This month we will discuss blunt and penetrating abdominal trauma to the adult patient. Victims of abdominal trauma can have both internal abdominal and extra abdominal injuries often complicating our care.

Blunt abdominal trauma often results from a motor vehicle collision or pedestrian versus auto collisions. These types of cases account for nearly 75 percent of all abdominal trauma cases. Blows to the abdomen account for about 15 percent while falls account for about 10 percent.

Let's first review the anatomy of the abdominal regions.

In the Thoracic Abdomen there are the liver and spleen that are protected on each side by the lower ribs. Life threatening hemorrhage can take place in the liver or spleen since they are both very vascular.

True abdomen contains small intestines and bladder. Intestinal injury can result in infection, peritonitis, and shock. In females, uterus, fallopian tubes, and ovaries are part of pelvic portion of true abdomen.

Retroperitoneal abdomen is located behind thoracic and true abdomen. It contains kidneys, ureters, pancreas, posterior duodenum, ascending and descending colon, abdominal aorta, and inferior vena cava. The retroperitoneal abdomen can conceal massive amounts of blood loss with very little external signs.

The most common cause of mortality in the abdominal trauma patient is from blunt trauma. The mortality rate is 10-30% for blunt trauma. Penetrating abdominal trauma usually is from gunshots which accounts for 5-15% mortality, while stabbing are at 1-2% mortality. Approximately 1/3 of all stabbing victims will require surgical intervention. The main concern is for intra abdominal hemorrhage and shock or sepsis and peritonitis from the damaged intestines.
Abdominal trauma is very difficult to evaluate and we need to pay close attention to the scene and mechanism of injury to clue us into the possible trauma that we may find. Do we see a steering wheel that is damaged, center console bent away from the driver, or is the victim of an assault injured from a nearby object.

When we look at the mechanism of the injury, often this will give us an idea of the organs involved. If there is a direct compression of the abdomen, there can be a fracture of the solid organs such as the liver and spleen. There can also be a “blow out” of the hollow organs or the intestines. Deceleration can cause a tearing of the organs or blood vessels away form the abdominal viscera. The other concern is almost 70 percent of abdominal trauma patients have associated head, chest or extremity injuries. So often times as EMS providers we focus our concerns at these injuries and not the abdomen.

Historical features to note would be:
- Fatality at the scene
- Vehicle type and velocity
- Whether the vehicle rolled over
- Patients location within the car
- Extent of intrusion into the passenger compartment
- Extend of damage to the vehicle
- Steering wheel deformity
- If seat belts were used and if so what type
- Front or side airbags were deployed

Often times with blunt trauma there will be minimal or no external signs of trauma. Most of the significant blood loss has been concealed into the abdominal region. If there is a seat belt sign, there is a 25% chance they will have an intra-abdominal bleed. Often with the blunt trauma patient they have no pain or it is covered by pain to another area.

In penetrating abdominal trauma, there is direct trauma to the organ and the vasculature. This can be caused by the projectile such as a bullet, a fragment of a bullet or even a knife. The energy that is transmitted by the penetrated object through mass and velocity is what does the damage. These types of injuries usually involve major uncontrolled hemorrhage and vigorous fluid resuscitation may make the hemorrhage worse.

Remember that penetrating injuries do not always follow the most obvious pathways. Chest injuries can have abdominal trauma and abdominal injury may have chest trauma. Consider the bullet or projectile may have passed through multiple structures. Ballistics information such as caliber, velocity, trajectory and range may all be very helpful information.

While doing your abdominal assessment, you want to make sure you are looking for the following things.
- Deformities
- Contusions
- Abrasions
- Punctures
- Evisceration
- Distention
- Tenderness
- Tenseness
Another sign would be if the patient has referred pain to another area such as a shoulder. This is another indication of possible abdominal injuries.

- Kehr’s Sign (pain in the left shoulder from ruptured spleen)
- Murphy’s Sign (pain on abdominal exam from gallbladder)
- Turner’s Sign (pancreatitis or injury)
- Liver injury (pain in the right shoulder)

Distention, tenderness and tenseness can be a sign of severe hemorrhage. When assessing the pelvic region, you should note any pelvic instability or bony crepitus as a sign of possible hemorrhage as well. Patients with pelvic fractures are at risk for life threatening retroperitoneal hemorrhage. Mortality due to pelvic fracture with hemorrhage has historically approached 25% to 40%. Treatment would be to wrap the pelvis with a sheet or pelvic binder. A PASG if available may also be used to stabilize the pelvis.

An abdominal evisceration is where part of the abdominal organs has come out of the body through a wound in the abdominal wall. You should never push the viscera back into the abdomen. Gently cover the organ with a moist sterile gauze or pad and then apply a non-adhering material such as plastic wrap to prevent the organ from drying out.

An impaled object must be secured in place and not removed. There could be uncontrolled hemorrhage into the abdomen if the object were removed. Therefore the object needs to be stabilized in place to limit all movement.

Our initial trauma care protocol indicates in our primary assessment should include a good general impression and determination of immediate life threats. LOC and the patients GCS should be one and then ABC’s and C-spine stabilization should be done. Vascular access should be established by the Paramedics and volume replacement should be based on systolic blood pressure readings.

If the patient has penetrating trauma of trauma to the torso, you want to maintain a SBP of 80. If the patient is blunt trauma, fluids should be given just to maintain a SBP of 90 unless there is head trauma also present.
Pain management can be achieved with the use of Fentanyl and because of the duration of the effect of the medication, physicians still can do an adequate exam once the patient arrives in the emergency department. The use of the Wong Baker pain scale is a good tool for EMS providers to use since it gives both a number (0-10) and facial reading.

Fentanyl can be given 1 mcg/kg (max 100 mcg) IVP/IN/IM/IO. You may repeat 0.5 mcg/kg in 5 minutes (max 50 mcg) IVP/IN/IM/IO. Additional doses require OLMC. You may repeat 0.5 mcg/kg up to a total of 3 mcg/kg (max 300 mcg).

Our goal in all traumas is to have a scene time of less than 10 minutes. Rapid transport to the appropriate level trauma center is needed. Document any reason why the scene time has been longer than 10 minutes in your EMS report.

Materials referenced include: UpToDate.com, ITLS International, and the McHenry Western Lake County EMS Protocol.
Across

2. Pain in the left shoulder from a ruptured spleen.
4. During your abdominal assessment, "P" stands for.
8. Pain in the right shoulder could be from damage to this organ.
9. Pain from the pancreatitis or due to injury.
10. _____ Abdomen contains the small intestines and bladder.
12. Part of the abdominal organs have come out of the body through a wound in the abdominal wall.
18. This can cause a tearing of the organs or blood vessels away from the abdominal viscera.
20. While doing your assessment, "A" stands for.

Down

1. In the _____ Abdomen there is the liver and spleen.
3. Hollow organs will do this if damaged.
5. This contains the kidneys, ureters, pancreas, abdominal aorta.
6. Solid organs such as the liver and spleen do this when damaged.
7. Almost 70% of all abdominal trauma patients have associated head, chest or _____ injuries.
11. Pain in the abdomen from the gallbladder.
13. Bleeding is also referred to as this.
14. Used to treat pain in the trauma patient.
15. Our ____ time should be less than 10 minutes.
17. The information gathered such as caliber, velocity, trajectory and range is known as.
19. An ____ object must be secured in place and not removed.

For the Crossword above, please use the following words for the puzzle.

ABRASIONS BALLISTICS BLUNT DECELERATION
EVISCERATION EXTREMITY FENTANYL FRACTURE
HEMORRHAGE IMPALED KEHRS LIVER
MURPHYS PUNCTURES SCENE RETROPERITONEAL
SPILL THORACIC TRUE TURNERS

IF YOU ARE NOT A MEMBER OF THE MCHENRY WESTERN LAKE COUNTY EMS SYSTEM, PLEASE INCLUDE YOUR ADDRESS ON EACH OPTIONAL QUIZ TURNED INTO OUR OFFICE. WE WILL FORWARD TO YOUR HOME ADDRESS VERIFICATION OF YOUR CONTINUING EDUCATION HOURS. IF YOU ARE A MEMBER OF OUR EMS SYSTEM, YOUR CREDIT WILL BE ADDED TO YOUR IMAGE TREND RECORD. PLEASE REFER TO IMAGE TREND TO SEE YOUR LIST OF CONTINUING EDUCATION CREDITS. ANY QUESTIONS REGARDING THIS CAN BE ADDRESSED TO THE EMS OFFICE AT 815/759-8040. THANK YOU.