

Updated Methods In Management of Abdominal Trauma

Essay

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Contents

1. List of tables.....	1
2. List of figures	2
3. List of abbreviation.....	2
4. Introduction & Aim of the work.....	3
5. Anatomy ,Classification, Mechanism of injury.....	6
6. Diagnostic modalities.....	26
7. Management of specific Abdominal injuries.....	65
8. Summary.....	120
9. References.....	126
10. Arabic summary.....	
11. Protocol.....	

List of tables

Table 1: Etiology of abdominal trauma.....	11
Table 2: Frequency of injury in penetrating abdominal trauma.....	12
Table 3: Frequency of injury in blunt abdominal trauma.....	12
Table 4: Spleen injury scale.....	16
Table 5: Liver injury scale.....	17
Table 6: Extra hepatic biliary tree injury scale.....	18
Table 7: Stomach injury scale.....	18
Table 8: Small bowel injury scale.....	19
Table 9: Colon injury scale.....	20
Table 10: Rectum injury scale.....	20
Table 11: Pancreas injury scale.....	21
Table 12: Duodenum injury scale.....	22
Table 13: Diaphragm injury scale.....	22
Table 14: Abdominal vascular injury scale.....	23
Table 15: Kidney injury scale.....	24
Table 16: Urinary bladder injury scale.....	25
Table 17: The most commonly detected injured organs in CT following blunt abdominal trauma.....	40
Table 18 Criteria for evaluation of peritoneal lavage fluid.....	47

List of figures

(Figure 1-1) Contents of the abdomen.....	9
(Figure 2-1) Obvious free intraperitoneal fluid contrasted between liver L and kidney K.....	38
(Figure 2-2) Transducer positions for FAST.....	38
(Figure 2-3) A sagittal CT section through the abdomen showing a trajectory of gunshot missile through the liver.....	42
(Figure 2-4) Diagnostic peritoneal lavage.....	46
(Figure 3-1) Pringle maneuver.....	82
(Figure 3-2) Atriocaval shunt.....	86
(Figure 3-3) Chest x ray following MVC revealing a left diaphragmatic rupture.....	90
(Figure 3-4) Zones of the retroperitoneum.....	102

List of abbreviations

FAST	Focused Assessment with Sonography for Trauma.
HHFAST	Hand Held FAST
US	Ultrasonography.
DL	Diagnostic Laparoscopy.
DPL	Diagnostic Peritoneal Lavage.
LS	Laparoscopy.
CT	Computed Tomography.
BAT	Blunt Abdominal Trauma.
PAT	Penetrating Abdominal Trauma.
LWE	Local Wound Examination.
ED	Emergency Department.
GSW	Gunshot Wound.
SW	Stab Wound.
Mph	Mile per hour.
USVS	Unstable vital sign.
HALS	Hand Assisted Laparoscopic surgery.

Introduction

Twenty percent of all trauma operations are performed for the management of abdominal injury. The distribution of blunt and penetrating injury in a given population is highly dependant upon geographic location.

(Macho et al, 2003)

In civilian life, the majority of abdominal injuries are due to blunt trauma secondary to high-speed automobile accidents. Penetrating injuries, although often associated with wartime combat, are seen with increasing frequency in hospital emergency departments, particularly in urban areas. The failure to manage abdominal injuries successfully accounts for the majority of preventable deaths following multiple injuries. Failure to recognize occult abdominal hemorrhage and to successfully control bleeding from intra-abdominal organs leads to significant morbidity.

(Hoyt et al, 2002)

The abdomen is a diagnostic black box. Fortunately, with few exceptions it is not necessary to determine which intra-abdominal organs are injured, only whether an exploratory laparotomy is necessary. Physical examination of the abdomen is unreliable in making this determination. For the majority of patients suffering blunt abdominal trauma, it is not clear whether exploration is needed.

(Burch et al, 2005)

As the evaluation of blunt abdominal trauma evolves, the use of newer diagnostic modalities should be compared with established methods. More recently, abdominal sonography has become an alternative method to screen for

hemoperitoneum in blunt abdominal trauma. it has been shown to have advantages over both diagnostic peritoneal lavage and abdominal computed tomography, but like abdominal computed tomography, there is a risk of missing significant intra-abdominal injuries, and it require trained personnel and specialized equipment.

(Mele et al, 1999).

Improved video technology has allowed general surgeons to use laparoscopy as an effective tool in diagnosing and treating intraabdominal disease since the 1980s. Laparoscopic intervention was used infrequently, however, to treat abdominal trauma injuries.

(Pilcher et al, 1996)

Despite improved diagnostic tools such as computerized tomography (CT) scans and magnetic resonance imaging, conventional treatment of patients with abdominal trauma injuries often requires exploratory laparotomy procedures to accurately diagnose and treat patients' injuries. Studies show that nontherapeutic (ie, negative) laparotomy rates range from 5% to 40%, depending on the clinical situation. During a nontherapeutic laparotomy, injuries are not treated and drains are not inserted. Many surgeons now perform diagnostic laparoscopic procedures before or instead of exploratory laparotomy procedures in hemodynamically stable patients with abdominal trauma injuries.

(Pilcher et al,1996)

Laparoscopy has an important diagnostic role in stable patients with penetrating abdominal trauma. It can quickly establish whether peritoneal penetration has occurred and thus reduce the number of negative and nontherapeutic

trauma laparotomies performed in selected patients. Laparoscopy has also been applied safely and effectively as a screening tool in stable patients with blunt abdominal trauma.

(Macho et al, 2003)

Laparoscopy has been reported infrequently as a therapeutic tool in selected trauma patients. Examples of therapeutic laparoscopy include repair of diaphragmatic lacerations with sutures, staples, or prosthetic mesh; suturing of gastrointestinal perforations; homeostasis of low-grade liver and splenic lacerations; resection of small bowel and colon; cholecystectomy; splenectomy; and distal pancreatectomy. Auto transfusion of collected blood from the hemoperitoneum is another potential application.

(Chol et al, 2003)

Aim of the work

The aim of this essay is to review the role of laparoscope and its applications in diagnosis and treatment of abdominal trauma; weather blunt or penetrating injuries with comparison to other diagnostic modalities and conventional surgery.

Anatomy, classification, mechanism of injury

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In civilian life, the majority of abdominal injuries are due to blunt trauma secondary to high-speed automobile accidents. Penetrating injuries, although often associated with wartime combat, are seen with increasing frequency in hospital emergency departments, particularly in urban areas. The failure to manage abdominal injuries successfully accounts for the majority of preventable deaths following multiple injuries. Failure to recognize occult abdominal hemorrhage and to successfully control bleeding from intra-abdominal organs leads to significant morbidity and such injuries account for approximately 10% of traumatic deaths that occur annually in the USA. Even today with the development of trauma systems, failure to manage abdominal injuries continually accounts for significant morbidity.

(Hoyt et al, 2002)

There are many mechanisms that account for abdominal injuries. The recognition of two major groups, penetrating and non-penetrating is of greatest importance for treatment and has direct implications for the diagnostic work-up and therapy. The abdomen encompasses a large area of the body, from the diaphragm superiorly to the infragluteal fold

inferiorly, including the entire circumference of this region. Penetrating or blunt injury to the back also may result in significant intra-abdominal injury. Multiple system injuries, particularly those involving the central nervous system, chest and musculoskeletal system, are often associated and may obscure injury to the abdominal contents and symptoms from this area. The importance of repeated assessment of a patient suspected of having intra-abdominal injury cannot be overemphasized.

(Hoyt et al, 2002)

***Anatomical considerations:**

A practical knowledge of the contents of the abdomen is important. Assessment of the abdomen is influenced by its differing anatomical features. For evaluation purposes, the abdomen is divided into four areas:

1. Intrathoracic abdomen.
2. True abdomen.
3. Pelvic abdomen.
4. Retroperitoneal abdomen.

All the other areas are difficult to assess on physical examination, with the exception of the true abdomen.

The intrathoracic abdomen is that portion of the upper abdomen that lies beneath the rib cage. The contents include the diaphragm, liver, spleen and stomach, but bony and cartilaginous structures make this portion essentially inaccessible to palpation. Each structure may be injured when blunt or penetrating injury is delivered to the rib cage and peritoneal lavage becomes useful in evaluating this area of anatomy.

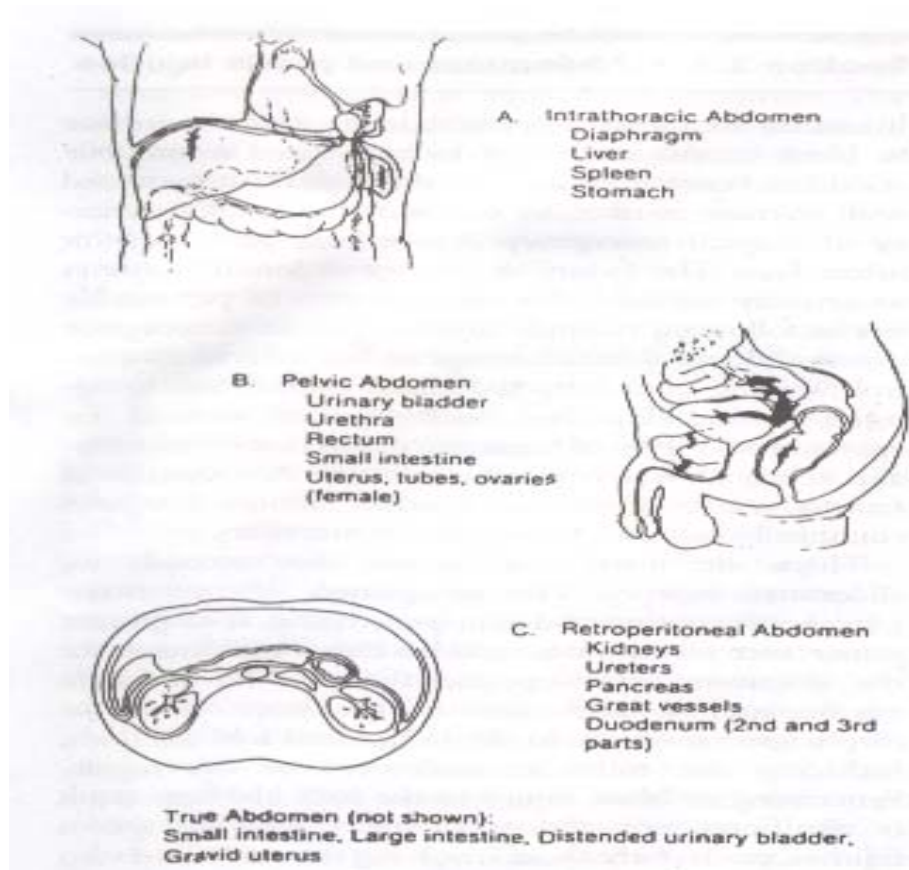
The pelvic abdomen lies in the hollow of the pelvis. It is surrounded on all sides by the bony pelvis and its contents include the rectum, bladder, urethra, small bowel, and in females, the uterus, fallopian tubes and ovaries. Trauma to the pelvis, particularly pelvic fractures, may damage the organs within, and penetrating injuries of the buttocks may injure any or all of the pelvic organs. Injury to these structures may lack physical findings and be difficult to diagnose. As such, suspected injuries to this area of the abdomen must be investigated using adjunctive procedures such as bladder catheterization, urethrocytography and sigmoidoscopy.

The retroperitoneal abdomen contains the kidneys, ureter, pancreas, second and third portion of the duodenum, the ascending and descending colon, and the great vessels, the aorta and vena cava. Injury to these structures may occur secondary to penetrating or blunt trauma as well. The kidneys may be damaged by injury to the lower ribs posteriorly, and crushing injuries to the front or sides of the trunk may damage any of these structures. As with the thoracic and pelvic abdomen, injury to these structures may result in few physical findings, and physical examination and peritoneal lavage may be of little or no help. Evaluation of the retroperitoneal abdomen requires utilization of radiographic procedures including intravenous pyelography, angiography and CT. In addition, serum amylase determinations may be helpful.

The true abdomen contains the small and large intestines, the bladder when distended, and uterus when gravid. Injuries to any of these organs are usually manifested by pain from peritonitis and are associated with abdominal findings. Peritoneal lavage is a useful adjunct when an injury is suspected and a plain abdominal film may be helpful when free air is present.

In summary, the abdomen consists of four distinct anatomical areas. Each of these must be suspected of sustaining injury and must be investigated systematically with knowledge of the limitations of physical examination, and the appropriate radiographic or diagnostic procedures that may reveal the diagnosis.

(Hoyt et al, 2002)



(Figure1-1) Contents of the abdomen.

(After Hoyt et al, 2002)

***Classification of injuries:**