A NEET SS (SURGERY) PREPARATION COURSE
BY MARROW, WITH A TEAM OF SELECTED
SUPER-SPECIALITY FACULTY

SURGERY NEET SS

HIGH YIELD

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NEET SS SURGERY HIGH YIELD TOPICS

CONTENT

TRAUMA 1

Basics of trauma management 00:00:31

Pre hospital care :

Information from driver/responder :

M : mechanism.

I : Injuries.

S : Signs & symptoms.

T : treatment given.

Information from Patient :

A : Allergies.

M : Medications.

P : Past history.

L : Last meal.

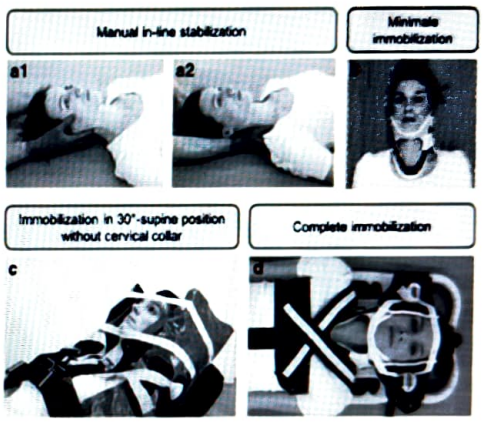
E : Events leading to trauma.

Helmet removal :

- 2 people required.
- One person stabilizes the cervical spine.

Transportation of patient :

- Supine position.
- Prone position.
- Never transported in lateral position (cannot maintain cervical spine).



Cervical spine immobilization.

Trimodal distribution of mortality in trauma :

1st spike (At impact) : Severe head injury.

and peak (within 1 hour) d/t :

1. Airway obstruction.
2. Tracheobronchial injury.
3. Open pneumothorax.
4. Tension pneumothorax.
5. Acute circulatory arrest.
6. Haemothorax.
7. Cardiac tamponade.

First hour following trauma : Golden hour.

Delayed causes (days/weeks) : Delayed head injury and sepsis.

Triage :

means "to sort out".

Internationally accepted 4 color coded system :

- Red : Highest priority.
- Yellow : medium priority (fractures).
- Green : Walking wounded.
- Black : Dead/moribund.

Priority group			Description
Number	Name	Color	
P1	Emergency/ immediate	Red	Patients who have life-threatening injuries that are treatable with a minimum amount of time, personnel, and supplies. These patients also have a good chance of recovery.
P2	Urgent	Yellow	Indicates that treatment may be delayed for a limited period of time without significant mortality or in the ICU setting patients for whom life support may or may not change their outcome given the severity of their illness.
P3	Delayed	Green	Patients with minor injuries whose treatment may be delayed until the patients in the other categories have been dealt with or patients who do not require ICU admission for the provision of life support.
P4	Expectant	Blue	Patients who have injuries requiring extensive treatment that exceeds the medical resources available in the situation or for whom life support is considered futile.
-	Dead	Black	Patients who are in cardiac arrest and for which resuscitation efforts are not going to be provided.

Advanced trauma life support 00:04:25

Primary survey : ABCD + life threatening injuries.

Secondary survey : Detailed survey to look for all the other injuries.

Note : In basic life support, CAB sequence is followed.

Primary survery :

Airway :

- Cervical spine f/b airway.
- Assessment of cervical spine : Nexus criteria.
- Any 1 criteria present → imaging and cervical spine stabilisation using philadelphia collar.
- Life threatening injuries ruled out.

Airway
- Airway Obstruction
- Tracheobronchial Tree Injury

Breathing
- Tension Pneumothorax
- Open Pneumothorax

Circulation
- Massive Hemothorax
- Cardiac Tamponade
- Traumatic Circulatory Arrest

Life threatening injuries.

Danger signs present :

- GCS ≤ 8.
- Coma.
- Unable to speak.
- Non purposeful movements.

Secure airway :
Orotracheal intubation.

If fails

Emergency airway :
Needle cricothyroidotomy
Good for 20 to 30 minutes.
C/I : <12 years of age
(Subglottic stenosis).

Definitive airway :
Tracheostomy.

Sometimes nasotracheal intubation is done.
C/I : Anterior skull base#

National Emergency X-Radiography Utilization Study (NEXUS) Criteria

Meets ALL low-risk criteria?
1. No posterior midline cervical-spine tenderness
and
2. No evidence of intoxication
and
3. A normal level of alertness
and
4. No focal neurologic deficit
and
5. No painful distracting injuries

Yes → No Radiography
No → Radiography

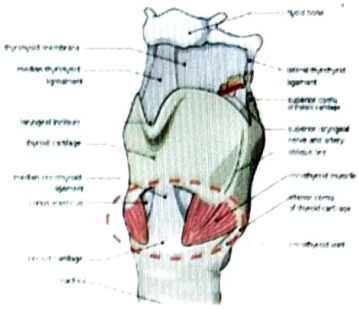
NEXUS Mnemonic
N - **N**euro deficit
E - **E**tOH (alcohol)/intoxication
X - e**X**treme distracting injury(ies)
U - **U**nable to provide history (altered level of consciousness)
S - **S**pinal tenderness (midline)

Fracture	Description	Typical management
C1 Jefferson #	Disruption of C1 ring. (blow out #)	Stable : Hard collar. Unstable : Surgery/ traction.
Odontoid #	Type I : Tip of odontoid. Type II : Through base. Type III : Involves C2 body.	Hard collar. Halo vest/surgery. Halo vest.
C2 hangman #	B/l C2 pedicles with spondylolisthesis.	Halo vest/surgery.
Cervical V.body #	Compression/burst of vertebral body (V.body) with/without retropulsion into canal.	Hard collar/surgical stabilisation.
Thoracic V.body #		Anterior column only : TLSO. Anterior and posterior columns : Surgical stabilisation.
Lumbar V.body #		
Chance #	Avulsion of posterior elements of lumbar vertebrae (high seat belt use)	Surgical stabilisation.

: Fracture.

Video laryngoscope.

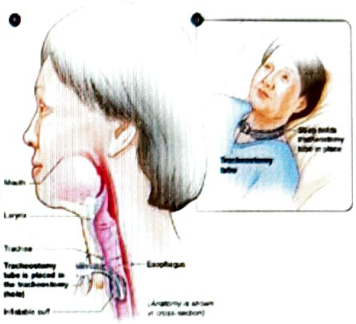
Laryngeal mask airway : Technically easier.



Cricothyroidectomy area.

Breathing :

- Chest examination .
- Pulse oximetry.
- Chest x ray, pelvic x ray & cervical x ray.
- eFAST scan



Tracheostomy.

Circulation :

Minimum 2 18 G (green) i/v lines

↓

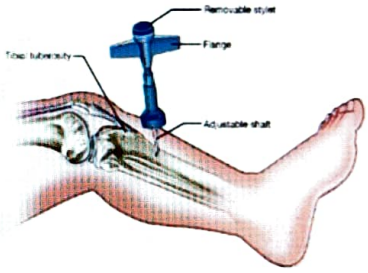
1 litre of fast fluid :

- Responders.
- Non responders.
- Transient responders.

↙ ↘

If i/v line is not possible : venous cut down in great saphenous vein/ intraosseous infusion.

Definitive intervention : Central venous line in internal jugular vein.



Interosseous infusion.

ATLS 10th edition update :

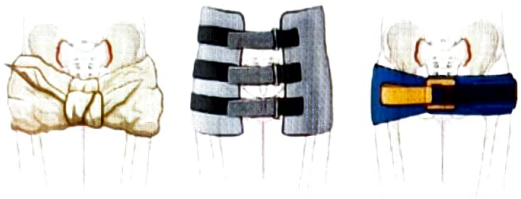
- A bolus of isotonic solution 1 L in adults and 20 mL/kg in pediatrics < 40 kg is administered : Judicious fluid therapy.
- Aggressive resuscitation before control of bleeding has been demonstrated to increase mortality and morbidity.

CRASH 2 trial : Role of tranexamic acid

- If SBP < 90 mm Hg and/or HR > 110/min,
- Give tranexamic acid : 1 g over 10 min, 1 g over 8 hours.
- Mortality is reduced.

REBOA :

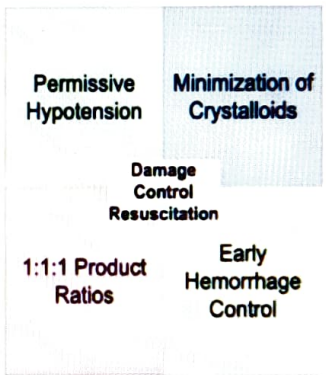
- Resuscitative endovascular balloon occlusion of aorta (REBOA).
- Temporary hemorrhage control in decompensated trauma patients
- Introduced through common femoral artery, advanced proximal to level of injury and then inflated.
- Helps in reducing bleeding and shunting the blood to heart and brain.



Pelvic binder in case of suspected pelvic #.

Damage control resuscitation :

- Permissive hypotension : SBP at lower limit of normal.
- minimisation of crytsalloids : to prevent dilutional coagulopathy.
- Blood products PRBCs/platelets/plasma ratio : 1 : 1 : 1.
- Early hemorrhage control.



Glagow coma scale :

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously To speech To pain No response	4 3 2 1
Best verbal response	Oriented to time, place, and person Confused Inappropriate words Incomprehensible sounds No response	5 4 3 2 1
Best motor response	Obeys commands Moves to localized pain Flexion withdrawal from pain Abnormal flexion (decorticate) Abnormal extension (decerebrate) No response	6 5 4 3 2 1

Single best score : motor score.

Always consider the highest response in GCS.

NT : Non testable.

Eye opening

Criterion	Observed	Rating	Score
Open before stimulus	☑	Spontaneous	4
After spoken or shouted request	☑	To sound	3
After finger tip stimulus	☑	To pressure	2
No opening at any time, no interfering factor	☑	None	1
Closed by local factor	☑	Non testable	NT

Verbal response

Criterion	Observed	Rating	Score
Correctly gives name, place and date	☑	Orientated	5
Not orientated but communication coherently	☑	Confused	4
Intelligible single words	☑	Words	3
Only moans / groans	☑	Sounds	2
No audible response, no interfering factor	☑	None	1
Factor interferring with communication	☑	Non testable	NT

Best motor response

Criterion	Observed	Rating	Score
Obey 2-part request	☑	Obeys commands	6
Brings hand above clavicle to stimulus on head neck	☑	Localising	5
Bends arm at elbow rapidly but features not predominantly abnormal	☑	Normal flexion	4
Bends arm at elbow, features clearly predominantly abnormal	☑	Abnormal flexion	3
Extends arm at elbow	☑	Extension	2
No movement in arms / legs, no interfering factor	☑	None	1
Paralysed or other limiting factor	☑	Non testable	NT

Pupils Unreactive to Light	Pupil Reactivity Score
Both Pupils	2
One Pupil	1
Neither Pupil	0

The GCS-P is calculated by subtracting the Pupil Reactivity Score (PRS) from the Glasgow Coma Scale (GCS) total score:

GCS-P = GCS - PRS

- GCS score :
  mild head injury : 13 to 5.
- moderate head injury : 9 to 12.
- Severe head injury : 8 or less, needs intubation.

Log roll :

Technique to examine back of a trauma patient.

Minimum 4 people are required.

Revised trauma score

Glasgow coma scale	Systolic blood pressure (mmHg)	Respiratory rate	Coded value
13 - 15	> 89	10 - 29	4
9 - 12	76 - 89	> 29	3
6 - 8	50 - 75	6 - 9	2
4 - 5	1 - 49	1 - 5	1
3	0	0	0

Mangled Extremity Severity Score (MESS)

Type	Characteristics	Injuries	Points
1	Low energy	Stab wound, simple closed fx, small-caliber GSW	1
2	Medium energy	Open/multilevel fx, dislocation, moderate crush	2
3	High energy	shotgun, high-velocity GSW	3
4	Massive crush	Logging, railroad, oil rig accidents	4
Shock group			
1	Normotensive	BP stable	0
2	Transiently hypotensive	BP unstable in field but responsive to fluid	1
3	Prolonged hypotension	SBP <90mmHg in field and responsive to IV fluids in OR	2
Ischemia Group			
1	None	Pulsatile, no signs of ischemia	1
2	Mild	Diminished pulses without signs of ischemia	2
3	Moderate	No dopplerable pulse, sluggish cap refill, paresthesia, diminished motor activity	3
4	Advanced	Pulseless, cool, paralyzed, numb without cap refill	4
Age Group			
1	<30y/o		0
2	> 30 <50		1

MESS score: six or less consistent with a salvageable limb. Seven or greater amputation generally the eventual result.

Abdominal trauma

00:18:36

m/c organ injured overall : Spleen.

m/c organ injured in blunt trauma : Spleen.

m/c organ injured in penetrating trauma : Liver> small intestine.

m/c organ injured in gun shot wound : Small intestine.

m/c organ injured in seat belt syndrome : mesentery.

Deceleration injury : Duodenojejunal flexure.

Blunt trauma abdomen.

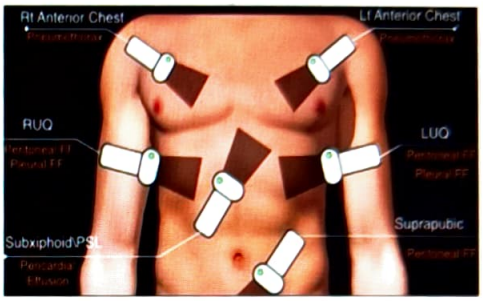
- Hemodynamically stable.
  - 1st investigation : FAST.
  - IOC : CECT.
- Hemodynamically unstable.
  - 1st investigation : FAST.
  - IOC : FAST.

FAST (Focussed Assessment Sonogram in Trauma) :

Ultrasound done in emergency.

4 probes :

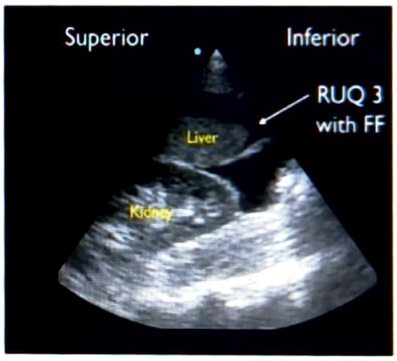
1. Epigastrium : To look for cardiac tamponade.
2. Right hypochondrium.
3. Left hypochondrium.
4. Suprapubic region : To look into pelvis.



eFAST : FAST + Thoracic cavity.

Utilisation of eFAST :

- Detects free fluid in the abdomen or pericardium.
- Not reliable to detect < 100 cc of free blood.
- Does not directly identify injury to hollow viscus.
- Cannot reliably exclude injury in penetrating trauma.

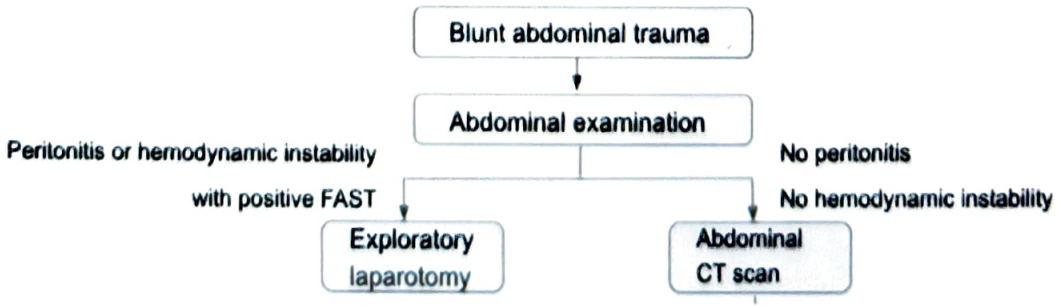


FAST positive : Hypoechoic collection present.

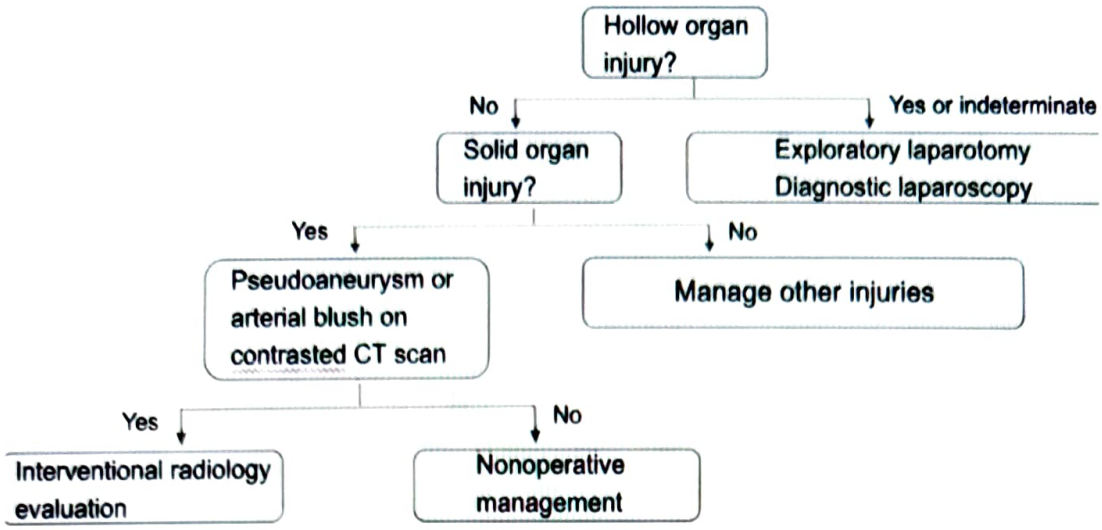
- may need repeating or supplementing with other investigations.
- Unreliable for assessment of retroperitoneum (Obscured by bowel gases).

Note : If FAST is positive, do midline laparotomy.

Algorithm for work up of blunt trauma abdomen :



In Abdominal CT



Penetrating abdominal trauma :

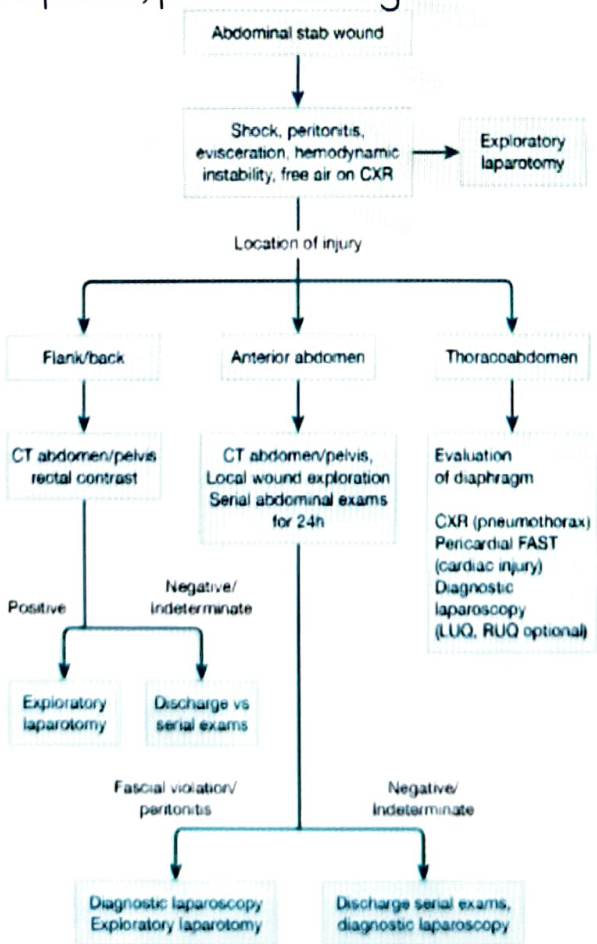
If injury is superior to peritoneum → local exploration and suturing → CECT.

If there is peritoneal breach :

- Peritonitis.
- Omentum hanging out.
- Bile staining of dressing.

} Laparotomy even if patient is hemodynamically stable.

Note : If there is a sharp object impaled in the body, remove the object in the OT only (Provides tamponade, prevents bleeding).



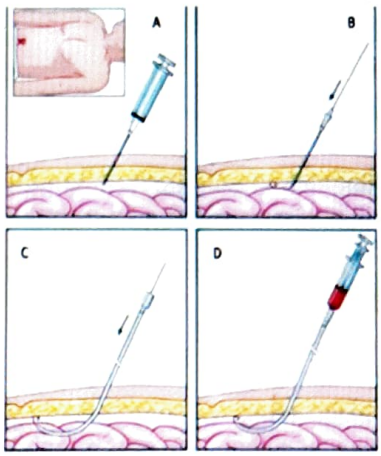
Diagnostic peritoneal lavage (DPL) :

Rarely done now.

Indication : When FAST is not available.

Positive DPL :

- If 10 cc of gross blood is aspirated.
- > 1,00,000 RBCs/mm^3.
- > 500 WBCs/mm^3.
- Amylase > 175 IU/L.
- Presence of rectal content.



DPL.

Splenic trauma :

Should be suspected if :

- Bruising in lower chest wall.
- # Left 9th to 11th ribs.

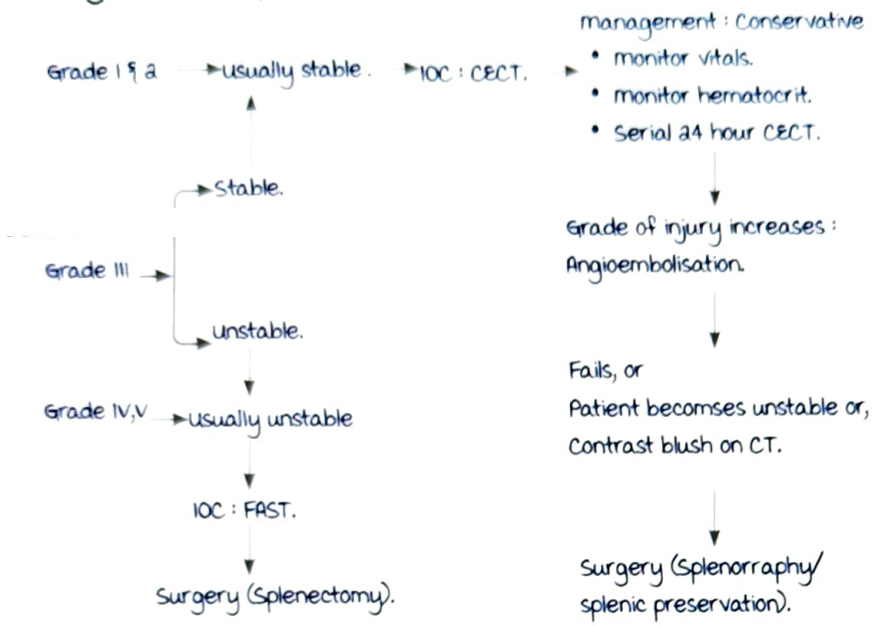
Grading of splenic trauma :

Grade 1	• Subcapsular haematoma <10% of surface area • Parenchymal laceration <1 cm depth • Capsular tear
Grade 2	• Subcapsular haematoma 10-50% of surface area; intraparenchymal haematoma <5 cm • Parenchymal laceration 1-3 cm
Grade 3	• Subcapsular haematoma >50% surface area; ruptured subcapsular or intraparenchymal haematoma ≥25 cm • Parenchymal laceration >3 cm depth
Grade 4	• Any injury in the presence of a splenic vascular injury or active bleeding confined within the splenic capsule • Parenchymal laceration involving segmental or hilar vessels producing >25% devascularisation
Grade 5	• Any injury in the presence of splenic vascular injury with active bleeding extending beyond the spleen into the peritoneum - shattered spleen

Vascular injury is defined as a pseudoaneurysm or arteriovenous fistula and appears as a focal collection of vascular contrast that decreases in attenuation with delayed imaging. Active bleeding from a vascular injury presents as vascular contrast, focal or diffuse, that increases in size or attenuation in the delayed phase.

Grading of splenic trauma.

management of splenic trauma :



Complications of splenic trauma :

a. Hemorrhage.

b. Injury to pancreas (Tail of pancreas is close to hilum of spleen).

c. Hematological changes :
   - Transient increase in WBCs, RBCs, platelets (uptil 2 weeks).
   - Permanent changes : Basophilic stippling, howell jolly bodies, reticulocytosis, hypersegmented WBCs.

d. Left lung atelectasis (m/c complication).

e. Opportunistic post splenectomy infections (OPSI) :
   - Caused by encapsulated bacteria : Pneumococcus (m/c), meningococcus, H. influenzae.
   - Children > adults.
   - Within 1st two years of splenectomy.
   - High mortality.
   - Splenectomy done for hematological conditions > trauma conditions.

Prophylactic antibiotics in children :

- For 2 years post splenectomy.
- Ideally given 2 weeks prior to surgery.
- Emergency surgery : Post op day 2.

CDC vaccine recommendations for asplenic patients :

	Pneumococcal vaccination	Meningococcal vaccination	Haemophilus influenzae Type B vaccination
Children	• Immunologically naïve 2-6 years: PCV13 followed by PVC13 8 weeks later; PPSV23 8 weeks later; repeat PPSV23 at 5 years • Immunologically naïve 6-18 years: PCV13 followed by PPSV23 8 weeks later; repeat PPSV23 at 5 years	• MenACWY series • AND MenB series	Hib once if 15 months or older and previously not vaccinated
Adults (age 19 and older)	• Immunologically naïve: PCV13 followed by PPSV23 8 weeks later; repeat PPSV23 every 5 years	• MenACWY or MPSV4 2 months apart; repeat MenACWY every 5 years • AND MenB series once	Hib once

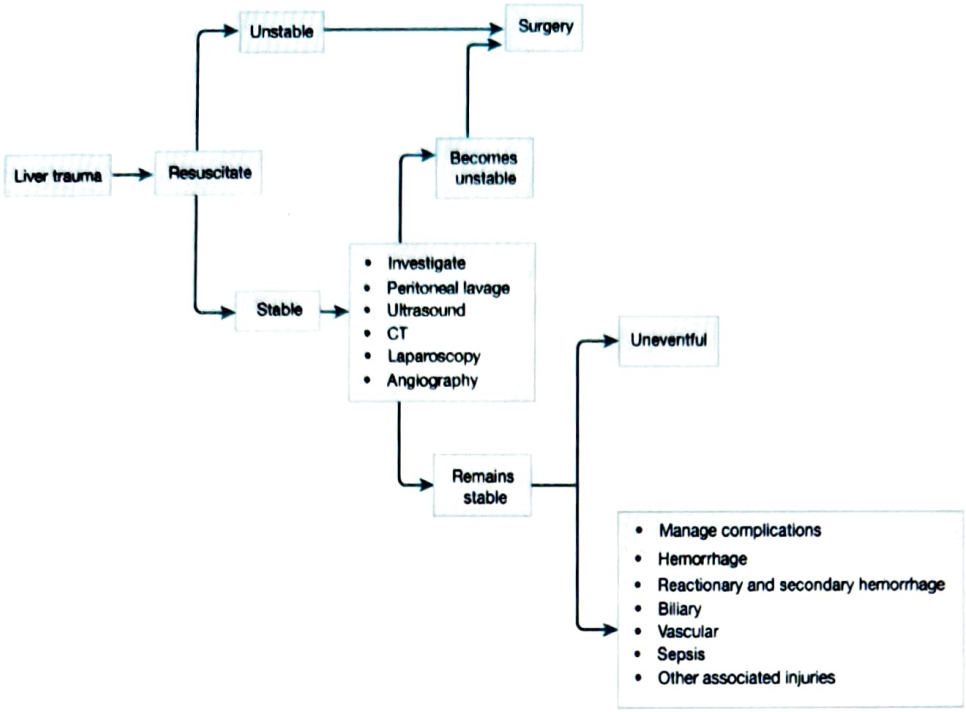
Liver trauma :

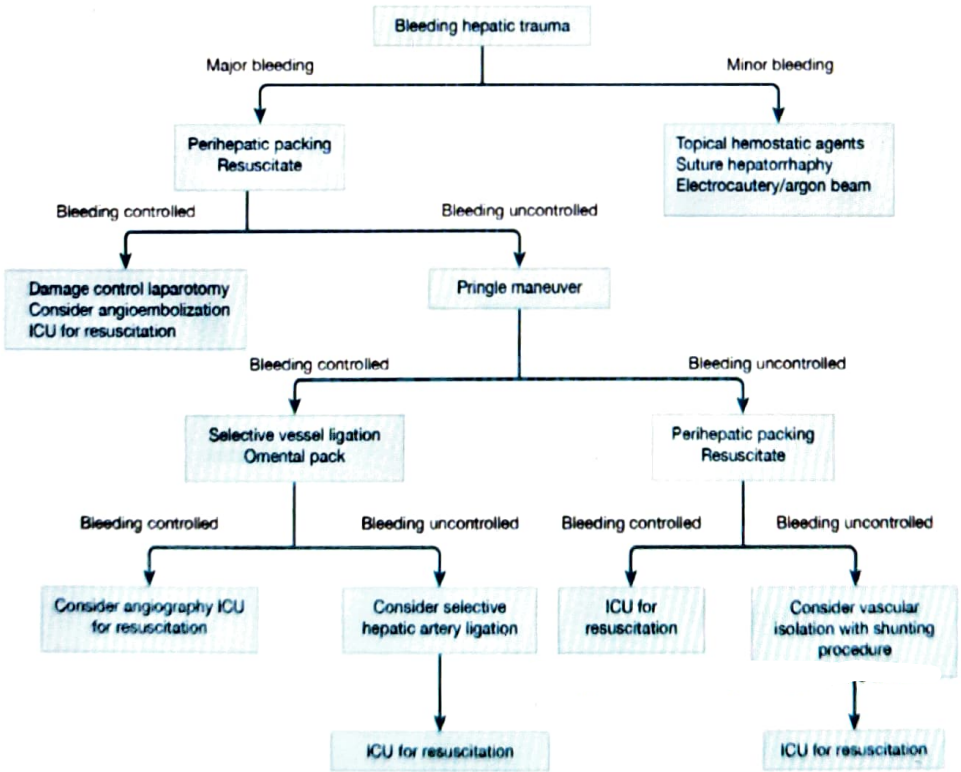
Should be suspected if : # Right 9th:11th ribs.

Grade 1	• Haematoma: subcapsular, <10% surface area • Laceration: capsular tear, <1 cm parenchymal depth
Grade 2	• Haematoma: subcapsular, 10-50% surface area • Haematoma: intraparenchymal, <10 cm diameter • Laceration: capsular tear 1-3 cm parenchymal depth, <10 cm length
Grade 3	• Haematoma: subcapsular, >50% surface area of ruptured subcapsular or parenchymal haematoma • Haematoma: intraparenchymal, >10 cm • Laceration: capsular tear, >3 cm parenchymal depth • Vascular injury with active bleeding contained within liver parenchyma
Grade 4	• Laceration: parenchymal disruption involving 25-75% hepatic lobe or involves 1-3 Couinaud segments • Vascular injury with active bleeding breaching the liver parenchyma into the peritoneum
Grade 5	• Laceration: parenchymal disruption involving >75% of hepatic lobe • Vascular: juxtahepatic venous injuries (retrohepatic vena cava/central major hepatic veins)

- Advance one grade for multiple injuries up to grade III.
- 'Vascular injury' (i.e. pseudoaneurysm or arteriovenous fistula): appears as a focal collection of vascular contrast that decreases in attenuation on delayed images.
- 'Active bleeding': focal or diffuse collection of vascular contrast that increases in size or attenuation on a delayed phase.

Algorithm for operative management of hepatic injuries





Pringle's maneuver :

- Compression of hepatic pedicle at the foramen of winslow.
- Can be done for 15 minutes.
- Can indicate source of bleeding (if bleeding stops, it is d/t hepatic artery/ portal vein).
- Can temporarily stop bleeding.

Packing : Covering of upper and lower surface of liver with mops to provide tamponade effect.

Note : Liver defects should not be packed with omentum (Can lead to adhesions).

Mesenteric injury :

Occurs in seatbelt syndrome.

Longitudinal tear :

- No loss of bowel vascularity.
- Mx : Repair of tear.

Transverse tear :

- Loss of bowel vascularity.
- Mx : Resection & anastamosis.

Duodenal and pancreatic injury :

Can be d/t penetrating and blunt trauma.

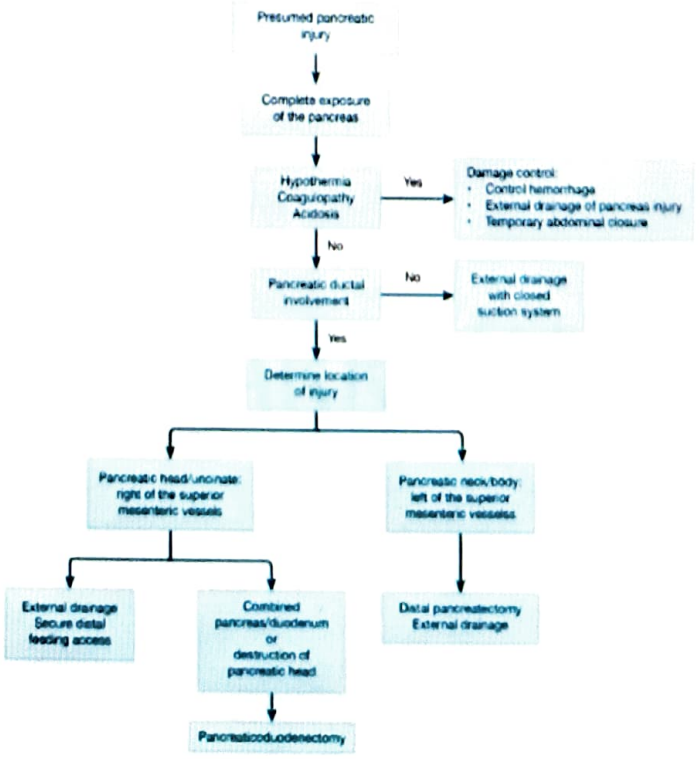
Management :

Duodenal hematoma : NPO and ryle's tube.

Perforation : Omental patch repair.

Pancreatic injury :

- Most important prognostic factor is the integrity of main pancreatic duct (MPD).
- MPD spared : Management is conservative.
- MPD injured : Surgical repair.



Damage control surgery (DCS) & Early total care (ETC):

Criteria for DCS	Criteria for ETC
Hypothermia: < 34°C	Stable haemodynamics
Acidosis: pH < 7.2	No need for vasoactive/ inotropic stimulation
Serum lactate > 5 mmol/L	No hypoxaemia, no hypercapnia
Coagulopathy	Serum lactate < 2 mmol/L
Blood pressure < 70 mmHg	Normal coagulation
Transfusion approaching 15 units	Normothermia
Injury severity score > 36	Urinary output > 1 mL/kg/h

- Early total care : Definitive management of a patients injuries within 36 hours of injury after a period of initial resuscitation.
- Damage control surgery :
  a. Aka abbreviated laparotomy.
  b. Simultaneous resuscitation with early rapid life and limb saving surgery.
  c. Time consuming definitive surgery should be deferred until the patient's physiological status allows.

Indications for damage control surgery :

a. Coagulopathy.
b. Hypothermia.
c. Acidosis.

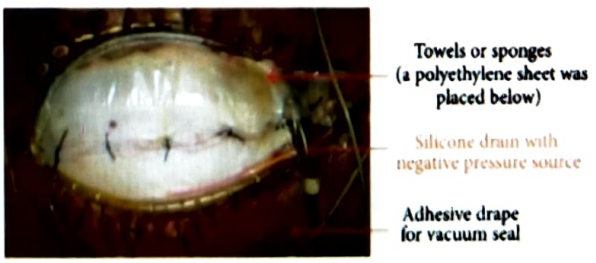
} Lethal triad of trauma.

Phases of DCS :

Phase 0 : Identification of patients.

Phase 1 :

- Emergency laparotomy.
- Aim : To stop bleeding, prevent contamination.
- Temporary closure of abdomen (Bogota bag).



Bogota bag.

Phase 2 :

- Patient shifted to ICU.
- Aim : Physiology is corrected (Hypothermia, acidosis, coagulopathy).

Phase 3 :

- After 24 to 48 hours, re exploration.
- Aim : Correction of anatomy.

Note : In DCS, correction of physiology is given more importance than correction of anatomy.

Stages of DCS :

1. Patient selection.
2. Control of hemorrhage and contamination.
3. ICU care.
4. Definitive surgery.
5. Abdominal closure.

Abdominal compartment syndrome :

Causes :

- Severe burns.
- Intestinal obstruction.
- massive ascites.

IAH	**Sustained or repeated pathologic elevation of IAP > 12 mm Hg**
Grade I	**IAP 12-15 mm Hg**
Grade II	**IAP 16-20 mm Hg**
Grade III	**IAP 21-25 mm Hg**
Grade IV	**IAP >25 mm Hg**
ACS	**Sustained elevation of IAP of > 20 mm Hg with new organ dysfunction**

IAH : Intra abdominal hypertension.

ACS : Abdominal compartment syndrome.

Note : To assess abdominal pressure, bladder pressure is calculated.

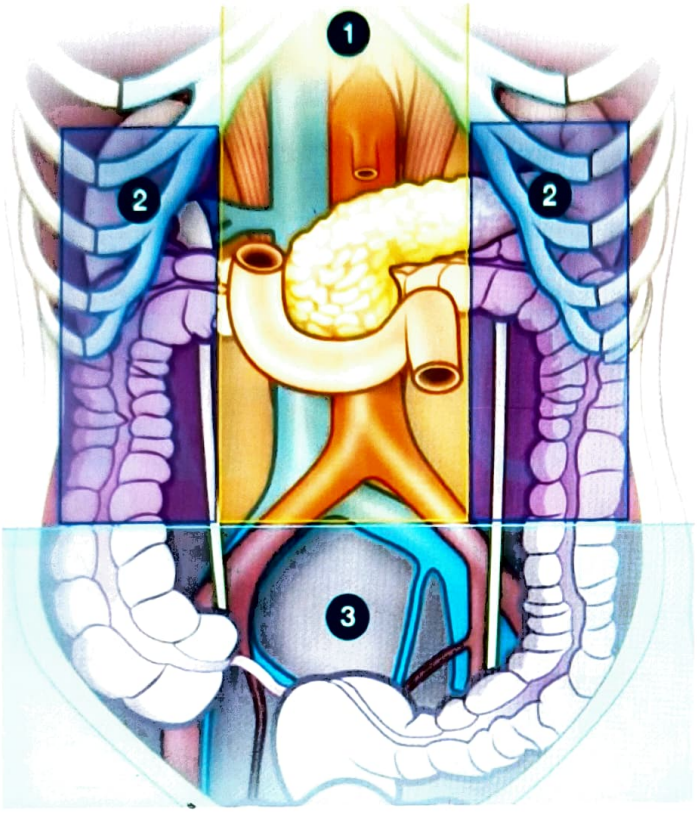
Effect of raised intra-abdominal pressure on individual organ function

Organ	Effect
Renal	Increase in renal vascular resistance leading to a reduction in glomerular filtration rate and impaired renal function
Cardiovascular	Decrease in venous return resulting in decreased cardiac output because of both a reduction in preload and an increase in afterload
Respiratory	Increased ventilation pressures because of splinting of the diaphragm, decreased lung compliance and increased airway pressures
Visceral perfusion	Reduction in visceral perfusion
Intracranial effects	Severe rises in intracranial pressures

Management :

- Decompressive laparotomy.
- Correction of acidosis.
- Intravenous fluids.

Retroperitoneal trauma :



Zones of retroperitoneal trauma :

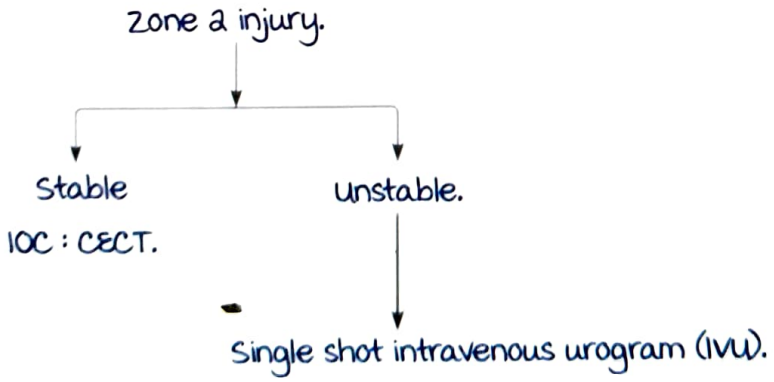
- Zone 1 : Major vessels.
- Zone 2 : Kidney, ureter and renal vessels.
- Zone 3 : Pelvic structures.
- Zone 4 : Above superior mesenteric artery.

management :

FAST is not useful in assessing retroperitoneal injury.

Zone associated with maximum mortality : Zone 1 → managed conservatively.

m/c injured zone : Zone 3.

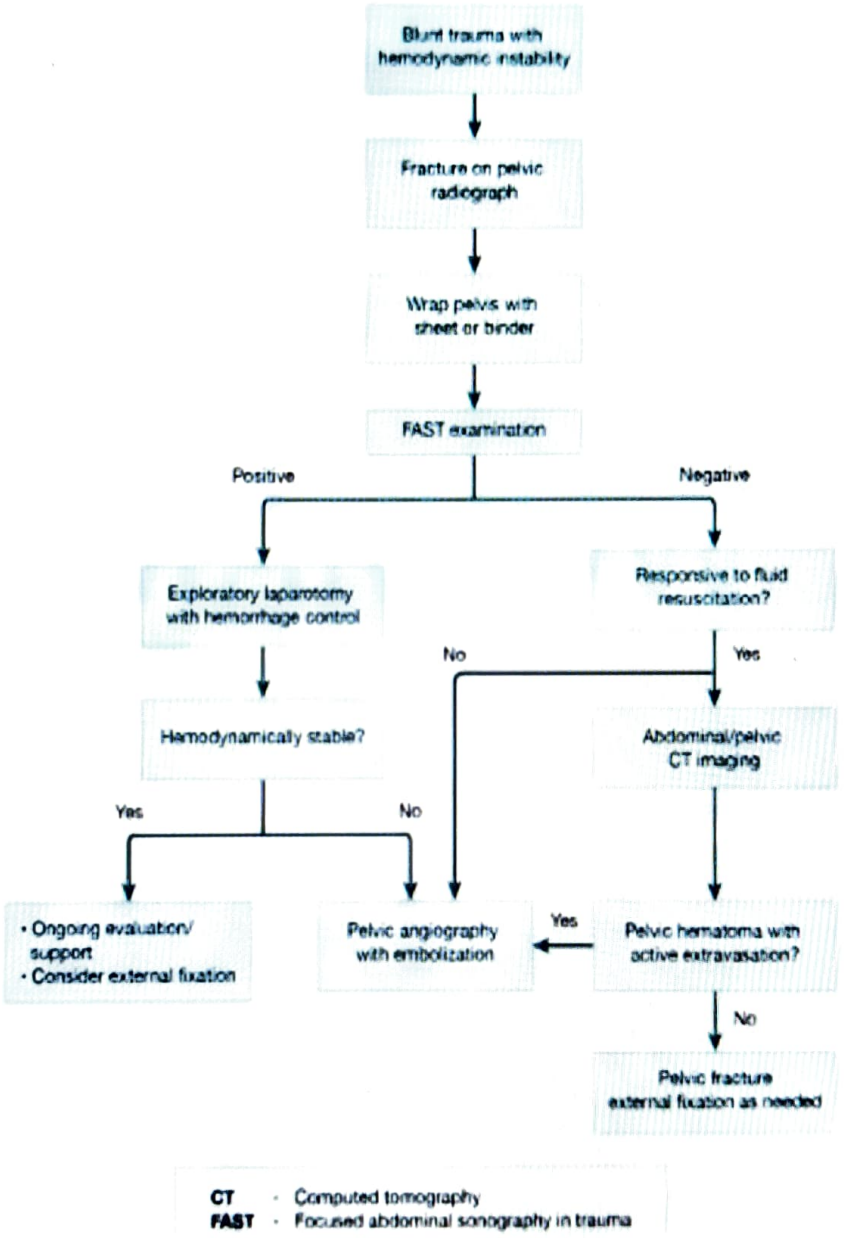


Urinoma :

- Sterile → double J stenting.
- Infected → pigtail catheter.

Vascular injury → Exploration.

Algorithm for evaluation and management of pelvic fractures with associated hemorrhage :



TRAUMA PART 2

Thoracic Trauma

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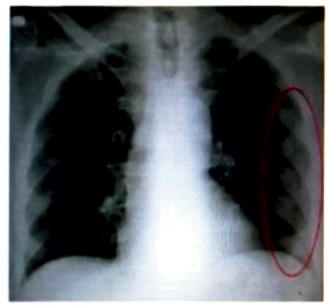
Common in polytrauma patients.
Majority can be managed conservatively.
m/c cause of death in blunt thoracic trauma : Tracheobronchial injury.
m/c cause of death in penetrating thoracic trauma : Hemothorax.

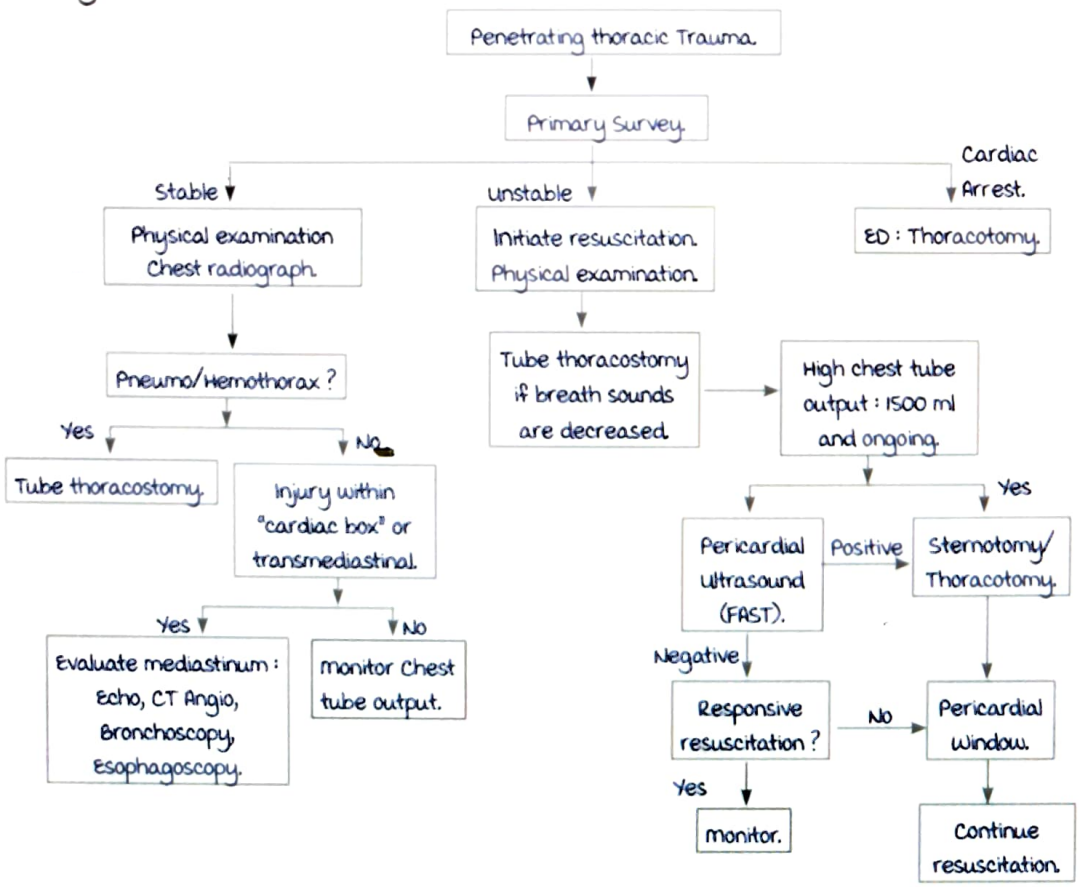
Rib fractures :

- most common type of thoracic trauma.
- mx : Analgesia.
- most common ribs fractured during CPR : 3rd to 5th ribs.
- 1st rib fracture : subclavian vessels, brachial plexus & apex of lung can be injured.
- 10-12th rib fracture :
  On Left : Spleen injured & Right : Liver injured.



Rib fractures.

Management :

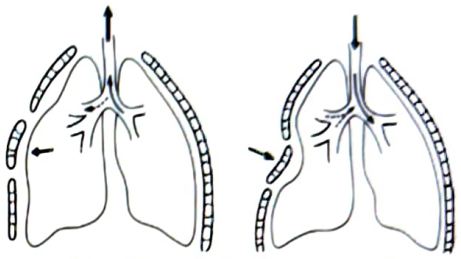


Flail chest :

- Fracture of 2 or more consecutive ribs at 2 or more places.
- Problems :
  a. Pulmonary contusion.
  b. Paradoxical chest wall movement.

Management :

- Initially, oxygen and adequate analgesia (thoracic epidural).
- If not sufficient : IPPV given.
- If RR >20/mins or pO_2 < 60 mmHg then, Surgical fixation.



Paradoxical chest movement.

Pneumothorax :

Types :

- Tension pneumothorax : Pneumothorax causing hemodynamic compromise.
- Simple pneumothorax : No hemodynamic compromise.

Tension pneumothorax :

One-way valve.

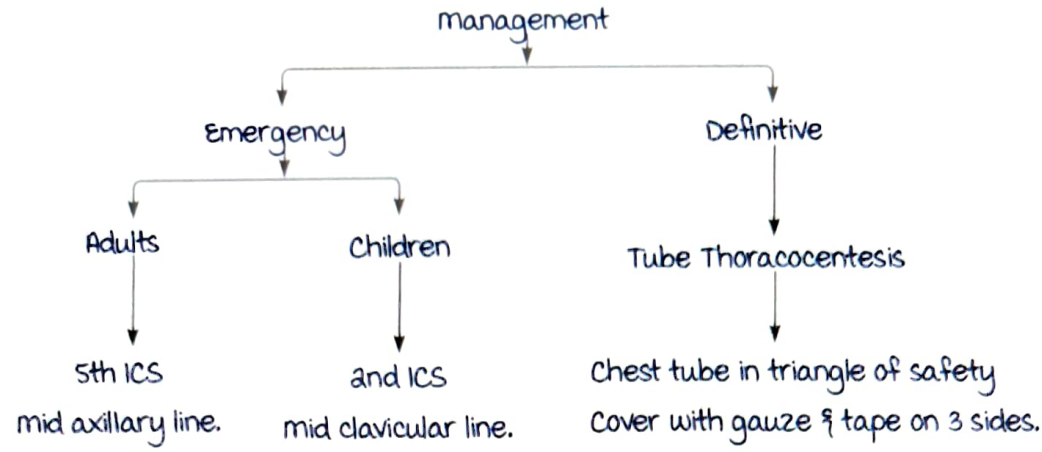
Clinical features :

- ↑ RR.
- ↓ CO = HR ↑ x SV ↓.
- ↓ SBP.
- ↑ JVP.

Left pneumothorax.

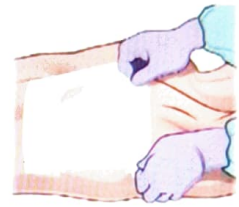
Comparison :

	Tension pneumothorax	Cardiac tamponade	Hemothorax	Simple pneumothorax
	Tachypnea. Tachycardia. Hypotension.	Tachypnea. Tachycardia. Hypotension.	Tachypnea. Tachycardia. Hypotension.	No change in hemodynamic status.
JVP	Raised.	Raised.		
Breath sounds	↓	Normal.	↓	
Percussion note	Hyperesonant.	Normal.	Dull.	Hyperesonant.
Cardiac sounds	Normal.	↓		



Extended FAST (eFAST) :

- Loss of seashore sign.
- Barcode sign.
- Stratosphere sign in M mode.



Three sided occlusive dressing.

Hemothorax :

Accumulation of blood.

Due to injury to intercostal vessels.

CP able is blunted.

Clinical features :

- Decreased SBP.
- Dull note on percussion.

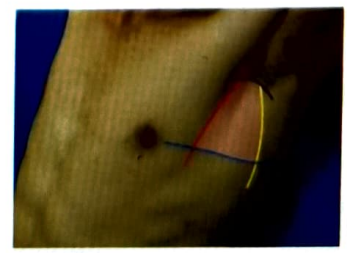
Hemothorax.

Management :

Insertion of Intercostal tube.

Indications for thoracotomy :

- > 1 to 1.5 L of blood at insertion.
- > 200 cc per hr for three consecutive hours.
- Cardiac tamponade.
- Trachea bronchial injury.
- Thoracic aortic injury.



Triangle of safety.

Triangle of safety : Area of insertion of ICT

- Apex : Axilla.
- Base : 5th ICS.
- Anterior : Anterior axillary fold.
- Posterior : Posterior mid axillary line.

Inserted in the upper border of the ribs (Since neurovascular bundle present on lower border).

Structures pierced on insertion :

- Skin.
- Superficial fascia.
- Deep fascia.
- Serratus anterior.
- 3 layers of intercostal muscles.
- Endothoracic fascia.
- Parietal pleura.

Underwater seal bag.

Underwater seal bag : Ensures bubbling out of air.

Important points :

- Functioning of chest tube is assessed by : Column movement.
- Position of the chest tube can be checked by : x ray.
- Chest tube is removed when :
  a. Lung has expanded.
  b. Output less than 100 cc in 24 hours.

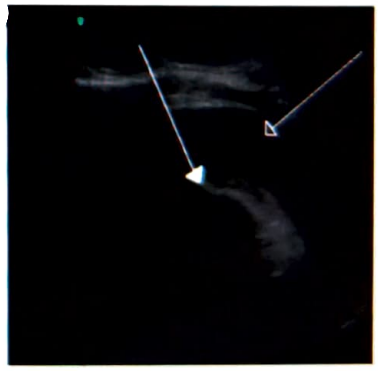
Falsely more inserted ICD.

Cardiac Tamponade :

Rapid accumulation of blood in the pericardial space (at least 40 to 50 cc).

Beck's triad :

1. Muffled heart sounds.
2. Hypotension.
3. Raised JVP.



Hypoechoic collection in FAST.

Diagnosis : FAST/ eFAST.

Management :

- Emergency :
  Pericardiocentesis
  Via Sub-xiphoid route
  Under ECG/Echo control.
- Definitive :
  Thoracotomy & Repair of tear.

Thoracotomy should be done after evacuation of hematoma in secondary penetrating trauma, there is no role of aspiration.

Traumatic thoracic aortic injury :

- Most common site : Ligamentum arteriosum.
- Clinical features :
  a. Chest pain.
  b. Difference in BP between two limbs.
  c. Absent pulsation in one limb.

IOC : Stable patient : CT Angio.
Unstable patient : Trans-Esophagial ECHO.

X ray : Widening of mediastinum.

Mediastinal widening.

Management :

- Esmolol : To control heart rate & maintain permissive hypotension (60 to 70 mm Hg).
- Thoracotomy & Graft repair.

Diaphragmatic injuries :

Most common side : Left > Right.

Can be secondary to blunt or penetrating trauma.

Clinical features :

- Breathlessness.
- Bowel sounds in thoracic cavity.


Diaphragmatic injury.

Management :

- Never blindly insert chest tube in suspected diaphragm injury (Bowel injury can occur).
- Laparotomy (Preferred).
- Bowel reduction → Repair diaphragm → Chest tube insertion.

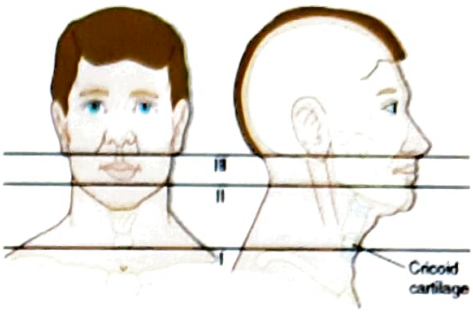
Neck Trauma

00:16:43

Zone 1	Thoracic inlet to cricoid cartilage (maximum mortality). IOC : Angiography.
Zone 2	• Cricoid to angle of mandible. • Most exposed. • m/c injured & most surgically accessible. • Rx : Conservative/ exploration if hard signs +ve.
Zone 3	Angle of mandible to base of skull. IOC : Angiography.

Hard Signs of neck trauma :

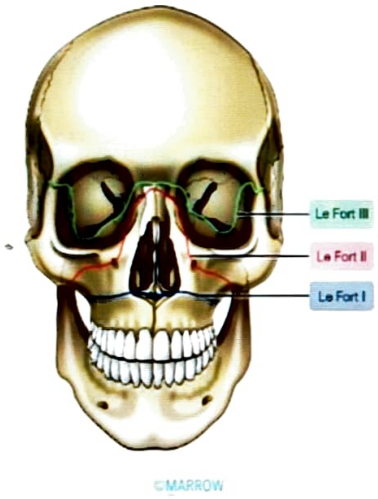
- Subcutaneous emphysema (increasing).
- Air bubbling from a penetrating wound.
- Expanding neck hematoma.
- Hoarseness of voice.



Zones of the neck.

Head Trauma

00:19:01



Le fort classification of maxillary fractures	
Le fort I	• Fracture of upper alveolus. • Malocclided bite. • Rx : Inter maxillary wiring.
Le fort 2	• Pyramidal fracture. • CSF rhinorrhea present.
Le fort 3	• Cranio facial dysjunction. • Orbital blow out fracture. • CSF rhinorrhea present.

Layers of the scalp :

1. Skin.
2. Connective tissue : Vessels adherent to fibrous tissue septae (Cannot vasoconstrict → increased risk of bleeding).
3. Aponeurosis (sub aponeurotic bleeding → Black eye/ raccoon eyes).
4. Loose areolar tissue : Emissary vein (Cavernous sinus thrombosis).
5. Periosteum.

Skull Fractures :

Non depressed skull fracture → No intervention.

Depressed skull fracture :

- Focal neurological signs present.
- Depression > depth of adjacent segment.

} Surgical elevation.