Chapter 11

Bleeding, Soft Tissue Wounds, and Shock Management

Learning Objectives

- Differentiate between arterial, venous, and capillary bleeding
- State emergency medical care for external bleeding
- Given a scenario in which a patient is bleeding, select appropriate personal protection equipment (PPE)

Learning Objectives

- List signs of internal bleeding
- List steps in emergency medical care for a patient with signs and symptoms of internal bleeding
- State types of open soft tissue injuries
Learning Objectives

- Describe emergency medical care for a patient with a soft tissue injury
- Discuss emergency medical care considerations for a patient with a penetrating chest injury
- State emergency medical care considerations for a patient with an open wound in the abdomen

Learning Objectives

- Describe emergency medical care for a patient with an impaled object
- Describe emergency medical care for a patient with an amputation
- Describe emergency medical care for a patient with burns
- List functions of dressing and bandaging

Circulatory System

- Responsible for transporting O₂ and other nutrients to all tissues of the body while also removing CO₂ and other waste products
- Basic components
  - Heart
  - Blood vessels
  - Blood
Circulatory System

- Blood vessels
  - Three main types
    - Arteries
    - Veins
    - Capillaries

Circulatory System

- Arteries
  - Vessels that carry blood away from heart
  - Transport blood that contains high levels of O₂
  - Composed of smooth muscles and are constantly changing in size to become either wider or narrower in response to body’s blood pressure needs
  - Pressure usually higher than pressure in venous system
**Circulatory System**

- **Blood vessels**
  - **Veins**
    - Vessels that carry blood back toward heart
    - Usually carry blood with low levels of O\(_2\) and wastes from cells
    - Not as muscular as arteries
    - Fluid is typically under lower pressure
    - Largest veins in body direct blood low in oxygen and high in waste back into heart
      - Superior vena cavae
      - Inferior vena cavae

- **Capillaries**
  - Smallest type of blood vessels
  - Connect arteries to veins
  - Site of gas exchange in lungs and other body tissues
  - O\(_2\) and nutrients are exchanged for CO\(_2\) and other wastes in blood

- **Blood**
  - Fluid transported by blood vessels
  - Consists of several elements:
    - Red blood cells (RBC)
    - White blood cells (WBC)
    - Platelets
    - Plasma
Types of Bleeding

● Bleeding
  ◦ Loss of blood; also called hemorrhage
  ◦ Body protects against blood loss in two main ways
    • Producing blood clots
    • Constricting blood vessels
  ◦ Uncontrolled bleeding leads to shock and death
  ◦ Goal
    • Stop or limit amount of blood loss
  ◦ Blood loss can occur
    • Outside body
    • Inside body

Types of Bleeding

● External bleeding
  ◦ Occurs outside body and can be seen
  ◦ Easier to detect, identify source, and control
  ◦ Arterial bleeding
    • Most severe type of hemorrhage
    • Most likely to quickly lead to death
    • Most difficult to control
    • Blood will spurt from open artery with each beat of heart
Types of Bleeding

- Venous bleeding
  - Blood escaping from veins
  - Blood has already delivered O₂ to body tissues
  - Appears darker red
  - Generally blood does not spurt out
    - Under lower pressure
  - Blood flows steadily out of wound
  - Bleeding can be heavy
  - Easier to control than arterial bleeding

- Capillaries
  - Microscopic blood vessels between arteries and veins
  - Vessels so small blood merely oozes out
  - Blood is darker red

- Capillary bleeding
  - Typically insignificant
  - Clots spontaneously
  - Requires little intervention

Types of Bleeding

- Assessment
  - Your safety is first priority
  - Always perform scene size-up before approaching patient
  - Protect yourself with appropriate personal protection equipment (PPE)
    - Gloves
    - Gown
    - Eye protection
    - Mask
Types of Bleeding

- Assessment
  - After scene size-up
    - Form general impression and establish patient's level of consciousness
    - Perform initial assessment of patient
      - Check for major bleeding
      - Control bleeding

- After initial assessment
  - Look for other evidence of bleeding under patient and within patient's clothing
  - Comfort, calm, reassure patient while waiting for additional help
  - Continue ongoing assessments as indicated
  - Always explain what you are doing in a calm professional manner
  - Have patient sit or lie down

- Bleeding control
  - Direct pressure
    - First step to control bleeding—apply direct pressure on wound
    - Applied by placing flat pads gloved fingers and applying fingertip pressure directly on point of bleeding
Types of Bleeding

- **Bleeding control**
  - **Elevation**
    - If direct pressure and pressure dressings do not control bleeding in an extremity and there is no evidence of musculoskeletal injury
    - Elevate extremity while maintaining direct pressure
    - Elevate above level of heart—can reduce flow of blood to wound—may help stop bleeding

- **Pressure points**
  - Used to control bleeding if direct pressure, pressure dressings, and elevation do not work
  - Any place in an extremity where an artery can be compressed against bony surface—can be used as pressure point
  - Pressure point should be located at site between trunk of body and bleeding wound
Types of Bleeding

- **Bleeding control**
  - **Pressure points**
    - Can use pressure points in both upper and lower extremities to reduce amount of blood flowing to wound
    - Pressure point is used in conjunction with direct pressure over wound
    - Brachial artery used as pressure point for bleeding in upper extremities
      - Locate brachial artery in injured upper arm
      - While holding forearm in elevated position with direct pressure in place on wound, press brachial artery against humerus with fingertips
  - Femoral artery used as pressure point for bleeding in lower extremities
    - Have patient lie supine
    - Locate femoral artery in groin area between genitalia and pelvis with your fingers
    - Use palm of hand to compress femoral artery against pelvic bones

- **Tourniquets**
  - Used to control life-threatening bleeding not controlled by other measures
  - If tourniquet must be used
    - Application is limited to control of bleeding from patient’s arms and legs
Types of Bleeding

- Bleeding control
  - General rules for applying tourniquet include:
    - Use as wide a piece of material as possible
    - Apply material just above injury
    - Wrap material twice around site
    - Tie a knot in material
    - Place stick or other solid object on tip of knot
    - Try another knot over the placed object
    - Turn object to tighten material until bleeding is controlled
    - You may not be able to completely stop bleeding

- Note time tourniquet was applied

- Write TK on patient’s forehead along with time tourniquet was applied
- Report presence of tourniquet to arriving EMS crew
- Never release tourniquet once it has been placed
- Once bleeding is controlled dress wound to prevent further contamination
- Treat patient for shock

Skill 11-1
Control Bleeding

- Identify source of external bleeding
- Apply direct pressure
Skill 11-1
Control Bleeding

- Apply pressure dressing if appropriate
- While maintaining direct pressure on wound, elevate extremity

If bleeding is still not controlled—apply pressure to appropriate pressure point
As last resort—apply tourniquet

Types of Bleeding

- Internal bleeding
  - Blood loss that occurs inside the body
  - Harder to identify and control
  - Causes range from tears in blood vessels to injured organs to musculoskeletal trauma
  - Range from minimal to life threatening
Types of Bleeding

- Internal bleeding
  - Be able to suspect internal bleeding based on
    - Mechanism of injury
    - Associated signs and symptoms
  - Should be suspected with any mechanism of injury involving blunt/penetrating trauma

- Indicators of internal bleeding
  - Painful, swollen abdomen or extremity
  - Discolored
  - Tender
  - Swollen
  - Hard tissues

- Symptoms of shock
  - Increased pulse rate
  - Increased respiratory rate
  - Pale, cool, moist skin
  - Altered mental status
  - Nausea and vomiting
  - Bleeding from any body orifice
  - Blood-tinged vomit or feces
  - “Coffee ground” vomit
  - Dark, tarry stool
  - Abdominal distention
  - Abdominal rigidity or tenderness
Shock

- Condition that results from decreased volume of circulating blood
  - Decreased supply of O\textsubscript{2} being delivered throughout body
    - If enough cells are deprived of an adequate amount of O\textsubscript{2}, tissue becomes damaged
    - If enough tissue is damaged, whole organs cannot function properly and internal organs begin to fail
    - Organ failure can progress rapidly to failure of one or more of the body’s systems
    - Eventually entire body shuts down in response to system failure—death quickly follows

Shock

- Condition that develops over time
  - Time depends on extent and rate of circulatory failure
- Compensation
  - Attempt by body to stop shock from progressing

Shock

- Signs and symptoms
  - Restlessness and anxiety
  - Altered mental status
  - Pale, cool skin
  - Increased respiratory rate
  - Increased pulse rate
  - Nausea and vomiting
  - Thirst
Skill 11-2
Signs and Symptoms of Shock

- Increased pulse rate
- Increased respiratory rate

Shock
Skill 11-2 Signs and Symptoms of Shock

- Anxiety, restlessness, or combativeness
- Pale, cool, clammy skin

Shock
Skill 11-2 Signs and Symptoms of Shock

- Nausea and vomiting
- Weaker pulses and respirations; eventual loss of consciousness
Shock

- Treatment
  - Position the patient
    - Supine position
    - Elevate feet no more than 12 inches off ground

Shock

- Treatment
  - Maintain airway, breathing, and circulation
    - Assessment should be repeated at least every 5 minutes
    - Provide patient with high flow supplemental O2 through nonrebreather mask
    - Ensure external bleeding is controlled
    - Treat additional injuries as needed

Shock

- Treatment
  - Keep patient warm
  - Provide care for specific injuries
  - Comfort, calm, and reassure patient
Soft Tissue Wounds

- Interruption of skin or underlying tissue
- Priority
  - Control bleeding
  - Prevent further injury
  - Reduce chance of contamination or infection until physician can see patient

Soft Tissue Wounds

- Closed wounds
  - No break in skin and no associated external bleeding
  - Contusion
    - Injury in which tissue under skin is damaged and blood vessels are torn
    - Generally an area of discoloration
    - Often associated with swelling and pain

Soft Tissue Wounds

- Closed wounds
  - General management
    - May be nothing at all
    - Wound larger—can be treated with application of ice and elevation of body
Soft Tissue Wounds
• Open wounds
  ➢ Skin has been broken—associated bleeding
  ➢ Abrasion
    • Most common
    • Generally a superficial soft tissue injury
    • Abrasion occurs when outermost layer of skin is damaged by something scraping against it
    • Usually painful

Soft Tissue Wounds
• Open wounds
  ➢ Laceration
    • Break in skin of varying depth and length
    • Can occur by itself or together with other lacerations or types of soft tissue injuries
    • Severity can range from paper cut to life-threatening wounds
    • Usually results from forceful impact with sharp object
    • Bleeding can be severe and may be either internal or external
Soft Tissue Wounds

- Open wounds
  - Penetration or puncture
    - Generally caused by sharp, pointed object
    - May be little or no external bleeding
    - Internal bleeding may be severe
    - May not be detected until patient is exhibiting signs and symptoms of shock
    - Entrance and exit wounds need to have bleeding control
Soft Tissue Wounds

- Open wounds
  - Amputation
    - Separation of body part from rest of body
    - May involve large amount of bleeding

Soft Tissue Wounds

- Open wounds
  - Management
    - Always protect yourself from exposure to body substances
      - Gloves
      - Eye protection
      - Face mask
      - Gown

Soft Tissue Wounds

- Open wounds
  - Management
    - Steps for treating open soft tissue wounds
      - Expose wound and control bleeding
      - If bleeding is mild or stops, prevent wound from further contamination and cover with sterile dressing and bandage it securely in place
Soft Tissue Wounds

- Open wounds
  - Management (dressing and bandaging)
    - Dressing
      - Protective/supporting covering that is placed on injured body part
    - Bandage
      - Holds dressing in place
    - Functions of dressings and bandages
      - Help stop bleeding
      - Prevent further damage to wound
      - Reduce contamination
      - Decrease risk of infection

- Dressings are available in many forms
  - 4 x 4-inch gauze pads
  - Abdominal pads
  - Adhesive dressing
  - Occlusive dressings

- Bandages also available in many forms
  - Self-adherent bandages
  - Gauze rolls
  - Triangular bandages
  - Adhesive tape
Soft Tissue Wounds

- Open wounds
  - Management (dressing and bandaging)
    - General principles of dressing and bandaging:
      - Expose injured area
      - Place sterile dressing over entire injury
      - Maintain direct pressure to control any bleeding
      - Use bandage to secure dressing with some pressure
      - Do not remove bottom dressing in contact with wound

Skill 11-3
Dressings and Bandages

- A wrist or forearm wound
- An elbow wound

Skill 11-3
Dressings and Bandages

- A knee wound
- An ankle wound
Skill 11-3
Dressings and Bandages

- An eye injury
  - Note that both eyes are covered for an eye injury to prevent further damage
- A head or ear injury

Skill 11-3
Dressings and Bandages

- A shoulder or upper arm injury

Soft Tissue Wounds

- Special considerations
  - Chest injuries
    - Injury to front, back, or side of chest between neck and upper abdomen
    - Require special treatment
    - Sucking chest wound
      - Hear air escaping from wound
      - See bubbles in blood outside wound
Soft Tissue Wounds

- Special considerations
  - Occlusive dressing
    - Apply over chest wound
    - Dressing should not be sealed
    - Place patient on injured side or in semisitting position
    - Assess and treat patient for signs of shock

- Eviscerations
  - Deep laceration through abdominal muscle wall that allows internal organs to protrude from abdomen
  - Organs may protrude from an opening in abdominal wall a small or large amount
  - Evisceration and skin around it typically do not bleed
  - Do not attempt to replace protruding organs inside abdomen
Soft Tissue Wounds

- Special considerations
  - Impaled objects
    - May be both an entry and exit wound, or just entry wound
    - Leave object in wound and complete assessment
    - Expose wound area as much as possible without disturbing object
    - Control bleeding
    - Manually secure object
    - Assess and treat for signs of shock

Soft Tissue Wounds

- Special considerations
  - Amputations
    - Body may be able to control bleeding by clotting and contracting blood vessels
    - If amputation part is bleeding control bleeding using
      - Direct pressure
      - Pressure dressing
      - Elevation
      - Pressure points
Soft Tissue Wounds

Special considerations

Amputations
- Once bleeding is controlled
  - Apply dressings and bandages to help prevent further contamination

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Soft Tissue Wounds

Special considerations

Amputations
- If amputated part can be located without compromising patient care
  - It should be preserved and sent with patient to hospital
  - Part should be rinsed, but not saturated with water
  - Part should be placed in sealed plastic bag by itself
  - Second bag/container should be filled with water and a few cubes of ice
  - Bag with amputated part should be placed into second bag/container holding water and ice
  - Never allow amputated body part to be submersed in water or placed directly on ice

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Soft Tissue Wounds

Special considerations

Nosebleeds
- Typically result of trauma
- Most can be controlled with simple techniques
- If patient is conscious and there is no indication of spinal injury
  - Have patient sit upright and lean slightly forward
  - Pinch nostrils together with gloved hand
  - Do not allow patient to sniffle or blow nose
Soft Tissue Wounds

Special considerations

- **Ear wounds**
  - If there is soft tissue wound to external ear
    - Apply dressings over ear and not in ear
    - Bandage dressings in place
    - Bleeding from ear should be considered a sign of head injury
    - Any fluid draining from ear may be cerebrospinal fluid

- **Eye wounds**
  - Cover both eyes even if only one is injured
  - Foreign body in eye
    - Dirt
    - Dust
    - Chemicals
    - Metal
    - Wood shaving
Soft Tissue Wounds

- Special considerations
  - Eye wounds
    - Pain
    - Increased tearing
    - Blurred vision
    - Loss of vision

- Before treatment
  - Ensure environment is safe
  - Ensure you are utilizing appropriate PPE

- If no indication of spinal injury
  - Place patient in supine position with head slightly lower
  - Turn patient's head toward affected side
  - Using gloved hand—hold affected eye open with your fingers placed above and below eyelids
  - Flush eye for 15 minutes with sterile water
  - If object cannot be flushed out—bandage both eyes

Soft Tissue Wounds

- Special considerations
  - Eye wounds
    - Before treatment
      - Ensure environment is safe
      - Ensure you are utilizing appropriate PPE
    - If no indication of spinal injury
      - Place patient in supine position with head slightly lower
      - Turn patient's head toward affected side
      - Using gloved hand—hold affected eye open with your fingers placed above and below eyelids
      - Flush eye for 15 minutes with sterile water
      - If object cannot be flushed out—bandage both eyes

Soft Tissue Wounds

- Burns
  - Classified according to depth of burn in skin and other tissue
    - Superficial burn
      - Involves only outer layer of skin
    - Partial-thickness burn
      - Involves outer and middle layers of skin
      - Causes deep, intense pain—nerve endings involved
      - Skin is reddened and usually has blisters
      - Patient will feel considerable pain
Soft Tissue Wounds

- Burns
  - Classified according to depth of burn in skin and other tissue
    - Full-thickness burns
      - Involve areas of charred or blackened skin, areas of redness, and blisters
      - Pain-free; nerve endings in layers of skin have been destroyed
      - Generally associated with partial-thickness or superficial burns

- Extent of burn
  - Rule of nines—assessment tool that allows quick calculation of extent of burn
  - Body divided into segments that account for approximately 9% of total body surface area
  - Combining regions that are burned—estimate of extent of burn can be reached
Soft Tissue Wounds

- Burns
  - Critical burns
    - Burns are determined to be critical or noncritical depending on
      - Type
      - Extent
      - Location
      - Depth
  - Require immediate transport to burn center and include
    - Any burns involving the respiratory system
    - Partial-thickness burns over greater than 10% of body
    - Full-thickness burns
    - Burns that involve face, hand, feet, genitalia, major joints
    - Electrical burns
    - Chemical burns
**Soft Tissue Wounds**

- **Burns**
  - **Thermal burns**
    - Initial treatment
      - Stop the burning process
      - Continually monitor airway to ensure it remains open
      - Hoarseness, shortness of breath, or any trouble breathing may indicate life-threatening injury
      - Prevent further contamination

- **Chemical burns**
  - Consider all possible dangers when you arrive on the scene
  - Ensure safety of the scene before entering
  - Wear gloves and eye protection or other special clothing based on chemical involved
Chemical burns
- Immediately brush any dry powder from patient
  - Flush area with large amounts of water for at least 10 minutes
  - Cover burned area with dry, sterile dressing
- Splash injuries often involve eyes
  - Flush patient’s eye with copious amounts of water for at least 20 minutes
  - Direct flow of water to outer corner of eye
  - Cover both eyes with dressing and bandage

Soft Tissue Wounds

Electrical burns
- Ensure scene safety before approaching patient
- Turn off electrical source
- Never run to patient
- Patient’s internal injuries are often much worse than external injuries
- Anticipate irregular heartbeat
- Monitor patient closely for respiratory or cardiac arrest
- Keep AED close to patient
- Check for exit wound and entry wound

Burn
- Infants and children
  - Must be treated as pediatric patients
  - Pediatric patients have greater surface area compared to their total body volume
  - Keep environment warm–when possible
  - Consider possibility of child abuse
  - Evidence of possible abuse
    - Give to responding EMS crew and privately share your suspicions
    - Do not be confrontational with any patient, family member, or bystander on the scene