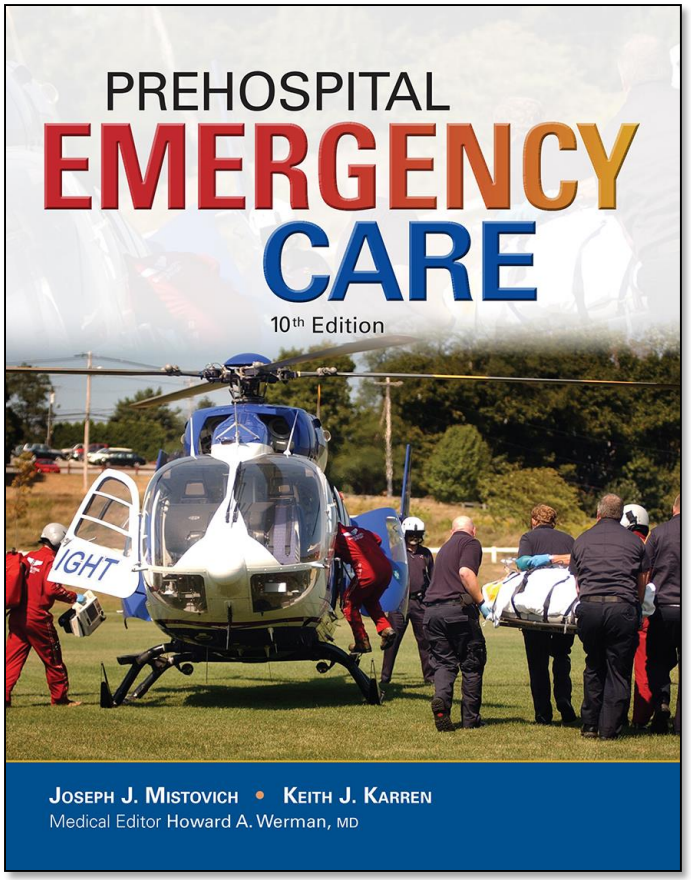
PREHOSPITAL EMERGENCY CARE

TENTH EDITION



CHAPTER 28

Part I
Bleeding and Soft Tissue Trauma

Learning Readiness

- EMS Education Standards, text p. 772

Learning Readiness Objectives

- Please refer to page 772 of your text to view the objectives for this chapter.

Learning Readiness Key Terms

- Please refer to page 772 of your text to view the key terms for this chapter.

Setting the Stage

- Overview of Lesson Topics
  - External Bleeding
  - Internal Bleeding
  - Hemorrhagic Shock

Case Study Introduction

EMTs Mick Horton and Dave Bowling arrive at the scene of a MVC, and quickly perform a scene size-up. They have one patient, a male in his 30s, who was the unrestrained driver of a an older model truck that struck a tree along the roadway. There is an EMR maintaining spinal stabilization, and another preparing a long backboard and stretcher.

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Case Study Introduction

Mick's general impression is that the patient is awake, but confused, and is pale and sweating, with blood running from his scalp down onto his neck and clothing.

Case Study

- From the mechanism of injury and general impression, what conditions should the EMTs be suspecting?
- What are the priorities in assessing and managing this patient?
- What are the consequences of failing to recognize and manage this patient's problems?

Introduction

- Bleeding can be a life-threatening emergency.
- Severe bleeding is controlled in the primary assessment.
- Most soft tissue injuries are cared for after the primary assessment.
- Recognizing shock is an important element of emergency care.

External Bleeding

- Always use Standard Precautions for patients with external bleeding.

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External bleeding from a soft tissue injury to the head.

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External Bleeding

- The severity of blood loss depends upon:
  - Amount of blood loss
  - Rate of blood loss
  - Other injuries or existing conditions
  - Patient's existing medical problems
  - Patient's age

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External Bleeding

- The severity of bleeding is relative to the patient's size.
  - A 70 kg adult has 4,900 mL of blood
  - A 10 kg infant has 800 mL of blood
- A loss of 15% or more of blood volume is significant.
  - ≥735 mL in a 70 kg adult
  - ≥120 mL in a 10 kg infant

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External Bleeding

- The best way to estimate blood loss is by assessing the patient's signs and symptoms.

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TABLE 28-1 Classes of Hemorrhage

	Class I	Class II	Class III	Class IV
Amount of blood loss	<15%	15–30%	30–40%	>40%
Heart rate	↑	↑↑	↑↑↑	↑↑↑↑ or ↓
Vasoconstriction	↑	↑↑	↑↑↑	↑↑↑↑ or ↓↓
Ventilatory rate	Normal	↑	↑↑	↑↑↑
Systolic blood pressure	Normal	Normal	↓	↓↓↓
Pulse pressure	Normal	Narrow	Narrow	Very narrow or wide
Skin	Normal or slightly pale and cool	Pale, cool, and clammy	Severely pale and cool	Severely pale, cold, and mottled

Note: In this table, up arrows indicate an increase, down arrows indicate a decrease, and multiple arrows indicate a greater degree of increase or decrease. For example, two arrows indicate a greater change than one arrow, and so on.

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External Bleeding

- When injured, blood vessels constrict and blood clots.
- The type and severity of injury can interfere with these mechanisms.

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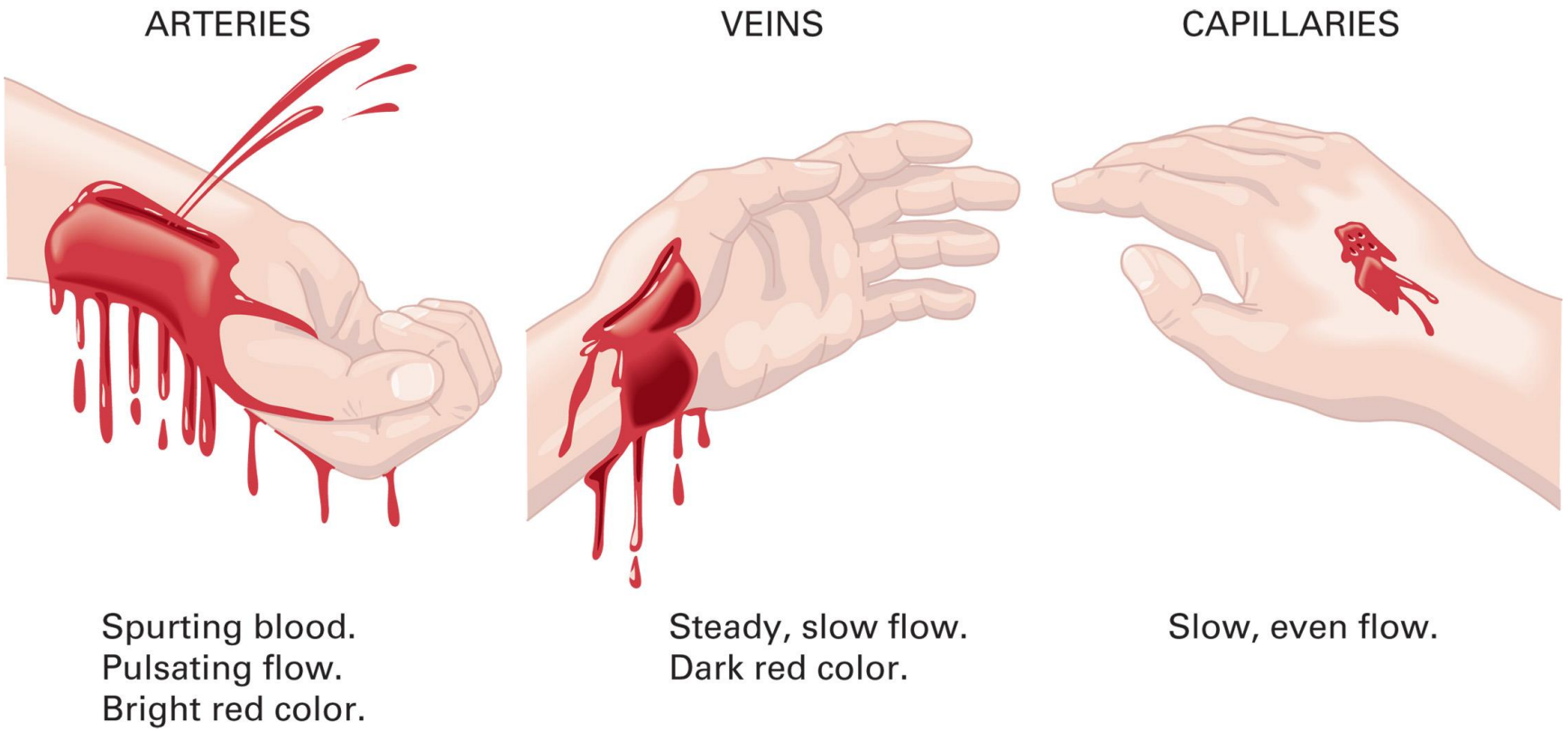
Types of bleeding.



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External Bleeding

- Methods of controlling external bleeding
  - Direct pressure
  - Tourniquets
  - Elevation
  - Splints
  - Topical hemostatic agents

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External Bleeding

- Direct pressure is the first method for controlling bleeding.
- A pressure dressing can be used.
- Do not apply pressure to or remove impaled objects.

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EMT SKILLS 28-1

Bleeding Control by Direct Pressure

Bleeding from a wound to the forearm.

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Apply gloved fingertip pressure over a dressing directly on the point of bleeding.

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If the bleeding does not stop, remove the dressing and apply direct pressure with gloved fingertips to the point of bleeding.

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Pack large, gaping wounds with sterile gauze and apply direct pressure.

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External Bleeding

- Tourniquets are used when direct pressure does not control bleeding.
- There are several types of commercial tourniquets.
- Tourniquets can be improvised if a commercial tourniquet is not available.

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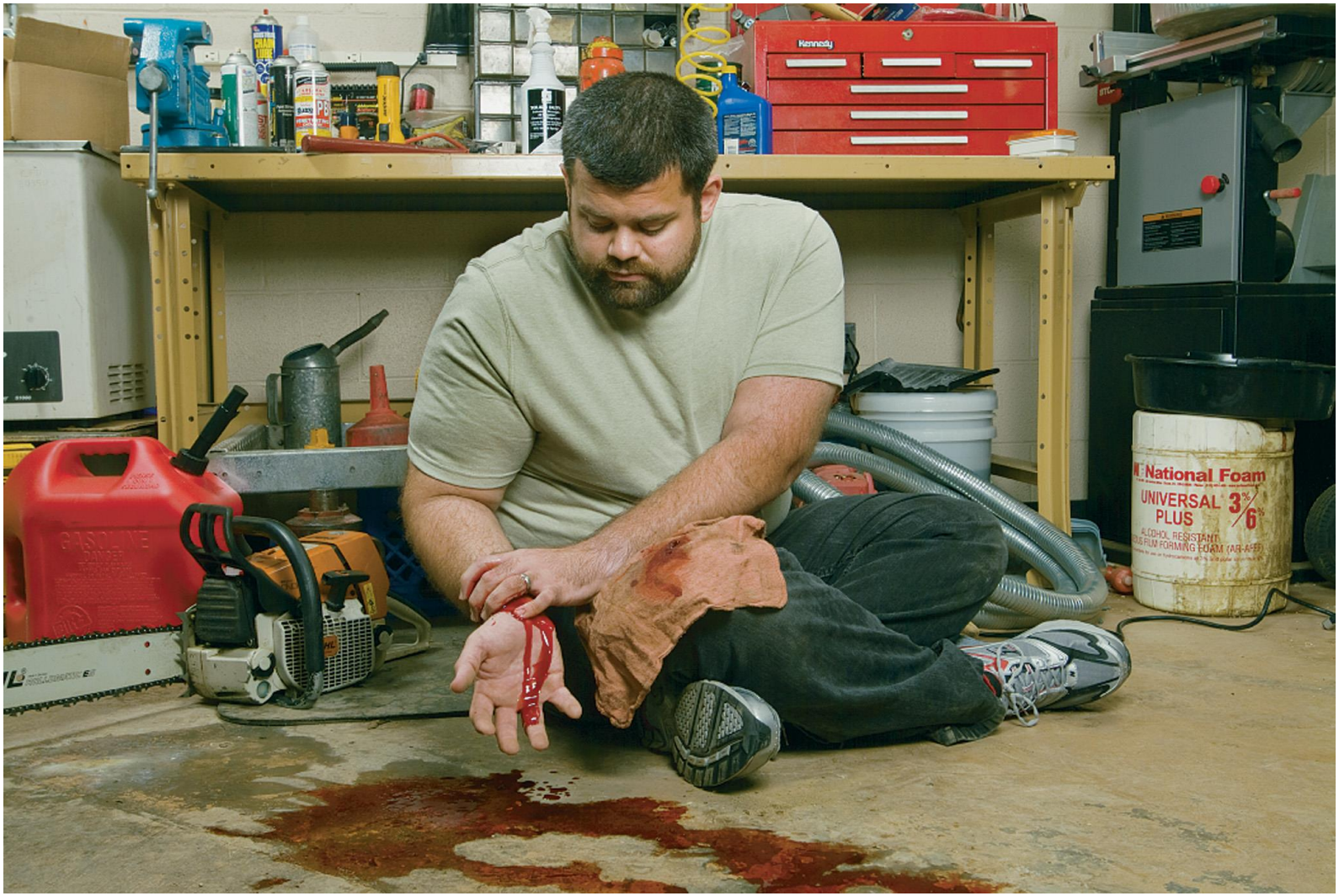
EMT SKILLS 28-2

Application of a Tourniquet

First attempt to control bleeding by direct pressure.



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If direct pressure is ineffective, apply direct pressure over a thick dressing while preparing the tourniquet.

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Apply the tourniquet proximal to the wound but not over a joint.

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Pack large, gaping wounds with sterile gauze and apply direct pressure. Twist the rod to tighten the tourniquet to the extent necessary to control bleeding and secure the tightening rod. Write the time of tourniquet application on tape and apply it to the tourniquet, leaving the tourniquet exposed to view, and notify the receiving facility that a tourniquet has been applied. Continuously reassess the wound for recurrent bleeding. Do not loosen or remove the tourniquet unless directed to do so by medical direction or local protocol.

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External Bleeding

- There is no evidence to support the use of elevation, but it is not known to be harmful.
- Do not use elevation as the sole means of bleeding control.
- Do not elevate an injured extremity that is not splinted.

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External Bleeding

- Splinting is an important way to reduce bleeding from an injured extremity.
- A traction splint can be helpful for a fractured femur.
- Do not delay at the scene for splinting with an unstable patient.

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External Bleeding

- Topical hemostatic agents
  - Can be used when direct pressure is ineffective.
  - Hemostatic agents promote blood clotting.
  - Use is generally reserved for long transport times.
  - There are some associated complications.

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Topical hemostatic agents such as QuikClot can be used with pressure dressings to control bleeding.

Click on the method that is always used first to control external hemorrhage.

A. Pressure dressing

B. Tourniquet

C. Direct pressure

D. Topical hemostatic agents

External Bleeding

- Assessment-based approach
  - Ensure that the scene is safe.
  - Form a general impression, noting any signs of shock and presence of significant bleeding.
  - Control significant bleeding immediately.
  - Continue with the primary assessment.

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External Bleeding

- Assessment-based approach
  - Assess the airway and breathing.
  - Assess oxygenation and maintain an SpO_2 of 94% or above.
  - Assess the pulses and skin.
  - Control bleeding, but do not let dramatic injuries distract you from the primary assessment.

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External Bleeding

- Assessment-based approach
  - Perform a rapid secondary assessment if:
    - There is significant bleeding.
    - There is altered mental status.
    - There are multiple injuries.
    - There is a significant mechanism of injury.

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External Bleeding

- Assessment-based approach
  - Obtain baseline vital signs.
  - Assess for signs of hypoperfusion.

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External Bleeding

- Emergency medical care
  - Use Standard Precautions.
  - Control bleeding with direct pressure.
  - If direct pressure is ineffective, apply a tourniquet.
  - Provide care for shock.
  - Immobilize injured extremities.
  - Reassess.

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External Bleeding

- Bleeding from the nose, ears, or mouth can indicate serious injury.
  - Skull injury
  - Facial trauma
  - Digital trauma to the nose
  - Sinusitis
  - Hypertension
  - Clotting disorders
  - Esophageal disease

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External Bleeding

- Do not attempt to control bleeding from the ears or nose if the patient has experienced a head injury.
- Epistaxis is controlled by direct pressure.

EMT SKILLS 28-3

Controlling a Nosebleed

Have the patient sit and lean forward.

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Pinch the fleshy part of the nostrils together.

Internal Bleeding

- Internal bleeding may result from trauma or medical problems.
- Internal bleeding may not be obvious, and can rapidly result in death.

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Internal Bleeding

- Common sources of internal bleeding are injured organs and fractured extremities.
- A hematoma is a contained collection of blood that can contain a significant amount of blood.
- Use signs and symptoms to estimate severity of blood loss.

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Internal Bleeding

- Assessment-based approach
  - Perform a scene size-up; look for a mechanism of injury.
  - Form a general impression.
  - Immediately control major external bleeding.
  - Pay close attention to the mental status.

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Internal Bleeding

- Assessment-based approach
  - Assess airway, breathing, and oxygenation.
  - Assess the pulses, skin, and capillary refill.
  - Pay attention to changes in the respirations, pulse, and skin that can indicate blood loss.

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Internal Bleeding

- Assessment-based approach
  - Perform a rapid secondary assessment if the mechanism of injury and assessment suggest internal bleeding.

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Internal Bleeding

- Assessment-based approach
  - Look for external indications that there is internal bleeding.
    - Contusions
    - Abrasions
    - Deformity
    - Impact marks
    - Swelling

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Internal Bleeding

- Assessment-based approach
  - Signs and symptoms of internal bleeding
    - Pain, tenderness, swelling, discoloration
    - Bleeding from a bodily orifice
    - Vomiting; bright red or coffee-ground material

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Internal Bleeding

- Assessment-based approach
  - Signs and symptoms of internal bleeding
    - Dark tarry stools or stools with bright red blood
    - Tender, rigid, or distended abdomen

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Internal Bleeding

- Assessment-based approach
  - Signs and symptoms of hemorrhagic shock
    - Anxiety, restlessness, combativeness, altered mental status
    - Weakness, faintness, dizziness
    - Thirst

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Internal Bleeding

- Assessment-based approach
  - Signs and symptoms of hemorrhagic shock
    - Shallow, rapid breathing
    - Thirst
    - Shallow, rapid breathing
    - Rapid, thready pulse

continued on next slide

Internal Bleeding

- Assessment-based approach
  - Signs and symptoms of hemorrhagic shock
    - Pale, cool, clammy skin
    - Delayed capillary refill
    - Narrow pulse pressure
    - Dropping blood pressure
    - Dilated, sluggish pupils
    - Nausea, vomiting

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Internal Bleeding

- Emergency medical care
  - Use Standard Precautions.
  - Maintain an open airway and adequate breathing.
  - Administer oxygen if there are signs of poor perfusion or to maintain an SpO_2 of 94% or above.

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Internal Bleeding

- Emergency medical care
  - Control external bleeding.
  - Provide immediate transport.
  - Treat for shock.
  - Reassess.

Factors that May Increase Bleeding

- Movement
- Low body temperature
- Medications
- Intravenous fluids
- Removal of dressings and bandages

Hemorrhagic Shock

- Shock results from inadequate tissue perfusion.
- Significant hemorrhage leads to inadequate perfusion.
- Cells are deprived of oxygen and nutrients, and begin to fail and die.
- Immediate recognition and treatment are critical.

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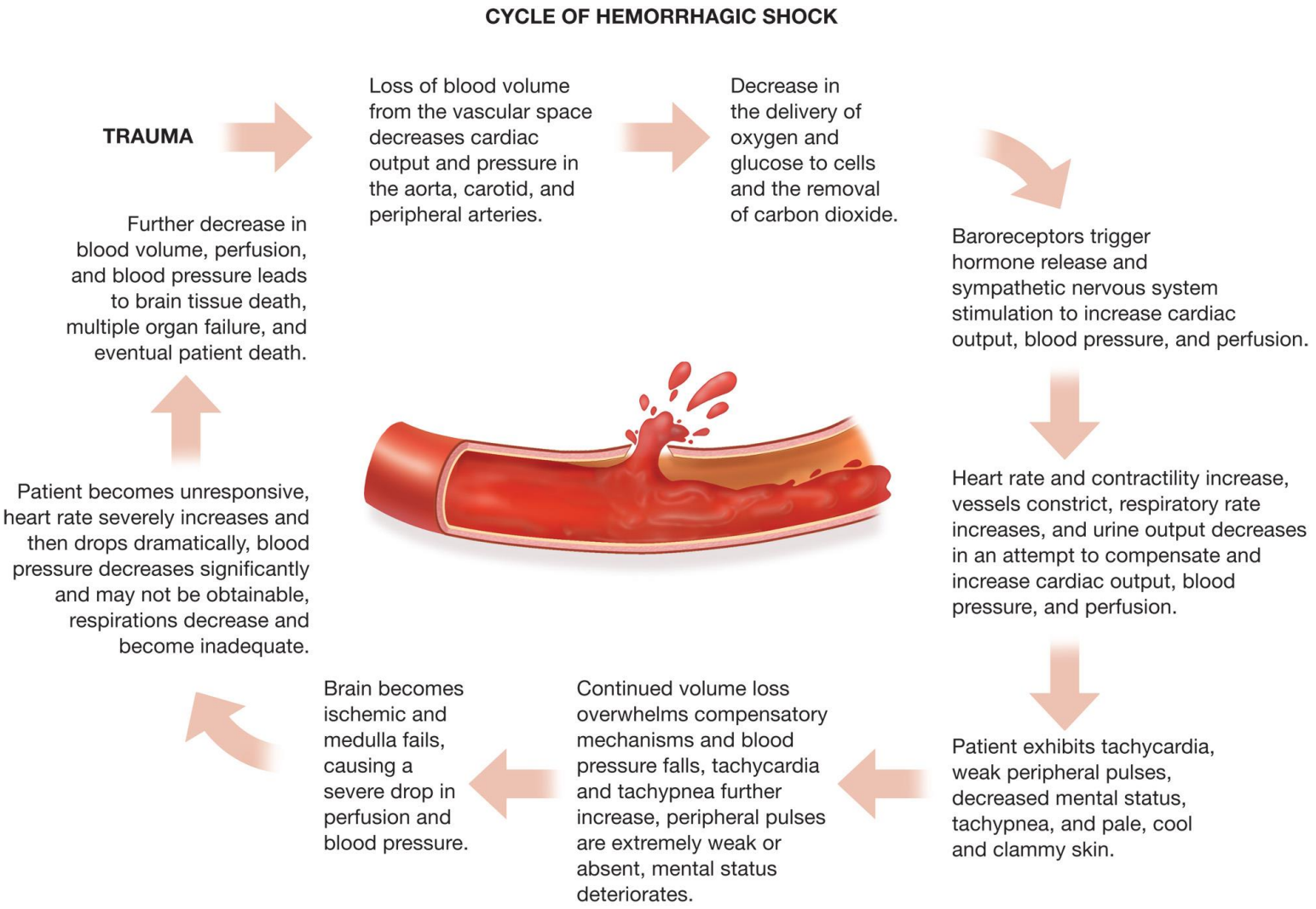
Continuous cycle of shock.



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Hemorrhagic Shock

- Assessment-based approach
  - Evaluate scene safety and the mechanism of injury.
  - Assess the mental status, airway, breathing, oxygenation, and circulation.
  - Assist breathing and administer oxygen, as needed.

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Hemorrhagic Shock

- Assessment-based approach
  - For unstable patients, perform a rapid secondary assessment.
  - Obtain baseline vital signs; loss of >15% of blood volume will cause changes in vital signs.

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Hemorrhagic Shock

- Signs and symptoms
  - Mental status
    - Restlessness
    - Anxiety
    - Altered mental status

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Hemorrhagic Shock

- Signs and symptoms
  - Peripheral perfusion
    - Pale, cool, clammy skin
    - Weak thready, or absent peripheral pulses
    - Delayed capillary refill

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Hemorrhagic Shock

- Signs and symptoms
  - Vital signs
    - Increased pulse rate; weak, thready pulse
    - Increased breathing rate; deep, shallow, labored, or irregular breathing
    - Narrow pulse pressure
    - Decreased blood pressure

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Hemorrhagic Shock

- Signs and symptoms
  - Other signs and symptoms
    - Dilated pupils
    - Thirst
    - Nausea, vomiting
    - Pallor; cyanosis of the lips

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Hemorrhagic Shock

- Emergency medical care
  - Use Standard Precautions.
  - Maintain an open airway, administer oxygen, and assist ventilations as needed.
  - Control external bleeding.
  - Apply and inflate PASG according to protocol.

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Hemorrhagic Shock

- Emergency medical care
  - Place the patient supine.
  - Splint bone and joint injuries.
  - Keep the patient warm.
  - Transport immediately.

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EMT SKILLS 28-4

Emergency Care for Shock

Take all necessary Standard Precautions.

Administer supplemental oxygen or positive pressure ventilation as indicated.

Cover the patient to prevent loss of body heat.

Hemorrhagic Shock

- Pneumatic antishock garment (PASG)
  - Controversial device used in some cases of hemorrhagic shock
  - Follow protocols.

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A pneumatic antishock garment (PASG).

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Hemorrhagic Shock

- PASG indications
  - Suspected pelvic fracture with SBP <90 mmHg
  - Suspected intraperitoneal hemorrhage with hypotension
  - Suspected retroperitoneal hemorrhage with hypotension

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Hemorrhagic Shock

- PASG contraindications
  - Penetrating thoracic trauma
  - Splinting of lower extremity fractures
  - Eviscerated abdominal organs
  - Impaled object in the abdomen

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Hemorrhagic Shock

- PASG contraindications
  - Pregnancy
  - Cardiopulmonary arrest
  - Congestive heart failure
  - Pulmonary edema

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Hemorrhagic Shock

- Do not deflate PASG once it has been inflated unless ordered to do so by medical direction.
- Contact medical direction about deflation if:
  - You suspect ruptured diaphragm.
  - The patient experiences respiratory distress after inflation.

EMT SKILLS 28-5

Applying the PASG

Place the PASG on the spine board, then the patient on the PASG. Position so the top of the garment is three finger-widths below the bottom of the rib cage.

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Apply the garment.

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Inflate the garment.

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Monitor and record vital signs every 5 minutes. If the garment loses pressure, add air as needed.

Case Study Conclusion

Mick ensures that the patient has an open airway and adequate breathing as Dave applies direct pressure to the scalp wound. Mick detects a weak, thready, rapid radial pulse. He performs a rapid secondary assessment, noting tenderness to the chest and abdomen.

Breath sounds are present on both sides, but seem to be deceased on the right side. There are swelling, deformity, and tenderness of the right femur and right lower leg.

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Case Study Conclusion

The EMTs recognize indications of significant internal bleeding, and rapidly extricate the patient, securing him to a long backboard. They begin transport immediately, applying oxygen by nonrebreather mask, assessing baseline vital signs, and performing a head-to-toe secondary assessment.

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Case Study Conclusion

At the emergency department, the patient receives a chest tube for a right pneumothorax, then is quickly prepared for surgery to repair damage to his liver and right leg.

Lesson Summary

- Hypoperfusion and shock can result from blood loss.
- Bleeding can be arterial, venous, or capillary.
- Bleeding can be external or internal.
- The first method of controlling external bleeding is direct pressure.

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Lesson Summary

- Tourniquets and hemostatic agents are only used if direct pressure is not effective for on-going significant bleeding.