Acute Coronary Syndrome (ACS) / Non ST Elevation Myocardial Infarction (NSTEMI) Pathway

Eligibility: Patients thought likely to have ACS/NSTEMI on chest pain assessment pathway

Ensure Chest Pain Assessment Pathway completed

Start s/c Dalteparin 120U/kg bd (max. 10,000 units)

Is random glucose > 11 or is patient known to have type I or II DM?

Yes

Start insulin sliding scale in addition to this protocol

No

Is pulse > 65/min and patient Killip Score I? (Use formula on back sheet)

Yes

Give Metoprolol 5 - 15mg i.v. PLUS start 50 - 100mg p.o. tds (to be continued)

No

Consider additional dose(s) i.v. Diamorphine 2.5mg Consider i.v. GTN infusion at titrated dose

Is Pain continuing?

Yes

Give i.v. Furosemide 40 - 80mg Consider i.v. GTN infusion (see separate protocol)

No

Use GRACE Score to estimate risk of in hospital death

(Use formula on back sheet)

GRACE Score > 9%

1 - 9%

High

Medium

Do 12 hour Troponin I

Discuss with cardiology re: transfer

Yes

No

Recurrent symptoms?

Yes

12 hour Troponin I > 0.5µg/l?

No

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Practice Point

ECG

- On admission
  - Within 24 hours
  - Prior to discharge
  - Any time symptomatic
  - Clinical changes

Practice Point

Hypotension (Systolic BP < 90)

- In the absence of clinical evidence of fluid overload consider a fluid challenge of 250ml normal saline i.v. stat
  - With clinical evidence of fluid overload consider inotropes

Practice Point

Use of Oxygen

- O2 should be continued if there is:
  - Hypoxia - SaO2 < 90%
  - Pulmonary oedema
  - Continuing myocardial ischaemia
  - There is no evidence that oxygen therapy has any benefit in other cases

Stop

- Dalteparin

Continue

- β-blocker if started (see practice point)

Start

- Aspirin 75mg od
  - Simvastatin 40mg nocte
  - Clopidogrel

- Discharge home

- Arrange Exercise Tolerance Test (ETT) as out-patient
Acute Coronary Syndrome (ACS) / NSTEMI Pathway

Patient discussed with cardiologists at ARI

Patient awaiting transfer

Start
- Aspirin 75mg od
- Clopidogrel 75mg od
- Simvastatin 40mg nocte
Continue
- s/c Dalteparin 120U/kg bd (max. 10,000 U)
- β-blocker (see practice point 1)

Consider starting Tirofiban infusion (only after discussion with cardiologists)
See separate protocol

Is pain ongoing
- Yes

Consider additional dose(s)
- i.v. Diamorphine 2.5mg
- Consider i.v. GTN infusion at titrated dose

Within 36 hours add p.o. Ramipril 1.25 - 2.5mg od (dose to be titrated up)

Transfer patient to ARI CCU with letter and any relevant investigation results (blood results, ECGs etc)

No

Within 36 hours add p.o. Ramipril 1.25 - 2.5mg od (dose to be titrated up)

Patient discussed with cardiologists at ARI

Declined or not suitable for transfer

Start
- Aspirin 75mg od
- Clopidogrel 75mg od
- Simvastatin 40mg nocte
Continue
- s/c Dalteparin 120U/kg bd (max. 10,000 U) for duration of admission
- β-blocker (see practice point 1)

Within 36 hours add p.o. Ramipril 1.25mg - 2.5mg od (dose to be titrated up)

Optimise anti-anginal therapy

Within 48 hours change Metoprolol to Atenolol (Metoprolol 50mg tds = Atenolol 50mg od)

Aim to discharge when symptom free after one week

- Refer to cardiac nurses for cardiac rehab programme
- GP should aim to titrate Ramipril to 10mg od or max. tolerated dose
- Clopidogrel should be continued for 3 months

1Practice Point

β-Blockers
- β-blockers not without problems. Check no contraindications
- No strong evidence for any particular one - appears to be class effect. Atenolol, having od dosage, will aid compliance
- Start with Metoprolol but if no problems change to Atenolol within 48 hours
- β-blockers should be withheld in patients with LV failure/pulmonary oedema. Subsequent cautious addition of highly selective β-blocker (e.g. carvedilol) is of proven benefit.

2Practice Point

Dalteparin in Renal Impairment
- Dalteparin (and other LMW heparins) are excreted mainly by the kidneys. LMW heparins, having smaller molecular size, bind less to plasma proteins, platelets and endothelium and so have greater bioavailability
- Unfractionated heparins (e.g. heparin sodium) are excreted mainly by the liver
- In patients with a creatinine of > 200mmol/L heparin sodium should be used.
  - Prophylactic dose is 5000units sc twice daily (but use Dalteparin 2500units once daily if heparin sodium is unavailable)
  - Treatment doses are administered as a continuous infusion of heparin sodium with 6-8 hourly APTT monitoring (target ratio usually 2 - 2.5)
- In patients with a creatinine of 130 - 200mmol/L consult BNF to calculate Dalteparin dose reductions both for treatment and prophylactic doses
**GRACE Score (Global Registry of Acute Coronary Events)**

Used to assess risk of in-hospital death in ACS

1. Find Points for Each Predictive Factor:

<table>
<thead>
<tr>
<th>Killip Score</th>
<th>Points</th>
<th>SBP mm Hg</th>
<th>Points</th>
<th>Heart Rate Beats/min</th>
<th>Points</th>
<th>Age years</th>
<th>Points</th>
<th>Serum Creatinine µmol/l</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>0</td>
<td>&lt; 80</td>
<td>58</td>
<td>≤ 50</td>
<td>0</td>
<td>≤ 30</td>
<td>0</td>
<td>0 - 34</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>20</td>
<td>80 - 99</td>
<td>53</td>
<td>50 - 69</td>
<td>3</td>
<td>30 - 39</td>
<td>8</td>
<td>35 - 70</td>
<td>4</td>
</tr>
<tr>
<td>III</td>
<td>39</td>
<td>100 - 119</td>
<td>43</td>
<td>70 - 89</td>
<td>9</td>
<td>40 - 49</td>
<td>25</td>
<td>71 - 105</td>
<td>7</td>
</tr>
<tr>
<td>IV</td>
<td>59</td>
<td>120 - 139</td>
<td>34</td>
<td>90 - 109</td>
<td>15</td>
<td>50 - 59</td>
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<td>106 - 140</td>
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<td>140 - 159</td>
<td>24</td>
<td>110 - 149</td>
<td>24</td>
<td>60 - 69</td>
<td>58</td>
<td>141 - 176</td>
<td>13</td>
</tr>
<tr>
<td></td>
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<td>160 - 199</td>
<td>10</td>
<td>150 - 199</td>
<td>38</td>
<td>70 - 79</td>
<td>75</td>
<td>177 - 353</td>
<td>21</td>
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<tr>
<td></td>
<td></td>
<td>≥ 200</td>
<td>0</td>
<td>≥ 200</td>
<td>46</td>
<td>80 - 89</td>
<td>91</td>
<td>≥ 353</td>
<td>28</td>
</tr>
</tbody>
</table>

2. Sum Points for All Predictive Factors:

3. Look Up Risk Corresponding to Total Points:

For example, a patient has Killip class II, SBP of 100mm Hg, heart rate of 100 beats/min, is 65 years of age, has serum creatinine level of 1mg/dL, did not have a cardiac arrest at admission but did have ST-segment deviation and elevated enzyme levels.

His score would be: 20+53+15+58+7+0+28+14=196

This person would have about a 16% risk of having an in-hospital death.

Similarly, a patient with Killip class I, SBP of 80mm Hg, heart rate of 60 beats/min, is 55 years of age, has serum creatinine level of 0.4, and no risk factors would have the following score:

0+58+3+41+1 = 103, which gives approximately a 0.9% risk of having an in-hospital death.

**Definitions**

**Acute MI:** symptoms ? consistent with cardiac ischaemia within 24 hours of presentation with a rise in Troponin I

**Unstable Angina:** symptoms consistent with cardiac ischaemia within 24 hours of hospital admission with no rise in Troponin I

AND at least one of:

1. Hx MI cardiac arrest, angina or ischaemic CCF
2. Hx of positive ETT
3. Documented cardiac catheterisation of ≥ 50% stenosis and ≥ 1 coronary artery
4. Hx of angioplasty with CABG
5. ECG – transient ST elevation ≥ 1mm in 3 continuous chest leads, ST depression ≥ 1mm, new T wave inversion ≥ 1mm, pseudonormaligatin of previously inverted T

**Killip Score**

Used to assess degree of acute cardiac failure

Excluded if pre-hospital cardiac arrest

**Definitions**

**Acute MI:** symptoms ? consistent with cardiac ischaemia within 24 hours of presentation with a rise in Troponin I

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