

## CASE DISCUSSION

from "Drugs in Use: Clinical Case Studies for Pharmacists 3th"

What routine test should be carried out to confirm a diagnosis of AMI ?

- 12-lead ECG
  - Distinguish STEMI from others (NSTEMI and unstable angina)
- Cardiac enzyme
  - Determine the presence or absence of myocardial necrosis
  - CK and CK-MB
    - Limitation :
      - A lot of hours after onset of MI
      - Increased after significant degrees of infarct damage
  - Troponin
    - Raised within 3~12H after MI
    - More sensitive and specific for minor damage

What routine test should be carried out to confirm a diagnosis of AMI ?

- In this case
  - the cardiac enzyme may not yet have become raised
  - Emphasis the importance of the ECG, then recheck enzyme

What actions of morphine are particularly useful in the acute phase of AMI ?

- Analgesic
  - Immediate relief from chest pain
- Anxiolytic
  - Calm the patient rapidly
- Vasodilation
  - Improve blood supply to myocardium
- Pethidine is avoided due to its short duration of action and propensity to increase blood pressure

Why is Metoclopramide necessary ?

- During the acute phase of MI, patients suffer from significant nausea and vomiting
  - Exacerbate by administration of an IV opiate
- Metoclopramide is a suitable agent
  - Be administered IV
  - Rapid onset of action

Why should IM injections generally be avoided in patients suffering with AMI ?

- CK levels can be increased by IM injection
  - May confuse the diagnosis of AMI
  - Non-cardiac problems increasing CK :
    - Cardiac resuscitation \ IM \ DM \ skeletal muscle damage \ alcoholism
- Administration by IV allows a rapid and predictable onset of action

What is the rationale for Aspirin administration during an AMI ?

- In the acute phase, the administration of Aspirin has been shown to reduce mortality at 5-week by 23%
  - Aspirin 300mg should be administered immediately, regardless of prior use.
  - 75~150mg Aspirin daily should be continued indefinitely post-MI.
  - Reduction of reocclusion and reinfarction

What other therapy should be considered at this stage ?

- Heparin
- Glycoprotein IIb/IIIa receptor antagonist or Thrombolysis
- Beta-blockers IV
- NTG IV
  - Ongoing pain or LV dysfunction
- Oxygen
  - Improve myocardial oxygen

What is the rationale for thrombolysis in the management of AMI ?

- Reduce 5W mortality in patients suffering AMI by 18%, with benefits being maintained for up to 10Y.
  - Reperfusion and myocardial tissue no die
  - Limit infarct size 、preserve LV function 、reduce deaths
  - Streptokinase : reduce 35D mortality by 25%
  - Combining Aspirin : reduce by 42%

When should thrombolysis be administered to gain maximal benefit ?

- Should be administered as early as possible after symptom onset to gain the maximum benefit from treatment.
  - door-to-needle target : 30 mins (NSF)
  - Significant benefits when administered up to 12H after symptom onset
    - Greater within the first 6H

The UK National Service Framework for Coronary Heart Disease  
(英國冠心病之全國性服務架構)

What are the contraindication to thrombolysis ?

- Absolute
  - Previous hemorrhagic stroke 、cerebrovascular event within the previous year 、active internal bleeding 、aortic dissection
- Relative
  - Uncontrolled hypertension (SBP > 180mmHg) 、anticoagulant therapy 、bleeding disorder 、recent trauma 、major surgery (within 4W) 、prolonged cardiopulmonary resuscitation 、pregnacy

What pharmaceutical issues should be considered when choosing a thrombolytic ?

- Ideal thrombolytic would be effective 、easy to administer (bolus) 、low complications
- Streptokinase :
  - Advantage :
    - Strong clinical data 、cheapest
  - Disadvantage :
    - Allergic reaction
    - Neutralising Ab within a few days

What pharmaceutical issues should be considered when choosing a thrombolytic ?

- Alteplase :
  - Strong clinical data in front-loaded regimen
    - 15mg bolus, then 50mg over 30min, then 35mg over 60 min
    - Increased incidence of intracranial hemorrhage
  - No improve survival significantly in comparison to Streptokinase
  - No allergy and Ab response
  - More expensive !!
- Reteplase (double-bolus agent) and Tenecteplase (single-bolus agent)

What monitoring should be undertaken for patients prescribed and administered thrombolytic therapy ?

- Hemorrhage :
  - Checking a full blood count prior and after
  - Risk for up to 4 D following the administration
- Hemodynamic instability :
  - Blood pressure (hypotension)
- Reperfusion arrhythmia :
  - Heart rate \ rhythm
- Repeat 12-lead ECG at 90 mins post-thrombolysis
  - Resolution of the ST segment (successful !)

What alternative strategies could be employed when thrombolysis is contraindicated ?

- Angioplasty and intracoronary stent placement
  - In patient presenting late (48H or more), myocardial damage is irreversible.
- Standard therapy : Heparin \ Aspirin \ NTG IV
- Beta-blocker :
  - Reduce ischemia-related tachyarrhythmia

Is intravenous Heparin indicated in this patient ?

- Heparin :
  - Weight-adjusted
  - Bolus dose followed by a continuous infusion
  - Monitor APTT/APTT<sub>r</sub> initiation and after any dosage changes
  - The aim is 2X of the control
  - Low-molecular-weight Heparin is unlicensed
  - Enoxaparin and Tenecteplase is both safe and effective in AMI (from the ASSENT-3)

Is intravenous Heparin indicated in this patient ?

- Heparin is indicated in combination with Tenecteplase \ Alteplase \ Reteplase for a minimum period of 48H
  - Protect against reocclusion
- Streptokinase no co-prescribed with Heparin
  - Increased risk of cerebral bleeding

What other therapies might be considered at this stage ?

- Aggressive blood sugar management in AMI (IGAMI study)
  - Reduce mortality by 11% when an aggressive insulin/glucose/potassium infusion for the first 24H
  - Sliding-scale insulin therapy

### Outline a pharmaceutical care plan for Mr. Wang

- Evidence-based strategies
- Efficacy and adverse effect
- Information on aims of therapy 、 dose titration post-discharge
- Adequate lifestyle advice
- .....

### Why are his potassium levels a cause for concern ? What other electrolytes should be monitored closely ?

- Reduction in K<sup>+</sup> maybe to post-infarction arrhythmias
  - Excess catecholamine release
  - Intensive insulin/glucose infusion
  - Loop diuretic
- Magnesium and Calcium should be monitored
- Sodium 、 Creatinine and Urea should be monitored throughout his diuretic therapy

### Comment in the drugs Mr. BY was taking prior to admission ?

- Nifedipine may increase early mortality post-MI and no associated with a reduction in cardiac events in the long-term.(SPRINY-2)
- Isosorbide mononitrate is an effective anti-anginal agent
  - No shown to improve outcomes

### What is the rationale for ACEI post-MI ? How should ACEI therapy be initiated ?

- Reduce in 30D mortality by 7% overall
  - Reduce LV ejection fraction 、 HF 、 DM 、 anterior infarct and tachycardia
  - Early initiation (24H) of therapy is recommended
  - Be temporarily delayed, when hemodynamic instability (SBP<90)
  - Be initiated at low doses to avoid first-dose hypotension and titration
  - Renal function should be checked (within 48H)

### Should beta-blocker therapy be considered at this stage ?

- Early IV beta-blocker is to reduce the risk of post-infarct arrhythmias
  - 20% reduction in mortality overall
  - Reduce in sudden cardiac death
  - 23% reduction in CAPRICORN (Carvedilol VS placebo)
  - Consider concurrent HF and LV function

### What advice would you give about the initiation of a beta-blocker ?

- Starting at low dose and monitoring HR 、 BP 、 ABS and symptoms of HF
  - Titration to Max by doubling at 2W intervals
  - If symptoms be exacerbated, additional diuretic may be required or interval extended

Comment on Mr. Wang's cholesterol.

- Cholesterol should be measured within 24H of onset with AMI
  - After 24H shown to fall and for 3M
  - Treatment with  $>5$  mmol/L (193) and LDL  $>3$  mmol/L (NSF)

How should Mr. Wang's cholesterol level be managed ?

- Dietary in combination with Statin
  - Using diet alone, reduction of CH by 5%
  - Statin : reduction 25~35% of CH
    - Reduce the risk of death 、 reinfarction 、 CV events
    - Starting at a clinically effective dose
    - Recheck CH in 3M and liver function annually
  - When CH  $>3.5$ mmol/L (135), Statin should be initiated in post-MI

A subcutaneous insulin regimen should be initiated on cessation of his sliding-scale IV insulin ?

- Combination of a long-acting insulin with short-acting
  - Be maintained for Mix of 3M post-infarction

*Thank You for Your Attention!!*