

#### Resuscitation phase:

- continues throughout primary and secondary survey and until treatments are complete
- fluids are required to sustain intravascular volume, tissue and organ perfusion and urine output
- administer blood for hypovolaemia that is unresponsive to crystalloid boluses
- end points are normal vital signs, absence of blood loss, adequate urine output and no evidence of end organ dysfunction; blood lactate and base deficit on an ABG may be helpful in patients who are severely injured

#### Secondary survey:

- identify all injuries by a head to toe examination
- exclude FATAL TRAUMA
- Flail chest
- Airway compromise
- Tamponade
- Air leaks
- Lung contusion
- Tracheal injury
- Ruptured diaphragm
- Aortic disruption
- Unseen haemorrhage
- Myocardial injury
- Any neurological abnormality
- if the patient is awake collect critical data including AMPLE

### resuscitation & comprehensive assessment

#### trauma series:

- CXR identifies haemothorax, pneumothorax and pulmonary contusion
- AP pelvis can confirm presence of significant pelvic fracture
- lateral c-spine can identify non-survivable neck injury

#### FAST:

- used solely to identify free fluid in the peritoneal cavity

#### CT scan:

- CT brain for neurological injury
- CT neck for neck injury
- CT chest, abdo, pelvis using oral and iv contrast to identify injuries to solid organs and pelvic and retroperitoneal bleeding
- CT aortogram

#### Spine X-rays:

- if likelihood of spinal injury is low then imaging can be deferred until resuscitation phase is well underway
- lateral c-spine helps identify 85% of c-spine fractures

### imaging and laboratory studies

#### Angiography:

- can be both diagnostic and therapeutic
- commonest indications are:
  - (i) suspected aortic injury
  - (ii) pelvic or retroperitoneal bleeding
  - (ii) organ specific embolisation

#### lab studies:

- (i) X-match
- (ii) ABG
- (iii) baseline Hb
- (iv) urine dipstick for haematuria
- (v) electrolytes, coags, cell counts

#### Burns:

- extensive lavage of area of chemical burns is required to stop further burning
- escharotomies may be required for full thickness burns of chest or extremities
- early intubation is required for suspected airway burns or inhalational injury
- patients with large burns require large volumes of crystalloid which need to be administered early

#### Cold injuries:

- dominant imperative is rapid rewarming with warm iv fluids

### special situations

#### High voltage electricity:

- most tissue injury will not be evident on physical examination
- massive myonecrosis and damage to soft and bone may be concealed under normal skin
- need low threshold for measuring compartment pressures and careful monitoring of urine for myoglobinuria
- provide direct cardiac monitoring to look for direct injury or arrhythmia secondary to hyperkalaemia

## principles of trauma assessment

### definition

objectives of initial evaluation of the trauma patient are:

- (i) stabilisation of the trauma patient
- (ii) identification of life-threatening injuries and initiation of adequate supportive therapy
- (iii) efficient and rapid definitive therapy

in trauma centres a team of providers evaluates patients who are critically injured and simultaneously performs diagnostic procedures (this parallel processing approach can dramatically reduce the time to assess and stabilise the patient with multiple injuries)

key elements are:

1. primary survey
2. resuscitative phase
3. secondary survey
4. definitive therapy

#### General:

- involves protocol of primary survey, resuscitation, secondary survey and either definitive treatment or transfer to an appropriate trauma centre for definitive care (ATLS system)
- absolute diagnostic certainty is not required to treat critical conditions identified early in the process and where resources are limited subsequent steps should not be performed until life-threatening conditions in the earlier steps are addressed

#### Primary survey:

- (i) Airway (ability of air to pass unobstructed to the lungs):

critical findings include:

- obstruction of the airway due to direct injury, oedema, foreign body or inability to protect the airway because of depressed level of consciousness

key treatment is:

- establishment of airway

- (ii) Breathing (ability to ventilate and oxygenate):

key clinical findings are:

- absence of spontaneous ventilation, absent or asymmetrical breath sounds, dyspnoea hyperresonance, dullness, gross chest wall instability or defects that compromise ventilation

key conditions to identify are:

- pneumothorax, endotracheal tube malposition, tension pneumothorax, haemothorax, sucking chest wounds, flail chest

key treatment is:

- chest tube

- (iii) Circulation:

key clinical findings are:

- collapsed or distended neck veins, signs or tamponade, external sites of haemorrhage

key conditions identified are:

- hypovolaemia, cardiac tamponade, external haemorrhage

key treatment is:

- iv access, fluid resuscitation, compression of sites of bleeding

- (iv) Disability:

key clinical conditions are:

- decreased level of consciousness, pupillary asymmetry, gross weakness

key conditions identified are:

- serious head and spinal cord injury

key treatment is:

- definitive airway if indicated, emergency treatment of raised icp

- (v) Exposure and control of immediate environment:

- expose patient and prevent hypothermia

Other procedures:

several monitoring and diagnostic adjuncts occur in concert with the primary survey:

- (i) ECG and ventilatory monitoring and continuous pulse oximetry
- (ii) decompress stomach with NG or OG tube once airway is secured
- (iii) insert a foley catheter during resuscitation phase (foley catheter placement is contraindicated if urethral injury is evident as identified by blood at the meatus, ecchymosis or scrotum or labium majora or high riding prostate - retrograde urethrogram is required for these patients)