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BLUNT ABDOMINAL TRAUMA

Essay

Submitted For Partial Fulfillment of Master Degree
In General Surgery

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2012

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Introduction

Blunt abdominal trauma is a leading cause of morbidity and mortality among all age groups. Identification of serious intra-abdominal pathology is often challenging. Many injuries may not manifest during the initial assessment and treatment period. Missed intra-abdominal injuries and concealed hemorrhage are frequent causes of increased morbidity and mortality, especially in patients who survive the initial phase after an injury**.(*Rivara, FP,2005)* .**

According to national and international data, blunt abdominal trauma is more common in men. The male-to-female ratio is 60:40. Most studies indicate that the peak incidence is in persons aged 14-30 years. ***(De Demetriades, 2004).***

Blunt abdominal trauma usually results from motor vehicle collisions (MVCs), assaults, recreational accidents, or falls. Blunt abdominal trauma most often results in injury to the spleen, which in over 60 percent of cases is the only damaged intra peritoneal structure. The liver and kidney can also be injured. Less commonly, hollow viscus injury may occur. Several patho-physiologic mechanisms can occur in patients with blunt abdominal trauma. A sudden and pronounced rise in intra abdominal pressure created by outward forces can rupture a hollow viscus.

Elderly and alcoholic patients generally have lax abdominal walls and are more likely to sustain such injuries, Delayed splenic rupture can occur**. *(Roudsari, 2005).***

A carefully performed physical examination remains the most important method to determine the need for exploratory laparotomy.

Introduction

In recent years, laboratory evaluation of trauma patients has been a matter of significant discussion. Commonly recommended studies include: complete blood- count (CBC), serum chemistries, serum amylase, coagulation studies, blood typing , cross-matching, arterial blood gases (ABGs) and a urine pregnancy test (for females of childbearing age).

The most important initial concern in the evaluation of a patient with blunt abdominal trauma is an assessment of haemo-dynamic stability. In the haemo-dynamically unstable patient, a rapid evaluation must be made regarding the presence of haemo-peritoneum. This can be accomplished by means of plain radiography; diagnostic peritoneal lavage (DPL) or the focused assessment with ultra-sonography for trauma (FAST) but Computed Tomography (CT) provides most detailed images***(Brasel,KJ, 2005).***

Pre-hospital care focuses on rapidly evaluating life-threatening problems, initiating resuscitative measures, and initiating prompt transport to a definitive care site. The injured patient is at risk for progressive deterioration from continued bleeding and requires rapid transport to a trauma center.

Hence, securing the airway, placing large-bore intravenous (IV) lines, and administering IV fluids must take place as early as possible.

Treatment of blunt abdominal trauma begins at the scene of the injury and is continued upon the patient's arrival at the emergency department (ED) or trauma center.

Management may involve non operative measures or surgical treatment . Surgical intervention is indicated in patients with evidence of

peritonitis, uncontrolled shock, hemorrhage or clinical deterioration during observation.

Non operative management strategies based on CT scan diagnosis and the haemo-dynamic stability of the patient are now being used in adults for the treatment of solid organ injuries, primarily those to the liver and spleen. ***(Nirula R, 2010).***

Aim of the work

The primary purpose of this study is to clarify methods of diagnosis and early proper management of blunt abdominal trauma and injuries.

Anatomy of the abdomen

Anatomic boundaries:

- Anterior abdomen: transnipple line superiorly, inguinal ligaments and symphasis pubis inferiorly, anterior axillary lines laterally.
- Flanks: between anterior and posterior axillary lines from 6^{th} intercostal space to iliac crest.
- Back: posterior to posterior axillary lines, from tip of scapulae to iliac crests.***(Keith and Anne, 2007).***

Pelvi- Abdominal cavity:

- ***Upper peritoneal cavity***: covered by lower aspect of bony thorax. Includes diaphragm, liver, spleen, stomach, transverse colon.
- ***Lower peritoneal cavity***: small bowel, ascending and descending colon, sigmoid colon, and (in women) internal reproductive organs).
- ***Pelvic cavity***: contains rectum,urinary bladder, iliac vessels, and (in women) internal reproductive organs.
- ***Retroperitoneal space***: posterior to peritoneal lining of abdomen, Abdominal aorta, IVC, most of duodenum, pancreas, kidneys, ureters, and posterior aspects of ascending and descending colon.***(Keith and Anne, 2007).***

Surface landmarks of abdominal wall:

- **Xiphoid process:**

This is the thin cartilaginous lower part of the sternum. The xihoid junction is identified by feeling the lower edge of the body of the sternum and it lies opposite the body of 9^{th} thoracic vertebrae.

- **Costal margin:**

This is the curved lower margin of the thoracic wall and is formed in front by cartilages of the 7^{th}, 8^{th}, 9^{th}, 10^{th} ribs and behind by the cartilages of 11^{th} and 12^{th} ribs. It lies opposite the body of 3^{rd} lumbar vertebra.

- **Iliac crest:**

This can be felt along entire length and ends in front at the ASIS and behind at PSIS. It is highest point lies opposite the body of 4^{th} lumbar vertebrae.

- **Pubic tubercle:**

It's important surface landmark, it may be identified as small protuberance along the superior surface of the pubis.

- **Symphysis pubis:**

It's the cartilaginous joint that lies in the midline between the bodies of the pubic bones. It's felt as solid structure beneath the skin in the midline at the lower extremity of anterior abdominal wall ***(Keith and Anne, 2007).***

- **Inguinal ligament:**

This ligament lies beneath skin crease in the groin. It's the rolled under anterior margin of the aponeurosis of external oblique muscle. It's attached laterally to the anterior superior iliac spine (ASIS) and curved downward and medially to be attached to the pubic tubercle. ***(Keith and Anne, 2007).***

Planes and regions of the abdomen:

There are two vertical and two horizontal planes divide abdomen into 9 regions.

The vertical planes:

They are right and left lateral planes each is drawn vertically from the midclavicular point to midinguinal point.

The horizontal planes:

I. Subcostal plane:

Is drawn transversely at the lowest points of the costal margin, at the lower border of the 10^{th} costal cartilage (level with the body of L_3 vertebra).

II. Intertubercular plane:

Is drawn across the tubercle of the two iliac crests (level with the body of L_5 vertebra). ***(Keith and Anne, 2007).***

Table (1) : The nine regions of the abdomen .

Upper abdomen	Rt hypochondrium	Epigastrium	Lt. hypochondrium
Middle abdomen	Rt. lumbar	Umbilical	Lt. lumbar
Lower abdomen	Rt. iliac fossa	Hypogastrium	Lt. iliac fossa

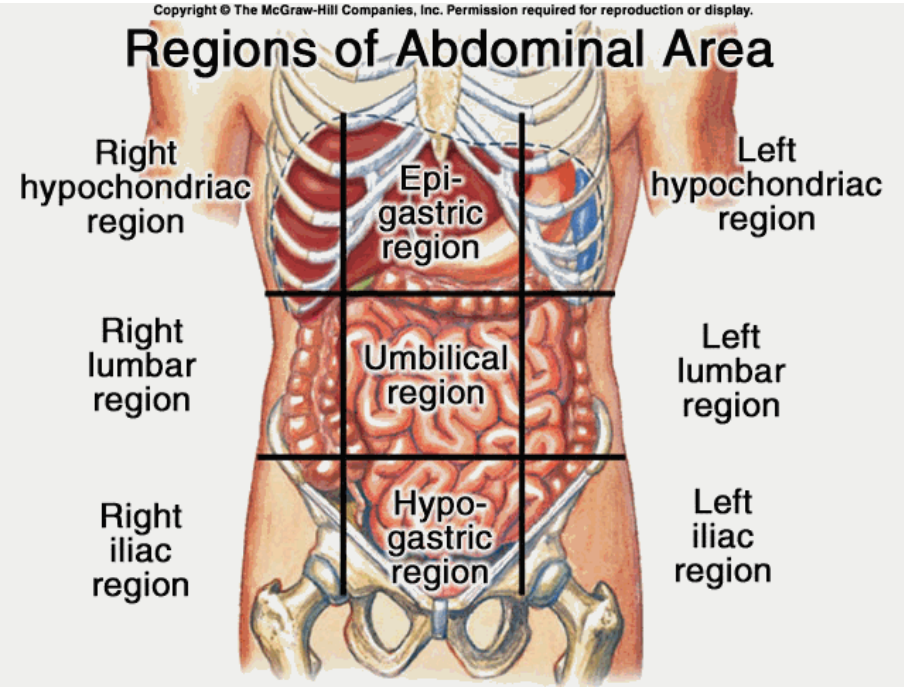

Figure (1) : Regions of the abdomen*.(Netter's human anatomy,2009).*

Contents of abdominal regions :

- ***Upper abdomen:***

I. Right Hypochondriom:

* Greater part of right lobe of the liver.

* Right hepatic flexure of the colon.

* Part of right kidney.

II. Epigastric region:

* Left lobe of the liver.

* Part of right lobe of the liver.

* Gall bladder .

* The 2 orifices of the stomach.

* Part of the stomach .

* 1^{st}, 2^{nd} parts of the duodenum.

* Pancreas .

* Inner end of the spleen.

III. Left hypochondrium:

* Part of the stomach.

* Splenic flexure of the colon.

* The greater part of spleen .

* Tail of pancreas .

* Part of left kidney. ***(Keith and Anne, 2007)***

- ***Middle abdomen:***

I. Right lumbar:

* Ascending colon .

* Right kidney .

II. Umbilical:

* Transverse colon.

* 3rd part of the duodenum.

* Coils of jejuneum and ileum.

* Greater omentum and mesentery.

III. Left lumbar:

* Descending colon .

* Part of left kidney .

- ***Lower abdomen:***

I. Right iliac fossa: