Guidelines for use in Simulation Based Learning

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1. Reviewed 22/8/12. Helen Hynes
Treatment Protocol For Chest Pain

General management

Clean hands, Introduce yourself, Check patient ID, Explain what you are going to do and get patient’s permission.

Check patient’s observations early on if he/ she appears unwell, distressed, unstable. Attach to a monitor: O2 saturation, Pulse, BP, Heart tracing.

Ask for ECG. (You can take the history at the same time as you or someone else does the ECG). The ECG needs to be done as quickly as possible if you suspect an MI as definitive treatment (PCI or thrombolysis) is time dependant.

Take targeted history including specific features of chest pain and risk factors.

Perform a targeted clinical examination.

IV access and bloods including cardiac enzymes and troponin.

If patient is unstable or history/ ECG suggestive of MI get help early.

Specific Management of MI

Remember MONA

- Oxygen therapy – (Can start with 100% O2, given using mask with reservoir bag at rate of 12 to 15 litres O2 per minute. Then titrate to keep O2 Sats ≥94%
- GTN spray- 2 puffs. Consider contraindications- hypotension (systolic BP < 90 mmHg) or recent use of Sildenafil or equivalent
- Aspirin 300mg (chewable or dispersable). Consider contraindications- true allergy- absolute C/I, active bleeding- relative C/I
• Morphine: give if GTN does not relieve the pain. May be given as Cyclomorph – (Morphine and cyclazine). Start with 2.5mg and repeat as needed up to about 10mg depending on the patient’s response. If too much morphine is given, the patient may become drowsy and hypoxic. This can be reversed using Naloxone 100-200 micrograms IV.

• Call senior help if you suspect MI or if the patient is unstable

• In cases where there is continued or recurrent pain it is worth considering iv B-blocker (contraindicated in heart failure, asthma or bronchospasm, heart block, HR<50, SBP< 90mmHg)

**Definitive Treatment:** Will depend on the unit.

If STEMI (ST elevation MI) treatment of choice is Percutaneous Coronary Intervention (PCI) (+ glycoprotein IIb, IIIa inhibitor such as abciximab) if available. The goal is to perform PCI within 90 minutes of the patient arriving in the Emergency Department. If PCI is not available, may treat with Thrombolysis, such as Streptokinase or Reteplase or Alteplase but need to consider contraindications below.

**Thrombolysis contraindications**

**Absolute contraindications**

• Active internal bleeding
• CVA within 6 months
• Cranial or spinal surgery within 2 months
• Cerebral or spinal tumour or AV malformation
• BP >200/120 not amenable to ED treatment
• Severe bleeding problem (moderate, eg von Willebrands acceptable)
Relative contraindications

- Cerebrovascular disease
- Gastrointestinal or urological bleeding within 10/7, including puncture of non compressible vessels.
- BP >180/110
- Suspected left heart thrombus (i.e. mitral stenosis with AF)
- Suspected aortic dissection or pericarditis
- Infective endocarditis
- Known coagulation defect (inc. severe liver disease)
- Pregnancy
- Active haemorrhagic ophthalmic disease
- Warfarin (manufacturers recommendation, no data)
- For reteplase, age >75, small infarctions, MI onset >6hrs
- For streptokinase, streptococcal infection or streptokinase use in the past

Side effects of Thrombolysis: Haemorrhage including stroke, Allergy, Re-perfusion Arrythmias, hypotension

If unstable angina (ST depression) or suspicion of Non-ST elevation MI, treat with Heparin infusion, GTN, and consider oral Beta Blockers, Clopidogrel and Glycoprotein IIa / IIIb inhibitor such as Abciximab, and admit to a monitored bed (ICU or high dependency unit).

Basic Life Support Guidelines 2010

Reference: American Heart Association, 2010 BLS Guidelines
Advanced Cardiac Life Support Guidelines, American Heart Association, 2010

CPR Quality
- Push hard (2 inches [5 cm]) and fast (≥100/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Avoid excessive ventilation
- Rotate compressor every 2 minutes
- If no advanced airway, 30:2 compression-ventilation ratio
- Quantitative waveform capnography
  - If PetCO₂ <10 mm Hg, attempt to improve CPR quality
- Intra-aortic pressure
  - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality

Return of Spontaneous Circulation (ROSC)
- Pulse and blood pressure
- Abnormal sustained increase in PetCO₂, (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-aortic monitoring

Shock Energy
- Biphasic: Manufacturer recommendation (eg, initial dose of 120-200 J; if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered)
- Monophasic: 360 J

Drug Therapy
- Epinephrine IV/IQ Dose: 1 mg every 3-5 minutes
- Vasopressin IV/IQ Dose: 40 units can replace first or second dose of epinephrine
- Amiodarone IV/IQ Dose: First dose: 300 mg bolus. Second dose: 150 mg.

Advanced Airway
- Supraglottic advanced airway or endotracheal intubation
- Waveform capnography to confirm and monitor ET tube placement
- 8-10 breaths per minute with continuous chest compressions

Reversible Causes
- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosia)
- Hypo-/hyperkalemia
- Hypothermia
- Tetralogy of Fallot
- Tamponade, cardiac
- Toxins
- Thromboses, pulmonary
- Thrombosis, coronary

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6. Reviewed 22/8/12. Helen Hynes
**Treatment Protocol For Acute Heart Failure**

**General management**

Clean hands, Introduce yourself, Check patient ID, Explain what you are going to do and get patient’s permission.

Check patient’s observations early on if he/ she appears unwell, distressed, or unstable.

Attach to a monitor: O2 saturation, Pulse, BP, Heart tracing.

Give O2 early to maintain O2 saturation of ≥94%.

Obtain IV access.

Position patient properly (will be more comfortable sitting up if breathless).

Take targeted history including risk factors.

Perform a targeted clinical examination.

Ask for ECG. (You can take the history at the same time as you or someone else does the ECG).

Ix; CXR, ABG, Bloods to include FBC, Na, K, Urea Creatinine, Glucose, LFT, Cardiac Enzymes, Troponin and INR if on Warfarin. Consider D- Dimers if PE a possibility

If patient is unstable or history/ ECG suggestive of MI get help early.

What is your differential?
Consider Cardiac Failure (=/- MI), PE, Asthma, Pneumonia

If diagnosis of acute heart failure suspected, treat as per European Society of Cardiology protocol below.

Notes:
Morphine relieves chest pain, anxiety and restlessness and improves dyspnoea. Give 2.5mg Cyclimorph IV. Can repeat as needed. Caution advised in hypotension, bradycardia, advanced AV block and CO2 retention.

Loop diuretic:
Usually use Furosemide (formerly called Frusemide)
Begin with 40mg IV but may need more. Monitor response in terms of dyspnoea, pulmonary congestion and urinary output.

IV Nitrates:
10-20 micrograms per minute adjusted to response rate and BP. Do not give if systolic BP <90mmHg.

CPAP:
Continuous Positive Airways Pressure.

Pacing: for symptomatic bradycardia.

Cardioversion: for unstable tachycardia.
**Treatment Protocol For Pulmonary Embolus**

**General management**

Clean hands, Introduce yourself, Check patient ID, Explain what you are going to do and get patient’s permission.

Check patient’s observations early on if he/ she appears unwell, distressed, unstable. Attach to a monitor: O2 saturation, Pulse, BP, Heart tracing.

Ask for ECG.

Take a targeted history and examination including specific features of chest pain and risk factors. Consider Well’s Prediction Rule (below)

IV access and bloods including FBC, U&E, Co-agulation screen, D-Dimers.

If patient is unstable get help early.

If O2 sats are low, give high flow Oxygen. Aim to maintain O2 sats ≥94%.

**Wells Clinical Prediction Rule for PE**

<table>
<thead>
<tr>
<th>Clinical feature</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical symptoms of DVT</td>
<td>3</td>
</tr>
<tr>
<td>Other diagnosis less likely than PE</td>
<td>3</td>
</tr>
<tr>
<td>Heart rate greater than 100 beats per minute [corrected]</td>
<td>1.5</td>
</tr>
<tr>
<td>Immobilization or surgery within past 4 weeks</td>
<td>1.5</td>
</tr>
<tr>
<td>Previous DVT or PE</td>
<td>1.5</td>
</tr>
<tr>
<td>Hemoptysis</td>
<td>1</td>
</tr>
<tr>
<td>Malignancy</td>
<td>1</td>
</tr>
</tbody>
</table>

**Total points:**

*PE = pulmonary embolism; DVT = deep venous thrombosis.*

*Risk score interpretation (probability of DVT): >6 points: high risk (78.4%); 2 to 6 points: moderate risk (27.8%); <2 points: low risk (3.4%)*
**Treatment of a Pulmonary Embolus** (from Cork Emergency Medicine Handbook)

<table>
<thead>
<tr>
<th>Assess clinical state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac arrest</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Resuscitation</td>
</tr>
<tr>
<td>50mg alteplase IV</td>
</tr>
<tr>
<td>Reassess at 30 mins</td>
</tr>
</tbody>
</table>

If diagnosis of PE is likely:

Stable patient - begin heparin while arranging urgent CT Pulmonary angiogram or echo.

If unstable - call for help. Patient may need thrombolysis (eg Alteplase, consider contra-indications) and may deteriorate to sudden cardiac arrest. Arrange CTPA or echo after you have called for senior help.

Refs: Cork Emergency Medicine Handbook:
http://handbook.muh.ie/Haematology/pe.htm

**Treatment Protocol For Asthma**

**General management**

Clean hands. Introduce yourself. Check patient ID. Explain what you are going to do and get patient’s permission.

Check patient’s observations early on if he/ she appears unwell, distressed, unstable.

Attach to a monitor: O2 saturation, Pulse, BP, Heart tracing and get IV access.

**Ask for Peak Flow measurement.**

Compare the patient’s Peak Flow to his personal best (or predicted Peak Flow for height.)

If PEFR is >75% of the expected value – mild exacerbation  
If PEFR is >50 – 75% - moderate  
If PEFR is 33 – 50% - severe  
If PEFR is <33% - life threatening.

If symptomatic, begin treatment with Salbutamol 5mg via Oxygen driven nebulizer.

Manage the event using British Thoracic Society Asthma Guidelines (attached).

Call senior help early if the patient is distressed or if PEFR is less than 75% or if the patient has ever been in ICU with asthma in the past.

**Remember that the patient may need referral to ICU for ventilation** if not responding to treatment or if features of “life threatening asthma” are present (see features overleaf).

Check ABGs if O2 sats <92% or other features of life threatening asthma present.

CXR only recommended if features of life threatening asthma present, or if pneumothorax, or infection is suspected, or if the patient is not responding to treatment, or if ventilation needed.
Management of acute severe asthma in adults in hospital

Features of acute severe asthma:
- Peak expiratory flow (PEF) 33-50% of best usual predicted
- Asthma attack (bronchoconstriction) uncontrolled
- Oxygen saturation (SpO2) <90%
- Hyperinflation: chest indrawing, flaring nares
- Difficult breathing
- Cyanosis
- Tachypnoea
- Tachycardia
- Hypertension
- Anxiety
- Altered consciousness

Life Threatening Features:
- PFE < 13% of best or predicted
- SpO2 < 92% in room air
- Silent chest, cyanosis, or feeble respiratory effort
- Arrhythmia or hypotension
- Exhaustion, altered consciousness

If a patient has any life threatening feature, measure arterial blood gases. No other investigations are needed for immediate management.

Blood gas markers of a life threatening attack:
- ‘Normal’ (4.6-6.6 kPa, 35-45 mmHg PaCO2)
- Severe hypoxia: PaO2 <8 kPa
- 60 mmHg (irrespective of treatment with oxygen)
- A low pH (or high H+)

Caution: Patients with severe or life threatening attacks may not be distressed and may not have all these abnormalities. The presence of any should alert the doctor.

Near fatal asthma:
- Raised PaCO2
- Requiring mechanical ventilation with raised inflation pressures

IMMEDIATE TREATMENT:
- Oxygen to maintain SpO2 94-98%
- Salbutamol 5 mg or terbutaline 10 mg via an oxygen-driven nebuliser
- Ipratropium bromide 0.5 mg via an oxygen-driven nebuliser
- Prednisolone tablets 40-50 mg or IV hydrocortisone 100 mg
- No sedatives of any kind
- Chest X-ray if pneumothorax or consolidation are suspected or patient requires mechanical ventilation

IF LIFE THREATENING FEATURES ARE PRESENT:
- Discuss with senior clinician and ICU team
- Consider IV magnesium sulphate 1-2.5 g infusion over 20 minutes (unless already given)
- Give nebulised ipratropium more frequently e.g. salbutamol 5 mg up to every 15-30 minutes or 10 mg per hour via continuous nebulisation (requires special nebulisers)

SUBSEQUENT MANAGEMENT:

IF PATIENT IS IMPROVING:
- Continue oxygen and steroids
- Use continuous nebulisation of salbutamol at 5-10 mg/hour if an appropriate nebuliser is available. Otherwise give nebulised salbutamol 5 mg every 15–30 minutes
- Continue ipratropium 0.5 mg 4–6 hourly until patient is improving

IF PATIENT NOT IMPROVING AFTER 15-30 MINUTES:
- Continue oxygen and steroids
- Use continuous nebulisation of salbutamol at 5-10 mg/hour if an appropriate nebuliser is available. Otherwise give nebulised salbutamol 5 mg every 15–30 minutes
- Continue ipratropium 0.5 mg 4–6 hourly until patient is improving

IF PATIENT IS STILL NOT IMPROVING:
- Discuss patient with senior clinician and ICU team
- Consider IV magnesium sulphate 1-2.5 g over 20 minutes (unless already given)
- Senior clinician may consider use of IV ipratropium or IV aminophylline or progression to mechanical ventilation

MONITORING:
- Oxygen saturation
- PEF
- Blood gas measurements
- Urine output

DISCHARGE:
- When discharged from hospital, patients should have:
  - Be on discharge medication for 12-24 hours and have had inhaler technique checked and recorded
  - PEF > 75% of best or predicted and PEF diurnal variation < 25% unless discharge is agreed with respiratory physician
  - Treatment with oral and inhaled steroids in addition to bronchodilators
  - Own PEF meter and written asthma action plan
  - GP follow up arranged within 2 working days
  - Follow up appointment in respiratory clinic within 4 weeks

Patients with severe asthma (indicated by need for admission) and adverse behavioural or psychosocial features are at risk of further severe or fatal attacks
- Determine reason(s) for exacerbation and admission
- Send details of admission, discharge and potential best PEF to GP

From British Thoracic Society Guidelines, 2009

12. Reviewed 22/8/12. Helen Hynes
Management of Anaphylaxis

Resuscitation Council (UK)

Anaphylaxis algorithm

Anaphylactic reaction?

Airway, Breathing, Circulation, Disability, Exposure

Diagnosis - look for:
- Acute onset of illness
- Life-threatening Airway and/or Breathing and/or Circulation problems
- And usually skin changes

- Call for help
- Lie patient flat
- Raise patient’s legs

Adrenaline

When skills and equipment available:
- Establish airway
- High flow oxygen
- IV fluid challenge
- Chlorphenamine
- Hydrocortisone

Monitor:
- Pulse oximetry
- ECG
- Blood pressure

1 Life-threatening problems:
Airway: swelling, hoarseness, stridor
Breathing: rapid breathing, wheeze, fatigue, cyanosis, Spo₂ < 92%, confusion
Circulation: pale, clammy, low blood pressure, faintness, drowsy/coma

2 Adrenaline (give IM unless experienced with IV adrenaline)
IM doses of 1:1000 adrenaline (repeat after 5 min if no better)
- Adult: 500 micrograms IM (0.5 mL)
- Child more than 12 years: 500 micrograms IM (0.5 mL)
- Child 6 -12 years: 300 micrograms IM (0.3 mL)
- Child less than 6 years: 150 micrograms IM (0.15 mL)

Adrenaline IV to be given only by experienced specialists
Titrator: Adults 50 micrograms; Children 1 microgram/kg

3 IV fluid challenge:
- Adult - 500 – 1000 mL
- Child - crystalloid 20 mL/kg

Stop IV colloid if this might be the cause of anaphylaxis

4 Chlorphenamine (IM or slow IV)
- Adult or child more than 12 years
  - 10 mg
- Child 6 -12 years
  - 5 mg
- Child 6 months to 6 years
  - 2.5 mg
- Child less than 6 months
  - 250 micrograms/kg

5 Hydrocortisone (IM or slow IV)
- Adult
  - 200 mg
- Child
  - 100 mg
  - 50 mg
  - 25 mg

See also: Anaphylactic reactions – Initial treatment


13. Reviewed 22/8/12. Helen Hynes
**Treatment Protocol for Suspected GI Bleed**

**General management**

Clean hands; introduce yourself; check patient ID; explain what you are going to do and get patient’s permission.

**Note:**

A suspected GI bleed needs urgent assessment and management. Perform a quick primary survey to assess for signs of shock such as pallor, sweating, tachycardia, hypotension, tachypnoea and impaired consciousness.

**If the patient is unstable get help early.**

Obtain a targeted history **while** you begin the patient’s initial assessment and management.

**Initial Assessment and Management**

Maintain airway and provide high flow oxygen (keep O2 Sats ≥94%).

Position the patient flat, may need to elevate end of bed if signs of shock

Attach ECG monitor & pulse oximeter.

Insert two large bore IV cannulae in forearm veins (14G).

- Take blood for Group and Crossmatch, FBC, U&E, Biochem profile, Coag screen
- IV fluids (crystalloid) or blood according to hemodynamic response.
- NG tube and Urinary catheter.
- May need to ask for CVP line if haemodynamically unstable.
- Consult Surgical team on call to stop the cause of bleeding

Note PMHx, including IBD, peptic ulcer, aortic surgery, etc.

Medications to note: NSAIDs, Steroids, and anticoagulants.

Record vital signs and perform cardiac, pulmonary, abdominal and rectal exam.
<table>
<thead>
<tr>
<th></th>
<th>Class I</th>
<th>Class II</th>
<th>Class III</th>
<th>Class IV</th>
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</thead>
<tbody>
<tr>
<td><strong>Blood Loss %</strong></td>
<td>&lt;15</td>
<td>15-30</td>
<td>30-40</td>
<td>&gt;40</td>
</tr>
<tr>
<td><strong>Volume, mls</strong></td>
<td>750</td>
<td>800-1500</td>
<td>1500-2000</td>
<td>&gt;2000</td>
</tr>
<tr>
<td><strong>BP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Systolic</strong></td>
<td>Unchanged</td>
<td>Normal</td>
<td>Reduced</td>
<td>Very low</td>
</tr>
<tr>
<td><strong>Diastolic</strong></td>
<td>Unchanged</td>
<td>Raised</td>
<td>Reduced</td>
<td>Very low /</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>unrecordable</td>
</tr>
<tr>
<td><strong>Pulse ( beats /min)</strong></td>
<td>Slight</td>
<td>100-120</td>
<td>120 (thready)</td>
<td>&gt;120</td>
</tr>
<tr>
<td></td>
<td>tachycardia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Capillary Refill</strong></td>
<td>Normal</td>
<td>Slow (&gt;2 sec)</td>
<td>Slow (&gt;2 secs)</td>
<td>Undetectable</td>
</tr>
<tr>
<td><strong>Resp rate</strong></td>
<td>Normal</td>
<td>Normal</td>
<td>Tachypnoea</td>
<td>Tachypnoea</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(&gt;20)</td>
<td>(&gt;20)</td>
</tr>
<tr>
<td><strong>Urine flow rate (mls/hr)</strong></td>
<td>&gt;30</td>
<td>20-30</td>
<td>10-20</td>
<td>0-10</td>
</tr>
<tr>
<td><strong>Extremities</strong></td>
<td>Normal</td>
<td>Pale</td>
<td>Pale</td>
<td>Pale and cold</td>
</tr>
<tr>
<td><strong>Complexion</strong></td>
<td>Normal</td>
<td>Pale</td>
<td>Pale</td>
<td>Ashen</td>
</tr>
<tr>
<td><strong>Mental State</strong></td>
<td>Alert</td>
<td>Anxious or aggressive</td>
<td>Anxious, aggressive or drowsy</td>
<td>Drowsy, confused or unconscious</td>
</tr>
</tbody>
</table>

Baskett’s Classification of hypovolaemic shock

BMJ, Volume 300; 1453-57, 2nd June 1990
**Treatment Protocol For Unconsciousness**

**General management**

Clean hands, Introduce yourself to staff, Check patient ID

Check responsiveness: If unresponsive get senior help.

Check breathing: If not breathing go to BLS / ACLS Algorithm.

If breathing, but unresponsive, insert a Guedel airway to keep the airway open and put on high flow O2.

Check circulation: pulse, BP, Cap refill, Put on monitors, IV access

Disability - AVPU score +/- Glasgow Coma Score, examine pupils

**D E F G - Don’t ever forget glucose!** Check gluometer

Exposure - Look for causes of unconsciousness

Is there a collateral history available? Are there patient notes or a GP letter?

Hunt for a cause.

Consider glucose abnormalities, hypoxia, stroke, head injury, drug overdose, infection, complications of alcohol, sub arachnoid haemorrhage, post ictal, hypovolaemia

Are there localizing signs to suggest intracranial pathology eg unequal pupils?

Are there any other signs to suggest the cause eg purpuric rash, cyanosis, abnormal CNS / PNS signs on examination?

Get IV access and bloods including blood glucose, ABG, FBC, U&E, LFT, Coag, CRP, ESR.

Consider need for other Ix such as: Drug levels, Blood cultures, Malaria parasite screen, Urine culture, CXR, CT Brain, X ray Cervical spine if head/ neck trauma
Control Seizures if present with lorazepam +/- Phenytoin

**IF GCS less than or equal to 8, refer urgently for intubation**

**Treat potential causes: For example**

Hypoglycaemia – see below

Hyperglycaemia: Refer to [http://handbook.muh.ie](http://handbook.muh.ie)

Hypoxia – O2 and monitor, look for causes

Drug overdoses – Naloxone (100-200 micrograms IV) for Opiates, Flumazenil (0.2mg IV repeated to max of 1mg) for Benzodiazepines. For other drug antidotes, phone poison centre in Beaumont Hospital +/- look up BNF.

IV Thiamine in possible Wernike’s Encephalopathy/ alcohol related causes

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**Management of Hypoglycaemia**

- Reduced capillary blood glucose (<3.0mmol/l)
- Always take venous blood glucose prior to initiating therapy to raise blood glucose
- **Conscious**
  - Venous blood for glucose
  - +/- others if indicated
  - Give carbohydrate drink
  - Fruit juice or milk
  - Exclude hypothermia
- **Unconscious with venous access**
  - Venous blood for glucose
  - +/- others
  - Give 250ml 10% dextrose IV
  - ALS as necessary
  - Exclude hypothermia
- **Unconscious, timely venous access impossible**
  - Blood glu estimation from any vein (e.g. femoral stab)
  - Give 1mg glucagon SC or IM
  - Bucluc glucose gel (or smear jam inside cheek) if possible.
  - ALS as necessary
  - Exclude hypothermia
- **Full symptomatic recovery**
- **Coma persisting 5-10mins after glucose raising therapy**


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Head injury – control C. Spine, urgent
neurosurgical consult

Infection – (meningitis / encephalitis) – antibiotics and get senior help