

## **1. INTRODUCTION**

The term 'acute coronary syndromes' (ACS) encompasses a range of conditions including unstable angina, non-ST-segment-elevation myocardial infarction (NSTEMI) and ST-segment-elevation myocardial infarction (STEMI). All are due to a sudden reduction of blood flow to the heart, usually caused by the rupture of an atherosclerotic plaque within the wall of a coronary artery, and may cause the formation of a blood clot that wholly or in part occludes the coronary artery.<sup>a</sup>

People with acute coronary syndromes may have a poor prognosis without prompt and accurate diagnosis. Treatments are available to help ease the pain, improve the blood flow and to prevent any future complications.<sup>a</sup>

## **2. RECOMMENDED ACS PATHWAY**

The recommended ACS pathway is outlined below.

**Initial ACS Medical Therapy<sup>1</sup>:**  
 Assess bleeding risk first in all patients<sup>2</sup> – if high, or diagnosis of MI is not secure, use Clopidogrel 300mg (po/ng) instead of Ticagrelor

**STEMI:** Aspirin 300mg (po/ng/pr/iv) + Ticagrelor 180mg (po/ng)

**Non-STEMI:** Aspirin 300mg + Ticagrelor 180mg + Fondaparinux 2.5mg sc

**Suspected ACS**  
 Acute symptoms consistent with ischaemia e.g. chest pain, SOB

**ECG:** ≤10 mins, repeat as required  
**Hs-Troponin:** at presentation and 3-6hrs later\*

**Non-diagnostic ECG (i.e. normal or unchanged) & no warning signs**

HEART score ≥ 4: intermediate/high risk

Yes

No

**ST elevation (STEMI) New LBBB**

**ST depression Deep t-wave inversion (non-STEMI) Dynamic ECG abnormality**

**Treat as STEMI**

**Treat as non-STEMI**

Refer to on-call Medical Registrar. Consider need for referral to Cardiology at PTWR.

Give aspirin 300mg. Carefully consider other diagnoses & risks of Ticagrelor /Fondaparinux

Out-of-hours

8.30am-5pm Mon-Fri

Out-of-hours

1<sup>st</sup> trop <14

1<sup>st</sup> trop ≥14

1<sup>st</sup> trop 3-14

1<sup>st</sup> trop <3

Immediately arrange Primary Angioplasty transfer to KCH Cath Lab and refer to KCH Cardiology on-call registrar<sup>5</sup>

Immediately refer to :  
 CUH Cath Lab (x3055/4311) or  
 Duty Consultant Cardiologist (via switch)

Early Referral to On-Call Medical Registrar

Repeat at 6 hrs

Repeat at 3 hrs

<7 rise

≥7 rise

≥7 rise

<7 rise

Early discussion with CUH Duty Consultant Cardiologist (via switch)

Ongoing chest pain/ ischaemia despite initial ACS medical therapy

**Consider Warning signs:**  
 a) hs-troponin T>14ng/l, or change >7ng/l  
 b) Crescendo angina  
 c) Recent Coronary Intervention (<1/12)

**Treat as non-STEMI**

**Treat as non-STEMI**

Consider discharge with an alternative differential<sup>4</sup>

<sup>1</sup> Please refer to CUH Antiplatelet Therapy Guidelines if necessary. If there is a history of prior hypersensitivity reaction to aspirin (rash, facial swelling, wheeze, anaphylaxis), do not give aspirin.

**<sup>2</sup> Assessment of bleeding risk:**

Factors such as advanced age, female sex, renal dysfunction, low bodyweight and known predisposition to bleeding e.g. co-administration of oral anticoagulants, are known to predict major in-hospital bleeding in patients admitted with ACS. Both CRUSADE<sup>c</sup> and (in patients with AF) HASBLED<sup>d</sup> scores have been validated to predict this risk.

Scoring System	HASBLED (for patients in AF)	CRUSADE
Threshold score indicating high bleed risk	3	40
Factors affecting score	<p><b>H</b>ypertension 1 point for uncontrolled high blood pressure, with a SBP <math>\geq</math>160 mmHg</p> <p><b>A</b>bnormal kidney and/or liver function 1 point for impaired kidney or liver function 2 points for both</p> <p><b>S</b>troke 1 point for previous history of stroke, especially deep brain (lacunar) stroke</p> <p><b>B</b>leeding 1 point for previous history of bleeding, anaemia or predisposition to bleeding</p> <p><b>L</b>abile INR 1 point for unstable or high INRs, or poor time (less than 60%) in the therapeutic time range</p> <p><b>E</b>lderly 1 point for age <math>\geq</math>65 or older</p> <p><b>D</b>rugs and/or alcohol 1 point for taking antiplatelet agents 1 point for consuming 8 or more alcoholic drinks per week (or 2 points for both)</p> <p><b>Key:</b> SBP = systolic blood pressure</p>	<p><b>Baseline patient characteristics</b> (female sex, history of diabetes, peripheral vascular disease), <b>admission clinical variables</b> (heart rate, systolic blood pressure, signs of CHF), and <b>admission laboratory values</b> (haematocrit, glomerular filtration rate, GFR, by Cockcroft-Gault formula)</p>
Risk Calculator		<p><a href="http://www.crusadebleedingscore.org">www.crusadebleedingscore.org</a></p> <p>NOTE: Cockcroft-Gault GFR = (140-age) x (Wt in kg) x constant.</p> <p>Serum creatinine in micromol/l</p> <p>Constant = 1.23 for men and 1.04 for women</p>

### <sup>3</sup> HEART Score

<b>History</b>	Highly suspicious	2
	Moderately suspicious	1
	Slightly suspicious	0
<b>ECG</b>	Significant ST depression	2
	Non-specific repolarization disturbance/ LBBB/ PM	1
	Normal	0
<b>Age</b>	≥ 65yrs	2
	45-65 yrs	1
	< 45 yrs	0
<b>Risk factors</b> e.g. hypercholesterolemia, hypertension, diabetes, smoker, +ve FH, BMI>30, prev MI, PCI, CABG, CVA/ TIA or peripheral arterial disease	≥ 3 risk factors or history of atherosclerotic disease	2
	1-2 risk factors	1
	No risk factors	0
<b>Troponin</b>	≥3x normal	2
	1-3 x normal limit	1
	≤ normal limit	0
<b>Total</b>		

### <sup>4</sup> Consider conditions other than acute myocardial infarction associated with cardiac troponin elevation

- Tachy-arrhythmias
- Heart failure
- Hypertensive emergencies
- Critical illness (e.g. shock/ sepsis/ burns)

- Myocarditis
- Tako-Tsubo cardiomyopathy
- Structural heart disease (e.g. aortic stenosis)
- Aortic dissection
- Pulmonary embolism, pulmonary hypertension
- Renal dysfunction and associated cardiac disease
- Coronary spasm
- Acute neurological event (e.g. stroke or subarachnoid haemorrhage)
- Cardiac contusion or cardiac procedures (CABG, PCI, ablation, pacing, cardioversion, or endomyocardial biopsy)
- Hypo- and hyperthyroidism
- Venoms
- Extreme endurance efforts

#### **<sup>5</sup> Policy for Transfer to KCH for Primary PCI for suspected STEMI**

If a senior physician (Consultant in ED or Medicine) has confirmed the diagnosis of STEMI, arrange critical care ambulance transfer to KCH before contacting KCH Cardiology Registrar. If not, or if there is doubt around the diagnosis or the patient's suitability for invasive coronary angiography, discuss with KCH Cardiology Registrar first.

#### **4. REFERENCES**

- a. NICE QS68: Acute Coronary Syndromes in adults published in 2014
- b. NICE TA 236: Ticagrelor for the treatment of Acute Coronary Syndromes published October 2011
- c. Subherwal S, Bach RG, Chen AY, Gage BF, Rao SV, Newby LK, *et al.* Baseline risk of major bleeding in non-ST-segment-elevation myocardial infarction: the CRUSADE (Can Rapid risk stratification of Unstable angina patients Suppress ADverse outcomes with Early implementation of the ACC/AHA Guidelines) Bleeding Score. *Circulation*. 2009;119(14):1873–1882
- d. Pisters, Ron; Lane, D. A.; Nieuwlaat, R; De Vos, C. B.; Crijns, H. J.; Lip, G. Y. (2010). "A Novel User-Friendly Score (HAS-BLED) to Assess 1-Year Risk of Major Bleeding in Patients with Atrial Fibrillation". *CHEST Journal*. 138 (5): 1093–100

