The Dudley Group
NHS Foundation Trust

General Surgery Induction Booklet

COMMON EMERGENCIES ON A SURGICAL TAKE

Acute Appendicitis

Presentation

- Central abdominal pain radiating to the RIF
- Associated nausea and/or vomiting.
- Usually, loss of appetite
- Minor disturbances of bowel function
- Tachycardia may/may not be present
- Temperature may/may not be raised
- Pelvic Appendicitis - Dysuria
- Retrocaecal Appendicitis - Tenderness in the right flank.
- Pre or Post Ileal Appendicitis - Diarrhoea

Abdominal examination

Tenderness with guarding and rebound tenderness or percussion tenderness in the RIF.

Differential Diagnosis

- Urinary Tract Infection (UTI)
- Torted or ruptured ovarian cyst
- Ectopic pregnancy
- Pelvic Inflammatory Disease
- Endometriosis
- Gastroenteritis
- Crohn's Disease

Investigations

- Full blood count
- CRP
- U/E
- Urine dipstick to exclude UTI
- Pregnancy test in women of childbearing age
- USS - in young women with atypical presentation or examination findings (*in keeping with ovarian pathology)* who are clinically well to r/o Ovarian pathology

Management

- Nil by mouth
- IV drip
- Analgesia and Antiemetics
- DVT Prophylaxis if indicated
- Book in Theatre
- IV antibiotics as per protocol if delay in Theatre, otherwise prescribe for at time of induction – DO NOT start IV antibiotics if there is any doubt about diagnosis (*unless clinically septic)*
- Take consent for appendicectomy. In case of children take consent from parents.

Post-Operative Care

- The decision whether or not to use post-operative antibiotics will be taken by the operating surgeon depending upon operative findings.
- Eat and drink post op.
- Home when eating/drinking, bowels open, apyrexial and mobile

Biliary Colic

Presentation

The typical history is of right upper quadrant pain, no signs of peritonitis, no fever and normal blood count

Investigations

- Full blood count, CRP
- LFTs
- Amylase
- CXR - Erect
- ECG if indicated
- US abdomen

Management

- If patient vomiting - IV fluids. Otherwise: Free fluids + diet (fat free diet)
- Analgesia and Antiemetics
- DVT prophylaxis, if indicated
- Antibiotics usually not indicated

For first episode of biliary colic, (fill in Hot gall bladder passport) Consent, Easibook and send to Consultants secretary to add to elective waiting list.

Acute Cholecystitis

Presentation

- Typical history is of epigastric / right upper quadrant pain
- Localized abdominal tenderness/guarding
- Pyrexia
- Raised WBC

Investigations

- Full blood count, clotting screen
- Emergency admission profile, CRP, Amylase
- CXR – Erect
- ECG if indicated
- US abdomen – to confirm gallstones and check CBD size
- Occasionally, MRCP maybe required (if patient clinically well and LFTs deranged)

Management

- IV fluids if patient vomiting, nauseous, unable to take oral fluids. If not can eat and drink.
- Analgesia and Antiemetics
- IV antibiotics
- DVT prophylaxis
- Depending on Consultant on call - consider Emergency Laparoscopic cholecystectomy – or add to Hot gallbladder pathway for urgent Cholecystectomy.

Discharge when patient clinically settled, eating/drinking.

Acute Cholangitis

This is a clinical syndrome resulting from infection in an obstructed biliary tree. Cholangitis frequently leads to Bacteraemia and Septicaemia.

Presentation

- Right upper quadrant pain
- High temperature
- Rigors
- Obstructive Jaundice *(high coloured urine, pale stools, itching)*

Investigations

- Full blood count, CRP
- Emergency admissions profile
- Amylase
- Blood cultures
- Hepatitis screen
- Clotting screen
- CXR – Erect
- U/S Scan Abdomen

Management

- IV fluids
- Analgesia and Antiemetics
- IV antibiotics
- Vitamin K stat dose if clotting profile deranged
- DVT prophylaxis
- Catheterise
- ERCP if CBD dilated/obstructed

May need HDU admission.
May need emergency Cholecystostomy (*Intervention radiology).*
After ERCP and clearing of ducts, patient needs to be added to Hot gallbladder pathway for urgent Cholecystectomy.

Acute Pancreatitis

Acute Pancreatitis is defined as acute inflammation of the Pancreas with variable involvement of remote organ systems.

Presentation

Sudden severe epigastric pain radiating to the back associated with vomiting.

Investigations

- Full blood count, CRP, clotting screen, Group and Save
- Emergency admissions profile including Calcium profile, Serum Amylase. *(Remember level has to be at least four times above normal for diagnosis of Acute Pancreatitis. In 20% cases Serum Amylase may not be raised)*
- Blood Glucose
- CXR – Erect
- ECG
- Arterial blood gases

Management

- IV fluids – Start with Normal Saline. Rate will depend upon state of patient's hydration presence or absence of shock.
- Oral fluids unless vomiting
- Nasogastric Tube – Only if patient vomiting.
- Catheterize – Monitor urine output hourly. Aim to maintain urine output at least 50ml/hour
- Analgesia and Antiemetics
- DVT prophylaxis
- IV antibiotics if LFTs deranged
- Maintain O2 saturation with oxygen supplementation
- Sliding Scale Actrapid Insulin if blood glucose high/unstable
- U/S scan abdomen or CT scan abdomen

Glasgow – Imrie Score for an attack of Severe Acute Pancreatitis is predicted by the presence of 3 or more positive criteria:

1. WBC > $15x10^9$/l
2. Blood Urea > 16 mmol/l
3. Blood glucose > 10mmol/l (In the absence of Diabetes)
4. Serum Calcium < 2mmol/l
5. Serum Albumin <32gram/l
6. p 0_2 < 8.0 Kpa
7. Lactate Dehydrogenase > 600 u/l
8. Aspartate Aminotransferase > 200u/l

All patients with Pancreatitis should have Severity Scoring
A score of 3 or more warrants an HDU referral/ admission for close monitoring

In case of severe pancreatitis

- All patients with severe acute Pancreatitis need urgent CT scan abdomen
- Consider moving the patient to surgical HDU or ITU and inform Outreach team or ITU registrar.

Danger Signs – CT scan to r/o Necrotizing Pancreatitis

- Increasing abdominal pain and distension
- Increasing respiratory rate and falling p 0_2
- Persistent tachycardia and pyrexia
- Decreasing urine output, not improving with adequate fluid resuscitation
- WBC < $3x10^9$/l or persistently above normal range, persistently raised CRP
- Amylase not falling by day 3 to 50-70% baseline

Acute Diverticulitis

Acute Diverticulitis is an acute infection occurring in and around a colonic diverticulum. The sigmoid colon is almost always involved.

Presentation

A. Uncomplicated Diverticulitis (Modified Hinchey 0, 1a)

- History of pain in the left iliac fossa
- Vomiting may or may not be present
- Minor degrees of bowel disturbances
- Mild tachycardia and pyrexia
- Localized tenderness, guarding and rebound tenderness in LIF

B. Diverticular perforation (Modified Hinchey 3/ 4)

- History of severe LIF pain – becoming generalized
- Vomiting
- Constipation
- Tachycardia, pyrexia, hypotension, hypoxia
- Signs of generalized peritonitis

C. Localized perforation/ Diverticular abscess (Modified Hinchey 1b/2)

- Presentation with symptoms and signs between A & B
- Lower abdominal peritonitis
- Tachycardia, pyrexia, but normal blood pressure + hypoxia

Investigations

- Full blood count, CRP, Clotting Screen, Group and Save
- Emergency admission profile
- CXR – erect - look for free gas under diaphragm
- ECG
- Arrange CT scan of abdomen/pelvis to look for an abscess and any evidence of perforation. Abscesses can be drained percutaneously or transrectally. Drain can be left in place until collection has resolved. Resolution can be confirmed by repeat U/S scan or CT scan of abdomen/pelvis.

Management

- IV fluids– start with normal saline. Rate will depend on state of patient's hydration and presence or absence of shock.
- Clear fluids unless going to theatre imminently
- Analgesia / Antiemetics
- Nasogastric tube – if vomiting or if patient has signs of generalized peritonitis
- Catheterize – if patient unwell, dehydrated, shocked or with signs of peritonitis
- DVT prophylaxis
- IV antibiotics

- Maintain O_2 saturation with oxygen supplementation

Category A patients - Should recover within 48-72 hours with conservative treatment with antibiotics. Clinically settled patient will need flexible sigmoidoscopy in 4- 6 weeks' time.

Category B patients - Will need laparotomy after aggressive fluid resuscitation.

Category C patients - Needs regular review every few hours. Laparotomy is required if there is any evidence of spreading peritonitis or worsening systemic sepsis with falling BP and urine output.

Ischaemic Bowel

This is a rare, difficult to diagnose and dangerous condition.

Presentation

- The clinical presentation is of severe abdominal pain out of proportion to the degree of abdominal tenderness.
- Vomiting - may or may not be present
- Diarrhoea - Occurs in approximately 50% of cases. Stool may have obvious blood, 80% have positive faecal occult blood.
- Profound hypotension - Unresponsive to aggressive fluid resuscitation suggests mesenteric arterial occlusion

High index of suspicion is required in any patient with abdominal pain, who has co-existent cardiac disease, particularly if there is recent evidence of:

- Arrythmias (acute or chronic)
- Myocardial infarction
- Coronary artery by-pass surgery

Investigations

- Full blood count, CRP, clotting screen, group and save
- Emergency admission profile
- Arterial blood gas - severe acidosis, elevated lactate (unresponsive to fluid resuscitation)
- CXR
- AXR – may show oedema of intestinal wall and occasionally gas in intestinal wall
- ECG
- CT abdomen and pelvis

Management

- IV fluids, Nil by mouth
- Nasogastric tube
- Analgesia / antiemetics
- Catheterize - aim to maintain urine out at least 30 - 50ml/hour
- DVT prophylaxis
- IV antibiotics
- Maintain 0_2 saturation with oxygen supplementation
- Consent for laparotomy +/- bowel resection +/- stoma and proceed.
- If patient medically unfit + extensive ischemia of entire small and large bowel – Palliate + DNAR

Small Bowel Obstruction

Presentation

- Colicky abdominal pain
- Vomiting - the higher the obstruction, the greater the vomiting.
- Abdominal distension - the lower the obstruction, the greater the distension
- Obstipation or Absolute constipation (*no flatus or stool)*

Common causes

- Bands/adhesions - primary or secondary to previous abdominal surgery.
- Hernias – Internal or External, especially femoral hernia
- Malignancy

Investigations

- Full blood count, CRP, clotting screen, group and save
- Emergency admission profile, Serum Amylase
- Arterial blood gases
- CXR
- AXR
- ECG if indicated
- CT scan if cause of Obstruction unclear.

Plain abdominal x-ray findings

- Small bowel dilatation - if the small bowel diameter is greater than 3cm
- Large bowel gas or distension - Colonic gas is only present in early or partial small bowel obstruction. The presence of small bowel and colonic distension suggests that patient has either pseudo-obstruction or mechanical colonic obstruction with an incompetent ileo-caecal valve.
- Gas in the biliary tree - This is seen in: Gallstone ileus/ After ERCP with sphincterotomy/ Previous anastomosis between the bile duct and duodenum.
- Small bowel wall oedema - This may suggest intestinal ischaemia

Clinical features to suggest actual or impending intestinal ischaemia

- Continuous unremitting pain or severe pain only partially relieved or unrelieved by opiate analgesics
- Tachycardia, localized or generalised tenderness, peritonism
- Substantially raised WBC count > $20x10^3$/l or raised CRP. However, normal WBC count does not exclude intestinal ischaemia.
- Rising lactate

Management

DRIP AND SUCK

- IV fluids – start with normal saline. Rate will depend on state of patient's hydration, presence or absence of shock
- Nasogastric tube

- Nil by mouth
- Catheterise - aim to maintain urine output at least 30 - 50ml/hour
- DVT prophylaxis
- Analgesia/antiemetics
- Maintain 0_2 saturation with oxygen supplementation
- Consider Gastrografin in adhesive obstruction after decompression with NG.
- Consent for laparotomy if doesn't settle in 48 hours.

Large Bowel Obstruction

Presentation

- Colicky abdominal pain
- Vomiting - occurs later as compared to small bowel obstruction
- Acute constipation/obstipation
- Distension - occurs early as compared to small bowel obstruction

Investigations

- Full blood count, clotting screen, group and save
- Emergency Admission profile
- Arterial blood gas
- CXR
- AXR - shows dilated colon with or without small bowel dilation. The absence of small bowel dilatation suggests closed loop obstruction necessitating urgent laparotomy
- ECG
- CT abdomen and pelvis is required to determine the cause of obstruction
    - If the abdomen is soft with no caecal tenderness and caecal diameter is less than 14cm, it is safe to do the test within 24 hours
    - If the caecum is tender or over 14cm; this test is required as soon as possible.

Management

- IV fluids - start with normal saline. The rate will depend on the state of patient's hydration.
- Nil by mouth
- Analgesia / antiemetics
- Nasogastric tube
- Catheterize - aim to maintain urine output at least 30 - 50ml/hour
- DVT prophylaxis
- Maintain 0_2 saturation with oxygen supplementation
- Consent for laparotomy
- Do not give Picolax or any other bowel preparation before establishing diagnosis as this may cause rupture of an obstructed colon.

Pseudo Obstruction of Large Bowel

Presentation

The same as for mechanical large bowel obstruction. Abdomen is distended but usually soft and non-tender.

Common causes are

- Fluid and electrolyte disturbances
- Renal failure
- Sepsis
- Hypoxia
- Prolonged immobilization especially after major orthopaedic operations
- Use of anticholinergic drugs

Investigations

- Full blood count, clotting screen, group and save
- Emergency admission profile including Magnesium and Phosphate levels
- AXR
- Arterial blood gas

Management

- Correction of fluid/electrolyte disturbances/renal failure
- Treatment of any sepsis
- Correction/treatment of hypoxia
- Regular enemas and laxatives
- Note: Flatus tube is only recommended if patient has a sigmoid volvulus, or distension is causing respiratory compromise

Lower Gastrointestinal Bleeding

Technically, lower G.I bleeding is from a point beyond the D-J flexure. 90% of cases of lower G.I bleeding will stop spontaneously.

Presentation

- Bloody diarrhea - typical description of the colour of blood will be dark red or bright red and not black.
- Abdominal pain
- Rectal and anal symptoms.

Fresh rectal bleeding may occasionally originate from brisk upper G.I bleeding (patient may be shocked). Therefore, it is important to exclude history of or predisposing factors for peptic ulcer disease and variceal bleeds.
Note: Any patient with Lower GI bleed who is haemodynamically unstable needs to be admitted under medical team to r/o an UGI bleed first.

Common causes

- Diverticular disease
- Angiodysplasia
- Inflammatory conditions – Crohn's disease, Ulcerative Colitis.
- Ischaemic Colitis
- Drugs e.g., NSAIDS/Anticoagulants
- Neoplastic (*Benign*, *malignant*)
- Jejunal Diverticulum, Meckel's Diverticulum
- Rectal causes (Usually blood is bright red with clots) - Solitary rectal ulcer, haemorrhoids, fissure
- Iatrogenic - Post Colonic biopsy, post haemmorrhoidectomy

Investigations

- Full blood count, CRP, Clotting screen, Group and Cross match blood
- Emergency admission profile
- Other investigations - AXR/ CT scan depending on suspected cause

Management

- Stop any anticoagulation/ antiplatelet medications.
- TXA 1g IV stat
- Reverse anticoagulation if possible.
- IV fluids – start with Normal Saline to maintain BP.
- Analgesia / Antiemetics
- DVT prophylaxis -withhold Enoxaparin for 24 hours if no contraindications
- Catheterize - Aim to maintain urine output at 30-50mls/hour
- Blood transfusion if Hb <80

Perforated Peptic Ulcer

Presentation

- Sudden, severe epigastric pain; with or without vomiting and occasionally shoulder tip pain.
- There may be a history of suspected or proven peptic ulcer disease or of taking non-steroidal anti-inflammatory drugs.
- Clinical findings may vary from localized epigastric to generalized peritonitis

Investigations

- Full blood count, CRP, clotting screen, group and save
- Emergency admission profile
- Arterial blood gases
- CXR – erect (free gas under diaphragm – 20% patients do not have this sign)
- ECG if indicated
- CT abdomen and pelvis to check if perforation has sealed off/ site of perforation

Management

- IV fluids – start with normal saline. Rate will depend on state of patient's hydration, presence or absence of shock.
- Nil by mouth
- Nasogastric tube
- Catheterize – monitor urine output hourly. Aim to maintain urine output at least 30- 50ml/hour
- Analgesia and antiemetics
- DVT prophylaxis
- IV antibiotics
- Maintain O_2 saturation with oxygen supplementation
- Consent for Laparotomy - if generalized free fluid and gas

Leaking / Ruptured Abdominal Aortic Aneurysm

**SHOULD ALREADY BE TRANSFERRED TO RUSSELL'S HALL HOSPITAL

Points to remember

- The risk of leak/rupture of an abdominal aortic aneurysm increases after it gets to a size of 5.5cm or greater.
- Pain and tenderness in the aneurysm are worsening signs of impending rupture.
- 80% of patients with a ruptured AAA die before reaching hospital
- 30-40% of those patients who get to hospital die without reaching theatre Operative mortality is approximately 50% Overall mortality is 90%

Presentation of ruptured AAA

- Severe abdominal pain radiating through to lower back, associated with collapse or confusion. *(**Note**: A patient over 50 years of age who collapses with back pain should be considered to have a AAA until proved otherwise)*
- The characteristics triad of abdominal or back pain, hypovolaemic shock and a pulsatile abdominal mass is present in only a few patients.
- The typical patient will be pale, sweaty, hypotensive and tachycardic with varying degrees of abdominal tenderness.

Atypical presentations

- Loin or groin pain
- Collapse with little abdominal pain
- Increased pain in an inguinal hernia
- Testicular pain
- Aorto-caval Fistula will present with Tachycardia, congestive cardiac failure, leg swelling, abdominal thrill, abdominal bruit, renal failure and peripheral Ischaemia.
- Aorto-Enteric Fistula will present with massive upper G.I haemorrhage, due to rupture of a AAA into the 4th part of the duodenum.

Differential Diagnosis

- Acute Pancreatitis
- Perforated Acute Diverticulitis
- Renal or Ureteric Colic

Investigations

- Full blood count, Clotting screen
- Group and crossmatch 10 units of blood
- Emergency admission profile

- ECG
- U/S scan abdomen or CT scan abdomen – To be done only if diagnosis is in doubt and if patient is haemodynamically reasonably stable.

Management

- Establish venous access with 2 large bore cannulae
- Cardiac and blood pressure monitoring - maintain **permissive hypotension** - Aim to maintain systolic BP of 80-100mm Hg. Do not attempt to restore 'normal' BP as this may lead to loss of tamponade and rapid exsanguination
- Maintain O_2 saturation with oxygen supplementation
- Catheterize
- Analgesia / Antiemetics
- Inform Consultant Vascular Surgeon on call, Consultant Anaesthetist on call Inform theatre staff

Resuscitation

- If Pulse, BP reasonably stable – Infuse fluids (Normal Saline). If patient improves, continue with crystalloid.
- If Hypotension severe, and patient not responding to fluids, O Negative Blood typed but not cross-matched may be justified.
- AVOID grouped/crossmatched blood until patient gets to theatre
- ALL ruptured AAA patients in need of operative management are transferred to Russell's Hall following discussion with the vascular consultant on call

Acute Limb Ischaemia

- The two main causes of acute Ischaemia are - thrombosis and embolism
- The lower limb is affected by both.
- Upper limb Ischaemia is almost always Embolic.
- Limb Ischaemia is more severe with embolism because no collateral circulation has developed.

Embolism should be suspected in presence of

- Atrial Fibrillation
- Good contralateral pulses
- Recent M.I
- Valvular Heart Disease
- Aortic Aneurysm, Iliac Aneurysm, Popliteal Aneurysm

Thrombosis should be suspected in presence of

- History of Claudication
- Risk factors for Arteriosclerosis
- Previous bypass surgery
- Previous Thrombosis
- Thrombophilia e.g., Protein S deficiency, factor V Leiden mutation, protein C deficiency, lupus anticoagulant

Clinical features

- Pain
- Pulseless
- Perishing cold
- Pallor
- Paraesthesia
- Paralysis
- **Note:** Fixed mottling, tender muscles and paralysis suggest irreversible ischaemia.

History

Take full history of cardiac, cerebrovascular and peripheral vascular symptoms e.g., Angina, M.I, TIA, Stroke, Claudication or Cardiovascular surgery prior to this episode.
Check for antiplatelet and anticoagulant medication

Examination

Cardiovascular system
Limb – ALWAYS CHECK BOTH LIMBS – Appearance, Neurological Status, Palpable pulses – Doppler signal if pulse not palpable.

Investigations

- Full blood count and clotting screen
- Emergency admission profile
- Group and cross match 2 units of blood
- ECG

Management

- IV fluids
- Analgesia / Antiemetics
- Supplemental oxygen
- Give IV Heparin 5000 units stat dose
- ALL patients with acute ischaemia are transferred (blue lighted) to Russell's Hall following discussion with the vascular consultant on call

Assessment and Management of Head Injuries

Head Injuries can range from mild concussion to major bleeds.
Head trauma patients are admitted from ED under General surgery, only on the advice of Neurosurgery for local observation for a specified period of time.

General principles of management

- Ensure cerebral oxygenation/perfusion is maintained.
- Identify patients who are developing or at risk of developing life-threatening intracranial bleeds causing a mass effect.

Triage

- Aims to identify those who have suffered a clinically important brain injury and those at risk of subsequent deterioration.
- Treat co-existing life-threatening injuries, including injuries to cervical spine.
- Follow ABC principles to prevent secondary deterioration from hypoxia or Hypotension

History – from patient or relatives or bystanders

- Age
- Loss of consciousness
- Vomiting
- Focal neurological deficit
- Mechanism of injury
- Seizure since injury
- Anticoagulant use

Examination

- Pupil size and reactivity.
- Lateralizing signs (weakness one side)
- Conscious level – using **GLASGOW COMA SCALE**

Score	Eye Opening	Verbal Response	Motor Response
6	-----	------	Obeys commands
5	-----	Orientated	Localises to painful stimuli
4	Open	Confused	Flexes to painful stimuli
3	Open to speech	Inappropriate words	Abnormal flexion to painful stimuli
2	Open to painful stimuli	Incomprehensible sounds	Extends to painful stimuli
1	None	None	None

Management

Admission and half-hourly observations until patient is alert and oriented.

- GCS
- Pupil size and reactivity
- Limb movements
- Respiratory rate
- Heart rate
- Blood pressure
- Oxygen saturation
- Temperature

Imaging – Indications of CT scan of head

- GCS < 13 at any stage since injury
- GCS = 13 or 14 at two hours following injury
- Suspected open (compound) or depressed skull fracture
- Signs of basal skull fracture – Haemotympanum/ Rhinorrhoea/ Otorrhoea/ Retromastoid bruising
- Post traumatic seizures
- Focal neurological deficit
- Persistent vomiting
- Significant mechanism injury
- Coagulopathy (if history of LOC or Amnesia)

Indications for Intubation and Ventilation

- GCS<8
- Deteriorating conscious level
- Seizures
- Hypoxia Pa O2 < 6kPa
- Severe facial trauma
- Loss of cough or gag reflex

Most patients admitted for observation have mild head injury. The aim in these patients is to prevent secondary brain injury.

Initial management

- Ensure patient has received TXA
- Stop anticoagulation/antiplatelets
- Reverse anticoagulation (Vitamin K or PCC as required) if CT has positive findings
- Transfuse platelets if <100,000
- Patient can eat and drink if not vomiting
- Maintenance IV fluid – 1L (more if required)
- Kepra if advised by Neurosurgery
- Analgesia
- Antiemetics

Prevention of secondary brain injury

- Airway - Nurse 30° – 45 head up
- Breathing
    - PaO2 >11 kPa
    - SpO2 95-98%
    - Pa CO2 4.5 – 5.0
- Circulation
    - MAP >80mmHg, SBP >120mmHg
    - Capillary refill time <2 seconds
    - HR 50-100/min
    - Urine output 0.5 – 1ml/Kg/Hour
    - ECG on admission and once daily (more frequently if indicated)
- Disability
    - Blood Glucose 6-10 mmol/L
    - Adequate analgesia
    - Monitor GCS and pupils
    - Limb movements
    - Seizure prophylaxis
- Exposure
    - Normothermia – actively treat fever
    - PRN laxatives + Bowel chart

Indication for re-scanning patient

- Development of agitation or abnormal behaviour
- Sustained (>30 mins) drop of 1 or more points in GCS
- Development of severe or increasing headache or persisting vomiting
- New or evolving neurological symptoms or signs such as pupil inequality or asymmetry of limb or facial movement

Most Patients will be discharged after a 24 – 48-hour observation period. Head injury advice card should be provided to the patient or parents of children.

How to refer a patient to neurosurgery

Any patients requiring discussion with the QE Neurosurgery department should be discussed with the on-call neurosurgery team through the NORSe system ***https://nww.norse.uhb.nhs.uk*** and imaging should be linked to the QE following discussion with the PACS team/ radiographer on call.

Checklist for NORSE referral

- Age
- Mechanism of Injury, including date and time
- Findings on examination (including GCS, pupils, and lateralizing signs) and CT
- Past medical history and medications including alcohol status
- Hb, platelet, INR, anticoagulation status, last dose and indication
- Social history, frailty, quality of life
- Pre-existing ceiling of care / DNAR decision

Questions to ask:

- Reversal of anticoagulation and when to restart?
- Loading with antiepileptics and duration required?

- Length of neuro observation period?
- Follow up plan: indication for repeat CT
- Ceiling of care decision
- Follow up with neurosurgical team required?
- Pneumovax (in skull fracture)?
- Nimodipine (in subarachnoid bleed)?

All admitted Head injury patients need to be clerked in using the Head trauma booklet – this has majority of the information regarding management of the patient, including referral to falls teams for older patients.

Paediatric Head trauma Management:

We don't usually get involved in management of paediatric head injuries. These should be referred to BCH or are admitted under paediatrics team for local observation. If you are ever called to assess a paediatric head injury, the following are the indications for a CT scan in children (NICE guidelines)

For children who have sustained a head injury and have any of the following risk factors, perform a CT head scan within 1 hour of the risk factor being identified:

- Suspicion of non-accidental injury.
- Post-traumatic seizure but no history of epilepsy.
- On initial emergency department assessment, GCS less than 14, or for children under 1-year GCS (paediatric) less than 15.
- At 2 hours after the injury, GCS less than 15.
- Suspected open or depressed skull fracture or tense fontanelle.
- Any sign of basal skull fracture (*haemotympanum, 'panda' eyes, cerebrospinal fluid leakage from the ear or nose, Battle's sign).*
- Focal neurological deficit.
- For children under 1 year, presence of bruise, swelling or laceration of more than 5 cm on the head.

For children who have sustained a head injury and have more than one of the following risk factors (and none of those mentioned above), perform a CT head scan within 1 hour of the risk factors being identified:

- Loss of consciousness lasting more than 5 minutes (witnessed).
- Abnormal drowsiness.
- Three or more discrete episodes of vomiting.
- Dangerous mechanism of injury (high-speed road traffic accident either as pedestrian, cyclist or vehicle occupant, fall from a height of greater than 3 metres, high-speed injury from a projectile or other object).
- Amnesia (antegrade or retrograde) lasting more than 5 minutes.

Children who have sustained a head injury and have only 1 of the risk factors in second set of recommendations and none of those in the first, should be observed for a minimum of 4 hours after the head injury. If during observation any of the risk factors below are identified, perform a CT head scan within 1 hour.

- GCS less than 15.
- Further vomiting.
- A further episode of abnormal drowsiness

These children should be urgently transferred to Birmingham Children's hospital.