Chapter 52

Acute Interventions for Home Care

Learning Objectives

• Discuss general issues related to the home health care patient.
• Outline general principles of assessment and management of the home health care patient.
• Describe medical equipment, assessment, and management of the home health care patient with inadequate respiratory support.
Learning Objectives

- Identify assessment findings and acute interventions for problems related to vascular access devices in the home health care setting.
- Describe medical equipment, assessment, and management of the patient with a gastrointestinal or genitourinary crisis in the home health care setting.

Learning Objectives

- Identify key assessments and principles of wound care management in the home health care patient.
- Outline maternal/child problems that may be encountered early in the postpartum period in the home health care setting.
- Describe medical therapy associated with hospice and comfort care in the home health care setting.

Overview of Home Health Care

- Home health care began in U.S. in late 1800s as direct result of rapid city growth and an increase in the number of immigrants moving into large cities
  - Emphasis of home health care at that time was on personal hygiene and preventive care
  - Health services were provided by visiting nurses
    - Worked in tenements to assist poor
    - Cared for wealthy and middle-class families after births or discharges from hospitals
  - At first, few physicians were associated with most of these home health care groups
Overview of Home Health Care

• Until mid-1960s, home health care continued to focus on poor
  – Rest of population received care in hospitals and doctors’ offices
  – With passage of Social Security Act Amendments (commonly known as Medicare) in 1965, home health care became benefit to older adult patients receiving Medicare
    • Greatly accelerated growth of industry
    • In 1973, these services were extended to certain disabled younger Americans
    • Hospice benefits were added in 1983

Overview of Home Health Care

• In 2008, 7.6 million Medicare recipients received formal home care services
  – Medicare is single largest payer of home care services in U.S.
  – Other funding sources
    • Medicaid
    • Older Americans Act
    • Title XX Social Services Block Grants
    • Veterans Administration
    • TRICARE/CHAMPUS for military personnel
    • Private insurance
    • Managed care organizations

Overview of Home Health Care

• In recent years, federal health care reform has led to development of managed care services provided to members by managed care organizations
  – These plans now cover about 95 percent of U.S. population
  – Have greatly influenced methods of health care delivery (including home health care services)
Overview of Home Health Care

• Today, home health care incorporates wide variety of health and social services
  – These services are provided at home to recovering, disabled, or chronically ill and
    terminally ill persons in need of
    • Medical treatment
    • Nursing
    • Social services
    • Therapeutic treatment
    • Help with essential activities of daily living

Overview of Home Health Care

• Sampling of services provided to home health care patients
  – Skilled nursing services
  – Physical, speech, and occupational therapy
  – Medical social services
  – Home health aides
  – Nutritional counseling

Advanced Life Support Response to Home Health Care Patients

• About 21 percent of home health care patients have conditions related to diseases of circulatory system as their
  primary diagnosis
  – Persons with heart disease make up about half of this group
  – Other common diagnoses of home health care patients
    • Cancer
    • Diabetes
    • Chronic lung disease
    • Renal failure/dialysis
    • Hypertension
Advanced Life Support Response to Home Health Care Patients

- Emergency responses for home health care patients likely will be more common for EMS agencies
  - Typical emergencies
    - Respiratory failure
    - Cardiac decompensation
    - Septic complications
    - Equipment malfunction
    - Other conditions that worsen in home health care setting

Infection Control

- Practice infection control in home health care setting
  - Use universal precautions and body substance isolation (or transmission-based precautions) when indicated
    - This practice, along with treating all patients as though they have an infectious disease, forms basis for infection control guidelines recommended by CDC
  - OSHA, CDC, and EPA recommend same infection control standards for treatment of home health care patients as for acute care patients

What factor decreases the risk of spreading infection within a home care setting versus a hospital?
Infection Control

- Equipment set forth by these agencies for infection control in home setting
  - Mask
  - Gown
  - Goggles, glasses, or face shield
  - Resuscitation mask
  - Specimen bags
  - EPA-approved disinfectant effective against hepatitis B virus, HIV, and tuberculosis
  - Soap and water/hand sanitizers
  - Disposable paper towels
  - Impervious trash bags and labels

Types of Home Care Patients

- Need to reduce costs of health care and technological advances in medicine have allowed many types of patients to receive home care
  - Many EMS agencies ask communities to notify them when someone is on complex home health care program
  - Many of these agencies will make visit to home prior to onset of emergency
    - Allows personnel to become familiar with patient’s condition and special equipment

Types of Home Care Patients

- Classifications
  - Pathological conditions of airway
    - Causing inadequate pulmonary toilet or inadequate alveolar ventilation and/or oxygenation
  - Circulatory pathological conditions
    - Causing alterations in central circulation (e.g., heart failure) or peripheral circulation (e.g., pressure ulcers, delayed healing, or infection)
Types of Home Care Patients

• Classifications
  – Neurological conditions
    • Stroke, traumatic brain injury, spinal cord injury
  – Orthopedic trauma or surgery
    • Requires rehabilitation (e.g., fractured hip, hip or knee replacement)
  – Gastrointestinal/ genitourinary conditions
    • Requiring special devices such as ostomies, feeding catheters, and special equipment needed for home dialysis

Types of Home Care Patients

• Classifications
  – Infection from cellulitis or systemic illness
    • Sepsis
  – Wounds that require care
    • Surgical wound closure
    • Decubitus wounds
    • Surgical drains

Types of Home Care Patients

• Other patient groups paramedic may encounter in home health care setting
  – Patients receiving hospice care
  – Expectant or new mothers
  – Patients with dementia or other conditions that require psychological support for the patient or family
  – Patients receiving chemotherapy or home care for chronic pain
  – Patients with organ transplants or those who are waiting for organ transplantation (transplant candidates)
Scene Size-up

- When paramedics arrive at scene of home health care patient, scene size-up should include
  - Universal precautions
  - Elements of scene safety
  - Assessment of patient’s environment (environmental setting)

Universal Precautions

- Use universal precautions to guard against communicable disease when caring for any patient
  - Equipment that may be found in the home health care setting
    - Containers of medical waste
    - Ostomy collection bags
    - Tracheostomy tubes
    - Sharps
    - Soiled dressings
    - Other equipment that may be contaminated with patient’s body fluids

Universal Precautions

- Use universal precautions to guard against communicable disease when caring for any patient
  - Ensure that any infectious waste found in home is contained properly
    - Disposed of per protocol
Scene Safety

• Whenever an EMS response is made to person’s home, evaluate scene for presence of dangerous pets, firearms, and other home protection devices, and for any home hazards
  – For safety of EMS crew, patient, and others at scene, all potential hazards found in home must be contained or remedied
  – May be necessary to request law enforcement to help with unruly or hostile bystanders
  – Extra personnel and equipment may be needed to help move patient down flight of steps for transport or to manage technology-assisted patient care devices

Environmental Setting

• Assess setting for patient’s ability to maintain healthy environment
  – Cleanliness of home
  – Evidence of basic nutritional support
  – Needs of heat, water, shelter, electricity
• EMS crew also should note any signs of abuse or neglect
• Note cleanliness and condition of any medical devices

Patient Assessment

• Primary survey should focus on life-threatening illness or injury
  – Appropriate measures should be taken as
• After primary survey, focused history should be obtained and secondary assessment performed
  – Make use of any medical documents found in home
  – Gather information from family and health care professionals present at scene
Patient Assessment

• Critical findings should alert paramedic to forgo detailed assessment and proceed with resuscitation measures and rapid transport for physician evaluation
  – If no critical findings, perform physical examination that considers possibility of
    • Medication interactions
    • Compliance with treatment regimen
    • Possibility of dementia or metabolic disturbance in patient with altered mental status

Patient Assessment

• Comprehensive assessment may include a physical examination using
  – Inspection
  – Palpation
  – Auscultation
  – Percussion (as indicated by patient’s condition and chief complaint)

Patient Assessment

• Reassessment (ongoing assessment) should evaluate any changes in patient’s status while at scene or en route to hospital
  – Can aid in differential diagnosis, treatment, direction of patient management
Management and Treatment Plan

• Depending on patient’s condition, home health care treatment may need to be replaced with advanced life support measures
  – Airway support
  – Ventilatory support
  – Circulatory support
  – Pharmacological and nonpharmacological therapy (e.g., electrical therapy)

Management and Treatment Plan

• Some patients with acute illness or injury need to be transported to hospital for evaluation
  – When transport is needed, give special consideration for patient packaging and for moving patient’s equipment
  – Examples
    • Properly securing intravenous (IV) catheters, urinary catheters, and feeding tubes
    • Ensuring available personnel to assist with moving patient care devices such as ventilation equipment

Management and Treatment Plan

• Family members at scene often are well versed on patient’s medical devices
  – Usually will be eager to help when asked by EMS crew
  – If no family at scene, attempt to contact family member or caregiver and advise of patient’s condition and hospital destination
Management and Treatment Plan

• Other patients need only home care follow-up by home health care practitioners or need referral to other public service agencies
  – Follow protocol and consult with medical direction about referrals and need for notifying private physicians or home health care agencies
  – Regardless of need for EMS transport, thoroughly document all findings and any care provided on patient care report

What feelings may a patient’s family member (or caregiver) in the home setting have if there is a problem and the patient’s condition worsens?

Specific Acute Home Health Care Interventions

• Acute home health care emergencies may occur from
  – Equipment failure or malfunction
  – Drug reactions
  – Complications related to home treatment
  – Worsening medical conditions
Respiratory Support

• More than 630,000 patients are discharged to home health care with diseases of respiratory system each year
  – Patients are at increased risk for airway infections
  – Progression of some respiratory diseases also may lead to increased respiratory demand, making current support inadequate

Respiratory Support

• Chronic pathological conditions that require home respiratory support
  – Asthma
  – Awaiting lung transplant
  – Bronchopulmonary dysplasia
  – Chronic lung disease
  – Cystic fibrosis
  – Infection causing exacerbation of condition
  – Sleep apnea

Respiratory Support

• Acute interventions may be required
  – High-concentration oxygen
  – Pulse oximetry monitoring
  – Ventilatory support as priorities in care
Respiratory Support

- Problems that may lead to request for EMS assistance
  - Increased respiratory demand
  - Increased bronchospasm
  - Increased secretions
  - Obstructed or malfunctioning respiratory devices
  - Improper application of medical devices to support respirations

Oxygen Therapy in the Home Setting

- Three common ways to provide oxygen therapy in home
  - Compressed gas
    - Oxygen stored under pressure in oxygen cylinders equipped with regulator that controls flow rate
  - Liquid oxygen
    - Cold and is stored in container similar to thermos
    - When released, liquid converts to gas and is used like compressed gas

Oxygen Therapy in the Home Setting

- Three common ways to provide oxygen therapy in home
  - Oxygen concentrators
    - Electrically powered device that separates oxygen from air, concentrates it, and stores it
    - Does not have to be resupplied
    - Not as costly as liquid oxygen
    - Cylinder of oxygen must be available as backup in case of power failure
What safety precautions for administering oxygen should be in place in the home setting?

**Oxygen Therapy in the Home Setting**

- Oxygen is delivered to patients via
  - Nasal cannulae
  - Oxygen masks
  - Tracheostomy collars (devices that deliver high humidity and oxygen to patients with surgical airways)
  - Ventilators
Oxygen Therapy in the Home Setting

• Some patients may require continuous positive airway pressure (CPAP) delivered by ventilatory support systems through
  – Mask CPAP
  – Nasal CPAP
  – Biphasic positive airway pressure (BIPAP)

Oxygen Therapy in the Home Setting

• BIPAP ventilatory support system (designed for mask-applied ventilation in home) delivers two different levels of positive airway pressure
  – System cycles spontaneously between preset level of inspiratory positive airway pressure and expiratory positive airway pressure
  – BIPAP ventilatory support system is intended only to augment patient’s breathing
    • Does not provide for total ventilatory requirements

Oxygen Therapy in the Home Setting

• Supportive ventilator management may be indicated to achieve the following
  – Prevent nocturnal hypoxemia caused by sleep hypoventilation in patients with neuromuscular disorders (e.g., muscular dystrophy or myasthenia gravis)
  – Prevent respiratory fatigue in patients with COPD
  – Improve ventilation and oxygen saturation in patients with obstructive apnea
    • Form of sleep apnea involving physical obstruction of upper airways that can lead to pulmonary failure, chronic fatigue, and cardiac abnormalities
Home Ventilators

- Classifications
  - Volume ventilators
  - Pressure ventilators
  - Negative-pressure ventilators
- Most ventilators have a number of controls and settings

Home Ventilators

- Volume ventilators (volume-preset)
  - Deliver predetermined volume of gas with each cycle, after which inspiration is terminated
  - Deliver constant tidal volume regardless of changes in airway resistance or compliance of lungs and thorax
  - Volume remains same unless very high peak airway pressures are reached
    - Safety release valves stop flow

Home Ventilators

- Pressure ventilators (pressure-preset)
  - Pressure-cycled devices that terminate inspiration when preset pressure is achieved
  - When preset pressure is reached, gas flow stops, and patient passively exhales
  - Most often used for patients whose ventilatory resistance is not likely to change
Home Ventilators

• Negative-pressure ventilators
  – Have settings for respiratory rate and pressure of negative force exerted
  • Devices use negative pressure to raise rib cage and lower diaphragm
  • Create negative pressure within lungs so air flows into lungs
  – Often used for patients with healthy lungs who have muscular inability to inhale
  • Examples are “iron lung” and plastic wrap, or poncho ventilators

Assessment Findings

• When caring for a patient who requires oxygen therapy, evaluate patient’s
  – Work of breathing
  – Tidal volume
  – Peak flow
  – Oxygen saturation
  – Quality of breath sounds
Assessment Findings

• Assessment can be performed with
  – Visual inspection (chest rise and fall)
  – Peak flow meters
  – Pulse oximetry
  – Auscultation

Assessment Findings

• Be alert for signs and symptoms of hypoxia
  – Confusion and mental status changes
  – Increased work of breathing
  – Cyanosis
  – Dyspnea
  – Headache
  – Hypertension
  – Hyperventilation
  – Restlessness
  – Tachycardia

Management

• Management goals for patient receiving oxygen therapy who requires acute intervention
  – Improve airway patency
  – Ventilation
  – Oxygenation
Improving Airway Patency

• To improve airway patency, first reposition airway devices (e.g., face masks and nasal cannulae) to ensure they are applied properly and well fitted
  – Any secretions that obstruct airflow from airway should be cleared with suction and from airway device with sterile water
  – If needed, home airway device should be replaced with new device

Improving Airway Patency

• Tracheostomy tube that has become blocked and cannot be cleared may need to be replaced with another tracheostomy tube to ensure adequate ventilation
  – Tube can be replaced temporarily with endotracheal tube
Improving Ventilation and Oxygenation

• If ventilation does not improve after providing patent airway, paramedic should remove home ventilator care device
  – Patient’s ventilations should then be assisted with positive-pressure ventilation via bag-valve-mask device and supplemental oxygen
  – Oxygen saturation should be monitored with pulse oximetry

Improving Ventilation and Oxygenation

• Administer supplemental oxygen as needed to maintain oxygen saturation at 90 percent or higher
  – Medical direction may advise adjusting settings of home care device or changing flow rate of oxygen delivery device to improve ventilation and oxygenation
  – Extra personnel may be needed to assist in moving patient who has ventilator device to ambulance for transport for evaluation

Improving Ventilation and Oxygenation

• On some ventilators inspiratory flow rate is determined by
  – Tidal volume
  – Respiratory rate
  – Inspiratory/ expiratory ratio
    • Ratio is generally 1:2
    • Allows for complete exhalation and prevents air trapping
Improving Ventilation and Oxygenation

- On other ventilators, flow rate is set independently
  - Allows for adjustment of air flow to flow wave pattern that is most comfortable for patient
  - If patient is having difficulty with spontaneous breathing, increase in flow rate may be indicated

Improving Ventilation and Oxygenation

- Higher flow rate means shorter inspiratory time and usually higher respiratory pressure because of increased resistance
  - Lower flow rate requires longer inspiratory time with decreased inspiratory pressure
  - Always consult with medical direction before changing flow rate on any ventilator

Psychological Support and Communication Strategies

- Difficulty breathing can be horrifying experience for patient, especially one who depends on ventilator
  - Try to calm patient and family
  - Assure respirations will be supported adequately by other means while at scene and during transport
Psychological Support and Communication Strategies

• Some patients with tracheostomies have special valves attached to tracheostomy tube (“talking trachs”)  
  – Valves redirect exhaled air  
    • Around tracheostomy tube  
    • Through vocal cords  
    • Out of mouth and nose to allow for normal speech  
  – Loss of verbal communication is major source of anxiety in patients who have tracheostomies

Psychological Support and Communication Strategies

• Ability to communicate will be based on  
  – Patient’s cognition  
  – Level of consciousness  
  – Language  
  – Fine and gross motor skills  
• Methods of communication  
  – Signing and writing on notepads  
  – Enlist help of family and other caregivers in communicating with patient

Cardiovascular Support

• Paramedics will encounter patients who have left ventricular assist device (LVAD)  
  – Most common  
    • Heart transplant candidates  
    • Heart surgery patients during recovery  
    • Patients with severe congestive heart failure
Cardiovascular Support

• LVAD
  – Surgically implanted, battery-operated, mechanical pump-type device
  – Helps maintain pumping ability of heart that can't effectively work on its own
  – Assumes or augments pumping function of left ventricle
  – Can operate in
    • Fixed mode where pump beats at set rate, regardless of other conditions
    • Auto mode where pump fills at variable rate depending on patient's activity and volume status
    • With either mode, no relationship to rate or rhythm of heart

Cardiovascular Support

• Families and caregivers generally are advised to contact EMS if patient
  – Is unconscious
  – Is awake but non-responsive
  – Falls or suddenly collapses
  – Has severe sensory or motor deficit
  – Experiences severe dysrhythmia or cardiac arrest

Types of LVADs

• Two most common LVADs
  – Pulsatile pumps
    • Pumps blood in cycle similar to normal heart (cycles of contraction-relaxation)
  – Nonpulsatile pumps
    • Move blood continuously through body
  – Both types of LVADs are controlled by battery packs and electronic pump and system controller
    • Usually carried on belt around patient's waist or on shoulder strap
Types of LVADs

• Two most common LVADs
  – Both types can malfunction, triggering advisory or alarm
    • Home care patients and their families are trained to troubleshoot device
    • Examples include failure in pumping device or system controller, and loss of power

Types of LVADs

• Most malfunctions can be remedied by patient or family member by
  – Checking cables
  – Changing power source
  – Changing system controller

Types of LVADs

• Some devices have emergency “hand pumps” in event of system failure
  – Manufacturer recommendations for managing advisories and alarms should be closely followed
  – LVAD that fails to provide pumping action of left ventricle can result in heart failure and cardiac arrest
Management

- If patient experiences pulseless VT, ventricular fibrillation, or asystole, normal care protocols should be applied
  - Manufacturer guidelines regarding chest compressions and defibrillation must be followed
    - Chest compressions over some LVADs may damage heart and cause severe bleeding
    - Some will need to have power source disconnected before administering electrical therapy
    - Consult with knowledgeable family members or caregivers and with medical direction

Vascular Access Devices

- Many patients in home care setting have indwelling vascular access device (VAD)
  - Used to provide nutritional support
  - Used to administer medications
  - Used for patients who need long-term vascular access
Vascular Access Devices

- Those with indwelling VADs may experience problems
  - Anticoagulation associated with percutaneous or implanted devices
  - Embolus formation associated with indwelling devices, stasis, inactivity
  - Air embolus associated with central VAD
  - Obstructed or malfunctioning VADs
  - Infection at access site (“line sepsis”)
  - Infiltration and extravasation
  - Obstructed dialysis shunts
  - Bleeding if catheter is torn

Types

- Variety of VADs
  - Surgically implanted subcutaneous VADs
  - Medication delivery devices
    - Mediports
  - Peripheral VADs
    - Peripherally inserted central catheters
    - Midline catheters
  - Central venous tunneled catheters
    - Hickman
    - Groshong
    - Broviac
  - Dialysis shunts
Assessment Findings and Acute Interventions

- Certain assessment findings may require acute interventions in patients with VADs
  - Infection
  - Hemorrhage
  - Hemodynamic compromise from circulatory overload or embolus
  - Obstruction of vascular device
  - Catheter breakage
  - Leakage of medication
Infection

Home health care patients with VADs generally are instructed to regularly examine area for infection
- Instructed to change dressings around their device often
- Done by family members and home health care practitioners
- All types of dressings must be changed immediately if they become wet, soiled, contaminated, or unocclusive
- Common problem of VADs is infection near exit site, tunnel, or port

Infection

- Signs and symptoms of localized site infection
  - Pain
  - Redness
  - Warmth
  - Purulence

Infection

- Signs and symptoms of systemic infection
  - Fever
  - Tachycardia
  - General weakness
  - Malaise
  - Mental status changes
  - Body aches
  - Possibly sepsicemia
- If patient has any evidence of systemic signs of infection, he or she should be transported to hospital
Infection

• General principles in managing site infection
  – Wash your hands
  – Put on nonsterile gloves and remove old dressing
  – Discard dressing and gloves
  – Open dressing change kit and don sterile gloves
  – Inspect site for signs of swelling, redness, or other complications

Infection

• General principles in managing site infection
  – Clean site vigorously
    • Chlorhexidine is gaining acceptance as antiseptic of choice
    • Use side-to-side cleaning motion
    • If using alcohol and povidone-iodine (in this order or iodine will be inactivated)
      – Use alcohol first to kill (organism most likely to cause catheter sepsis)
      – Then vigorously clean with povidone-iodine and let skin dry completely

Infection

• General principles in managing site infection
  – Do not apply ointment unless you are removing catheter
  – Cover with gauze or transparent dressing
    (according to local medical direction protocol)
Will it always be possible to identify the catheter as the source of sepsis while on the scene?

Hemorrhage

- Bleeding at site of VAD should be controlled by applying gentle, direct pressure with aseptic technique
  - Transport for physician evaluation
  - Blood loss from broken or dislodged VAD can be significant
  - Medical direction may recommend that damaged catheter be clamped
  - If blood loss is severe, treat for hemorrhagic shock

Hemodynamic Compromise

- May result from circulatory overload or embolus
  - Circulatory overload can develop from too much IV fluid being delivered too fast
  - Signs and symptoms of circulatory overload
    - BP
    - Distended neck veins
    - Pulmonary congestion (crackles and wheezes)
    - Dyspnea
Hemodynamic Compromise

- If circulatory overload is suspected
  - Slow infusion to keep-open rate
  - Provide high-concentration oxygen and monitor oxygen saturation
  - Elevate patient’s head

Hemodynamic Compromise

- If circulatory overload is suspected
  - Maintain body warmth
    - Promotes peripheral circulation
    - Eases stress on central veins
  - Monitor vital signs
  - Consult with medical direction for patient management and disposition

What drug(s) may the physician order if this circulatory overload happens?
Hemodynamic Compromise

• Displacement of surgically implanted catheter or port is rare
  – Embolus that occurs from air, thrombus, or plastic or catheter tip entering circulation can develop
  – Signs and symptoms of an embolus
    • Hypotension
    • Cyanosis
    • Weak, rapid pulse
    • Loss of consciousness

Hemodynamic Compromise

• Patient suspected of having embolism should be managed as follows
  – Stop IV infusion
  – Position patient on left side with head down (in attempt to keep embolus in right side of heart)
  – Administer high-concentration oxygen and monitor oxygen saturation
  – Notify medical direction

Hemodynamic Compromise

• If plastic or catheter tip embolism is suspected, medical direction may advise that constricting band be applied above VAD site
  – Should stop embolus from further movement

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Obstruction

• Indwelling VAD may become obstructed and disrupt flow of fluids and medications
  – Immediate intervention needed
    • Must be cleared by irrigation or administration of fibrinolytic agents
    • Always consult with medical direction before attempting to clear obstruction from VAD

Flushing and Irrigation

• VADs and medication ports need regular irrigation with normal saline and/or heparin
  – Solution used depends on type of VAD
  – Frequency of irrigation depends on specific device and on frequency of medication administration

Flushing and Irrigation

• If VAD is obstructed, consult with medical direction and follow these steps
  – Explain procedure to patient
  – Establish sterile field and use strict aseptic technique
  – Prepare prescribed irrigation solutions
    • Normal saline
    • Normal saline and heparin
  – Clean injection cap(s) with antiseptic and alcohol wipe (per protocol) and allow to air dry
  – Release clamp from catheter (if present)
Flushing and Irrigation

• If VAD is obstructed, consult with medical direction and follow these steps
  – Irrigate lumen with appropriate volume of solution using 10-mL syringe (no faster than 0.5 mL/sec)
    • If resistance is persistent, stop irrigation, or catheter may rupture
    • Never try to force or dislodge clot or other obstruction
    • Fibrinolytic agents may be required
    • Application of force could dislodge obstruction and cause it to enter circulatory system

• If VAD is obstructed, consult with medical direction and follow these steps
  – Aspirate blood back into syringe
    • Removes clots or fibrin sheaths
  – Flush with normal saline (10 to 20 mL) to clear system
  – Use heparin lock if necessary
    • Broviac, Hickman, or peripherally inserted central catheter

• If VAD is obstructed, consult with medical direction and follow these steps
  – Clamp catheter if needed
  – Loop catheter with cap pointing upward on dressing
    • Secure with tape
  – Properly dispose of all equipment
Anticoagulant Therapy

- Medication port or other VAD may require declotting with fibrinolytic agents (t-PA)
  - Flushing with fibrinolytic agents should be performed by specialized personnel
  - X-ray may be needed prior to administration of these agents

Other Complications

- If unable to aspirate blood from central VAD, or patient or family reports length of catheter visible has changed, do not administer fluid or drugs through it
  - Patient will need transport for further evaluation

Other Complications

- Decrease in length of catheter coupled with sudden onset of tachycardia can mean that catheter has moved into right atrium
  - Catheter may have advanced into jugular vein if patient
    - Hears bubbling in ear when catheter is flushed
    - Has sudden earache on side of body where catheter is inserted
  - X-ray will be needed to determine location of catheter
Catheter Damage

• Damaged (e.g., cracked or torn) catheter can allow fluids or medications to infiltrate into surrounding tissues and lead to air embolism
  – Signs and symptoms of damaged catheter
    • Leaking fluid
    • Complaint of burning sensation
    • Swollen and tender skin near insertion site
  – If damage suspected, infusion should be stopped immediately
    • Clamp catheter between crack or tear in catheter and patient

• Managed with
  – High-concentration oxygen and pulse oximetry
  – IV access through peripheral vein
  – Transport for physician evaluation
  – Patient who develops altered level of consciousness (indicating possible air embolism)
    • Position on left side
    • Head slightly lowered
    • Helps prevent embolism from traveling to brain

Gastrointestinal/Genitourinary Crisis

• More than 500,000 patients with diseases of the digestive or genitourinary system are discharged to home health care each year
  – Some have medical devices such as
    • Urinary catheters or urostomies
    • Indwelling nutritional support devices
    • Colostomies
    • Nasogastric tubes
Gastrointestinal/Genitourinary Crisis

• More than 500,000 patients with diseases of the digestive or genitourinary system are discharged to home health care each year
  — Acute interventions that may be required
    • Urinary tract infection (UTI)
    • Urosepsis
    • Urinary retention
    • Problems with gastric emptying or feeding

Urinary Tract Infection, Urosepsis, and Urinary Retention

• UTI is common
  — Occurs in all age groups and both sexes
  — Organisms most often associated are gram-negative organisms normally found in GI tract
    • Frequently introduced from hands of health care personnel at time of bladder catheterization
    • About 75 percent of UTIs are result of urological instrumentation
    • Sterile technique during these procedures crucial

Urinary Tract Infection, Urosepsis, and Urinary Retention

• Other factors that increase risk of UTI
  — Obstructions
    • Urethral strictures
    • Calculi
    • Tumors
    • Blood clots
Urinary Tract Infection, Urosepsis, and Urinary Retention

• Other factors that increase risk of UTI
  – Trauma
    • Abdominal injury
    • Ruptured bladder
    • Local trauma related to sexual activity

• Other factors that increase risk of UTI
  – Congenital anomalies
    • Polycystic kidneys
    • Horse-shoe kidney
    • Spina bifida

• Other factors that increase risk of UTI
  – Abdominal or gynecological surgery
  – Acute or chronic renal failure
  – Immunocompromised state
    • Patients with HIV
    • Older adults
  – Postpartum state
  – Aging changes, particularly in women
Urinary Tract Infection, Urosepsis, and Urinary Retention

- If UTI is allowed to progress
  - May lead to septic complications (urosepsis)
  - Disease managed with antibiotics

Urinary Retention

- Urinary retention may result from
  - Urethral stricture
  - Inflammation
  - Enlarged prostate
  - CNS dysfunction
  - Foreign body obstruction
  - Use of certain drugs, such as parasympatholytic or anticholinergic agents

Urinary Retention

- Need to be evaluated by physician to determine cause of retention
  - If cause is not easily correctable, patient may need to be hospitalized
  - Some patients may require bladder catheterization with indwelling Foley catheter device
What measure should you take to protect yourself legally when inserting a Foley catheter into a patient in a home?

Problems with Gastric Emptying or Feeding
- Gastric tubes used in home health care setting are devices inserted into stomach or intestines
  - Used to
    - Remove fluids and gas by suction or gravity
    - Instill irrigation solutions or medications
    - Administer enteral feedings (through feeding tubes)
  - Two common problems with gastric tubes
    - Aspiration of gastric contents
    - Malfunction of gastric devices
Aspiration of Gastric Contents

- Aspiration of gastric contents may occur in home health care patient as result of
  - Nonpatent gastric tube
  - Improper nutritional support via feeding tube
  - Patient positioning with these medical devices

Aspiration of Gastric Contents

- Patients at greatest risk for aspiration of tube feedings are those who
  - Are unconscious
  - Are confused
  - Are seriously debilitating
  - Are older adults
  - Have tracheostomies or large-bore feeding tubes
  - Have impaired gag reflexes
  - Cannot sit upright

Aspiration of Gastric Contents

- Monitor patients with feeding tubes closely for signs of increased respiratory effort
  - Lung sounds should be clear on auscultation
  - Respiratory difficulty or tachypnea may indicate developing aspiration pneumonitis
  - Other problems that can occur in patients with feeding tubes
    - Diarrhea
    - Choking
    - Irritable bowel syndrome
    - Bowel obstruction
Obstruction or Malfunction of Gastric Devices

• Gastric device may become obstructed or malfunction for different reasons
  – Kinked or clogged tube
  – Surgically implanted feeding tube may become displaced

• Acute interventions
  – Unkinking tube
  – Irrigating clogged tube
  – Reinserting displaced tube (per medical direction)

Obstruction or Malfunction of Gastric Devices

• When transporting patient with gastric device, ensure patient comfort
  – Device should be positioned to allow for proper drainage and to prevent reflux
  – Time is of essence in correcting malfunctioning gastric device
  – Immediate transport

Ostomies

• Artificial opening into urinary tract, gastrointestinal tract, or trachea
  – May be temporary or permanent
  – Ileostomy
    • Opening into small intestine
  – Colostomy
    • Opening into large intestine
    • Bowel usually discharges liquid or solid feces into bag (pouch) once or twice/day
    • Bag then is changed
Ostomies

- Artificial opening into urinary tract, gastrointestinal tract, or trachea
  - Potential complications
    - Infection
    - Hemorrhage
    - Obstruction
    - Stomal problems (e.g., necrosis, retraction, stenosis, and prolapse)

Ostomies

- Colostomy irrigation, ostomy care, and pouch changes
  - Usually performed for home health care patients by
    - Patients themselves
    - Family members
    - Home health care practitioners
  - Procedures require special training
    - Not considered acute intervention for paramedic practice
    - Bowel perforation and significant fluid/electrolyte imbalances may accidentally occur from colostomy irrigation performed by patient or caregiver

Gastrointestinal/Genitourinary Crisis

- Paramedic should evaluate patient with GI/genitourinary complaints by
  - Obtaining focused history
  - Performing physical examination to determine need for immediate transport for physician evaluation
Gastrointestinal/Genitourinary Crisis

- Depending on patient’s chief complaint, physical examination may include assessment for
  - Abdominal distention
  - Abdominal pain
  - Aspiration
  - Fever
  - Intestinal obstruction
  - Peritonitis
  - UTI
  - Urinary retention

Acute Infections

- More than 160,000 patients with infectious and parasitic diseases are discharged to home health care in U.S. each year
  - Have increased death rate from sepsis and severe peripheral infections
  - Have decreased ability to perceive pain or perform self-care
  - Patients at risk for infection and impaired healing are those
    - With chronic diseases
    - Who have poor nutrition
    - Who are unable to perform self-care

Acute Infections

- Conditions that may result in need for acute interventions in home health care population
  - Airway infections in immunocompromised patient
  - Delayed healing and increased peripheral infection from poor peripheral perfusion
  - Skin breakdown and peripheral infections from immobility or sedentary lifestyle
  - Infection and sepsis from implanted medical devices
  - Wounds and incisions
  - Abscesses
  - Cellulitis
Open Wounds

• Patients with open wounds may have
  – Variety of dressings, wound packings, and drains that permit drainage of fluid or air
  – Variety of wound closure devices
    • Dressings, packings, and wound closure devices can become contaminated
    • Drains can become occluded or displaced
  – Wound healing greatly depends on wound management
    • Patient must be made aware of importance of taking all prescribed medications (especially antibiotics)
    • Be informed of importance of completing all wound care procedures

Open Wounds

• Wound repair generally is believed to be enhanced by
  – Moist environment
  – Wound bed free of necrotic tissue, eschar, and environmental contamination or infection
  – Adequate blood supply to meet metabolic demands for tissue generation
  – Sufficient oxygen and nutrition for cellular metabolism and tissue generation

General Principles in Wound Care Management

• Wound care requires
  – Assessment of wound and surrounding tissues
  – Evaluation for infection or sepsis
### General Principles in Wound Care Management

- Include assessment for
  - Location and size
  - Color of wound bed
    - Red or pink granular wound bed indicates healing
    - Green, yellow, or black wound bed suggests infection or necrosis (tissue death)

### General Principles in Wound Care Management

- Include assessment for
  - Drainage
    - Clear or blood-tinged drainage is common in healing wound
    - Green or yellow drainage suggests infection
  - Wound odor
    - Sweet smell may indicate decay
    - Foul smell may indicate infection

### General Principles in Wound Care Management

- Include assessment for
  - Surrounding skin
    - Assess skin for redness, inflammation, signs of tissue breakdown
    - If dressing is wet or contaminated, change it after wound evaluation
    - Medical direction may advise cleaning wound with normal saline and/or antiseptic solution before redressing
    - Debridement of necrotic tissue may be required
    - Mechanical debridement is achieved by gently rubbing tissue with gauze pad moistened with sterile, normal saline
    - Some patients may need transport if severe infection or sepsis is suspected
Maternal/Child Conditions

• In early 1990s, many insurance companies began paying only for 24-hour hospital stays for uncomplicated vaginal childbirth
  – Sometimes were called “drive-by deliveries”
  – In wake of complaints about inadequate care, states began passing laws in 1995 and 1996
    • Laws required insurance to pay for 52-hour stays

• Similar federal law was passed in 1996
  • Law took effect in January 1998 and became Final Rule in 2009
  • Under this law, health plans must cover hospital stays of at least 48 hours for women who give birth naturally and 96 hours following a caesarean delivery

• Problems that may be encountered when return to home health care setting
  – Postpartum pathophysiologies
    • Hemorrhage
    • Infection
    • Pulmonary embolism
  – Postpartum depression
  – Septicemia in the newborn
  – Infantile apnea
  – Failure to thrive
  – Sudden infant death syndrome
A mother is having a postpartum complication that requires urgent transport. What will you do with the baby if they are home alone?

**Postpartum Pathophysiologies**

- Include
  - Hemorrhage
  - Infection
  - Pulmonary embolism

**Postpartum Pathophysiologies**

- Postpartum hemorrhage
  - Occurs in about 5 percent of all deliveries
  - Frequently takes place within first few hours after delivery
  - Can be delayed up to 6 weeks
  - Causes
    - Incomplete contraction of uterine muscle fibers
    - Retained pieces of placenta or membranes in uterus
    - Vaginal or cervical tears during delivery (rare)
Postpartum Pathophysiologies

• Postpartum infection
  – Affects 2 to 8 percent of all pregnancies
  – Most common infection is endometritis
  – Occurs when bacteria grow and invade uterus or other tissues along birth canal
  – Symptoms usually develop on second or third day after delivery
  – Fever and abdominal pain are most common signs of infection

Postpartum Pathophysiologies

• Pulmonary embolism during pregnancy, labor, or postpartum period is one of most common causes of maternal death
  – Embolus often results from blood clot in pelvic circulation
  – More commonly associated with cesarean section than with vaginal delivery

Postpartum Depression

• Affects 10 to 15 percent of mothers
  – Most likely caused by combination of sudden hormonal changes and psychological and environmental factors
  – Can be short-lived attack of mild depression ("baby blues")
  – Can manifest as depressive illness that requires in-hospital supervision
Postpartum Depression

- Risk factors for postpartum depression
  - Adverse socioeconomic conditions
  - Anxiety
  - Complicated pregnancy or delivery
  - Fetal complications
  - Low self-esteem
  - Poor marital adjustment
  - Previous episodes of depression
  - Recent life stressors

Postpartum Depression

- Recognizing and treating is important
  - Can interfere with bonding between mother and infant
  - Can seriously affect mother’s ability to care for her newborn
  - Many fear they will harm their babies
    - Feel ashamed and guilty for these feelings
  - Sensitivity to possibility of depression is crucial and necessary for successful diagnosis and treatment

Septicemia in the Newborn

- Healthy newborns are vulnerable to several conditions that can require hospital treatment
  - Examples
    - Jaundice that results from physiological immaturity of bilirubin metabolism
    - Dehydration that can lead to serious electrolyte abnormalities
    - Sepsis
  - Neonates are highly susceptible to infection because of diminished nonspecific (inflammatory) and specific (humoral) immunity
Septicemia in the Newborn

• Usually caused by
  – Group B streptococci
  – Listeria monocytogenes
  – Gram-negative enteric organisms (especially Escherichia coli)
• Signs and symptoms of sepsis may be minimal and nonspecific
  – “In the newborn, anything can be a sign of anything”

Septicemia in the Newborn

• Signs and symptoms of sepsis in newborn
  – Temperature instability
  – Respiratory distress
  – Apnea
  – Cyanosis

Septicemia in the Newborn

• Signs and symptoms of sepsis in newborn
  – Gastrointestinal changes
    • Vomiting
    • Distention
    • Diarrhea
    • Anorexia
  – CNS features
    • Irritability
    • Lethargy
    • Weak suck
Septicemia in the Newborn

- Risk factors for sepsis
  - Prematurity
  - Prolonged rupture of membranes
  - Chorioamnionitis
    - Inflammatory reaction in amniotic membranes
    - Caused by bacterial viruses in amniotic fluid
  - Diagnosis generally is confirmed after physician evaluation by positive blood, urine, or cerebrospinal fluid culture

Infantile Apnea

- Defined by American Academy of Pediatrics as "an unexplained episode of cessation of breathing for 20 seconds or longer, or a shorter respiratory pause associated with bradycardia, cyanosis, pallor, and/or marked hypotonia (diminished tone)"
  - Apnea often reflects immature respiratory control centers in some infants

Infantile Apnea

- Other causes
  - Metabolic derangements
    - Hypoglycemia
    - Hypocalcemia
    - Hypothermia
  - Infection
    - Sepsis
    - Pneumonia
    - Meningitis
Infantile Apnea

• Other causes
  – CNS damage
    • Hemorrhage
    • Hypoxic injury
    • Seizures
  – Hemorrhage
  – Hypoxic injury
  – Seizures
  – Intentional poisoning
    • Child abuse

Infantile Apnea

• Other causes
  • Pulmonary disorders
  • Respiratory distress
  • Hyaline membrane disease
  • Pneumonia
  • Obstruction
  • Upper respiratory abnormalities
  – Intentional poisoning
    • Child abuse

Infantile Apnea

• Assess presence of apnea carefully and document
  – Most infants with diagnosis will be hospitalized and observed closely
  – Observed using electronic apnea monitoring devices
    • Detect changes in thoracic or abdominal movement and heart rate
  – Managing apnea may include home health care use of
    • Apnea monitors
    • Oscillating waterbeds
    • CPAP with supplemental oxygen
    • Respiratory stimulants (e.g., doxapram or methylxanthines)
Failure to Thrive

• Abnormally slow rate of growth and development of infant
  – Results from conditions that interfere with normal metabolism, appetite, activity

• Causative factors
  – Chromosomal abnormalities
  – Major organ system defects that lead to deficiency or malfunction
  – Systemic disease or acute illness
  – Physical deprivation (primarily malnutrition related to insufficient breast milk, poverty, or poor knowledge of nutrition)
  – Various psychosocial factors (e.g., maternal deprivation)

• Can result in permanent and irreversible retardation of physical, mental, or social development
  – Any suspicions should be documented carefully
  – Report suspicions to medical direction
Well-Baby Care

• Some infants and children have periodic health assessments through well-baby care programs
  – Specialize in medical supervision and services for healthy infants
  – Well-baby care promotes optimal physical, emotional, and intellectual growth and development

Well-Baby Care

• Such health care measures include
  – Routine immunizations to prevent disease
  – Screening procedures for early detection and treatment of illness
  – Parental guidance and instruction in
    • Proper nutrition
    • Injury prevention
    • Specific care and rearing of child at various stages of development

Well-Baby Care

• Recommended preventative health care schedule for children who are developing normally
  – Monthly for first 6 months of life
  – Every 2 months until 1 year of age
  – Every 3 months during 2nd year
  – Every 6 months during 3rd year
  – Followed by annual visits
Well-Baby Care

- Care may be provided in
  - Clinic ("well-baby clinics")
  - Doctor’s office
  - Office of community health nursing center
  - School
    - Nurses or nurse practitioners often provide care in these programs

Hospice/Palliative Care

- In 2006, hospice care served over 1 million patients throughout U.S.
- Hospice services include
  - Supportive social, emotional, and spiritual services for the terminally ill
  - Support for patient’s family

Hospice/Palliative Care

- Hospice care relies on combined knowledge and skill of team of professionals
  - Physicians
  - Nurses
  - Medical social workers
  - Therapists
  - Counselors
  - Chaplains
  - Volunteers
**Hospice/Palliative Care**

- Work together to provide personal plan of care for each patient and family
  - Need for hospices likely will continue to rise because of
    - Aging population
    - Increasing number of persons with AIDS
    - Rising health care costs
  - Medical professionals and general public more and more are choosing hospice care over other forms of health care for terminally ill patients
    - Holistic, patient-family, in-home-centered philosophy

**Palliative Care**

- Unique form of health care
  - Mainly directed at providing relief to terminally ill persons through symptom management and pain management
  - Also called comfort care
  - Focuses on needs of patient and family when life-threatening illness has reached terminal stage
  - Chief goals
    - Improve quality of person’s life as death approaches
    - Help patients and their families move toward this reality with comfort, reassurance, strength

**Palliative Care**

- Not focused on death
  - About specialized care for living
  - Well-rounded programs also address mental health and spiritual needs
  - May be delivered in hospice, home care settings, and hospitals
  - Medical needs vary depending on disease leading toward death
    - Specialized palliative care programs exist for common conditions such as cancer and AIDS
Palliative Care

- EMS and medical direction should work closely with families and physicians of terminally ill patients in private homes and hospice programs
  - Will make best use of EMS system
- Even though resuscitation may not be indicated, may need to
  - Manage pain
  - Treat acute medical illness or traumatic injury
  - Provide transport

Palliative Care

- If patient is not to receive medical intervention to prolong life, provide measures of comfort to patient and emotional support to family members and loved ones

Hospice Care in the Home Setting

- Patient receiving hospice care may be receiving medication delivery for relief of pain (e.g., narcotic infusion devices)
  - Will have medical and legal documents such as Do Not Resuscitate orders and advance directives
  - Discuss any concerns with medical direction about
    - Effective pain management
    - Overmedication
    - Interpreting medical or legal documents
  - Not all patients who receive hospice care have Do Not Resuscitate orders
Summary

• About 25 percent of home health care patients have heart and circulatory diseases as their primary diagnosis
  – Other common diagnoses of home health care patients include cancer, diabetes, and hypertension
  – Typical EMS calls to a home health care setting include respiratory failure, cardiac decompensation, septic complications, equipment malfunction, and other medical problems

Summary

• After arrival at the scene of a home health care patient, scene size-up should include standard precautions, elements of scene safety, and environmental setting
  – Initial assessment should focus on illness or injury that poses a threat to life
  – Take appropriate measures as indicated

Summary

• Patients with diseases of the respiratory system being cared for at home are at increased risk for airway infections
  – Progression of their illnesses may lead to difficulty breathing, making current support equipment inadequate
Summary

• Assessment findings that may require acute interventions in patients with VADs include infection, hemorrhage, hemodynamic compromise from circulatory overload or embolus, obstruction of the vascular device, and catheter damage with leakage of medication

Summary

• Patients with diseases of the digestive or genitourinary systems may have medical devices such as urinary catheters or urostomies, indwelling nutritional support devices (e.g., percutaneous endoscopic gastrostomy tube or gastrostomy tube), colostomies, and nasogastric tubes
  – Acute interventions required for these patients can result from UTI, urosepsis, urinary retention, and problems with gastric emptying or feeding

Summary

• Home health care patients with acute infections have an increased death rate from sepsis and severe peripheral infections
  – Many also have a decreased ability to perceive pain or perform self-care
Summary

- Maternal/child conditions that one may encounter in the home health care setting during the postpartum period include postpartum hemorrhage, infection, pulmonary embolism, postpartum depression, septicemia in the newborn, infantile apnea, and failure to thrive.

Summary

- Hospice services include supportive social, emotional, and spiritual services for the terminally ill.
  - Also provide support for a patient’s family
  - Palliative care is directed mainly at providing relief to a terminally ill person
    • Through symptom and pain management

Questions?