to changes in the patient’s ability to effectively deliver oxygenated blood to the tissues. Breath sounds must be assessed at frequent intervals to ascertain any changes that could signal an increase in fluid and the effects of inflammation. Oxygen saturation, as measured by pulse oximetry, is a crucial measurement to assist in recognition of changes. Invasive lines to measure pressure changes and fluid status are a mainstay of critically ill patients in intensive care units. Individuals may begin to show signs of respiratory compromise even before they land in an intensive care unit, so it is imperative that nurses assess patients to look for signs showing that they could be developing ARDS.

NURSING INTERVENTIONS, MANAGEMENT, AND IMPLICATIONS

The treatment for ARDS is supportive and centered on mechanical ventilation. In the setting of lung injury associated with ARDS, this modality can treat both the condition and contribute to lung injury, too. However, the positive pressure mechanical ventilation is the cornerstone of management; it can also incite lung injury and contribute to both the morbidity and mortality seen in ARDS (Fanelli et al., 2013). Thus, a judicious management of positive pressure ventilation is recommended among patients with ARDS.

Results of recent studies point to the use of lower tidal volumes and maintenance of plateau pressures in a specified range to reduce mortality and provide a survival benefit (Fanelli et al., 2013, p. 327). Tidal volumes of 6 mL/kg are
now recommended as opposed to 10 mL/kg used previously (Vidyasagar, 2016). Lower tidal volumes help prevent ventilator-induced lung injury (VILI) caused by volutrauma (Vidyasagar, 2016). One recent and very significant change in ventilator strategy is the acceptance of lesser arterial oxygen tension (PaO₂) in the range of 85% to 90% for patient survival and hemodynamic stability (Vidyasagar, 2016). Lower tidal volumes and acceptance of lesser oxygen tension reduce lung overdistension and help prevent additional injury.

Another problem of management is the cyclic opening and closing of small airways and alveolar units, known as atelectatic trauma. Clinical trials have measured the effects of using higher levels of positive-end expiratory pressure (PEEP). The results are inconclusive, but there is limited evidence that higher (between 5 and 9 cm H₂O) levels of PEEP may reduce mortality (Fanelli et al., 2013).

Many other unconventional therapies are also used to manage ARDS, with varying success. Prone positioning exploits gravity and repositioning of the heart in the thorax to promote lung reexpansion and improve ventilation, thus improving oxygenation. Its impact on mortality remains controversial (Fanelli et al., 2013). The recent PROSEVA (Proning Severe ARDS Patients) trial demonstrated a significant benefit in mortality with the use of ventilation in the prone position (Scholten, Beitler, Prisk, & Malhotra, 2017).

High-frequency oscillatory ventilation (HFOV) is a technique that delivers extremely small tidal volumes using a relatively high mean airway pressure at high respiratory frequencies to avoid tidal overstretch (Fanelli et al., 2013). In two large multicenter clinical trials, HFOV failed to demonstrate improvement in survival, and its use is currently quite controversial (Fanelli et al., 2013).

In the case of severe hypoxemia and respiratory failure, extracorporeal membrane oxygenation (ECMO) is used as a rescue therapy. The objective is to overcome severe hypoxemia and respiratory acidosis while maintaining the lungs in a state of complete rest (Fanelli et al., 2013). However, ECMO is a scarce and expensive resource available only in major specialty centers. Regarding pharmacologic interventions, neuromuscular blockade and sedatives are often administered to decrease the patient’s work of breathing, thereby improving respiratory mechanics and lowering oxygen consumption (Sweeney & McAuley, 2016).

As ARDS is a form of pulmonary edema, fluid therapy is an essential component of management. Fluids are provided for resuscitation and organ rescue during the early stages of the illness, followed by fluid unloading (dresuscitation)—either spontaneous or induced—after hemodynamic stability has been achieved (Sweeney & McAuley, 2016). The nursing role in intake and output measurement is paramount is this aspect of management.

OUTCOMES
Individuals who survive ARDS have significant morbidity and look on the clinicians to provide interventions to reduce the sequelae. Survivors experience exercise limitation, physical and psychological sequelae, decreased physical quality of life, and increased costs and use of health care services that may persist for
5 years or more (Mehta & Povoa, 2017). Interventions are aimed at identifying modifiable risk factors and addressing specific needs such as rehabilitation, nutrition, and support for caregivers.

Summary

ARDS is an acute process that can occur rapidly. Nursing vigilance can contribute to early identification and excellence in management to reduce morbidity and mortality. Prevention includes vaccination and other methods to reduce predisposing factors.


Overview

Acute respiratory failure (ARF) is characterized by a sudden onset of respiratory distress. It occurs when the lungs fail to maintain adequate exchange of oxygen and carbon dioxide to meet the body’s metabolic needs. ARF is classified as either hypoxemic (insufficient oxygen) or hypercapnic (excessive carbon dioxide). It may result from inadequate air movement, insufficient gas diffusions in the alveoli, and/or poor pulmonary blood flow. Conditions, such as pneumonia, chronic obstructive pulmonary disease (COPD), acute respiratory distress syndrome (ARDS), and congestive heart failure (CHF), commonly lead to ARF (Fourneir, 2014; Peter, 2016; Rehder, Turi, & Cheifetz, 2014).

In the United States, the number of hospitalizations for ARF has increased to approximately 2 million each year. Although a reduction in inpatient mortality has been noted, ARF still carries an annual cost of more than $50 billion (Stefan et al., 2013). Due to the two different types of ARF, knowledge of the physiologic cause of ARF is crucial to selecting appropriate treatments. Targeted management of ARF is dependent on the extent and duration of symptoms, but nursing management should focus on providing symptom support until the underlying cause of ARF can be identified and treated (Fourneir, 2014; Peter, 2016; Rehder et al., 2014).

Background

Respiration, the act of inhaling and exhaling air to transport oxygen to the lung alveoli, includes (a) ventilation, (b) oxygenation, (c) perfusion, (d) ventilation/perfusion relationship. Ventilation, the movement of air in and out of the lungs through inspiration and expiration, is affected by airway compliance and airway resistance. Oxygenation involves the exchange of carbon dioxide and oxygen at the alveoli. Perfusion is the movement of blood through the pulmonary capillaries. The ventilation/perfusion relationship encompasses the balance between the amount of air reaching the alveoli (ventilation) and the amount of blood reaching the alveoli (perfusion). These processes involve the conducting airways (nose, pharynx, larynx, trachea, bronchi, bronchioles, and terminal bronchioles), alveoli (tiny sacs within the lungs where gas exchange occurs), pulmonary circulation (portion of the cardiovascular system that oxygenates the blood), and respiratory pump (thorax, respiratory musculature, and nervous system). They are regulated by neurological, chemical, and mechanical control systems within the body, and dysfunction in any of these control systems can lead to ARF (Fourneir, 2014; Peter, 2016; Rehder et al., 2014).

ARF is classified as hypoxemic, a lack of circulating oxygen in the blood characterized by an arterial oxygen concentration of PaO₂ less than 60 mmHg,
or hypercapnic, an excess of circulating carbon dioxide in the blood, characterized by an atrial carbon dioxide concentration of PaCO₂ greater than 40mmHg. Hypoxemic ARF occurs in conditions that cause lung atelectasis and those that lead to fluid in the lungs such as pulmonary edema, pneumonia, alveolar hemorrhage, ARDS. Hypercapnic ARF happens when there is hypoperfusion of the respiratory muscles during shock states as well as when processes in the central nervous system (CNS), peripheral nerves, muscles, neuromuscular junction, or alveoli malfunction. These conditions include: CNS depression (drug overdose, stroke), spinal cord infections or transection, peripheral nerve weakness (Guillain–Barré Syndrome), chest wall deformities, muscle weakness (myasthenia gravis, hypokalemia, hypophosphatemia), and alveolar hypoventilation (COPD, cystic fibrosis, airway obstruction, pulmonary fibrosis) (Fourneir, 2014; Peter, 2016; Rehder et al., 2014).

ARF is the most frequent reason for admission of hospitalized patients to the intensive care unit with 2.5% of cases requiring ventilatory support. ARF requires an average hospital length of stay of 7.1 days and results in more than 350,000 in-hospital deaths each year. The most common etiologies noted in hospitalized patients with ARF include: pneumonia, CHF, COPD, ARDS, asthma, drug ingestion, trauma, and sepsis. Mortality rates were highest in patients 85 years of age and older (Stefan et al., 2013). Patients with severe ARF requiring mechanical ventilation report a multitude of distressing symptoms, including anxiety, pain, delirium, and lack of sleep (Puntillo et al., 2010). In addition, after hospital discharge, patients report symptoms of posttraumatic stress disorder (PTSD) and rate their quality of life significantly lower than comparative controls (Bienvenu et al., 2013).

Clinical Aspects

ASSESSMENT

Clinical signs of acute respiratory distress are often nonspecific, but early detection through comprehensive nursing assessment can help prevent progression to ARF. Tachypnea and shortness of breath are often the first signs of respiratory distress. Clinical indications of worsening condition include nasal flaring, use of accessory muscles, paradoxical abdominal movements, prolonged expiratory phase, expiratory grunting, cyanosis, decrease in pulse oximetry despite increasing the administration of supplemental oxygen, anxiety, diminished lung sounds, inability to speak in full sentences, tripod positioning to further expand the chest, feelings of impending doom, and altered mental status. In addition to clinical presentation, pulse oximetry, arterial blood gasses, and capnography are important physiologic measurements to consider (Fourneir, 2014; Peter, 2016; Rehder et al., 2014).

The goals of treatment for ARF depend on its pathophysiologic cause, but should aim to treat the underlying cause of the respiratory failure, improve oxygen delivery to the tissues, decrease oxygen demand in the tissues, reduce the production of carbon dioxide, promote the elimination of carbon dioxide, and
limit damaging therapies. Treatment of the underlying cause may include antibiotics (infection), steroids and bronchodilators (acute asthma, COPD), medications to reverse CNS or peripheral nerve problems that caused the respiratory failure (i.e., Narcan for a drug overdose). Oxygen delivery to the tissues can be enhanced by applying supplemental oxygen through low-flow devices, high-flow devices, or noninvasive or invasive mechanical ventilation. Ventilator support may be required for patients with severe or hypoxic respiratory failure with progressing respiratory fatigue. Extracorporeal life support may also be necessary to treat ARF when conventional ventilatory strategies are not sufficient. In addition to supplemental oxygen delivery, it is important to maintain hemoglobin and optimize cardiac output as well as reduce fever and control sepsis in order to decrease oxygen demand of the tissues (Fourneir, 2014; Peter, 2016; Rehder et al., 2014).

Carbon dioxide production can be reduced, controlling excess motor activity (anticonvulsants for seizures). The elimination of carbon dioxide can be promoted by increasing respiratory drive (reduce sedatives; give CNS stimulants) and improving lung mechanics. Upright positioning, analgesics for chest pain, bronchodilators and bronchial hygiene for airway resistance, and interventions to reduce abdominal distention can all improve lung mechanics. In addition, respiratory muscle performance can be enhanced by ensuring adequate oxygenation and tissue perfusion, correcting electrolyte abnormalities, and administering medications to improve diaphragmatic contractility. Special care should be given to limit therapies that may potentially damage lung tissue such as using high oxygen concentrations for protracted periods and failing to implement lung-protective ventilator strategies (Fourneir, 2014; Peter, 2016; Rehder et al., 2014).

NURSING INTERVENTIONS, MANAGEMENT, AND IMPLICATIONS

When caring for a patient with ARF, it is imperative to perform continuous assessments and provide appropriate symptom support measures to promote relaxation and facilitate oxygenation. Supplemental oxygen should be applied immediately and the airway must be evaluated for patency. The airway should be clear of secretions or mechanical obstructions and the head of bed upright. If a patient continues to decompensate, an oral or nasal airway may be placed and mechanical ventilation applied. The need for mechanical ventilation should be assessed with attention to the clinical scenario, rate of clinical deterioration, and the patient’s response to previously attempted therapies (Fourneir, 2014; Peter, 2016; Rehder et al., 2014).

OUTCOMES

Nurses must be aware of physiologic symptoms of inadequate tissue oxygenation, such as angina and mental status changes, as well as conditions that may impair oxygen delivery. It is important to turn the patient regularly to maintain the ventilation/perfusion relationship. Efforts to minimize and remove secretions in addition to liberal use of an incentive spirometer will maximize
tissue oxygenation and help prevent atelectasis. Malnutrition can impair respiratory muscle function and reduce ventilator drive. Patients with ARF can easily become malnourished due to increased metabolic demands and inadequate nutrition intake, therefore nutritional expertise should be sought. Lastly, nurses should offer the patient and family pertinent education related to medications, the purpose of nursing measures, signs of clinical decompensation, patient risk factors, and appropriate follow-up (Fourneir, 2014; Peter, 2016; Rehder et al., 2014).

Summary

Treating ARF requires knowledge of the specific mechanisms that cause respiratory failure and a systematic approach to supportive symptom management. As the number of ARF cases continues to rise, nurses must be acutely aware of the signs, symptoms, and appropriate nursing interventions for ARF in order to reduce the morbidity and mortality related to ARF (Fourneir, 2014; Peter, 2016; Rehder et al., 2014).


ADRENAL INSUFFICIENCY

Rachel K. Vanek

Overview

Adrenal insufficiency (AI) can be an acute or chronic illness affecting patients in the acute care, office, long-term care, or home care settings. It can either be a primary disorder due to destruction of the adrenal cortex or a secondary disorder due to disruption of hypothalamic–pituitary functions. Its signs and symptoms are a consequence of the failure of the hypothalamic–pituitary–adrenal axis (HPA) to secrete adequate amounts of essential hormones and of the adrenal gland to respond properly. It is a rare disease, often undiagnosed, thought to occur in one person in 100,000; it occurs equally in men and women in the United States. It is often an overlooked disorder that has myriad symptoms that mimic other acute and chronic illnesses (National Organization for Rare Disorders, 2017).

Background

The Endocrine Society’s clinical practice guidelines define primary adrenal insufficiency as “the inability of the adrenal cortex to produce sufficient amounts of glucocorticoids and/or mineralocorticoids. It is a severe and potentially life-threatening condition due to the central role of these hormones in energy, salt, and fluid homeostasis” (Bornstein et al., 2016, p. 367).

This hypothalamic–pituitary–adrenal axis is essential for the regulation of homeostasis and an individual’s stress response. Any alteration affecting a component of the HPA axis can lead to insufficient adrenal hormone secretion. Under physiologic conditions, the HPA axis is regulated by negative feedback control mechanisms. When there is insufficient circulating cortisol, the hypothalamus secretes corticotropin-releasing hormone, which stimulates the release of adrenocorticotropic hormone (ACTH) from the anterior pituitary. ACTH affects the cortex of the adrenal gland to stimulate the secretion of cortisol until there is an adequate concentration of circulating cortisol to maintain homeostasis (Charmandari, Nicolaides, & Chrousos, 2014.)

In primary AI, the adrenal cortex is either destroyed or does not function properly. This can be caused by infiltrative disease destroying the adrenal cortex. Bleeding into the adrenal gland, systemic fungal or bacterial infection, HIV infection, tuberculosis, autoimmune disease, metastatic disease, and amyloidosis can result in adrenal destruction. Secondary AI occurs when damage to the hypothalamus or pituitary gland occurs. Surgery to remove the pituitary, radiation to the pituitary, tumors of the hypothalamus, metastatic disease involving the pituitary or hypotalamus, chronic systemic steroid use, and pituitary necrosis are some examples of pathological states that can lead to the development of secondary deficiency of adrenal hormones. These disorders can be seen in pediatric and adult populations (Oelkers, 1996).
AI can have vague and insidious symptoms and signs. They often overlap with symptoms of other disorders and can be difficult to characterize as caused by AI alone. In general, AI symptoms impact quality of life by rendering the patient at baseline tired, weak, dizzy from orthostasis, anorexic, and depressed. The patient can have skin changes, constipation, diarrhea, loss of libido, arthralgia, myalgia, and electrolyte disturbances. Acutely, the patient can have fever, abdominal pain, mental status changes, encephalopathy, delirium, and shock. Refractory hypotension can lead to multisystem organ dysfunction and failure (Bornstein et al., 2016).

Clinical Aspects

ASSESSMENT

History of the patient or family may reflect fatigue, loss of energy, perhaps recent infection, or pregnancy. Heat or cold intolerance can also be a common complaint. Recent changes in appetite, bowel habits, or abdominal pain are common. Dizziness is often a trigger prompting patients to seek medical care. Physical exam may reveal patients with evidence of recent weight loss. Their skin may be very dry or have changes in pigmentation, such as hyperpigmentation in areas of skin exposed to the sun or constant friction (think “waistband, socks”). Blood pressure and heart rate should be checked with the patient sitting and standing to evaluate orthostasis. Mucous membranes may be dry and appear dusky in color. Patients may have loss of axillary or pubic hair (Bornstein et al., 2016).

Laboratory findings may reveal hyponatremia, hypoglycemia, and hyperkalemia. Chloride may also be elevated. Elevated blood urea nitrogen and creatinine due to dehydration may also be noticed. Hemoglobin usually is normal but in up to 15% of the patients with AI normocytic anemia may occur. An early-morning cortisol level may be collected and, if it is less than 10, AI should be considered (Oelkers, 1996).

An ACTH stimulation test may also be done. In this test, the patient’s baseline cortisol is measured. The patient is then given a dose of intravenous ACTH and cortisol is checked at 30 and 60 minutes. If the levels increase above 20 mcg/mL, then adrenal function is normal. Plasma ACTH, renin, or aldosterone levels may be measured as well in patients who are not in extremis. Laboratory studies to rule out autoimmune disease may also be ordered. Abdominal CT can be performed to evaluate for disruptions in adrenal anatomy. The test can identify enlarged, calcified, or acute hemorrhage in the adrenal glands (Oelkers, 1996).

NURSING INTERVENTIONS, MANAGEMENT, AND IMPLICATIONS

Risk for falls and risk for injury may be related to volume depletion. Oftentimes, changing position slowly and allowing time for equilibration lessens this risk while the disorder is being evaluated. Once treatment has commenced, orthostatic changes should improve.
Ongoing monitoring of orthostatic blood pressure and pulse helps assess response. Assessing adequate oral hydration and administering any ordered intravenous fluids while monitoring for signs of fluid overload are within the nursing realm. Proper administration of glucocorticoid and mineralocorticoid is key to treatment. The patient must be taught signs of symptoms of treatment failure, how and when to take medications, and what symptoms to report to the health care provider (National Organization for rare disorders, 2017).

Weight loss and poor appetite are key signs of nutritional imbalance and should begin to improve with treatment. Weighing patients, assessing for weight loss, and appetite changes are part of the ongoing nursing assessment. The patient may have a knowledge deficiency of AI as a new diagnosis or even as a previously existing problem (The Complete List of NANDA Nursing Diagnosis for 2012–2014, with 16 New Diagnoses, 2014. The nurse should assess the patient’s knowledge and provide education for a positive outcome. Key education requirements for patients are proper medication management, when to call the provider, side effects, and warning signs of infection. Patients must be taught to keep an up-to-date medication list for all providers who participate in their care. Informing other providers of the diagnosis of AI will allow proper treatment during surgery or other interventions that can precipitate an adrenal crisis. Patients and their caregivers need to recognize signs of adrenal crisis and know what to do to intervene (Charmandari et al., 2014).

OUTCOMES

Nurses should be astute to the subtle signs of renal insufficiency (RI) on laboratory analysis to help identify the patient with RI and help to prevent progression to kidney injury and chronic failure. These signs may not be apparent but the nurse can use measures that encourage RI from occurring or progressing through hydration, avoidance of renal damaging medication administration, and diet. These measures can promote positive outcomes.

Summary

AI is a rare disorder that can lead to life-threatening symptoms related to the actions of the HPA axis, the most severe being refractory hypotension leading to organ damage. Nursing actions and management are key to establishing proper diagnosis and supporting recovery. Proper administration and timing of diagnostic tests are essential. Restoration of volume and correction of electrolyte disturbances facilitate resumption of life activities and improved satisfaction with the improved quality of life. Teaching the patients and their caregivers about the diagnosis, treatment aims, medications actions, and warning signs of failing treatment are all essential to positive outcomes.


Back pain is one of the most common conditions for which patients seek medical treatment from a health care professional. Most people older than 18 years experience at least one episode of acute low-back pain (ALBP) during a lifetime. According to data from the National Electronic Injury Surveillance System, the incidence of back pain is 139 per 100,000 person-years in the United States. According to the Centers for Disease Control and Prevention’s (CDC) National Center for Health Statistics (NCHS), 28.4% of adults older than 18 years had experienced lower back pain in the previous 3 months (Ma, Chan, & Carruthers, 2014). In addition, approximately 6 million people annually are evaluated in emergency departments (EDs) for back pain (Perina, 2017). Back pain is costly to treat and manage. Along with high incidence and prevalence, back pain is the third most costly medical condition followed by cancer and heart disease (Perina, 2017). The cost of treatment increases considerably with chronicity. The economic impact of chronic low-back pain (CLBP) includes decreased function and mobility that results in lost productivity, high treatment costs, and disability payments. Chronic back pain (CBP) is the most common cause of disability in Americans younger than 45 years (Allen & Hulbert, 2009). Each year, 3% to 4% of the U.S. population is temporarily disabled, and 1% of the working-age population is totally and permanently disabled due to back pain (Ma et al., 2014). Low-back pain (LBP) is the second most frequent reason to visit an outpatient office, the fifth most common cause for hospitalization, and the third most frequent reason for a surgical procedure (Wheeler & Berman, 2016). Estimates of the cost of back pain treatment and management have reached $100 to $200 billion annually (Allen & Hulbert, 2009, p. 1067; Ma et al., 2014, p. 4).

Background

ALBP is defined as pain with duration of less than 6 weeks in the posterior area between the costal angles and gluteal folds (Kinkade, 2007). Typically, in adults, the first episode of LBP will occur between the ages of 20 and 40 and resolve within 6 to 12 weeks (Kinkade, 2007). Episodes of LBP may be nonspecific in nature or may be the result of an underlying illness or injury. Most acute episodes of musculoskeletal LBP are self-limited and resolve quickly requiring minimal interventions. Typically, strains and sprains of the back are described as nonspecific. However, pain associated with the condition can be moderate to severe and in some cases debilitating, causing the patient limited activity and mobility and lost time from work. Moreover, within 1 to 2 years, recurrent back pain occurs in approximately 25% to 62% of patients (Casazza, 2012).
Pain that persists longer than 3 months is defined as CLBP (Allen & Hulbert, 2009, p. 1067). As with ALBP, CLBP can be related to an underlying chronic condition. Sometimes, the underlying chronic condition may be serious in nature and therefore patients warrant a careful clinical evaluation. In many cases, CLBP impacts a patient’s quality of life. It is common for psychosocial issues to play a role in treatment of patients with CLBP. Patients with chronic, persistent pain that is not well controlled may experience clinical, psychological, and social problems associated with chronic pain. The consequences of unrelieved pain include limitations in daily activities, lost work productivity, reduced quality of life, and stigma (Dowell, Haegerich, & Chou, 2016). Patients with CLBP may also experience a reduced sense of control, disturbed mood, negative self-efficacy, anxiety, and other mental health disorders (Last & Hulbert, 2009), including opioid use disorder (Dowell et al., 2016). Opioids are commonly prescribed to patients with CLBP in spite of a lack of evidence to support the efficacy of these medications. In fact, opioids are commonly prescribed for adults with both acute and chronic pain. An estimated 20% of patients seen by a primary care provider with noncancer pain will obtain an opioid prescription (Dowell et al., 2016).

Clinical Aspects

ASSESSMENT

A careful and accurate focused health history and physical examination are essential for all patients experiencing back pain. A thorough evaluation of a patient’s symptoms by a clinician is essential to identify potentially serious underlying causes of back pain. Generally, back pain can be placed into four broad categories. They are nonspecific LBP, including sprains/strains; pain associated with radiculopathy or spinal stenosis (spine related); referred pain from a nonspinal source such as aortic aneurysm, gynecologic, or renal conditions; and pain associated with another cause such as cancer, arthritis, or infection (Last & Hulbert, 2009).

Although back pain associated with a serious underlying pathology is rare, health care providers (HCPs) are obligated to assess patients for “red flags,” which are symptoms that raise clinical suspicion of a serious underlying etiology (Casazza, 2012). Red flags will prompt a clinician to investigate further, initiate aggressive treatment, and/or make a referral to the ED or spine specialist. Examples of chief complaints involving LBP that raise clinical suspicion about serious red flags include significant trauma such as motor vehicle crash, falls in the elderly, falls from significant heights in younger patients, and heavy lifting in patients with osteoporosis (Casazza, 2012).

Likewise, patients with back pain need to be assessed for the presence or absence of sciatica indicating a mechanical spinal condition, which in some cases may be serious, and indicates a need for a specialist referral. Sciatica or sciatic neuralgia is defined as pain in the distribution of the sciatic nerve often associated with a lumbar herniated disc (Stafford, Peng, & Hill, 2007).
important to differentiate between leg pain and sciatica that involves pain traveling below the knee. Neurological symptoms, including progressive motor or sensory deficits in the extremities, raise serious concerns and may indicate the need for urgent surgical intervention. Patients need to be assessed quickly for signs of cauda equina syndrome (CES). CES is a rare but serious condition that results from pressure and swelling of the nerves at the end of the spinal cord. CES is a medical emergency requiring urgent surgical intervention to relieve pressure of the spinal nerves (Spector, Madigan, Rhyne, Darden, & Kim, 2008). Without emergency intervention, patients with CES may experience adverse results, including paralysis, impaired bladder and/or bowel control, difficulty walking, and/or other neurological and physical problems. Although CES is an uncommon condition, it is important that patients are screened quickly for signs of the disorder. Signs and symptoms include bowel and bladder dysfunction or urinary retention, loss of anal sphincter tone, saddle anesthesia, progressive leg weakness, bilateral sciatica, or numbness in the legs. Decreased rectal tone may be a relatively late finding. Early signs and symptoms of a developing postoperative CES are often attributed to common postoperative findings. Therefore, HCPs in the perioperative setting are urged to have a high level of suspicion of potential CES in postoperative spine patients with back and/or leg pain refractory to analgesia, especially with urinary retention (Spector et al., 2008).

Additional assessment of the patient with back pain includes a thorough history of any cancer that may have metastasized to bone and risk factors for suspected spinal infections. Spinal infections are of high clinical suspicion in patients injecting intravenous (IV) drugs such as heroin and crack cocaine. A complete health history must also specifically include questions about bone health (osteoarthritis, arthritis, prior fractures, or injuries), fever, weight loss, and any prior imaging to help determine whether any underlying cause can be identified (Wheeler & Berman, 2016).

The goal of a focused history and physical examination is to help clinicians stratify patients into back pain categories—nonspecific, spine related, referred from nonspine source, or other causes as described previously. Clinicians are obligated to identify and treat the cause of back pain. One important test to help identify a possible herniated disc is the straight leg raise (SLR). The SLR is a screening test used by clinicians to detect a herniated lumbar disk and it has high sensitivity and moderate specificity (Perina, 2017). The test is performed with the patient sitting or lying; however, the supine position is preferred. The knee is kept extended while the clinician raises one leg at a time to assess for pain in the posterior leg radiating below the knee caused by irritation or inflammation of the sciatic nerve. The SLR test is positive only when the maneuver elicits pain that radiates to below the knee. It is not considered a positive test, indicating a possible herniated disc, if the pain remains localized in the back or there is pain in the hamstrings when the leg is raised. In addition to the SLR, the patient should have strength and reflexes in the lower extremities assessed as part of a thorough physical examination. The basic examination of a patient with back pain includes observation of movement and palpation of the spine for

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tenderness, range of motion of the back and extremities; SLR; and neurological examination, including deep tendon reflexes, muscle strength, and sensation in the lower extremities.

NURSING INTERVENTIONS, MANAGEMENT, AND IMPLICATIONS

Providing nursing care to patients with back pain can be challenging across all settings. The aim of treatment for LBP is to provide adequate pain care and improve function, reduce time away from work or activities, and develop coping strategies in the event of chronic, persistent pain or surgical intervention (Casazza, 2012). Most often, clinicians will not order imaging, such as radiographs, for patients presenting with back pain in the absence of trauma and red-flag symptoms. If the clinician suspects a serious underlying condition, he or she will order an MRI, which is the study of choice. CT is an alternative diagnostic test when MRI is contraindicated or unavailable. Radiography may be helpful to screen for serious conditions but usually has little diagnostic value. If spinal infection is suspected, the clinician may order laboratory tests. These tests would likely include a complete blood count with differential, erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP) level. In the case of nonspecific LBP, clinicians will not typically order any laboratory testing or imaging; however, in some cases of LBP that are not clearly musculoskeletal, a urinalysis may be useful. Other laboratory studies are rarely needed unless the clinician strongly suspects a disorder other than back pain (Kinkade, 2007).

Treatment of back pain depends on the suspected underlying cause. Generally, patients with back pain are treated conservatively and surgical referral is a last resort. Treatment for CBP encompasses conservative management with both pharmacological and nonpharmacological pain care. Remaining active with exercise and physical therapy may be beneficial for patients with CLBP (Perina, 2017). Recommended first-line treatment for nonspecific back pain includes nonsteroidal anti-inflammatory drugs (NSAIDs) and acetaminophen. There is conflicting evidence about NSAIDs being more effective than acetaminophen in the treatment of ALBP. Used by patients in recommended dosages, acetaminophen can be a helpful adjunct that avoids the renal and gastrointestinal toxicities of NSAIDs (Perina, 2017). This is a particularly important consideration for the treatment of back pain in older adults who are at higher risk for adverse drug reactions. For patients experiencing sciatica, opioids may be required to control pain when first-line medications fail. Tramadol (Ultram) is an analgesic that has weak opioid and serotonin–norepinephrine-reuptake inhibitor (SNRI) activity. Studies show some short-term improvements in pain and function with Tramadol but there is a lack of evidence to support long-term use in chronic pain sufferers. Opioids should be considered a second- or third-line analgesic for a short period of time. It is important to note that studies have shown no significant advantage of opioid use in symptom relief or return to work when compared with NSAIDs or acetaminophen (Kinkade, 2007).

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Muscle relaxants are another class of drugs that may be prescribed in the treatment of back pain. Patients may be prescribed cyclobenzaprine (Flexeril) in the first 1 to 2 weeks of treatment. There is some evidence that suggest skeletal muscle relaxants lead to better relief of symptoms when used with NSAIDs. However, studies do not show benefit of long-term use of muscle relaxants to treat CBP. The use of benzodiazepines and carisoprodol (Soma) carries risk of dependency. Clinicians will often refer people with CLBP to pain management and/or a spine specialist.

Nurses are an important and integral part of the interprofessional team involved in the care of patients with LBP. Often, nurses have a significant impact on a patient’s ability to self-manage their pain. Education around self-management is important to help prevent back pain relapses and in managing pain that lasts longer than 3 months. Patient education that has shown to have some benefit in preventing CLBP includes exercise and activity, promoting weight loss where indicated, increasing overall physical conditioning, recognizing and avoiding aggravating factors, the natural history of the disease, and expected time frame for improvement in pain and function (Kinkade, 2007; Perina, 2017).

OUTCOMES

Back pain relapses are common and the socioeconomic burden of CBP is sizable. Therefore, efforts to prevent relapse and reduce the incidence of chronic pain are of great importance in addressing quality of care and improved outcomes for patients with back pain. Strategies aimed at preventing injuries that cause initial back pain episodes and preventing CBP improve outcomes. The U.S. Preventive Services Task Force (USPSTF) and the COST B13 Working Group on European Guidelines for Prevention in LBP have synthesized the evidence for treatment and management of back pain. Of note, back belts that patients may commonly wear, especially in occupations with heavy lifting, have not been proven to prevent back injuries. An interprofessional approach to treating and managing back pain will improve outcomes. Patients have access to an enormous amount of information on the Internet about back pain treatments. HCPs must be ready to discuss evidence-based approaches to prevention, treatment, and management. In addition to physical therapy, massage and yoga therapy may be treatments patients inquire about and want to try. There is insufficient evidence to recommend for or against massage therapy for ALBP (Casazza, 2012). Yet, for chronic pain, it may be helpful. Moreover, one form of yoga has been shown to have benefit. A therapeutic form of yoga, Viniyoga, may provide relief to CBP. Research has shown that a 6-week course of yoga decreased medication use and provided more pain relief than exercise and self-care strategies for nonspecific back pain (Last & Hulbert, 2009). Clinicians who are aware of these and other therapies will help patients make informed decisions and engage them in shared decision making about their care.
Summary

The evaluation and treatment of back pain occurs along a continuum in most cases from the initial treatment aimed at alleviating the pain associated with an acute episode to improving pain and function with adequate pain care for patients experiencing CBP. It is important for HCPs in all settings to thoroughly assess patient’s back pain even if the pain is chronic. There are a variety of causes of back pain and some may be serious requiring immediate intervention. It is also important to document and openly discuss patient expectations about pain care, self-care, alternative therapies, and return to their previous level of activity. Discussing and documenting goals and expectations at each encounter helps to provide continuity of care. HCPs must be vigilant in helping patients understand prevention strategies for back pain and how to recognize red flags that require urgent intervention.


