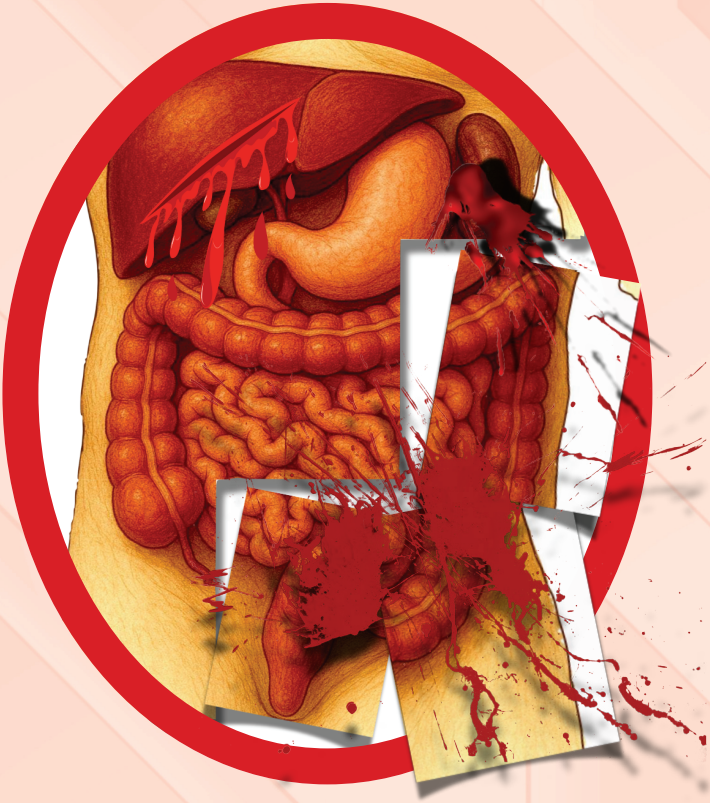
QUICK REFERENCE FOR HEALTHCARE PROVIDERS

MANAGEMENT OF ABDOMINAL TRAUMA IN ADULTS



Ministry of Health Malaysia

Trauma Surgery Society of Malaysia

Academy of Medicine of Malaysia

KEY MESSAGES

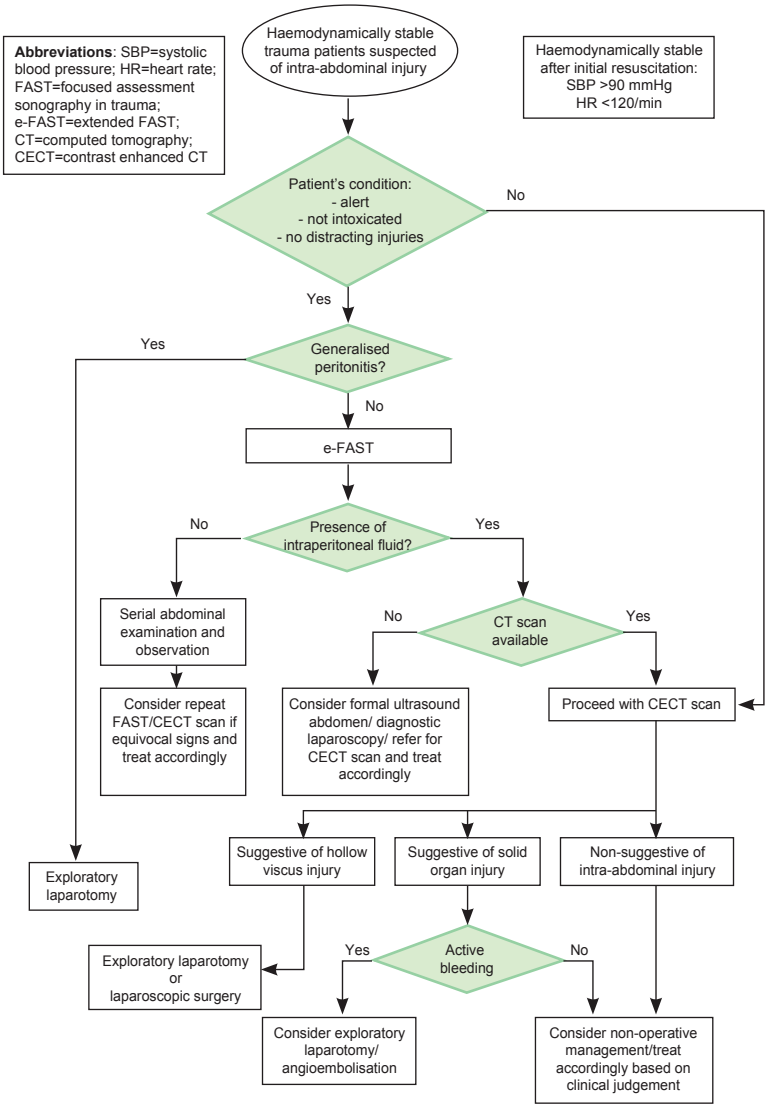
1. Intra-abdominal injury has been defined as injuries to the abdominal organs caused by trauma, which may be associated with injuries to the ribs, vertebrae, pelvis and abdominal wall.
2. All severely injured trauma patients should be transferred to the nearest appropriate hospital within 60 minutes from time of injury (trauma bypass system).
3. Resuscitation in abdominal trauma involves judicious fluid administration [initial fluid bolus not exceeding 1L (15ml/kg)] combined with early blood transfusion and timely haemostasis. Where available, massive transfusion protocol, should be activated early.
4. Polytrauma patients should be managed by a specialist-led multidisciplinary trauma team and it should be initiated promptly upon patient's arrival at the hospital.
5. In trauma, combination of clinical assessment, which includes mechanism of injury and physical findings, with adjuncts such as e-FAST, chest x-ray and pelvic x-ray are paramount to diagnose intra-abdominal injury and guide further management.
6. Management is based on haemodynamic status:
   a. Haemodynamically stable patients warrant further diagnostic modalities such as CECT scan or diagnostic laparoscopy
   b. Haemodynamically unstable bleeding patients unresponsive to resuscitation require immediate haemostatic surgical intervention via damage control surgery.
7. Non-operative management in abdominal trauma should only be considered in centres with 24-hours availability of surgical services, operating theatres, intensive care units and other supporting resources. Patients should be closely monitored for clinical deterioration (e.g. haemodynamic instability and peritonitis) which warrants urgent intervention.
8. In abdominal trauma patients without active bleeding or other contraindications, venous thromboembolism (VTE) prophylaxis should be initiated within 48 hours.
9. All abdominal trauma patients at risk of developing abdominal compartment syndromes should be identified early and monitored closely. Management strategies for intra-abdominal hypertension (IAH) should be individualised based on cause and severity of IAH.
10. If the initial health facility is unable to provide the patient the required trauma care, a timely referral to an appropriate facility should be made.

This Quick Reference provides key messages & a summary of the main recommendations in the Clinical Practice Guidelines (CPG) Management of Abdominal Trauma in Adults.

Details of the evidence supporting these recommendations can be found in the above CPG, available on the following websites:
Ministry of Health Malaysia: www.moh.gov.my
Academy of Medicine Malaysia: www.acadmed.org.my
MaHTAS: https://mymahtas.moh.gov.my
Trauma Surgery Society of Malaysia: https://www.traumasurgerymalaysia.org/

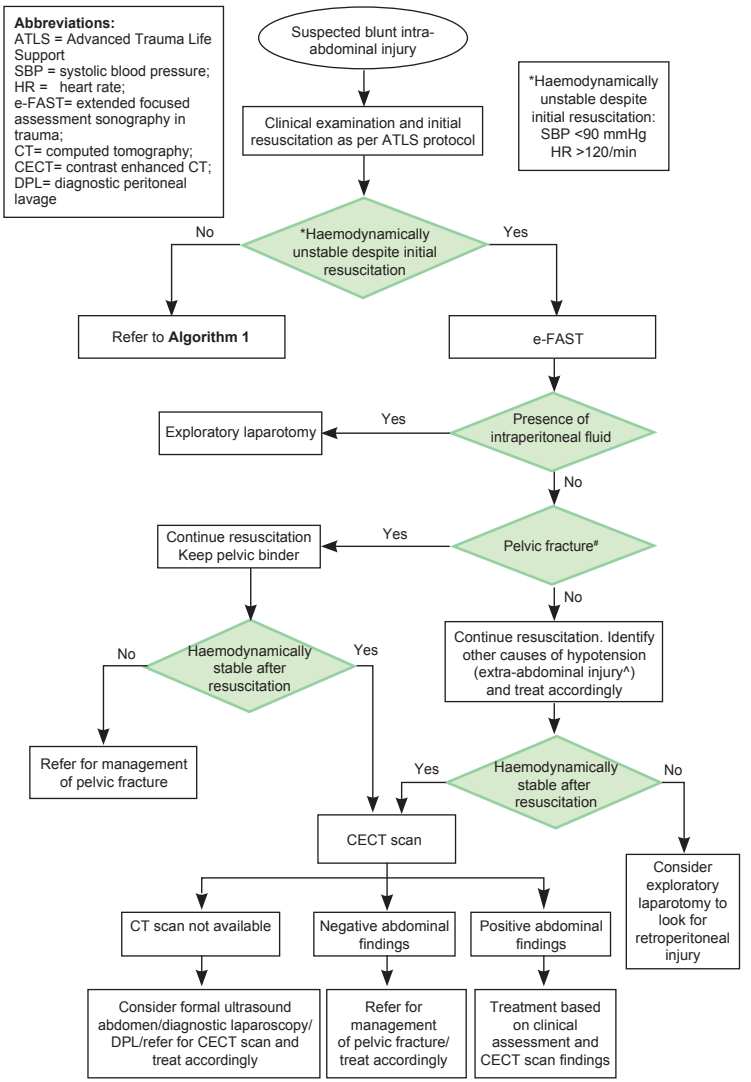
CLINICAL PRACTICE GUIDELINES SECRETARIAT
Malaysian Health Technology Assessment Section (MaHTAS)
Medical Development Division, Ministry of Health Malaysia
Level 4, Block E1, Presint 1,
Federal Government Administrative Centre 62590
Putrajaya, Malaysia
Tel: 603-88831229
E-mail: htamalaysia@moh.gov.my

MANAGEMENT OF HAEMODYNAMICALLY STABLE ABDOMINAL TRAUMA PATIENTS



Note: Complete assessment should be repeated regularly when managing a patient with suspected intra-abdominal injury especially when there is a change in haemodynamic status.

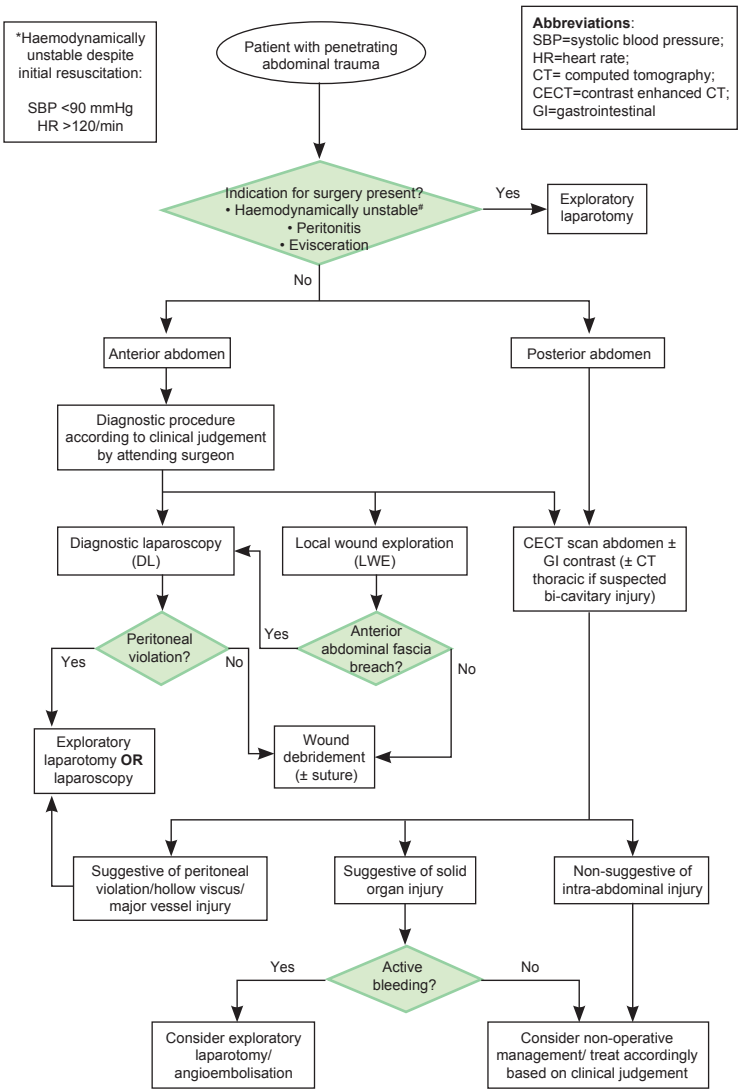
MANAGEMENT OF HAEMODYNAMICALLY UNSTABLE ABDOMINAL TRAUMA PATIENTS



#Diagnosis of pelvic fracture should be based on primary survey imaging
^extra-abdominal injury e.g. extremities/thoracic/spine injuries

Note: Complete assessment should be repeated regularly when managing a patient with suspected intra-abdominal injury especially when there is a change in haemodynamic status.

MANAGEMENT OF PENETRATING ABDOMINAL TRAUMA



Note: Impaled/embedded object to be removed with precaution in operation theatre/controlled environment

PRE-HOSPITAL CARE AND TRANSFER

During the prehospital phase of trauma patient management, it is important to recognise presence of severe injuries to ensure early initiation of life support interventions (e.g oxygen and fluid therapy) and rapid transportation to the most appropriate center with pre-arrival notification. In a patient with haemorrhage (or suspected haemorrhage) TXA should be administered en route to hospital.

EARLY ASSESSMENT AND RESUSCITATION

During primary survey, cervical spine protection is maintained with the use of cervical collar and pelvic binder is applied in patients where pelvic fracture is suspected.

Based on the Malaysian Triage Scale (MTS) for Emergency and Trauma Departments the following are levels of triaging which can be used as a guide in abdominal trauma patients.

Level of Triage	Parameters associated with Chest/ Abdominal Trauma	
Level 1: Resuscitation	• Agonal breathing • Pulseless	• Unrecordable BP • Shock index ≥1.4
Level 2: Emergency	• Penetrating injury • High velocity mechanism of injury	• Respiratory distress • SpO_2 <95% • Shock index ≥1.0 to <1.4
Level 3: Urgency	• Likely rib fractures • Possibility of pelvic injury	• Significant external bruising • Shock index ≥0.6 to <1.0
Level 4: Early Care	• Elderly • Anticoagulant use	• Pregnancy • Shock index <0.6
Level 5: Routine	• Mild symptoms	

CLINICAL DIAGNOSIS

A focused history provides valuable information, especially in cases of blunt abdominal trauma (BAT). Evaluating the mechanism of injury is crucial as certain scenarios, e.g. high-speed motor vehicle collisions, falls from height, direct abdominal trauma and penetrating injuries (e.g. gunshots or stab wounds), are highly associated with intra-abdominal injury.

Physical examination findings to look for are abdominal tenderness, guarding, rigidity, distension or external signs of trauma (e.g. bruising or abrasions including the “seatbelt sign”). The absence of abdominal pain or tenderness does not rule out serious injury, as symptoms may develop several hours after the initial trauma. Therefore, repeated assessment and timely imaging are essential.

- Seatbelt signs is associated with intra-abdominal injury and has become an important clinical factor in assessing blunt abdominal trauma related to road traffic accidents.

SIGNS AND SYMPTOMS OF HAEMORRHAGE BY CLASS

Parameters	Class I	Class II	Class III	Class IV
Approximate blood loss	<15%	15 to 30%	31 to 40%	>40%
Pulse rate	↔	↔/↑	↑	↑/↑↑
Blood pressure	↔	↔	↔/↓	↓
Pulse pressure	↔	↓	↓	↓
Respiratory rate	↔	↔	↔/↑	↑
Urine output	↔	↔	↓	↓↓
GCS Score	↔	↔	↓	↓
Base deficit*	0 to -2 mEq/L	-2 to -6 mEq/L	-6 to -10 mEq/L	≤ -10 mEq/L
Need for blood products	Monitor	Possible	Yes	Massive Transfusion Protocol

*a Base excess is the quantity of base ($HCO3–$, in mEq/L) that is above or below the normal range in the body. A negative number is called a base deficit and indicates metabolic acidosis.
Abbreviations: GCS=Glasgow Coma Scale; ↔=normal; ↑=increase, ↑↑=marked increase, ↓ =decrease, ↓↓=marked decrease

IMAGING

- In intra-abdominal injury patients, e-FAST is only used for detection of free fluid.
- A negative initial e-FAST does not completely exclude the possibility of intra-abdominal injury, hence it should be repeated together with regular clinical assessment.

- All abdominal trauma patients undergoing computed tomography scan should have at least arterial and portovenous phases which can be obtained by either multiphasic or split-bolus protocol.

Patients who fulfill at least two criteria from any two of the three categories may be considered for WBCT as shown below.

CRITERIA TO CONSIDER FOR WBCT

Physiological	Anatomical	Mechanism
• GCS ≤13 or abnormal pupillary reaction • SBP <100 mmHg • Pulse rate <50 or >120 beats per minute • Respiratory rate <10 or >29 breaths per minute • Oxygen saturation <90% on air • Estimated exterior blood loss ≥500 ml	• Visible injury to >1 body part involving head, neck, chest, abdomen and pelvis (exclude extremity) • Flail chest, open chest or multiple rib fractures • Positive FAST scan • Suspected unstable pelvic fracture • Vertebral fractures/spinal cord compression	• Fall from a height (>4 m) • Wedged or trapped chest/abdomen • Ejection, rollover or death of passenger in same vehicle • Pedestrian, cyclist or motorcyclist hit by moving vehicle • Explosion

PRINCIPLES OF MANAGEMENT

- The principles of management in abdominal trauma are:
  - systematic and timely assessment of injuries
  - resuscitation and stabilisation of the patient
  - control of haemorrhage and/or contamination
  - prevention of secondary injuries

OPERATIVE MANAGEMENT

- Unstable abdominal trauma can be caused by major intra-abdominal bleeding from solid organs or abdominal vascular injury and peritonitis secondary to contamination following hollow viscus perforation. This group of trauma patients requires immediate arrangement for emergency laparotomy to arrest the bleeding or clear and clean the contamination.
- Immediate surgery, e.g. damage control surgery (DCS), is indicated if the patient remains unstable despite initial resuscitation.
- DO NOT perform CT scan in persistently unstable patients as it may delay definitive surgical intervention.

NON-OPERATIVE MANAGEMENT

The CPG DG opines the following guide should be referred when considering NOM.

Non-Operative Management Guide in Abdominal Trauma

Prerequisites

1. Resources
   a. 24-hour access to surgeon, operation theatre, ICU care, CT scan and continuous monitoring capability
   b. Care of patients undergoing NOM should be led by a surgeon
2. Patient factor
   a. haemodynamically stable
   b. no peritonitis
3. Injury factor
   a. Full extent and severity of injuries determined by CECT scan
   b. In polytrauma patients, treatment plan should take into account the severity of extra-abdominal injuries such as TBI, chest and extremity injuries, rather than addressing abdominal injuries in isolation.

Monitoring

1. Parameters to monitor
   a. Vital signs (BP, PR, RR, SpO_2, Temperature, pain score) and GCS
   b. Fluid balance and urine output
   c. Clinical parameters e.g. presence of peritonitis
   d. Blood results e.g. blood gases analysis, Hb level, coagulation profile, RP, LFT
2. Complications – clinically or by re-imaging

Deciding factors for termination of NOM

1. Deterioration in patient's haemodynamic status
2. Onset of peritonitis
3. Increased requirement of blood transfusion suggestive of active bleeding
4. Radiological evidence of complications on reimaging (e.g. bleeding, hollow viscus perforation)

Note: Special population- e.g. geriatric, obese, pregnancy, comorbidities, polypharmacy; will have unique characteristics which may affect interpretation of findings