LESSON ASSIGNMENT

LESSON 6 Abdominal Trauma.

TEST ASSIGNMENT Paragraphs 6-1 through 6-6.

LESSON OBJECTIVES After completing this lesson, you should be able to:

6-1. Identify causes and mechanisms of abdominal injuries.

6-2. Identify signs/symptoms of abdominal injuries.

6-3. Identify treatment for abdominal injuries.

SUGGESTION After completing the assignment, complete the exercises of this lesson. These exercises will help you to achieve the lesson objectives.
6-1. INTRODUCTION

Injuries to the abdomen are of concern to individuals who are involved with acute medical care. Many penetrating abdominal wounds are seen in combat. Surgical treatment is often necessary. Prompt initial therapy is the key to survival.

6-2. CAUSES AND MECHANISMS OF ABDOMINAL INJURIES

Automobile accidents, gunshot wounds, and stabbings to the abdomen are the most common causes of abdominal trauma. Automobile accidents are a common cause of abdominal injuries and trauma. The reason is that the seat belt is normally fastened across the abdomen resulting in seat belt trauma. Gunshot wounds to the abdomen also cause abdominal trauma. In the civilian sector, such wounds usually occur at low speed. In the military, gunshot wounds usually occur with high speed causing tissue to be destroyed. Gunshot wounds are more common in the military than stab wounds. In the civilian community, the reverse is true with stabbings to the abdomen being more common then gunshot wounds to the abdomen. Stab wounds can be very deceiving in that they may be more serious than they look. A small hole from an ice pick or screwdriver can hide a rupture of the spleen, for example.

a. Most Commonly Ruptured Organs. The spleen, the liver, the intestines, and the kidneys are the most commonly ruptured organs. The spleen is the organ which ruptures most frequently in blunt trauma. The liver ruptures frequently in penetrating trauma despite the protection of the rib cage. The size, weight, and location of the liver makes this organ highly susceptible to injuries. Injury to the intestines may be difficult to diagnose. Such injury sometimes goes undetected for days. The most common sign of intestinal injury is local tenderness. The casualty may eat and have normal bowel movements for a week before fever or infection begins. The kidneys bruise easily.

b. Hemorrhaging Vessels. Two major vessels are likely to hemorrhage if there is abdominal trauma. These vessels are the abdominal aorta and the inferior vena cava. An individual with abdominal hemorrhaging, who vomits and strains will increase the hemorrhaging.

NOTE: Body cavities are spaces in the body containing internal organs. The abdominal cavity contains the stomach, spleen, liver, gallbladder, pancreas, small intestine, most of the large intestine, the kidneys, and the ureters.
6-3. SIGNS/SYMPTOMS OF ABDOMINAL INJURIES

   a. Evaluate Nature/Extent of Abdominal Injuries. Determine if the casualty has pain, is nauseated, or is vomiting. Ask questions if the casualty is able to respond. Check the casualty for wounds, bruises, old scars, and abrasions. Listen to each quadrant of the abdomen with a stethoscope. Palpate the abdomen making sure you carefully palpate the area of pain last.
Figures 6-2. Palpate the abdomen (continued).
Figure 6-2. Palpate the abdomen (concluded).
b. **Signs/Symptoms of Abdominal Injuries.** Included are the following:

1. Localized or generalized pain.
2. Blood in emesis (vomit).
3. Abdomen rigid when palpated. This critical sign, rigidity, is caused by muscle spasms in the abdominal body wall.
5. Signs of shock when there is no apparent hemorrhage. There is often internal bleeding which was caused by the blow of a blunt object.
6. Distention (swelling), a late sign.
7. Pain referred up either shoulder.
8. Extravasation (escape of fluid) of urine or blood under the skin.
10. Unusual masses (hernia). You may feel a tumor or intestinal obstruction if the mass is large. The exact location should be recorded for the doctor.
11. Lack of bowel sounds. By itself, this is not significant.

**NOTE:** Abdominal tenderness, guarding, and rigidity, on palpation are probably the most frequent and reliable findings of abdominal injury.

c. **Significant Findings of Abdominal Injury Evaluation.** If there are missile wounds in the abdominal walls, note the position of the casualty at the time of impact. This will help you determine the extent of damage due to missile trajectory. High velocity missiles can cause extensive internal damage to the human body. Bullets can tumble around organs and bounce off bones. Wounds of the chest or buttocks can also cause abdominal injury. The soldier may experience diaphragmatic rupture, the diaphragm reaching just below the nipples. If the casualty experiences rectal bleeding, there may be damage to the colon.

6-4. **NONPENETRATING AND PENETRATING ABDOMINAL INJURIES**

a. **Classification of Abdominal Injuries.** Abdominal injuries can be classified as either penetrating wounds (the skin is penetrated) or nonpenetrating blunt wounds (the skin is not penetrated).
b. **Nonpenetrating (Blunt) Injuries.** These injuries are caused by a heavy blow pushing the contents of the abdomen up against the spine. Blunt injuries damage the abdominal body wall and are equally tender whether muscles are tight or relaxed. If the abdominal cavity is injured, it will be more tender when the abdominal muscles are relaxed. Blunt trauma is often overlooked when it is associated with other injuries.

c. **Complications Associated with Nonpenetrating (Blunt) Injuries.**

(1) **Ruptured spleen.** The organ most frequently injured by blunt trauma is the spleen. Signs and symptoms include:

   (a) A history of trauma.
   (b) Pain in the left upper quadrant (LUQ).
   (c) Referred pain in the top left shoulder.
   (d) Hypovolemia (abnormally decreased amount of blood circulating in the body).
   (e) Lower left rib fracture.

(2) **Lacerated liver.** Signs and symptoms of this condition include:

   (a) Pain and tenderness in the right upper quadrant (RUQ).
   (b) Jaundice (a yellowing of the skin due to disturbed functioning of the liver).
   (c) Referred pain in the right top shoulder due to nerves that service the shoulder.
   (d) Hypovolemia progressing to shock since the liver is an organ with many blood vessels.

(3) **Peritonitis.** This condition is inflammation of the peritoneum. Leakage from a ruptured gallbladder may be a sign that the casualty has peritonitis.

(4) **Duodenum and pancreas.** An injured duodenum and pancreas are usually associated with another organ's involvement with injury. Look for the following:

   (a) Epigastric pain.
   (b) Hypovolemia progressing to shock.
(c) Epigastric tenderness and/or rigidity. Rigidity is a critical sign when blunt trauma is the cause; surgery is required.

(d) Fever.

(e) High intestinal obstruction.

d. **Penetrating Injuries.** These injuries have both solid organ and hollow organ involvement. (This includes eviscerations, injuries in which the intestine protrudes through the intestinal wall.) In solid organ involvement, the liver may hemorrhage into the abdomen and lead to hypovolemic shock. The spleen may rupture which usually means that the spleen must be surgically removed. The kidneys may develop hematuria (blood in the urine). In the case of hollow organ involvement (intestinal injuries), chemical and bacterial peritonitis (inflammation of the intestine linings) may occur. Penetrating stomach wounds can cause bloody nasogastric aspirate. Blood found on rectal examination may be due to lower colon wounds.

**NOTE:** Subcutaneous emphysema (the presence of air or gas in the tissues under the top layer of skin is possible in the abdominal wall if there are ruptures in hollow organs.

**6-5. TREATMENT FOR ABDOMINAL INJURIES**

Begin treating for abdominal injuries immediately.

a. **First, Apply Emergency Medical Treatment to Sustain Life.** Check the casualty's airway, breathing, and circulation.

   (1) Check the airway and at the same time assess the casualty for any cervical spine injuries. To determine whether the casualty is breathing, follow this procedure. Place your ear over the casualty's mouth and nose and look towards the casualty's chest. Your ear should be touching the casualty's nose. **Look** at the casualty's chest. If he is breathing, you should be able to see his chest rise and fall. **Listen** for the sound of breathing (air being inhaled and exhaled). **Feel** for the flow of air on the side of your face; the air flow is caused by the casualty exhaling. If you suspect that the casualty may have a cervical spine injury, **DO NOT move the casualty's head or neck.**
(2) Open the airway and perform artificial respiration (rescue breathing), if necessary. If your check shows that the casualty is not breathing, begin artificial respiration. There are three methods of rescue breathing: mouth-to-mouth, mouth-to-nose, and mouth-to-stoma. The most commonly used method is mouth-to-mouth. Mouth-to-nose is used when the casualty's mouth can't be opened or when the rescuer can't achieve a tight seal around the casualty's mouth. Mouth-to-stoma is used when there is an opening in the casualty's neck for breathing. Remember that mouth-to-mouth rescue breathing requires a good airseal of your mouth and the casualty's mouth in order to inflate the lungs. Here is the procedure for mouth-to-mouth rescue breathing. If you need more information, refer to Subcourse MD0571, Cardiac Impairment, and look at Lesson 3(Basic Cardiac Life Support).

(a) Pinch the casualty's nostrils shut.

(b) Open your mouth wide and take a deep breath.

(c) Place your mouth tightly over the patient's mouth. Make an airtight seal.

(d) Blow your breath into the casualty's mouth. You should see the casualty's chest rise as air fills his lungs. You should feel and hear the air as it is exhaled from the casualty's lungs.

(e) Remove your mouth and allow the casualty to exhale.

(f) Initially, repeat steps two through five four times. Do not wait for the lungs to deflate fully.

(g) Maintain a rate of 16 to 20 respirations per minutes.

(3) Check for a carotid pulse and perform cardiopulmonary resuscitation (CPR).

(a) Carotid pulse. Palpate the carotid artery for a pulse rather than trying to find a radial pulse at the wrist or a temporal pulse. The carotid arteries carry blood to the brain and the head, and a pulse can usually be felt here when other pulses have disappeared. The carotid arteries are located on each side of the neck. The pulse can be most easily felt next to the larynx (the voice box). Follow these steps to locate the carotid pulse:

1. Locate the larynx. The larynx is also called the "Adam's apple" or voice box. It is located in the front center of the neck.

2. Use the tips of your index and middle fingers.
3 Slide your fingers alongside the larynx in the groves formed by the muscles at the side of the neck.

4 Palpate the pulse. Avoid pressing too hard and compressing the artery. You will block out a weak pulse if you do this.

(b) Cardiopulmonary resuscitation (CPR). If there is no carotid pulse, begin artificial circulation (CPR) using external chest compression. Follow these steps:

1 Place the casualty on his back on a hard surface.

2 Position yourself at the left side of the casualty's chest.

3 Locate the lower half of the casualty's sternum. Avoid putting pressure on the tip of the sternum (xiphoid process).

4 Place the heel of your hand over the lower half of his sternum, keeping your fingers off the chest wall.

5 Put the heel of your second hand on top of the first, and move so that your shoulders are lengthwise over the casualty's sternum. Keep your arms straight and your elbows locked.

6 Exert a firm, heavy force downward on the chest. For adults, 80 to 120 pounds of pressure are required to depress the sternum 1 1/2 to 2 inches. By using your entire weight, you should be able to compress the casualty's chest. This compresses the heart and forces blood into the arteries.

7 Release the pressure, but do not remove your hands. Develop a rhythm by rolling your body forward to press and then back to release.

8 Continue compressions at the rate of 80 per minute. Continue until the casualty revives or until you are relieved. If another rescuer relieves you, change places with that person without interrupting the rhythm of chest compressions.

NOTE: Be sure to give two lung inflations after each 15 compressions.

9 For further information, refer to Subcourse MD0571, Cardiac Impairment, and look at Lesson 3 (Basic Cardiac Life Support).

b. Make a Rapid Physical Assessment. If organs are exposed, DO NOT PUSH THEM BACK IN. Cover exposed organs with sterile dressings. Pick up any organs which may be on the ground. Do this with a clean, dry dressing or with the cleanest available material. Put the organs on top of the casualty's stomach.
CAUTIONS: DO NOT probe, clean, or try to remove any foreign object from the stomach.

DO NOT touch with bare hands any exposed organs.

DO NOT push organs back inside the body.

c. **Check Frequently for Signs of Shock.** Shock is the body's response to inadequate circulation due to a variety of causes. Abdominal trauma is one of the causes. The signs of shock are related to the effects of inadequate circulation. The symptoms are:

1. **Skin**—pale in color, clammy to the touch.

2. **Blood pressure**—progressive, consistent fall in pressure (the earliest change to signify shock).

3. **Pulse**—rapid (often over 120 beats per minute), thready, or quivery.

4. **Respirations**—rapid and shallow, often grunting as if hungry for air.

5. **Cyanosis**—blueness of fingernail beds or lips due to lack of oxygen; use the inner lip for detection in a dark-skinned person.

6. **Urine output**—scanty or absent because of decreased circulation through the kidneys.

7. **Mental state**—check by asking the casualty what time or day it is.

8. **Vital signs**—take and record vital signs including blood pressure, pulse, and respirations. Also, ask about and record the presence, location, and severity of pain.

d. **Treat the Casualty for Shock.** Inflate the medical anti-shock trousers (MAST) if shock develops. Monitor the MAST to see if air is evacuating. Initiate IVs (at the rate necessary to keep the vein open) of colloid (Dextran Plasmanate), if possible. If colloid is not available, administer an IV using normal saline solution or Ringer's lactate solution. If shock develops, increase the rate of IV. It is preferred that two IVs be given simultaneously. Give nothing by mouth, but you may moisten the casualty's lips.

e. **Insert the Foley Catheter.** A catheter is inserted into the body to maintain a continuous free flow of urine. Foley catheters come in a variety of sizes. The size to be used depends on the physical structure of the patient. The doctor may designate the size when he writes the order for the catheter to be inserted. The Foley catheter has
two rubber tubes; the main line is identified by the openings at the tip and at the wide base on the opposite end. The second tube is connected and sealed along the side of the main tube; the end of the tube is fixed in a manner that allows it to be inflated with air or sterile liquid, causing the formation of an inflated balloon around the main tube. The balloon prevents the catheter from slipping out of the urinary tract. Refer to Subcourse MD0579, The Genitourinary System I for complete information on inserting a Foley catheter in a patient, male or female.

f. **Insert a Nasogastric (NG) Tube.** Insert this tube unless you suspect a fractured cribriform plate. Confirm a cribriform plate fracture by X-ray. If there is a cribriform plate fracture, insert an orogastric tube. See lesson 5 of this subcourse for information on nasogastric intubation. Orogastric intubation is much like nasogastric intubation with the exception that the tube is passed through the casualty's mouth rather than his nose.

**CAUTIONS:** DO NOT have inexperienced personnel perform nasogastric intubation.

DO NOT give morphine to the casualty unless there is a long wait before the casualty can be evacuated and a medical doctor has ordered nasogastric intubation.

g. **Position the Casualty.** Place the casualty in a semi-Fowler's position. The semi-Fowler's position involves raising the casualty's head 45 degrees and raising his knees 15 degrees. Raising the casualty's knees makes him more comfortable because this reduces strain on his abdominal and leg muscles. If the casualty is not comfortable in the semi-Fowler position, place him in any other position. Be sure the position you have placed the casualty in does not cause further medical complications.

h. **Evacuate the Casualty.** Evacuate the casualty immediately at low altitude. General considerations for air transport of casualties with intra-abdominal (within the abdomen) injuries include the following:

1. Gas in the bowel and stomach expands as the altitude increases.
2. Vomiting can lead to fatal aspiration into the tracheo-bronchial tree. Therefore, place a nasogastric tube in the casualty before take-off. The tube should be left open so that drainage can occur freely.
3. If a casualty has possible intra-abdominal hemorrhaging, the straining and retching associated with vomiting can cause additional hemorrhaging.

**6-6. CLOSING**

The patients with abdominal injuries will usually require definite surgical treatment. You can optimally prepare these patients for their surgical treatment.
EXERCISES, LESSON 6

INSTRUCTIONS. Answer the following exercises by writing the answer in the space provided.

After you have completed all of these exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

1. List three common causes of abdominal injuries.
   a. _________________________________.
   b. _________________________________.
   c. _________________________________.

2. In blunt trauma, the most commonly ruptured organ is ___________________.

3. In penetrating trauma, the most commonly ruptured organ is _________________.

4. The organs which bruise easily are _______________________.

5. Injuries to the __________________________ are the most difficult to diagnose and these injuries can go undetected for days.

6. List three things you would do to evaluate the nature and extent of abdominal injuries.
   a. _________________________________.
   b. _________________________________.
   c. _________________________________.

7. List four signs/symptoms of abdominal injuries.
   a. ____________________________________________.
   b. ____________________________________________.
   c. ____________________________________________.
   d. ____________________________________________.

8. You are evaluating a casualty with missile wounds in the abdominal walls. List two reasons why it is important to note the position of the casualty at the time of missile impact.
   a. ____________________________________________.
   b. ____________________________________________.

9. A casualty who has abdominal injuries with rectal bleeding may have damage to the ____________________________.

10. Write the definitions of the two major classifications of abdominal trauma.
    a. Penetrating wounds = ____________________________________________
    b. Nonpenetrating blunt wounds = ____________________________________.

11. List three signs/symptoms of an injured duodenum or pancreas.
    a. ____________________________________________.
    b. ____________________________________________.
    c. ____________________________________________.
12. If there is solid organ involvement in a penetrating abdominal injury, the ____________ may hemorrhage into the abdomen and lead to hypovolemic shock.

13. If there is hollow organ involvement (intestinal injuries, for example) in a penetrating abdominal injury, the ____________ linings may become inflamed.

14. Subcutaneous emphysema is possible in the abdominal wall if __________________ ________________________________________________________________.

15. List two conditions that must be met in order for you to administer morphine to an abdominal trauma casualty.
   a. __________________ __________________________.
   b. __________________ __________________________.

16. Place the abdominal trauma casualty in the ______________________ position if that position is comfortable for him.

17. Abdominal trauma casualties must be evacuated at low altitude because of the possibility of ________________________________.

Check Your Answers on Next Page
SOLUTIONS TO EXERCISES, LESSON 6

1. Automobile accidents.
   Gunshot wounds.
   Stabbings to the abdomen. (para 6-2)

2. The spleen. (para 6-2a)

3. The liver. (para 6-2a)

4. The kidneys. (para 6-2a)

5. Intestines. (para 6-2a)

6. You are correct if you listed any three of the following:
   Determine if the casualty has pain, is nauseated, or is vomiting.
   Check the casualty for wounds, bruises, old scars, and abrasions.
   Listen to each quadrant of the abdomen with a stethoscope.
   Palpate the abdomen making sure you carefully palpate the area of pain last.
   (para 6-3a)

7. You are correct if you listed any four of the following:
   Localized or generalized pain.
   Blood in emesis.
   Abdomen rigid when palpated.
   Pain caused by light pressure.
   Signs of shock when there is no apparent hemorrhage.
   Distention.
   Pain referred up either shoulder.
   Escape of fluid of urine or blood under the skin.
   Jaundice; unusual masses.
   Lack of bowel sounds. (para 6-3b)

8. High velocity missiles can cause extensive internal damage.
   Bullets can tumble around organs and bounce off bones. (para 6-3c)

9. Colon. (para 6-3c)

10. Penetrating wounds = wounds in which the skin is penetrated or broken.
    Nonpenetrating blunt wounds = wounds in which the skin is not penetrated or broken. (para 6-4)
11. You are correct if you listed any three of the following:

   Epigastric pain.
   Hypovolemia progressing to shock.
   Epigastric tenderness and/or rigidity.
   Fever.
   High intestinal obstruction. (para 6-4c(4))

12. Liver. (para 6-4d)

13. Intestinal. (para 6-4d)

14. There are hollow organ ruptures. (para 6-4d, NOTE)

15. Evacuation prolonged.
   Ordered by medical doctor. (para 6-5f, CAUTION)

16. Semi-Fowler's. (para 6-5g)

17. Gas in the bowel and stomach. This gas would expand as the altitude increased.
   (para 6-5h)

Return to Table of Contents