Initial Management of Acute Coronary Syndrome Guideline

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1	12.06.17	Clinical Written Control Documentation Group	18.11.2018	19.11.2018	18.11.2021

Brief Summary of Document:	A brief summary of important issues in the investigation and treatment of acute coronary syndrome (ACS), including a flowchart outlining the initial management of ACS in the Hywel Dda University Health Board (HDUHB).
Scope	This guideline should be used by healthcare professionals working in HDUHB who are involved in the diagnosis and treatment of **inpatients** suffering from an acute coronary syndrome. Practitioners in minor injury units or GP surgeries are encouraged to follow the initial step (Aspirin, ECG and GTN) before arranging urgent ambulance transfer as appropriate- see Appendix B for further information.

To be read in conjunction with:	Please see the list of references for relevant national guidance and evidence.

Owning committee/group	Guideline led by Senior House Officer Benjamin Masterman. Overseen by Dr Adrian Raybould, consultant cardiologist, in conjunction with our cardiology colleagues in the Aneurin Bevan Health Board.

Reviews and updates		
Version no:	Summary of Amendments:	Date Approved:
1	New Guideline	18.11.2018

Glossary of terms

Term	Definition
ACE Inhibitor	Angiotensin Converting Enzyme Inhibitor
ACS	Acute Coronary Syndrome
ARB	Angiotensin Receptor Blocker
CCF	Congestive Cardiac Failure
d/c	Discharge
ED	Emergency Department
GTN	Glyceryl trinitrate
HDUHB	Hywel Dda University Health Board
ICH	Intracranial haemorrhage
LBBB	Left Bundle Branch Block
LV EF	Left Ventricular Ejection Fraction
MI	Myocardial Infarction
NOAC	Non-Vitamin K Oral Anticoagulant (e.g. Rivaroxaban, apixaban, dabigatran, edoxaban)
NSTEMI	Non ST-elevation Myocardial Infarction
PCI	Primary Coronary Intervention
s/l	Sublingual administration
STEMI	ST-elevation Myocardial Infarction

Keywords	Acute Coronary Syndrome; ACS; Myocardial Infarction; MI; Heart attack; Chest pain; STEMI; NSTEMI; PCI; Ticagrelor;

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1. AIM

The aim of the guideline is to standardise and clarify investigation, treatment and referral of patients with suspected Acute Coronary Syndrome (ACS) in the HDUHB. This will simplify and occasionally improve the standard of care provided to these patients and may reduce time taken for definitive management to be reached.

2. OBJECTIVES

The aim of the guideline is achieved by the following factors:

- It is easily and quickly available on the intranet for all staff across HDUHB to use.
- It is easy to use with a flowchart clearly showing the important steps and information in ACS.
- It is specific to HDUHB with certain details relevant only to this area.

3. SCOPE

The guideline is for use in the treatment of any inpatient deemed to be suffering from ACS in the HDUHB. Local practice varies and it should not be taken as the universal treatment of ACS across the UK.

It affects those directly involved in the investigation and treatment of inpatients in the HDUHB, especially doctors and nurses. It is to be used in conjunction with clinical experience and IS NOT a treatment tool for all patients presenting with chest pain. The guideline is not prescriptive, the clinician responsible for the treatment of the patient should direct decisions whether these follow the guideline or not. However they should be able to justify deviations from the guideline in suspected cases of ACS.

4. GUIDELINE STEPS: FLOWCAHRT FOR TREATMENT OF SUSPECTED ACS

Suspected Acute Coronary Syndrome STEMI
12 lead ECG and clinical assessment within 10 minutes

Aspirin 300 mg, Ticagrelor 180 mg, offer GTN if ongoing pain

Investigations:
FBC, U&E, LFT, Chol, Gluc, Trop, INR if on warfarin
CXR but do not delay treatment

PRN Medications:
Morphine iv 2.5 mg*
Metoclopramide iv 10 mg
GTN 800 micrograms s/l
O2 if sats <94%

*Morphine should be used judiciously due to recent evidence suggesting an increased mortality with its use[7]

Clear cut STEMI
(see ECG criteria)

1) Initiate treatment
2) Arrange immediate transfer to Morriston Cardiac Centre via WAST- no discussion required
(see appendix A)

If unable to transfer for treatment (PCI) within 90 mins

1) Refer to medical team on site
2) Discuss with Morriston RE starting thrombolysis
3) Transfer direct to Morriston **CCU** ASAP (see appendix B)

(new) **LBBB**
or
borderline ST elevation
or
STEMI + major comorbidities

1) Initiate treatment
2) Send ECG(s) to Morriston CCU
3) Discuss with Morriston Cardiology Reg via switchboard
(see appendix A)

Treatment of STEMI

1) Resus bed + cardiac monitoring
2) Aspirin 300 mg (if not already given)
3) Ticagrelor 180 mg†
4) Unfractionated Heparin 5,000 units iv

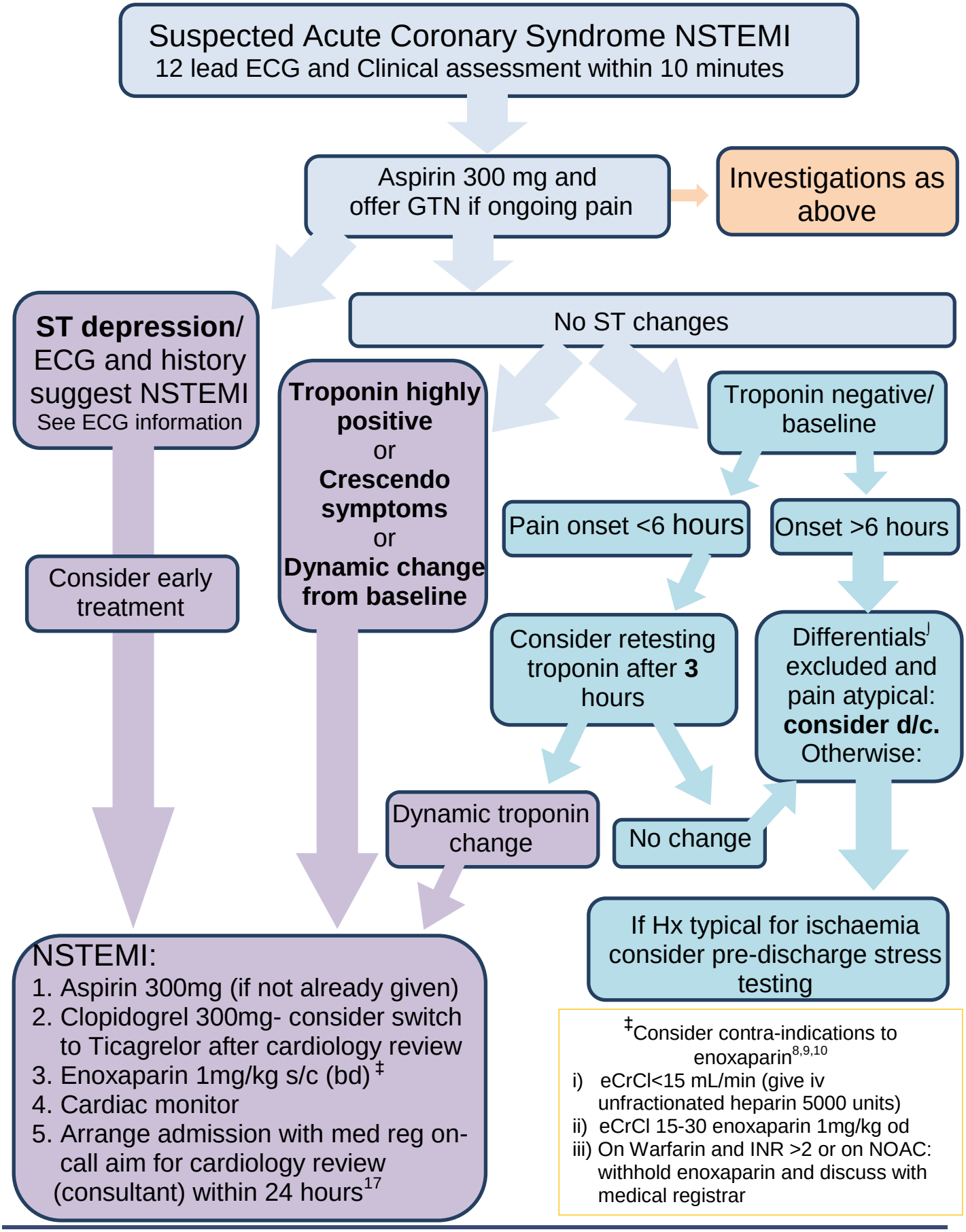
† Consider contra-indications to Ticagrelor:

i) Previous bradycardia/ sick sinus syndrome
ii) On Warfarin and INR >2 or on NOAC
iii) Previous ICH
iv) 2nd or 3rd degree Heart block

For further information on the medicines used in this guideline Consult the BNF or the SPC via the eMC

5. FLOWCHART FOR TREATMENT OF SUSPECTED ACS (WITHOUT ST ELEVATION)

Adapted from ECS guideline: "0 hr/ 3 hr rule-out algorithm of NSTE ACS using high- sensitivity cardiac troponin assays" In Roffi and Patrono et al (2016)[11]



∫Always consider alternative diagnoses. The following is a list of alternative causes for chest pain and/or a raised troponin:

Table 1: Differential Diagnoses for chest pain/ raised troponin

Cardiac	Pulmonary	Vascular	Gastrointestinal	Orthopaedic	Other
Myopericarditis	Pulmonary Embolism	Aortic Dissection	Oesophagitis/ GORD/ spasm	Musculoskeletal	Anxiety
Tachyarrhythmias	(Tension) Pneumothorax	Aortic Aneurysm	Peptic ulcer/ gastritis	Trauma	Chronic Kidney Disease
Acute heart failure	Bronchitis/ Pleuritis	CVA	Pancreatitis	Costrochondritis	Critical illness (sepsis, shock)
Hypertensive emergencies	Pneumonia	Subarachnoid Haemorrhage	Cholecystitis		Infiltrative: amyloid, haemochromatosis, sarcoid, scleroderma
Tako-Tsubu cardiomyopathy					Rhabdomyolysis
Coronary Spasm					Anaemia
Cardiomyopathy/ Structural disease					Drugs: Cocaine, doxorubicin, Herceptin, 5-FU
Cardiac trauma					

Adapted from "Table 6. Differential diagnoses of ACS in the setting of acute chest pain". In Roffi and Patrono et al (2016)[11]

6. RISK STRATIFICATION- GRACE SCORING

When considering discharge or the need for early invasive management it may be useful to calculate a GRACE (Global Registery of Acute Coronary Events) score. It is a validated tool based on observational data from >100,000 patients worldwide. It calculates an in-hospital, 6 month, 1 and 3 year mortality percentage based on:

- Age
- Systolic blood pressure
- Heart rate
- NY HF class
- Creatinine
- ST segment deviation
- Cardiac arrest at presentation
- Elevated troponin/ cardiac biomarker

It can be found at: http://www.gracescore.org/website/webversion.aspx

7. ECG CRITERIA FOR DIAGNOSIS OF STEMI[16]

The ECG should always be interpreted in the context of the clinical history. If there is a low clinical suspicion (and low GRACE score) but a suggestive ECG then confirmation with biochemistry may be necessary before invasive treatment, especially in the context of contraindications to anticoagulation.

Equally if there is a high clinical suspicion/ GRACE score but an absence of ECG changes then further leads* should be performed and referral for inpatient assessment **may be necessary even if biochemistry is negative** (e.g. for exercise testing).

*Additional leads of V7- V9 can show ST-elevation in circumflex artery occlusion and V3R- V4R in right ventricular MI.

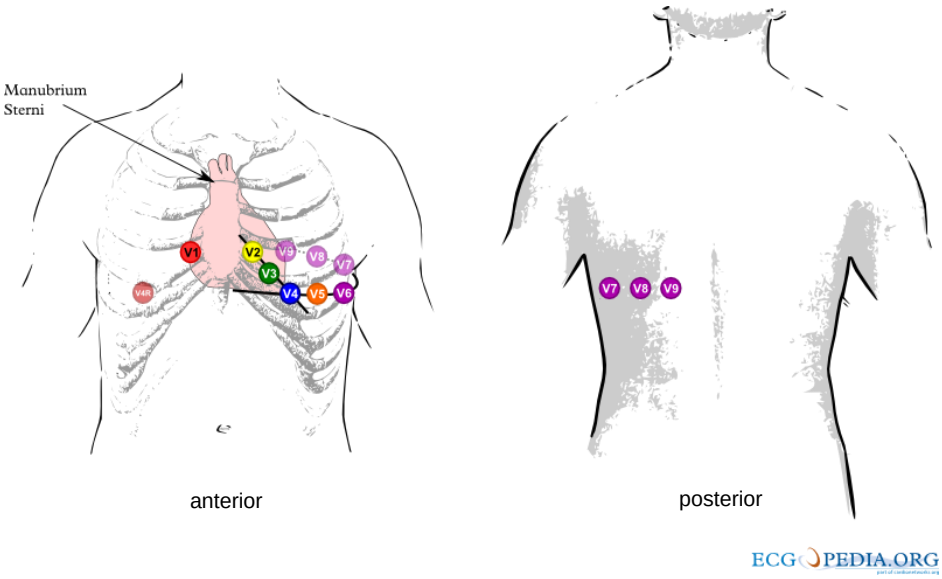


Image 1: placement of additional leads.
Image obtained from:
https://en.ecgpedia.org/wiki/Basics
Last accessed 22/07/2017

In the correct clinical context ECG can diagnose STEMI if:

In 2 contiguous leads:
≥1 mm elevation in any lead other than V2/ V3
Leads V2/3: ≥2 mm in men or ≥1.5 mm elevation in women (exact height depends on age, this is a rough guide only)
Deep ST depression in V1-3 with tall R waves, indicative of a posterior STEMI
Diagnosis aided by reciprocal ST depression elsewhere on ECG, and pathological Q waves:
- ≥2mm deep or 25% depth of QRS
- ≥1mm wide
- Anterior leads V1-3

Left Main Stem MI

A rare presentation but with high mortality, especially when not treated as an emergency. ECG shows:
- ST elevation in aVR ≥1 mm (high specificity for LMS/ proximal LAD occlusion)
- ST depression ≥1 mm in leads I, II and V4-6

7. ECG CHANGES IN NSTEMI

N.B. the ECG is absent of any changes in one third of NSTEMI diagnoses. Thus the ECG cannot be relied upon absolutely for diagnosis of NSTEMI, however it does give important prognostic information[14]. An increasing degree of ST depression, in both the number of leads and the depth of depression, indicates high mortality risk. There should also be a higher urgency for invasive management of these cases.

The ECG should be regarded as suggesting NSTEMI if depression is present in:
≥ 2 contiguous leads
≥ 1 mm (0.05mV) depression
Horizontal or downsloping ST segment (upsloping ST depression is non-specific)

A subgroup who also have a high mortality risk are those with transient ST elevation followed by normal ECG. These patients should be treated as NSTEMI but with early revascularisation[14].

T wave inversion can lead to a prompter identification of NSTEMI, but does not alter prognosis[15].

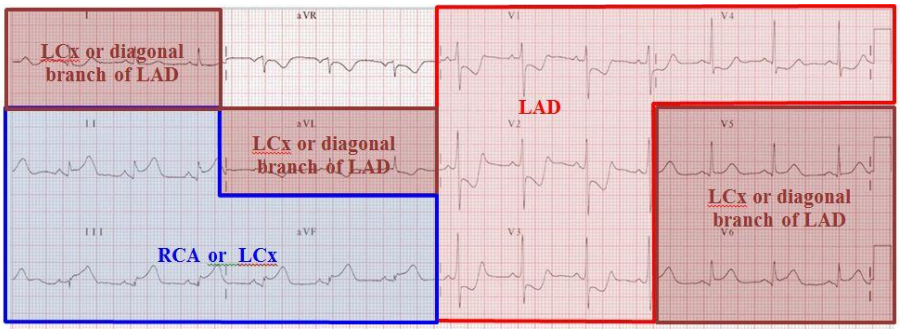


Image 2: ECG correlation to coronary arteries. Image obtained from: http://www.derangedphysiology.com/main/required-reading/cardiology/Chapter%201.1.8/ecg-localisation-coronary-artery-territories

Accessed on 11/06/2017

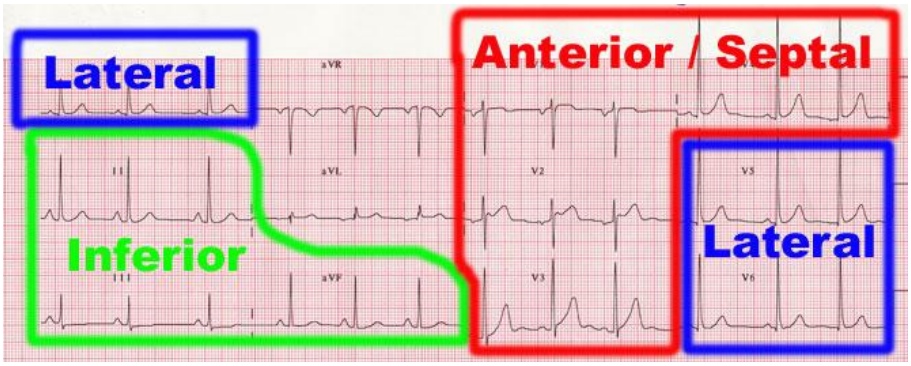


Image 3: ECG correlation to arterial territories. Image obtained from: http://www.clinicaljunior.com/cardiology/ecg.html
Accessed on 11/06/2017

8. FURTHER TREATMENT BEFORE DISCHARGE[11]

Echocardiogram should be performed to assess LV function and for investigation of possible differential diagnoses

Secondary Prevention Strategies

After stabilisation and >24 hours following diagnosis of ACS aggressive modification of risk factors should be undertaken, as the risk of MI and death remains elevated for several months following MI.

Lifestyle factors should be addressed including diet, exercise, glycaemic control and smoking cessation. Enrolment in a well-structured cardiac rehabilitation programme should be considered.

All patients who have had an acute MI should start treatment with the following drugs:

- ACE (angiotensin-converting enzyme) inhibitor: **Ramipril** starting at 2.5mg once daily. If an ACE inhibitor is not tolerated, prescribe an Angiotensin Receptor Blocker (ARB) Titrate the ACE inhibitor dose upwards at short intervals (for example, every 12–24 hours) before the person leaves hospital until the maximum tolerated or target dose is reached.

- dual antiplatelet therapy (aspirin plus a second antiplatelet agent)

- beta-blocker: **Bisoprolol** 1.25mg once daily and titrate to the maximum tolerated or target dose

- Statin: **Atorvastatin** 80 mg once daily. Consider adding ezetimibe10mg once daily if LDL >1.8 mmol/L despite maximally tolerated statin.[12]

- If the LVEF<35%, start **eplerenone** 25mg once daily

These are minimum starting doses and can be titrated upwards until the maximum tolerated or target dose is reached as deemed appropriate by the medical team responsible for the patient.

Blood pressure should also be managed aggressively, aiming for <140/ 90 mmHg.

When the patient is discharged ensure that a clear management plan is available to the person who has had an MI and is also sent to the GP, including:

- details and timing of any further drug titration
- monitoring of blood pressure
- monitoring of renal function
- follow-up and referral information (for example, cardiac rehabilitation team).

9. REFERENCES

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See also:

Summary of Product Characteristics

Clexane pre-filled syringes Sanofi. Date of Review:08.04.2018 Updated on the eMC:20.9.2018. Accessed at: https://www.medicines.org.uk/emc/product/4499/smpc#

Brilique 90mg film coated tablets AstraZeneca UK Limited. Date of Review: 26.7.2018 Updated on the eMC: 6.8.2018. Accessed at: https://www.medicines.org.uk/emc/product/5767/smpc#DOCREVISION

10. APPENDIX A: ABERTAWE BRO MORGANNWG STEMI TRANSFER CHECKLIST

WGH ED STEMI TRANSFER CHECKLIST

Date	
Time	
Staff code/signature	

(Tick each box when completed)

Barn Door STEMI for PCI

- ☐ Consistent history
- ☐ Definite STEMI on ECG (not just LBBB)
- ☐ No major co-morbidities (dementia/cancer)

↓

- ☐ Activate Morriston cath lab via CCU directly 901792 703 920

↓

Possible STEMI for PCI

- ☐ Atypical Symptoms
- ☐ Borderline ECG (or suspected new LBBB)
- ☐ Significant co-morbidities/PCI may not be appropriate

↓

- ☐ Fax ECG to Morriston CCU 01792 703 180 (fax)
- ☐ Discuss with Cardiology Reg (Morriston switch then bleep). Continue below if accepted for transfer

↓

Arrange Transfer

- ☐ Contact Ambulance Control 1128 / 1129
- ☐ Request 'IMMEDIATE blue lights transfer'
- ☐ Transfer to Morriston cath lab within 90 minutes

If unable to transfer within 90 minute (eg no available ambulances or no capacity in cath lab) consider thrombolysis on site. Inform Morriston Cardiology Reg. If ambulance subsequently available transfer with lysis in progress

↓

Investigations and Treatments (DO NOT DELAY TRANSFER)

- ☐ Aspirin 300mg PO
- ☐ GTN spray/morphine for pain
- ☐ Ticagrelor 180mg PO
  Contraindicated if:
  - Warfarin, NOAC or previous ICH
  - Bradycardia or sick sinus syndrome
  - 2nd or 3rd degree heart block
- ☐ Unfractionated Heparin 5000 units IV
- ☐ GTN infusion if pain persists & BP tolerates (NB: requires nurse escort)

- ☐ FBC, U&E, LFT, Trop T, lipids
  - INR if warfarin
- ☐ Chest X-ray – portable in resus
- ☐ ECG repeat if clinical change – eg bradycardic
- ☐ Document focused history/examination

- ☐ Fax a copy of the completed checklist and ECG to Morriston CCU 01792 703 180 (fax)
- ☐ Ensure a copy of the checklist, ECGs and any other notes go with the patient

Focused History/ Examination

ECG Interpretation

ST elevation:

☐ I	☐ aVR	☐ V1	☐ V4
☐ II	☐ aVL	☐ V2	☐ V5
☐ III	☐ aVF	☐ V3	☐ V6
Sinus Rhythm: Other Rhythm:			

ST depression:

☐ I	☐ aVR	☐ V1	☐ V4
☐ II	☐ aVL	☐ V2	☐ V5
☐ III	☐ aVF	☐ V3	☐ V6
☐ LBBB ☐ RBBB			

Clinical Details

Main Pain: ☐ Chest ☐ Back ☐ Throat/ jaw ☐ Other

Radiating: ☐ L arm ☐ R arm ☐ Both ☐ Back ☐ Throat/ jaw ☐ Other

Nature: ☐ Heavy ☐ Tight ☐ Burning ☐ Sharp ☐ Stabbing ☐ Other

Exacerbating: ☐ Exertion ☐ Rest ☐ Movement ☐ Inspiration

Relieving: ☐ Rest ☐ GTN

Onset: ☐ Sudden ☐ Gradual

Duration: ☐ Constant ☐ Intermittent Time of onset: ☐

Associated: ☐ Nausea ☐ Vomit ☐ Sweating ☐ Palpitations ☐ SOB ☐ Syncope

Risk Factors

Known Cardiac History:

☐ MI ☐ Angina ☐ Angioplasty ☐ Stent ☐ CABG ☐ PPM ☐ ICD

☐ Smoking ☐ Hypertension ☐ High Cholesterol ☐ Diabetes ☐ Family History

Other relevant history

Focused Examination

11. APPENDIX B: TRANSFER OF BARN DOOR STEMI

Taken from "PPCI Integrated care pathway version 1.4" by Dr D Smith of ABMUHB