Trauma Intervention Guidance for Emergency Reference

T.I.G.E.R #10

Blunt Abdominal Injuries (Adult)

Blunt abdominal injury commonly occurs due to motor vehicle accidents, falls, or assaults. Clinicians should have a low threshold for imaging if the patient displays any signs or symptoms of abdominal injuries. Management depends on the severity of injuries and the stability of the patient. Minor injuries may be managed non-operatively with observation, while severe injuries, active bleeding, or signs of hollow organ perforation often require surgery.

It is expected that local, surgical consultant led advice has been sought prior to referral to The Royal London Major Trauma Centre. Ensure this is documented in the clinical notes accordingly (date, time and colleagues name and grade).

Situation

- Patients admitted to the Emergency Department following blunt injury to the abdomen.
- Clinicians trained in assessing blunt abdominal injury.
- General Surgery support is available.

Assessment

Blunt abdominal injuries can often be missed on clinical examination, especially in a polytrauma patient with distracting injuries. It is important to have a high index of suspicion for any polytrauma patient with torso injuries. Any patient with external signs of trauma, including seatbelt signs, should be evaluated fully for intra-abdominal injuries. All haemodynamically unstable patients should be assessed by the surgical registrar or consultant surgeon. Importantly, hollow viscus injuries can be missed on imaging, and patients should be assessed clinically for abdominal pain and signs of shock or peritonism. Patients with missed intra-abdominal injuries have high morbidity and mortality rates. Serial examination and observation may be required for this cohort.

Investigations

Focussed Assessment with Sonography in Trauma (FAST)...

- May be a helpful bedside assessment, especially for patients who may be too unwell to go for a CT scan.
- Evaluates for fluid in the hepatorenal, splenorenal, pelvis, and pericardiac space.
- Should be done by trained personnel with appropriate certification performing the assessment regularly.
- A negative FAST scan does not rule out an intra-abdominal injury (at least 250 mL of blood in the peritoneum is required to be visualised on FAST)
- A positive FAST signifies free fluid in the abdomen, which in the setting of trauma is blood until proven otherwise.
- FAST scan will not be able to identify retroperitoneal bleeding - major blood loss arising from any injury to inferior vena cava or aorta can be missed.

Computed Tomography (CT)

- CT of the abdomen and pelvis is the mainstay of blunt abdominal trauma assessment, especially in stable patients, as it is relatively fast, sensitive, specific, and easily accessible 24/7.
- Single-phase split-bolus contrast or multiphasic contrast-enhanced CT are both acceptable as initial imaging.
- CT can identify solid organ injuries, haemoperitoneum, free air, vascular, retroperitoneal, and musculoskeletal injuries, and detect any active bleeding from these injuries.
- Hollow viscus injuries may be missed on CT injury, and it is important to assess the patient clinically for signs of peritonism.
- Serial clinical examination, ideally by the same clinician, is important, as signs of peritonism may develop over a period of hours

Laboratory

- Blood tests such as haemoglobin, creatinine, liver function tests, lipase, inflammatory markers and coagulation profiles are helpful adjuncts to assess the presence and severity of intra-abdominal injury.
- In the case of pancreatic injury, the lipase level may be normal if measured early after the initial blunt trauma.

Indications for surgery

- Haemodynamically unstable patients with suspected abdominal trauma
- Haemodynamically unstable patients with positive FAST or free fluid on CT
- Clinical peritonitis
- Evidence of hollow viscus injury on imaging
- Free fluid (blood) in the abdomen without solid organ injury
- Evisceration

Solid Organ Injury

Solid organs within the abdomen, such as the spleen or liver, can be injured through blunt or penetrating trauma. The spleen is the most commonly injured solid organ.

Initial Management

The patient's haemodynamic status guides the Initial management of solid organ injuries. Immediate surgical care and resuscitation using damage control principles if indicated, is required if the patient is shocked. A FAST scan performed in the trauma bay may be useful to assess for free fluid and guide decision-making in shocked patients. In patients with acute haemorrhage from the liver, spleen and kidney who are too unstable to transfer to a Major Trauma Centre (MTC), immediate laparotomy in the Trauma Unit (TU) is required.

If the patient is not in shock, then most injuries to the liver, spleen and kidney can be managed without an operation. These patients need close haemodynamic monitoring in high-acuity areas, and serial clinical examinations are required. In patients at risk of rebleeding, haemoglobin levels should be monitored. If the patient becomes haemodynamically unstable or develops clinical signs of peritonitis, a change in management is needed. Serial observation is critical.

The appearance of injury on a CT scan guides non-operative management.

Discharge advice

All patients with severe solid organ abdominal trauma should avoid contact sports. For lower grade injuries (I-II) then 6 weeks is reasonable and for higher grade injuries 3-6 months duration after injury is recommended.

Splenic Injury

The severity of splenic injuries is graded from I to V, where grade I indicates a haematoma or a small laceration, and grade V indicates severe tissue and vascular injury with active bleeding.

Management

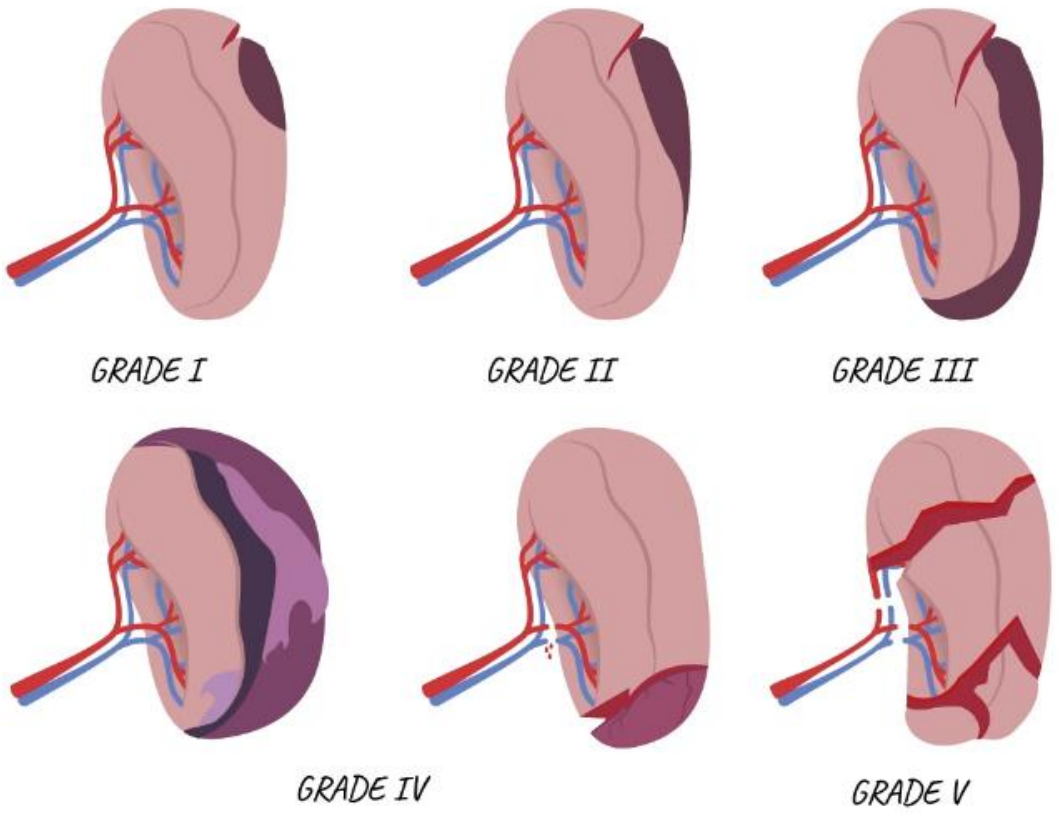
Patients with isolated grade I and II splenic injuries can be routinely managed in TUs with a period of observation for 24 to 48hrs with no need for further imaging unless the clinical picture changes.

Grade III to V injuries, or those with extravasation of contrast or a pseudoaneurysm are at risk of significant bleeding and may benefit from embolisation.

Some grade 5 injuries will benefit from urgent splenectomy. All grade III to V injuries should be discussed with the MTC.

If recovery is slower than expected or if there is increased pain or other clinical signs, re-imaging is recommended.

Figure 1. AAST Spleen Injury Scale



Liver Injury

The severity of the liver injury is graded from grades I to V, where grade I indicates haematoma or a small laceration and grade V is over 75% lobe disruption and significant venous injury.

Management

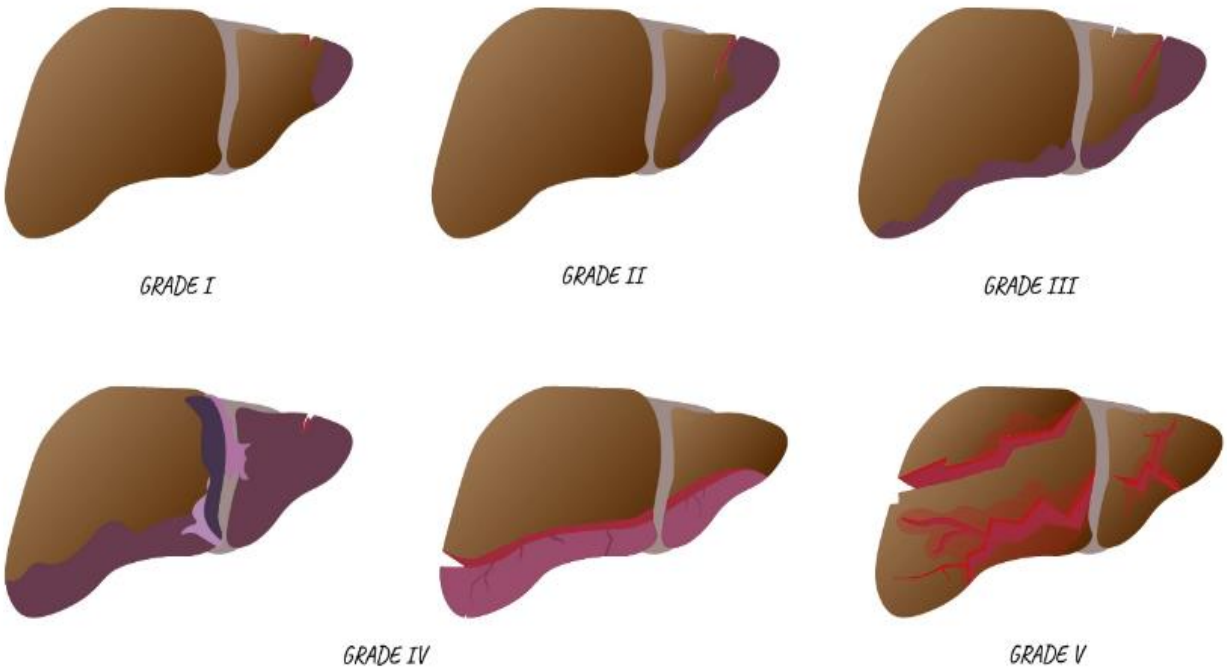
Grade I or II liver injuries without concerning features on CT can be observed safely at a TU with a period of observation for 24 to 48 hrs with no need for further imaging unless the clinical picture changes.

Patients with grade III or more injuries need to be monitored closely for signs of deterioration requiring operative intervention.

High-grade injury (III-V), or those with extravasation of contrast or a pseudoaneurysm may require interventional radiology and should be discussed with the MTC.

If recovery is slower than expected or if there is increased pain or other clinical signs, re-imaging is recommended.

Figure 2. AAST Liver Injury Scale



Kidney Injury

The severity of a kidney injury is graded from grades I to V, where grade I indicates haematoma or minor contusion and grade V is a shattered kidney or severe vascular injury.

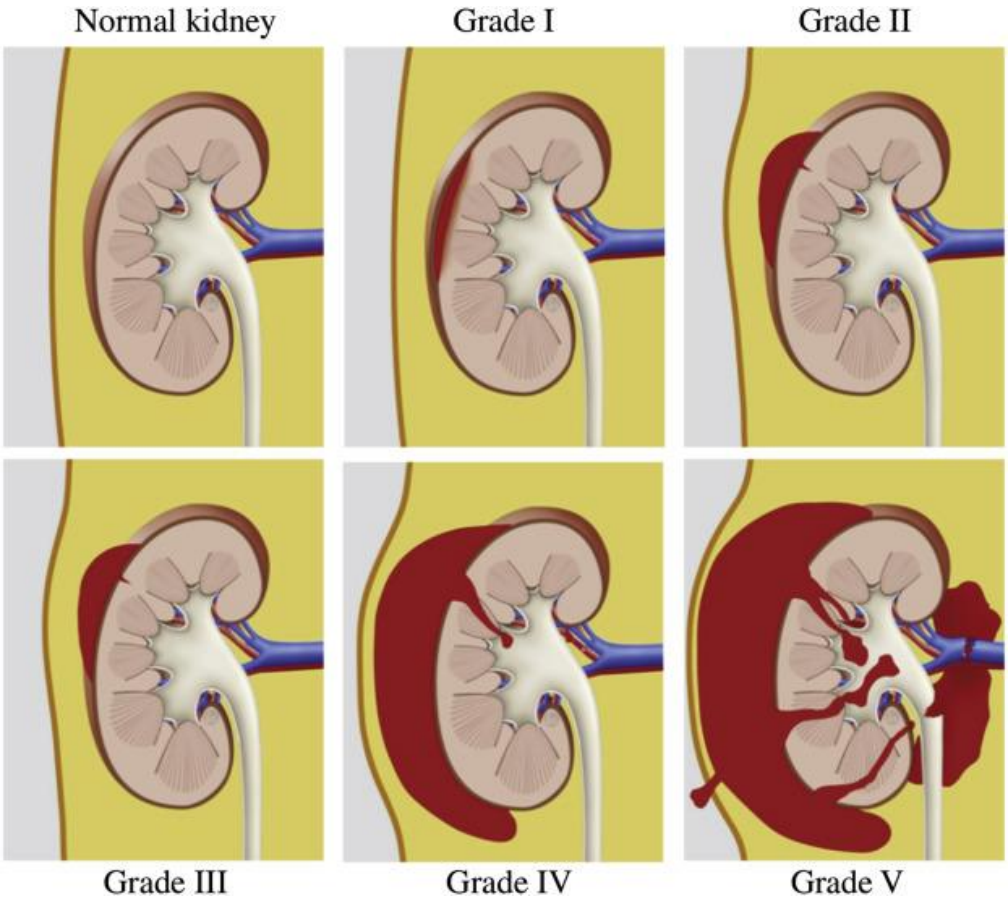
Management

Grade I or II liver injuries without concerning features on CT can be observed locally at a TU.

Patients with suspected grade III-V injuries should routinely have delayed imaging or a CT Intravenous Urogram (IVU) to rule out injury to the collecting system or urinary extravasation.

Grade I-III injuries require a period of observation for 24 to 48 hrs with no need for further imaging unless the clinical picture changes.

All grade IV and V injuries should be discussed with the MTC.



Hollow Viscus Injury

Early recognition of hollow viscus injury (HVI) is arguably the most critical factor influencing the success of treatment and serves as a key determinant of patient morbidity and mortality. Findings such as pneumoperitoneum, bowel wall thickening, fat stranding, mesenteric hematoma, or active contrast extravasation on CT scan should prompt serious consideration of hollow viscus injury.

Surgical intervention is required in most cases of HVI, and indications include:

- Signs of peritonitis
- Evidence of free air on imaging
- Haemodynamic instability with suspected abdominal injury
- Persistent abdominal pain or clinical deterioration in presence of radiological abnormality

The standard approach for suspected HVI is by trauma laparotomy, though laparoscopy may be considered in stable patients with minimal injury or uncertain injury.

Bowel and bladder must be carefully evaluated to rule out any injury or determine the full extent of injury during surgery.

Any delay in the recognition of HVI exponentially increases morbidity for the patient.

Rectal Injury

Assessment of Injury

Early suspicion of rectal injury should be raised by the presence of pelvic, perineal or gluteal injuries and/or blunt trauma with high-energy mechanism pelvic fractures.

Patients with suspected rectal injuries must undergo careful evaluation of the location and extent of injuries. Any patient with bladder injuries or gross haematuria should be evaluated for concomitant rectal injury =/- vaginal injury.

Bedside examination should include a digital rectal examination (DRE) to evaluate sphincter tone, presence of blood in the rectum, and any palpable defects.

CT scan may show extraperitoneal or intraperitoneal free air, haematoma or fat stranding around the rectum. Rectal contrast administration during initial CT scan is not routinely performed but in haemodynamically normal patients can aid diagnosis.

In absence of any clear signs of rectal injury on imaging and DRE, a rigid sigmoidoscopy may be useful to rule out any rectal injury. Examination under anaesthesia and diagnostic laparoscopy or laparotomy may be needed to evaluate the extent of injuries and whether there is any intraperitoneal extension of rectal injury.

Management

Management of rectal injury depends on the location (intraperitoneal or extraperitoneal), extent of injury and the patient's overall condition.

Patients who are haemodynamically unstable should proceed directly to the operating room for laparotomy. Intraperitoneal rectal injuries are managed as per colonic injuries and will generally require repair or resection of the injured rectum.

Extraperitoneal injuries account for 60-70% of rectal injuries and often require faecal diversion with a colostomy to prevent contamination, with or without repair of the injury. If the injury is accessible transanally, primary repair without faecal diversion may be attempted in selected patients with minimal contamination, healthy tissue and non-destructive injury. In cases where the injury is obscured or poorly visualised, proximal diversion is generally recommended.

Damage Control Surgery

Damage control surgery (DCS) in trauma is a staged surgical approach aimed at managing life-threatening injuries in critically injured patients with severe physiological derangements. Patients who arrive at TUs in extremis and are too unwell to transfer may need DCS at the TU. DCS must be paired with damage control resuscitation, prioritising correction of coagulopathy, hypothermia and acidosis.

DCS should be considered in patients with significant physiological derangements or those at risk:

- Haemorrhagic shock
- Severe coagulopathy
- Significant hypothermia
- Severe metabolic acidosis
- Complex polytrauma requiring prolonged surgical time

The primary goal in the initial surgery is to stabilise the patient by controlling haemorrhage and contamination and avoiding prolonged procedures to minimise physiological insult. Definitive surgery with anatomic reconstitution should be delayed until the patient stabilises.

Techniques in DCS:

- Pack and compress liver and pelvic bleeding to tamponade bleed (Extraperitoneal approach)
- Splenectomy or nephrectomy may be required for bleeding spleen or kidney injuries
- Significant distal pancreatic injury (pancreatic injury to the left of SMV) may require distal pancreatectomy +/- splenic preservation
- Pancreatic head and uncinate injuries may be drained
- Ligation of bleeding vessel
- Consider repair or temporary vascular shunt of vessels where ligation carries high mortality (aorta, SMA, portal vein and suprarenal IVC)
- Resect or primary repair of bowel injury, bowel may be left in discontinuity if resected, as anastomosis after resection is not necessary at the first procedure
- Abdomen may be temporarily closed with commercially available negative pressure systems (such as VAC or Renasys systems). An Opsite sandwich may be fashioned if large Ioban or Opsite sheets are available.

Remote peer support from the MTC major trauma surgeon is available 24/7 for intra-operative advice patients that require DCS at the TU.

All postoperative patients that have undergone DCS should be discussed with the MTC with a low threshold for transfer when the patient is stable.

All referrals into the Major Trauma Centre should come via
www.referapatient.org

Use the QR code for direct access.
There are 4 key *referapatient* workstreams. Please review carefully to ensure you refer to the correct clinical team.

for clinical emergencies call the MTC ED consultant on 020 3519 7165