ABDOMINAL INJURY

The abdomen is a diagnostic black box.

The presence of abdominal rigidity or hemodynamic compromise is an indication for prompt surgical exploration.

Abdominal trauma may occur as a result of either blunt or penetrative injury.

Many patients have associated chest, skeletal and head injuries, and cooperation with all specialists involved is essential.

Assessment, and initial management, along the principles of the Advanced Trauma Life Support system (ATLS) is important, and should ensure that other relevant injuries are not overlooked.

Blunt trauma includes direct blows, crushing injuries, blast and deceleration forces.

The history of the mechanism of injury is important in predicting the likely pattern of internal damage.

Penetrating trauma includes knife and bullet wounds and, again, the pattern of damage varies with the object which has penetrated the abdomen.

In gunshot injuries, the velocity of a bullet is also important .

The abdominal cavity is most frequently breached from an external wound in the anterior abdominal wall, but entry into the peritoneal cavity and damage to intra- abdominal organs can also occur from penetrating wounds in the thorax, the loin, the buttock or the perineum.

The traditional teaching was that all penetrating trauma of the abdomen should be explored, whereas blunt injury could be observed and a laparotomy performed if there was any evidence of peritonitis or intraperitoneal bleeding.

The decision to proceed to laparotomy following abdominal trauma is based on clinical judgement, often supplemented by imaging and peritoneal lavage.

Some times Physical examination of the abdomen is unreliable in making this determination, and drugs, alcohol, and head and spinal cord injuries complicate clinical evaluation.

For this reason a variety of diagnostic adjuncts are used to identify abdominal injury.

The diagnostic approach differs for penetrating trauma and blunt abdominal trauma.

Minimal evaluation is required before laparotomy for gunshot or shotgun wounds that penetrate the peritoneal cavity, because over 90% of patients have significant internal injuries.

Anterior truncal gunshot wounds between the fourth intercostal space and the pubic symphysis whose trajectory as determined by radiograph or entrance and exit wounds indicates peritoneal penetration should be operatively explored ).

Gunshot wounds to the back or flank are more difficult to evaluate because of the retroperitoneal location of the injured abdominal organs.

Triple-contrast CT scan can delineate the trajectory of the bullet and identify peritoneal violation or retroperitoneal entry, but may miss specific injuries.

In obese patients, if the gunshot wound is thought to be tangential through the subcutaneous tissues, CT scan can delineate the track and exclude peritoneal violation.

Laparoscopy is another option to assess peritoneal penetration and is followed by laparotomy to repair injuries if found.

If there is doubt, it is always safer to explore the abdomen than to equivocate.

Which abdominal organs are most commonly injured?

How may suspected injuries be investigated?

• Focused abdominal sonar for trauma

FAST is a technique whereby ultrasound imaging is used to assess the torso for the presence of blood, either in the abdominal cavity or in the pericardium.

The purpose of the ultrasound evaluation of the injured casualty is to determine the presence of free Intra-abdominal or pericardial fluid.

The technique therefore focuses only on four areas:

pericardial;

splenic;

hepatic;

pelvic.

FAST is accurate for the detection of >100 ml of free blood;however, it is very operator and experience dependent and, especially if the patient is very obese or the bowel is full of gas, it maybe unreliable.

Hollow viscus injury is difficult to diagnose, even in experienced hands, with a low sensitivity for organ injury without haemoperitoneum.

FAST is unreliable for excluding injury in penetrating trauma.

If there is doubt, the FAST examination should be repeated.

• Computerised tomography

CT has become the ‘gold standard’ for the intra-abdominal diagnosis of injury in the stable patient.

The scan is performed using intravenous contrast and often oral contrast as well.

CT is sensitive for blood and has the added advantage of sensitivity for the diagnosis of retroperitoneal injury.

An entirely normal abdominal CT is usually sufficient to exclude injury.

If duodenal injury is suspected from the mechanism of injury,oral contrast may be helpful.

If rectal and distal colonic injury is suspected in the absence of blood on rectal examination, rectal contrast may be helpful.

• Diagnostic laparoscopy

Diagnostic laparoscopy (DL) is a valuable screening investigation in penetrating trauma to detect or exclude peritoneal penetration and/or diaphragmatic injury in stable patients following an abdominal or thoracoabdominal stab wound.

DL is not appropriate for use in the unstable patient.

Evidence of penetration requires a laparotomy to evaluate organ injury, as it is difficult to exclude all intra-abdominal injuries laparoscopically.

When used in this role DL reduces the non-therapeutic laparotomy rate.

DL is not a substitute for open laparotomy, especially in the presence of haemoperitoneum or contamination.

• Diagnostic Peritoneal Lavage (DPL)

Some of the indications are

;

ﰂ A suspicion of abdominal trauma on clinical examination

ﰂ Unexplained hypotension: with the abdomen being the source of occult haemorrhage

ﰂ Equivocal abdominal examination because of head injury and reduced level of consciousness

ﰂ The presence of a wound that has traversed the

abdominal wall, but there is no indication for immediate laparotomy, e.g. a stab wound in a stable patient

.

When is DPL contraindicated?

The most important contraindication for DPL is in the situation which calls for mandatory laparotomy, e.g. frank peritonitis following trauma, abdominal gunshot injury or a hypotensive patient with abdominal distension.

What are the positive criteria with DPL?

ﰂ Lavage fluid appears in the chest drain or urinary catheter

ﰂ Frank blood on entering the abdomen

ﰂ Presence of bile or faeces.

ﰂ Red cell count of >100,000/ml

ﰂ White cell count of >500/ml

ﰂ Amylase of >175 U/ml

Which incision?

The midline incision – bloodless, rapid, and easily extended – affords superior exposure and versatility;

it remains the classic“incision of indecision”when the site of the abdominal catastrophe is unknown and is the safest approach in trauma.

Incisions heal from side to side, not from end to end, but length does matter.

“The incision must be as long as necessary and as short as possible”.

Grading the Severity of Injury

;There are many available organ injury scale.

From the operating surgeon’s point of view there are essentially two patterns of visceral damage: “minor trouble” and “major trouble”.

 “Minor trouble” involves easily fixable injuries, either because the injured organ is accessible or the surgical solution is straightforward (e.g., splenectomy, suture of mesenteric bleeders, or a colon perforation).

There is no immediate danger of exsanguination or loss of surgical control.

Under these circumstances you can immediately proceed with definitive repair.

 “Major trouble”is when the spontaneous condition or injury is not easily rectified because of complexity or inaccessibility (e.g., a high-grade liver injury, a major retroperitoneal vascular injury in the supracolic compartment, or destruction of the pancreatoduodenal complex).

This is the appropriate time to seek more competent help, and to plan the operative attack, including additional exposure and mobilization.

Such preparations are crucial for the survival of your patient.