Update in Management of Blunt Abdominal Trauma

Essay

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By

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AAST : American Association for the Surgery of Trauma.
ACTH : Adreno Cortico Trophic Hormone.
ACS : American College of Surgeons.
ADH : Anti Diuretic Hormone.
ANP : Atrial Natriuretic Peptide.
ARDS : Adult Respiratory Distress Syndrome.
ATLS : Advanced Trauma Life Support Program.
BAT : Blunt Abdominal Trauma.
CBD : Common Bile Duct.
CNS : Central Nervous System.
CRH : Cortisol Releasing Hormone.
CT : Computerized Tomography.
DL : Diagnostic Laparoscopy.
DPL : Diagnostic peritoneal Lavage.
ERCP : Endoscopic Retrograde Cholangio-Pancreatography.
FAST : Focused Assessment with Sonography for Trauma.
GSC : Glasgow Coma Scale.
HALS : Hand Assisted Laparoscopy Surgery.
IVU : Intravenous Uorography.
IL : Interleukin.
INF : Interferon.
MRCP : Magnetic Resonance Cholangio-Pancreatography.
MRI : Magnetic Resonance Image.
RTS : Revised Trauma Score.
TS : Trauma Score.
TSA : Total Serum Amylase.

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Dedication

To my family; my Father, my Mother, my Wife and my Daughter

Introduction

The incidence of abdominal trauma increases each year . Blunt abdominal trauma generally leads to higher mortality rates than penetrating wounds and presents greater problems in diagnosis ***(Luchett et al., 2007).***

20% of all trauma operations are performed for management of abdominal injury . 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 ***(Hoyt et al ., 2002)***.

Blunt trauma to the abdomen can cause severe injury especially to solid abdominal organs ***(Hann , et al ., 2005).***

Assessment of the abdomen for possible intra abdominal injury due to trauma is a common clinical challenge for surgeons and emergency medicine physicians . Physical findings may be unreliable because of altered patient consciousness and neurological deficit associated with head injury or spinal injury ***(Mc Kenney et al ., 1996).***

Advanced trauma life support (ATLS) system has provided a frame work and approach to acute trauma care and

allowing parallel or simultaneous treatment in the multiple injured patient by a coordinated team approach . This has increased the speed with which injuries are identified and treated , making the most use of the "golden hour " in order or improve survival and patient outcome ***(Zietlow . et al .,1994).***

A variety of tests are used to identify abdominal bleeding in blunt multi trauma patient including Focused Assessment with Sonography for Trauma (FAST) , computed sonography (CT) and diagnostic peritoneal lavage (DPL) ***(Miller et el ., 2003).***

Non- operative management may be up to 50% of isolated blunt liver injuries in Adults, and have a 50 – 80% success rate ***(Carrillo, et al., 1998)***.

Laparoscopy has been applied safely & effectively as a screening tool in stable patients with blunt abdominal trauma ***(Macho et al., 2003).***

Aim of the Work

The aim of this work is to discuss the advanced concepts in management of blunt abdominal trauma in order to improve prognosis and decreasing morbidity & mortality

Pathophysiology of Blunt Abdominal Trauma

Trauma is defined as injury that occurs to human tissues or organs when mechanical energy is transferred from the environment. Actual injury only occurs when this transfer of energy is beyond the body's resilience.

Trauma is the leading cause of death for all persons between the age of 1 and 44 years old. It is the third leading cause of death for all age groups combined in the United States.

Learning the principles of mechanisms of injury is important for healthcare providers as it helps with injury prediction the process of determining what injuries are likely to occur as a result of the applied forces. This in turn raises the index of suspicion for particular injury patterns (***Mackay et al., 1990)***.

Blunt injury to intra-abdominal structures can be caused by 2 primary mechanisms of injury, compression forces and declaration forces (***Sturdivan et al., 2004*)**.

Compression or concussive forces may result from direct blows or external compression against a fixed object (e.g. lap belt, spinal column). Most commonly, these crushing forces cause tears and subcapsular heamatomas to the solid viscers. These forces also may deform hollow organs and transiently increase intra-luminal pressure, resulting in rupture. This is a common mechanism of blunt trauma injury to the small bowel.

Deceleration forces cause stretching and linear shearing between relatively fixed and free objects. These longitudinal shearing forces tend to rupture supporting structures at the junction between free and fixed segments. Classic declaration injuries include hepatic tear along the ligamentum teres and initial injuries to the renal arteries. As bowel loops travel from their mesenteric attachments, thrombosis and mesenteric tears, with resultant splanchinic vessel injuries, can result ***(Sturdivan et al.,2004).***

Generally, the liver and spleen seem the most frequently injured organ, although reports vary. Small and large intestines are the next most injures organs, respectively. (***Sturdivan etal., 2004)***

Motor vehicle crashes are the source of the majority of BAT. The lap portion of seat belts frequently causes injury to the hollow organs, particularly small bowel, colon, and

abdominal wall. Liver and spleen injuries commonly occur in both head-on and lateral impact collisions.

Motorcyclists that have been ejected form their bike frequently sustain pelvic fractures and intra-abdominal trauma. Falls, assaults, and sporting incidents also produce a large unmber of blunt injuries. Firearms, stabbings, and injuries for other projectiles produce penetrating trauma. There is a higher mortality rate associated with multiple abdominal organ injuries that with single organ injuries (***Orlondo et al., 2003***).

Anatomical Consideration

Before dealing with, hollow organs injured in BAT, we must put in consideration the anatomical location of these organs ***(Hoyt et al., 2002)***..

In the practical point of view, the abdomen is divided into, Intrathoracic abdomen, True abdomen, Pelvic abdomen, 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.

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. Injury to these structures may lack physical findings and be difficulty to diagnose. As such, suspected injuries to

this area of the abdomen must be investigated using adjunctive procedures such as bladder catheterization, urethrocystography ***(Hoyt et al., 2002) .***

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. The kidney injuries may be due 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. Physical examination and peritoneal lavage may be of little or on 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 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)***