Royal Cornwall Hospitals NHS Trust

POLICY UNDER REVIEW

Please note that this policy is under review. It does, however, remain current Trust policy subject to any recent legislative changes, national policy instruction (NHS or Department of Health), or Trust Board decision. For guidance, please contact the Author/Owner.

Information Category	Detailed Information
Document Title:	Management of Acute Chest Pain of Suspected Cardiac Origin (Unstable Angina/ NSTEMI) in Cornwall Policy V7.0
This document replaces (exact title of previous version):	Chest pain and Acute Coronary Syndrome (ACS) Pathway Guideline V6.1
Date Issued / Approved:	3 March 2020
Date Valid From:	June 2020
Date Valid To:	December 2024
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Brief summary of contents:	This guideline applies to 'ST elevation MI / Non ST elevation MI / Unstable angina/ NSTEMI. This document provides guidance for any professional involved in the clinical management of patients, presenting to either secondary or primary care NHS care providers in Cornwall, with chest pain due to suspected or proven acute coronary syndrome.
Suggested Keywords:	Cardiology, Chest pain Acute Coronary Syndrome, Ticagrelor Early Rule Out TNI, 'ST Elevation MI, Non ST Elevation MI, Unstable Angina'
Target Audience:	**RCHT:** Yes **CFT:** No **CIOS ICB:** No
Executive Director responsible for Policy:	Chief Medical Officer

Information Category	Detailed Information
Approval route for consultation and ratification:	Consultant Cardiologists Members of the Cardiology Speciality Cardiology Governance Meeting
Manager confirming approval processes:	Sharon Matson
Name of Governance Lead confirming consultation and ratification:	Siobhan Hunter
Links to key external standards:	None
Related Documents:	1. Stefan Agewall, John F. Beltrame, Harmony R. Reynolds, Alexander Niessner, Giuseppe Rosano, Alida L. P. Caforio, Raffaele De Caterina, Marco Zimarino, Marco Roffi, Keld Kjeldsen, Dan Atar, Juan C. Kaski, Udo Sechtem, Per Tornvall, on behalf of the WG on Cardiovascular Pharmacotherapy, ESC working group position paper on myocardial infarction with non-obstructive coronary arteries, *European Heart Journal*, Volume 38, Issue 3, 14 January 2017, Pages 143–153, https://doi.org/10.1093/eurheartj/ehw149 2. Fourth Universal Definition of Myocardial Infarction Guidelines ESC Clinical Practice Guidelines.
Training Need Identified:	No
Publication Location (refer to Policy on Policies – Approvals and Ratification):	Internet and Intranet
Document Library Folder/Sub Folder:	Clinical / Cardiology

This document is only valid on the day of printing.

Controlled Document.

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Management of Acute Chest Pain of Suspected Cardiac Origin (Unstable Angina/ NSTEMI) in Cornwall Policy

V7.0

June 2020

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For more information about your obligations under the DPA18 please see the *Information Use Framework Policy* or contact the Information Governance Team

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1. Introduction

1.1. Acute coronary syndrome (ACS) describes the constellation of signs and symptoms compatible with acute myocardial ischemia-chest pain/discomfort/pressure, dizziness/light-headedness, shortness of breath and sweating. ACS clinical spectrum includes unstable angina, non ST-segment elevation myocardial infarction (NSTEMI) and ST-segment elevation myocardial infarction (STEMI).

1.2. Disruption of atheromatous plaque is the pathophysiologic basis of ACS. Following plaque rupture and the initiation of thrombotic cascade, myocardial ischaemia and injury sets in and lead to differing clinical forms of ACS. ACS with the presence of myocyte necrosis characterises myocardial infarction. At RCHT we currently employ high sensitivity troponin assay to detect myocardial infarction. ACS with no evidence of myocardial injury constitutes the clinical spectrum of unstable angina. Patients with myocardial infarction are further classified into STEMI and NSTEMI based on the presence or not of persistent ST segment elevation on ECG.

1.3. The umbrella term “acute coronary syndrome” is useful in that it groups patients with symptoms consistent with acute myocardial ischemia and is the basis for subsequent established diagnostic and treatment decisions. In England and Wales in 2016/17 more than 87,500 hospital admissions were caused by MI. According to the Myocardial Ischaemia National Audit Project (MINAP), of these, 39% were STEMIs and 61% were NSTEMIs. Almost twice as many men had MIs as women.

1.4. At the Royal Cornwall Hospital approximately 1250 ACS patients are treated per annum of which 220 are STEMI patients. Our aim is to treat all STEMI patients by PPCI with a door to balloon time of < 60 minutes, as all the evidence point to maximal benefit of PPCI with early revascularisation. We also aim to perform invasive coronary angiography +/- PCI in all appropriate ACS patients within 72 - 96 hours of admission to hospital in accordance with the national guidelines.

1.5. If untreated, the prognosis is poor and mortality high, particularly in people who have had myocardial damage. Appropriate triage, risk assessment and timely use of acute pharmacological or invasive interventions are critical for the prevention of future adverse cardiovascular events (myocardial infarction, stroke, repeat revascularisation or death).

1.6. People who have had an acute coronary syndrome benefit from treatment to reduce the risk of further MI or other manifestations of vascular disease. This is known as secondary prevention.

1.7. The following pathway should be implemented for patients with chest pain which

is suspected to be due to acute cardiac ischaemia.

1.8. This version supersedes any previous versions of this document.

2. The Guidance

2.1. Chest pain is a very common symptom leading to assessment of patients in Emergency department and/or acute medical unit. Acute coronary syndrome typically presents with chest pain or discomfort. Assessment of these patients with acute chest pain to identify acute coronary syndromes should include clinical evaluation, 12 lead ECG and serial measurement of markers of myocardial injury (currently by high sensitivity troponin at RCHT). Prompt pharmacological therapy and coronary intervention is the main stay of treatment in this group of patients to minimise associated mortality and morbidity. Further long term evidence based drug therapy reduces future cardiovascular morbidity.

2.2. This guideline aims to assist the attending health care professionals in treating patients with acute coronary syndrome with particular emphasis on immediate pharmacotherapy, risk assessment for urgent coronary angiography, secondary prevention, cardiac rehabilitation and post MI health and lifestyle advice. It is also designed to enable an early `rule out` of an acute coronary syndrome in low risk patients to facilitate early discharge from hospital within four hours of their presentation.

3. Scope

This document provides guidance for any professional involved in the clinical management of patients, presenting to either secondary or primary care, NHS care providers in Cornwall, with chest pain due to suspected or proven acute coronary syndrome.

This will include:

- GPs
- Specialist Nurses
- Junior Drs
- Speciality Registrars
- Consultants

4. Definitions / Glossary

4.1. **Assessment for possible acute coronary syndrome (ACS)**

Symptoms that may indicate ACS include:

- *Pain or discomfort in the chest* and/or *the arms, back, neck or jaw lasting longer than 15 minutes.*

- *Chest pain with nausea, vomiting, marked sweating and/or breathlessness, or haemodynamic instability.*

- *New-onset chest pain or abrupt deterioration of stable angina, with recurrent pain occurring frequently with little or no exertion and often lasting longer than 15 minutes.*

4.1.1 Consider the history of the pain, any cardiovascular risk factors, history of ischaemic heart disease and any previous treatment, and previous investigations for chest pain.

4.2. ***Abbreviations:***

ACS	Acute Coronary Syndrome
MI	Myocardial Infarction
STEMI	ST elevation Myocardial Infarction
NSTEMI	Non ST elevation Myocardial Infarction
UA	Unstable Angina
LBBB	Left Bundle Branch Block
MINAP	Myocardial Ischaemia National Audit Project
PCI	Percutaneous Coronary Intervention
CXR	Chest X-ray
ICH	Intracranial Haemorrhage
LVEF	Left Ventricular Ejection Fraction
BNF	British National Formulary
COW	Cardiologist of the Week
PLATO	The Study of Platelet Inhibition and Patient Outcomes
Hs- TnI	High sensitivity troponin I
MINOCA	Myocardial Infarction with non-obstructive coronary arteries

5. Ownership and Responsibilities

This section provides a detailed overview of the strategic and operational roles responsible for the development, management and implementation of this policy/procedure.

5.1. **Role of the Clinical Lead in Cardiology**

- Reviewing this document every 3 years (or sooner if new, relevant national guidelines are published.

5.2. **Role of the Managers**

Line managers are responsible for:

- Ensuring staff are aware of, and act upon, the Trust's procedural documents.
- Implementing the procedural documents for the areas in which they apply.
- Notifying all new and existing staff on how to access both current and archived Trust procedural documents.
- Ensuring that all staff members have access to the Trust intranet site to enable access to published procedural documents.
- Ensuring that all staff members are aware of their responsibility in maintaining

5.3. **Role of the Cardiology Speciality Governance Group**

The Cardiology speciality governance Group is responsible for:

- Signing off the reviewed document prior to upload to the document library.
- Ensuring adequate monitoring of the pathway process.

5.4. **Role of Individual Staff**

All staff members are responsible for:

- Making themselves aware of the procedural documents that relate to their role and responsibilities.
- Complying with agreed Trust procedural documents where they apply.
- Raising any queries about implementation of Trust documents with their line manager.
- Alerting their line manager of any non-compliance with procedural documents where it is noted and represents an actual risk to the Trust, its staff, patients or the public.
- Contacting the CITS Service Desk (01209 881717) if experiencing difficulties accessing the electronic Document Library.

6. Standards and Practice

6.1. **Initial assessment and treatment of suspected ACS**

This guideline applies only to patients whose history and clinical examination are suggestive of an acute coronary syndrome (ACS) as the cause of their chest pain (pain suggestive of cardiac ischaemia, often with sweating/nausea, lasting longer than 15 minutes).

- Initial assessment should include brief history, physical examination and 12 lead ECG. These are crucial.
- 12 LEAD ECG – every 15 minutes until pain-free, then at one hour and four hours after pain.
- Use the ECG for initial risk stratification: ST elevation myocardial infarction (STEMI Immediately proceed to 6.2 and activate the PPCI pathway)
- Please complete the cardiac chest pain care bundle sticker and attach to patient notes (Appendix 8)
- Blood Pressure should be recorded in both arms.

- IV access and blood samples – initial troponin 1 hours post maximal chest pain, U&E, lipids, LFT, glucose, CRP, FBC, Coag screen, CXR (do not delay other therapy). Repeat troponin 3 hours post 1st test.
- Aspirin 300 mg orally (if not already given by ambulance service).
- Morphine for pain 2.5-10mg intravenous initially, repeated if necessary after 5 minutes
- Antiemetic should be given with the first dose of Morphine unless already given prior to hospital admission. Metoclopramide 10 mg IV is first line
- Oxygen should not be routinely prescribed, but should be initiated if hypoxaemia is evidenced by reduced O2 saturation monitoring or if oxygen saturations cannot be monitored accurately.
- If the patient is symptom free with no ECG changes and initial hsTnI at ≥1 hour is <2 ng/L with a GRACE 2.0 `in hospital` risk <2%, discharge home and consider a referral to the Urgent Cardiac Chest Pain Pathway using the maxims referral system if their presenting symptoms are felt to be cardiac in origin. This also applies to patients who present >6 hours after maximal chest pain with a hsTnI of ≤34ng/L in males or ≤15ng/L in females.
- If the Initial hsTnI at 1 hour is 2-259ng/L then repeat hsTnI 3 hours after the first test. If the second hsTnI is ≤34ng/L in males or ≤15ng/L in females with no other high risk features (GRACE in hospital risk <2%) discharge home and consider a referral to the Urgent Cardiac Chest Pain Pathway if their presenting symptoms are felt to be cardiac in origin.
- If the GRACE in hospital >2% +/- dynamic ECG changes, then consider obtaining a cardiology opinion prior to discharge.
- If the second hsTnI increases <50% consider chronic causes for raised Troponin BUT treat as ACS if no other cause found.
- If the hsTnI has a >50% AND male ≥35ng/L, female ≥16ng/L rise, or is > 260ng/L admit the patient and refer them to a cardiologist. Give full ACS treatment to include dual antiplatelet therapy, Fondaparinux, a Beta Blocker, and high dose Atorvastatin if not contraindicated.
- In high risk patients, consideration should also be given for small molecule GP IIb/IIIa inhibitor in discussion with a cardiologist.
- Refer to a cardiologist without delay if any of the following apply;
    - ST depression of >1mm,
    - abnormal ECG with dynamic changes,
    - on-going chest pain / discomfort,
    - Haemodynamic instability.

Remember that these are guidelines only and that patients can still have significant coronary artery disease despite negative screening tests. If in doubt, and especially with a good history for ischaemic cardiac symptoms, refer for a specialist opinion. A +ve hs TnI rise without comparative rise is not -ve. Ensure you have accounted for hsTnI result if not thought to be cardiac in origin. Seek Cardiology advise and treat as an ACS if an explanation for a +ve hsTnI is not identified.

6.2. **Initial assessment suggests STEMI**

- ST elevation ≥ 1 mm in 2 or more contiguous limb leads or ≥2 mm in 2 or more consecutive chest leads
- Left bundle branch block (unless known to have LBBB previously)
- Posterior MI changes : Deep ST depression and tall R waves in leads V1 and V2
- **Activate Primary PCI Pathway** for STEMI management without delay (see appendix 4)
- Load with Aspirin 300mg and Ticagrelor 180 mg orally unless contraindicated (see further information on Ticagrelor below and when Prasugrel 60 mg orally should be used).

6.3. **Initial assessment suggest NSTEMI / Unstable angina**

- All patients with confirmed unstable angina or NSTEMI should be reviewed by Cardiologist of the week (COW) within 24 hours for consideration of invasive coronary angiography +/- percutaneous intervention, where appropriate, taking co-morbidities and patient wishes into consideration.
- Ticagrelor 180 mg orally stat, unless contraindicated (see further information on Ticagrelor below; when Clopidogrel 300 mg orally stat should be prescribed).
- Fondaparinux 2.5 mg subcutaneous stat and ONCE daily for 2 -8 days or until intervention or discharge, whichever is sooner (unless immediate/ urgent coronary angiography planned or contraindicated – see further information on Fondaparinux below).

Urgent discussion with on call Cardiologist is recommended for high risk ACS patients with on-going chest pain +/- dynamic ECG changes

6.4. **Concomitant Pharmacological treatment:**

- **Aspirin** 75 mg daily
- **Ticagrelor** 90 mg BD for 12 months
  - (if contraindicated Clopidogrel 75 mg OD – for 12 months, or if loaded with Prasugrel continue on Prasugrel 10 mg OD for 12 months)
- **Fondaparinux** 2.5 mg subcutaneous stat and ONCE daily for 2 -8 days or until intervention or discharge, whichever is sooner (unless immediate/ urgent coronary angiography planned within a few hours or contraindicated – see further information on Fondaparinux below)
- **Statins:** Treat all patients post MI regardless of Serum Cholesterol on admission. First line treatment should be Atorvastatin 80 mg STAT and then once daily nocte. Advise post discharge to **continue lifelong** unless it is not tolerated in which case consider reduction to 10 mg OD or switch to Simvastatin 40 mg daily (With monitoring of lipid profile after further 8 weeks to ensure target values of total cholesterol < 4 and LDL < 2 are still being met

- **ACE inhibitors:** Should be given to all patients post MI unless contraindicated. Renal function must be monitored. Initiate Ramipril 1.25 -2.5 mg OD and aim to double after 24-48 hours
- **Beta blockers:** oral beta blockers should be given to all patients unless there are clear contraindications such as asthma, severe bradycardia, second or third degree AV block or severe heart failure. Initiate Bisoprolol 1.25 -2.5 mg OD and aim to double after 24-48 hours
- **Eplerenone** 25 mg OD should be initiated in any patient with evidence of cardiac failure or LVEF < 40 %
- Consider **anti-coagulation** with Dalteparin instead of Fondaparinux and further Warfarin/NOACs – if associated Atrial fibrillation/ LV thrombus / LV aneurysm or another indication for full anti-coagulation
- **Potassium replacement** should be considered in patients with K < 3.5 especially if arrhythmias are present

6.5. **Diabetes management in acute myocardial infarction**

- All known and newly diagnosed patients with diabetes should have regular glucose monitoring and should be maintained within the strict targets, if needed initiate treatment with intravenous insulin and glucose for at least 24 hours (See CCU protocol).
- Existing oral hypoglycaemic agents should be stopped while intravenous Insulin is being given.
- Patients already on Insulin should be recommenced on their previous regime when stable.
- New diabetics or patients previously on oral hypoglycaemic agents should be referred to a diabetologist for consideration of further management.

6.6. **LV assessment in acute myocardial infarction**

- All patients should have an echocardiogram pre-discharge to assess LV function not assessed by LV gram during angiogram. If there is evidence of significant LV dysfunction, please request a repeat echocardiogram after 3 months for risk stratification and further cardiology input.

6.7. **Ticagrelor**

- Ticagrelor is a potent antiplatelet agent licensed for use in combination with aspirin to reduce the risk of further cardiovascular events in patients presenting with acute coronary syndrome (ACS).
- Ticagrelor should be commenced in all forms of suspected and/or proven acute coronary syndrome (STEMI/NSTEMI/Unstable angina) unless contraindicated.
- **Avoid Ticagrelor if the patient is on Warfarin or requires Novel Oral Anticoagulation (NOAC). Clopidogrel is the first line alternative in patients requiring anticoagulation.**

- Before Ticagrelor is continued beyond the immediate treatment, the diagnosis of ACS should be confirmed by a Cardiologist. Such patients should be reviewed on the daily round of the Cardiologist of the week, and if necessary Ticagrelor therapy stopped. Aspirin 75 mg OD and Ticagrelor 90 mg BD should be continued for 12 months in patients with all forms of ACS presentation (STEMI/NSTEMI/UA)
- Duration of treatment with Aspirin and Ticagrelor for 12 months remains the same in patients treated with Bare metal or Drug eluting stents and in those with no coronary intervention.
- Aspirin 75 mg OD lifelong thereafter.
- Patients previously on Clopidogrel or who received loading dose of Clopidogrel should further be given Ticagrelor 180 mg loading dose and 90 mg BD maintenance dose as per ACS pathway.
- Clopidogrel or Prasugrel should be discontinued on starting Ticagrelor.
- Patients on Clopidogrel can be safely switched to Ticagrelor.

➢ **Dosing**

- **Initiation:** A loading dose of 180 mg should be given as early as possible after ACS presentation

- **Maintenance dose:** Ticagrelor should be continued at a dose of 90mg twice daily for a period of 12 months. Patients prescribed Ticagrelor should also be taking Aspirin at a dose of 75mg daily which should continue lifelong (higher aspirin doses are not recommended due to increased risk of bleeding).
- Selected high risk patients may require longer term Ticagrelor. Suggested dose of 60 mg twice daily from the 13th to 36th month.

➢ **Contraindications for use of Ticagrelor**

- Hypersensitivity (e.g. angioedema)
- History of intracranial haemorrhage (ICH)
- Active pathologic bleeding (peptic ulcer, ICH)
- Moderate-Severe hepatic impairment (probable increase in drug exposure)
- Combination with strong CYP3A4 inhibitors such as Clarithromycin, Ritonavir, Azatanavir, Nefazodone, Ketoconazole

6.8. Cautions

- Bradycardia (HR < 50 min, 2nd or 3rd degree AV block)
- On oral anti-coagulants
- Known Uric acid Nephropathy
- On renal dialysis

Effect of Ticagrelor may be increased by:	Diltiazem, Fluconazole, Erythromycin, Amprenavir,

	Aprepitant, Verapamil, Quinidine, Ciclosporin
Effect of Ticagrelor may be reduced by:	Rifampicin, Dexamethasone, Phenytoin, Carbamazepine and Phenobarbital
Ticagrelor may increase the effect of:	Simvastatin (avoid dose >40mg), Digoxin, Ergot Alkaloids

6.8.3 Do not stop Ticagrelor prematurely without discussion with a cardiologist.

6.8.4 When prescribing for patients on Ticagrelor therapy, consider potential drug interactions (see BNF). The use of macrolide antibiotics, such as clarithromycin, Erythromycin and azithromycin, should be avoided during ticagrelor treatment.

6.8.5 The most commonly reported adverse reactions are dyspnoea, subcutaneous or dermal bleeding and epistaxis. Procedural site haemorrhage is also reported commonly. In the PLATO study the following bleeding episodes were seen uncommonly: intracranial haemorrhage, GI bleeding, haemoptysis and haematemesis, urinary and vaginal bleeding. GI side effects also included nausea, vomiting, diarrhoea and abdominal pain.

6.9. ***Dyspnoea:*** in the PLATO study, 11.8% of patients reported dyspnoea with ticagrelor, and approximately 1% withdrew from ticagrelor as a result. Most reported symptoms of dyspnoea were mild to moderate, and most were reported

as a single episode early after starting treatment. Dyspnoea usually resolves within 7 days.

Patients previously on Clopidogrel or who received loading dose of Clopidogrel should further be given Ticagrelor 180 mg loading dose and 90 mg BD maintenance dose as per ACS pathway

[Patients on Clopidogrel can be safely switched to Ticagrelor]

Aspirin 75 mg OD and Ticagrelor 90 mg BD should be continued for 12 months in patients with all forms of ACS presentation (STEMI/NSTEMI/UA)

Duration of treatment with Aspirin and Ticagrelor for 12 months remains the same in patients treated with Bare metal or Drug eluting stents and in those with no coronary intervention

Aspirin 75 mg OD lifelong thereafter

Clopidogrel or Prasugrel should be discontinued on starting Ticagrelor

6.10. **Anti-thrombin therapy - Fondaparinux**

- Fondaparinux sodium is a synthetic pentasaccharide that inhibits activated factor X. It is recommended by NICE for use in patients with Unstable angina (UA) or non ST-elevation MI (NSTEMI).
- **Fondaparinux is approved for use for the treatment of all Acute Coronary Syndromes (UA / NSTEMI/STEMI) patients. Patients should not be prescribed Dalteparin/ Enoxaparin simultaneously.**
- Fondaparinux 2.5mg S/C daily should be given if angiography / intervention is **NOT** planned within 24 hours. Where early angiography / intervention is planned unfractionated heparin (UFH) is preferred.
- Fondaparinux should be given once daily for at least 48 hours after admission up to a maximum of 8 days or until discharge, whichever is sooner.
- If the patient is undergoing PCI, Fondaparinux should be omitted on the morning of the procedure – if not omitted, additional UFH (50-100unit/kg adjusted to ACT) can be given to reduce the risk of catheter-related thrombosis; although bleeding risk will increase.
- Fondaparinux **should not** be used in patients with eGFR < 20 ml/min – use unfractionated heparin instead. No dosage reduction for Fondaparinux is required for the treatment of ACS patients with eGFR ≥ 20 ml/min (Note: dose adjustment is required for non-ACS indications for Fondaparinux).
- On cessation of Fondaparinux therapy for ACS, all patients should be assessed for risk of venous thromboembolism and initiated on appropriate thromboprophylaxis if needed in line with local guidance.

6.11. **Administration of Fondaparinux:**

- Fondaparinux should be administered by deep subcutaneous injection while the patient is lying down.
- Sites of administration should alternate between the left and the right anterolateral and left and right posterolateral abdominal wall.
- **Do not expel the air bubble** from the syringe before the injection to avoid the loss of medicinal product from the pre-filled syringe. The air bubble helps to minimise bruising at the site of injection.
- The whole length of the needle should be inserted perpendicularly into a skin fold held between the thumb and the forefinger; the skin fold should be held throughout the injection. The site should not be rubbed when the needle is removed.

6.12. **Tirofiban**

- Tirofiban is the Glycoprotein IIb/IIIa inhibitor of choice at RCHT.
- Tirofiban is a non-peptidal antagonist of the GP IIb/IIIa receptor and is one of the small-molecule GP IIb/IIIa inhibitors. It prevents fibrinogen from binding to the GP IIb/IIIa receptor, thus blocking platelet aggregation.
- Consider Tirofiban in ACS patients who have ECG evidence of ischaemia, especially with on-going chest pain and the patient cannot be imminently taken to cardiac cath lab for coronary angiography.
- Commencement should only be on the advice of a Cardiology consultant or SpR and patients should be monitored closely on Coronary Care.
- Tirofiban should be used in the cardiac cath lab during PPCI in combination with unfractionated heparin, where thrombus burden is evident. (Use accelerated bolus protocol for PPCI as compared to standard bolus for other ACS patients – dosing protocols in cardiac cath labs).

- **Contraindications**
  - History of stroke within 30 days
  - Previous haemorrhagic stroke
  - Active or recent (within 30 days) significant bleeding
  - Malignant hypertension
  - Recent trauma or major surgery (within last 6 weeks)
  - Platelet count < 100,000/mm3
  - INR > 1.5
  - Severe liver failure
  - Traumatic CPR/ Organ biopsy/ Lithotripsy within last 2 weeks
  - Active Peptic ulcer within last 3 months
  - Acute Pericarditis
  - Known Vasculitis
  - Haemorrhagic Retinopathy

- **Monitoring**
    - If bleeding occurs, consider discontinuing Tirofiban.
    - Platelet count, haemoglobin and haematocrit should be determined before using Tirofiban, within 2-6 hours of starting therapy and daily thereafter.
    - Half-life of Tirofiban is about 2 hours in patients with coronary artery disease and is increased by over 50% in patients with a creatinine clearance of < 30 ml/minute.

6.13. Guidance for patients with a simultaneous indication for anticoagulation and anti-platelets

- Approximately 6–8% of patients undergoing PCI have an indication for long-term oral anticoagulants (OACs).
- Compared with oral anticoagulation therapy alone, the addition of DAPT to OAC therapy results in at least a two- to threefold increase in bleeding complications.
- The indication for OAC should be reassessed and treatment continued only if a compelling indication exists {e.g. paroxysmal, persistent, or permanent AF with a CHA_2DS_2-VASc score ≥1 in men, ≥2 in women; mechanical heart valve; recent (i.e. 6 months) or a history of recurrent deep venous thrombosis or pulmonary embolism}.
- Every effort should be undertaken to implement strategies to minimize PCI-related complications in these patients. In particular, the duration of triple therapy should be limited or omitted after hospital discharge (i.e. confined to the periprocedural phase with aspirin being stopped thereafter), taking into account the ischaemic (e.g. complexity of treated CAD, amount of disease left untreated, technical considerations regarding stent implantation techniques, and results) as well as the bleeding risks.
- ***In patients treated with coronary stent implantation, triple therapy with aspirin, clopidogrel and OAC should be considered for 1 month, irrespective of the type of stent used***.
- Keep triple therapy duration as short as possible; dual therapy after PCI (oral anticoagulant and clopidogrel) to be considered instead of triple therapy.
- Triple therapy with aspirin, clopidogrel and OAC for longer than 1 month and up to 6 months should be considered in patients with high ischaemic risk due to ACS or other anatomical/procedural characteristics, which outweigh the bleeding risk.
- Dual therapy with clopidogrel 75mg/day and OAC should be considered as an alternative to 1-month triple antithrombotic therapy in patients in whom the bleeding risk outweighs the ischemic risk.
- Dual therapy with clopidogrel 75mg/day and OAC should be considered as an alternative to 1-month triple antithrombotic therapy in patients in whom the bleeding risk outweighs the ischemic risk.
- Discontinuation of antiplatelet treatment in patients treated with OAC should be considered at 12 months.

- Assess ischaemic and bleeding risks using validated risk predictors (e.g. CHA_2DS_2-VASc, ABC, HAS-BLED) with a focus on modifiable risk factors.
- Consider the use of NOACs instead of VKA when NOACs are not contra-indicated.
- In patients with an indication for VKA in combination with aspirin and/or clopidogrel, the dose intensity of VKA should be carefully regulated with a target INR in the lower part of the recommended target range and a time in therapeutic range >65-70%.
- When a NOAC is used in combination with aspirin and/or clopidogrel, the lowest approved dose effective for stroke prevention tested in AFib trials should be considered.
- When rivaroxaban is used in combination with aspirin and/or clopidogrel, rivaroxaban 15mg OD may be used instead of rivaroxaban 20mg OD
- Clopidogrel is the $P2Y_{12}$ inhibitor of choice. The use of ticagrelor or prasugrel is not recommended as part of triple antithrombotic therapy with aspirin and OAC.
- Routine use of PPIs is recommended.

6.14. **Unfavourable patient profile for a combination of oral anticoagulant and antiplatelet therapy**

- Short life expectancy
- Ongoing malignancy
- Poor expected adherence
- Poor mental status
- End stage renal failure
- Advanced age
- Prior major bleeding/prior haemorrhagic stroke
- Chronic alcohol abuse
- Anaemia
- Clinically significant bleeding on dual antithrombotic therapy

Source: 2017 ESC Focused Update on Dual Antiplatelet Therapy in Coronary Artery Disease developed in collaboration with the EACTS (European Association for Cardio-Thoracic Surgery)

6.15. **Timing of elective non cardiac surgery and guidance on discontinuation of dual anti platelet therapy**

- ESC guidance on timing of elective surgery is preferred.
- In the absence of high ischaemic risk (or ACS) elective surgery could be considered any time after 1month. In patients with high risk features, consider delaying surgery up to 6 months.
- Minimal discontinuation and prompt re-implementation time frames for patient undergoing elective surgery.

- Please continue aspirin throughout the perioperative phase, except in very high bleeding risk situations (Intracranial procedures, transurethral prostatectomy, intraocular procedures and operations with extremely high bleeding risk).
- Based on the ESC updated guidance on antiplatelet therapy, Prasugrel should be stopped 7 days prior to planned surgery, clopidogrel 5 days and Ticagrelor 3 days before planned surgery (Table below).
- Recommendation regarding anti platelet therapy prior to planned surgery:

Drug	Discontinuation	Restart
Aspirin	Do not stop	Continue
Clopidogrel	5 days before	1-4 days after
Ticagrelor	3 days before	1-4 days after
Prasugrel	7 days before	1-4 days after

- Please restart $P2Y_{12}$ Inhibitors (Clopidogrel/Prasugrel/Ticagrelor) as soon as the bleeding risk has come down (1-4d)

6.16. **Cardiac rehabilitation**

- All patients with STEMI requiring PPCI should be seen by the Cardiac rehabilitation team, within 48 hours of admission.
- All patients diagnosed with NSTEMI should be seen prior to discharge.
- All patients are referred on to the community rehab team for follow-up post discharge.

6.17. **Follow-up post discharge**

All patients with an LVEF <35% will be reviewed in Cardiology outpatient clinic at 3 months with a preceding repeat echo and 24 hour Holter ECG between 2 and 3 months after discharge. All other uncomplicated STEMI and NSTEMI patients are referred back to Primary care on discharge with follow up from Cardiac rehab only.

6.18. **Sexual activity**

6.18.1 Reassure patients that after recovery from an MI, sexual activity presents no greater risk of triggering a subsequent MI than if they had never had an MI.

6.18.2 Advise patients who have made an uncomplicated recovery after their MI that they can resume sexual activity when they feel comfortable to do so, usually after about 4 weeks.

6.18.3 When treating erectile dysfunction, treatment with a PDE5 (phosphodiesterase type 5) inhibitor may be considered in men who have had an MI more than 6 months earlier and who are now stable.

6.18.4 PDE5 inhibitors must be avoided in patients treated with nitrates or nicorandil because this can lead to dangerously low blood pressure.

6.19. **Lifestyle changes after an MI**

- **Changing diet**

6.19.1 Advise people to eat a Mediterranean-style diet (more bread, fruit, vegetables and fish; less meat; and replace butter and cheese with products based on plant oils).

6.19.2 Do not offer or advise people to use the following to prevent another MI:

- Omega-3 fatty acid capsules
- Omega-3 fatty acid supplemented foods.

6.19.3 If people choose to take omega-3 fatty acid capsules or eat omega-3 fatty acid supplemented foods, be aware that there is no evidence of harm.

- **Alcohol consumption**

Advise people who drink alcohol to keep weekly consumption within safe limits (no more than 14 units of alcohol per week for men and women and to avoid binge drinking (more than 3 alcoholic drinks in 1–2 hours).

- **Regular physical activity**

- Advise people to undertake regular physical activity sufficient to increase exercise capacity.
- Advise people to be physically active for 20–30 minutes a day to the point of slight breathlessness. Advise people who are not active to this level to increase their activity in a gradual, step-by-step way, aiming to increase their exercise capacity. They should start at a level that is comfortable, and increase the duration and intensity of activity as they gain fitness.

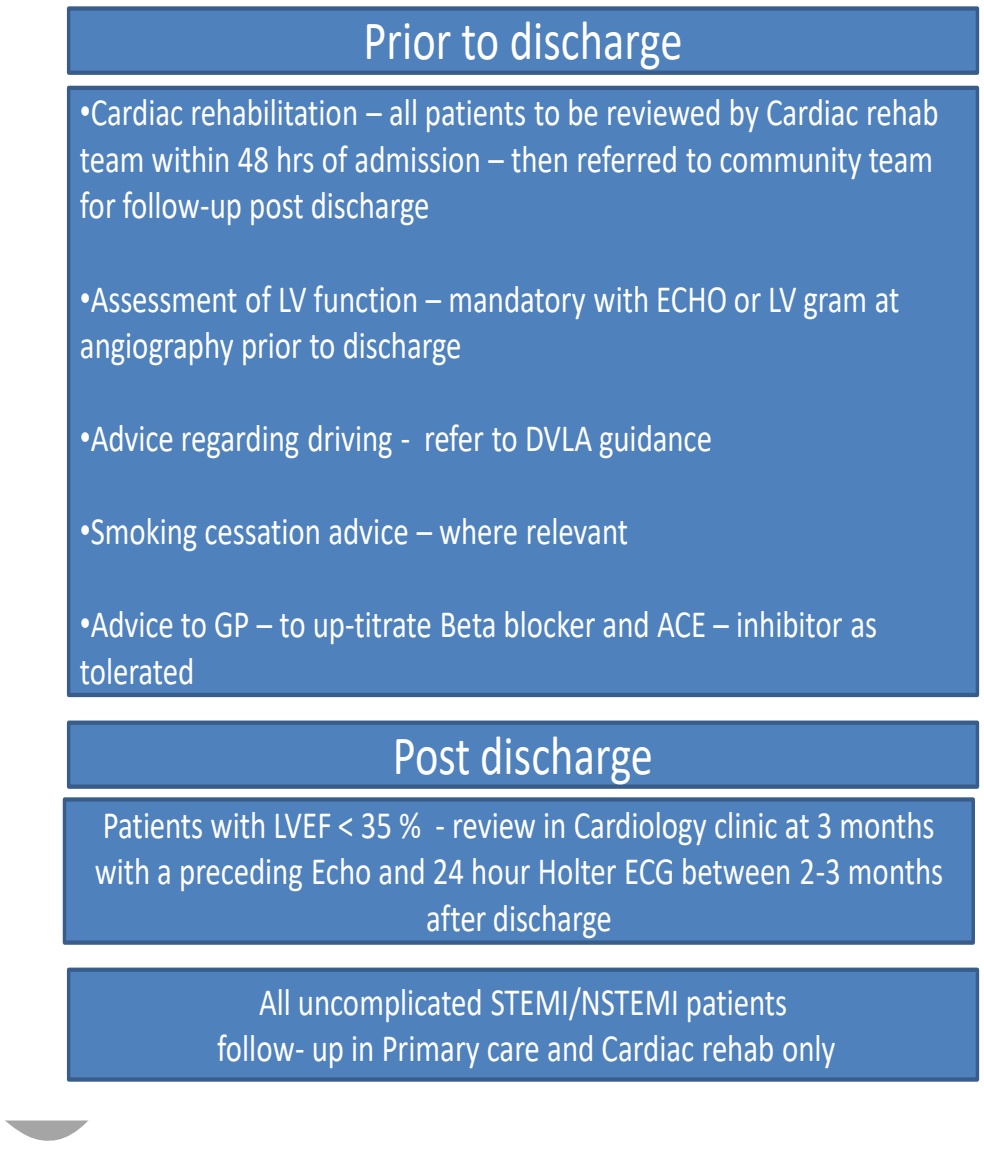
- **Smoking cessation**

- Advise all people who smoke to stop and offer assistance from a smoking cessation service.

6.20. **Advice regarding driving: Please refer to DVLA guidance –** (https://www.gov.uk/government/publications/at-a-glance)

- Unfortunately, in view of the frequent changes in DVLA guidance, we can't add a summary here. The guiding principles include the functional status of the patient, completeness of revascularisation, effect of ACS on the left ventricular function and the type of driving licence. Needless to say, type 2 licence (LGV licence) carries much stricter criteria for regaining the licence.

6.21. **Discharge planning:**



6.22. MINOCA: Myocardial infarction with non-obstructive coronary arteries

6.22.1 MINOCA is characterised by clinical evidence of myocardial infarction with normal or near normal coronary arteries on angiography. 1 Its prevalence is estimated to be 6 – 8% among patients diagnosed with MI and it is more common in women than men.2

6.22.2 MINOCA should be considered as a 'working diagnosis', analogous to heart failure, and thus prompting further evaluation to identify its underlying mechanism(s). This is important in order to achieve patient specific treatments. Further functional tests, such as Cardiac MRI, and coronary imaging can help establish this. 1

6.22.3 MINOCA can be caused by coronary plaque disease (i.e. Type 1 MI), coronary dissection, coronary artery spasm, Takotsubo cardiomyopathy, myocarditis or other forms of type 2 myocardial infarction. 1

Diagnostic criteria for myocardial infarction with non-obstructive coronary arteries 1
The diagnosis of MINOCA is made immediately upon coronary angiography in a patient presenting with features consistent with an acute myocardial infarct, as detailed by the following criteria:

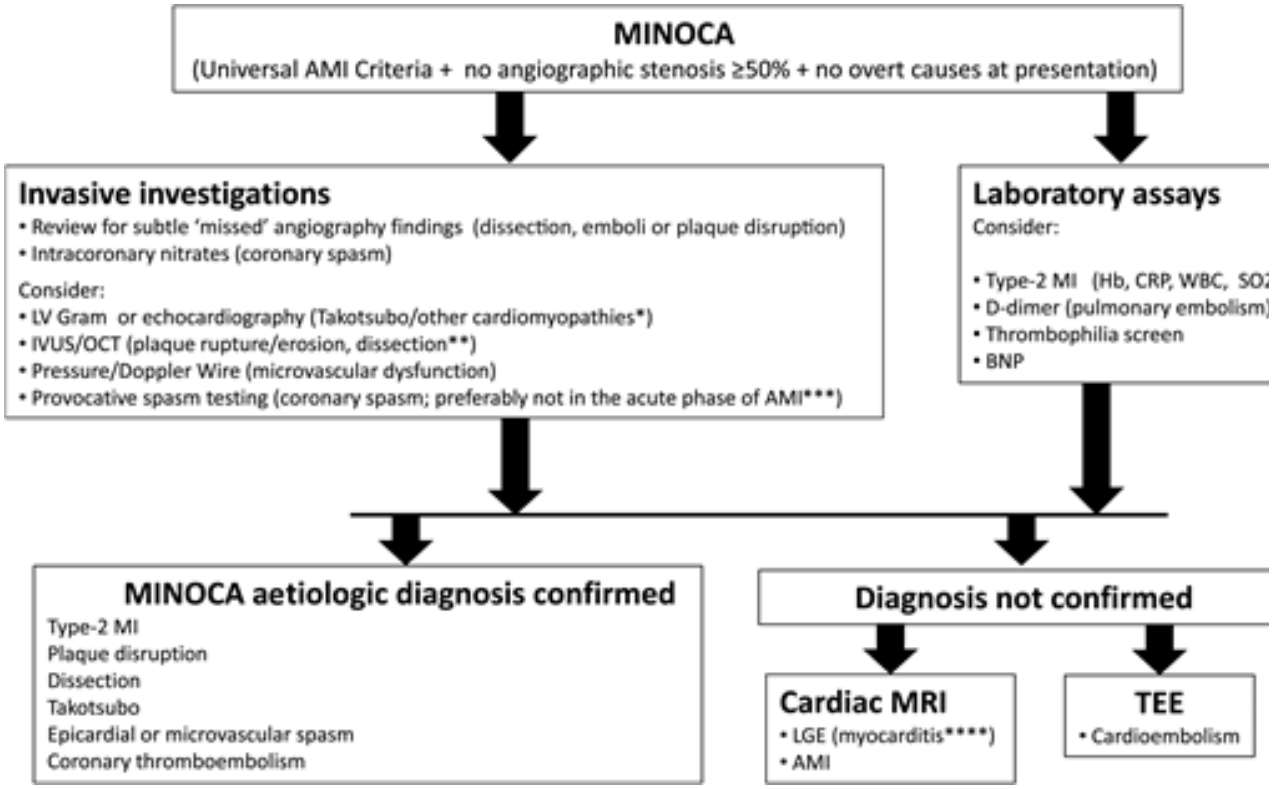
1. Acute Myocardial Infarction criteria.
    - (a) Positive cardiac biomarker (preferably cardiac troponin) defined as a rise and/or fall in serial levels, with at least one value above the 99th percentile upper reference limit.

    and

    - (b) Corroborative clinical evidence of infarction evidenced by at least one of the following:
        i. Symptoms of ischaemia
        ii. New or presumed new significant ST-T changes or new LBBB
        iii. Development of pathological Q waves
        iv. Imaging evidence of new loss of viable myocardium or new RWMA
        v. Intracoronary thrombus evident on angiography or at autopsy
2. Non-obstructive coronary arteries on angiography:
    - Defined as the absence of obstructive CAD on angiography, (i.e. no coronary artery stenosis ≥50%), in any potential infarct-related artery.
    - This includes both patients with:
        i. Normal coronary arteries (no stenosis >30%)
        ii. Mild coronary atheromatosis (stenosis >30% but <50%).

No clinically overt specific cause for the acute presentation:

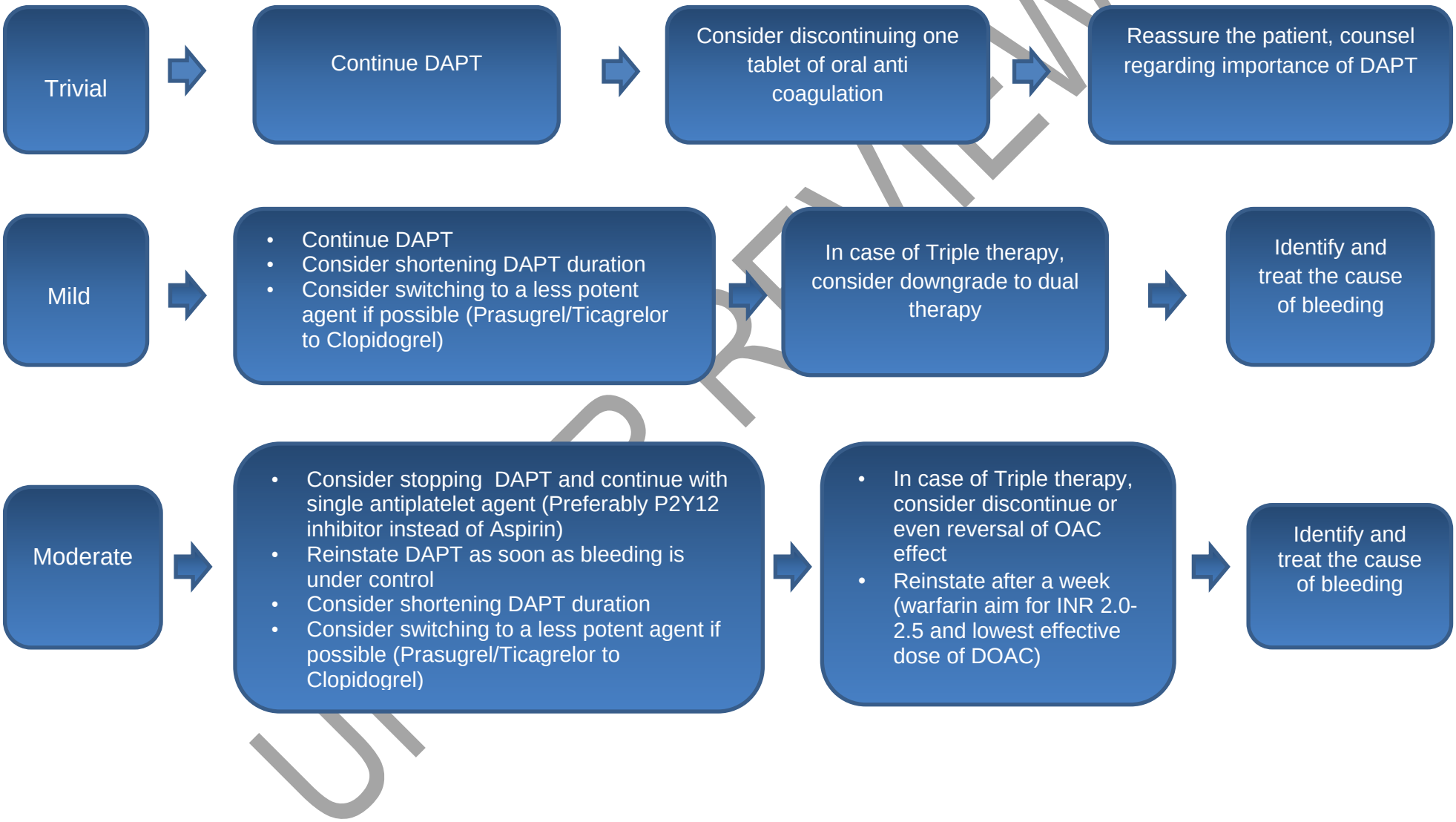
- At the time of angiography, the cause and thus a specific diagnosis for the clinical presentation is not apparent.
- Accordingly, there is a necessity to further evaluate the patient for the underlying cause of the MINOCA presentation.



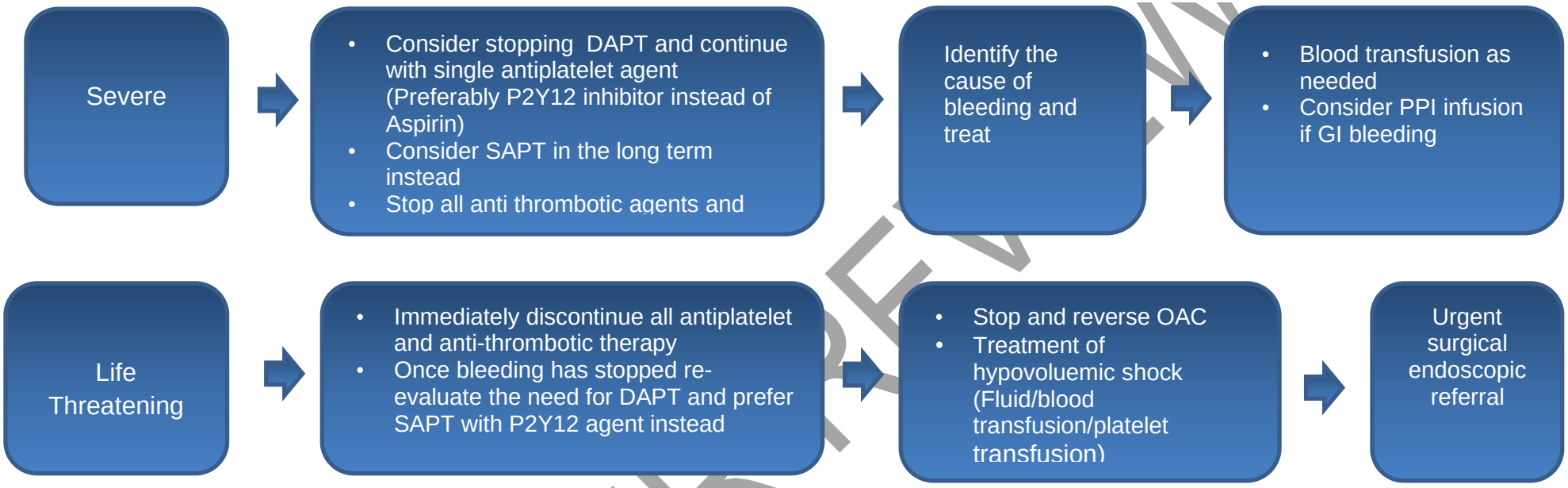
6.23. **Bleeding during treatment with dual antiplatelet therapy and/or OAC:**

The following table gives an overview of management of bleeding in patients taking dual antiplatelet therapy (and/or oral anticoagulants). A detailed description of management of severe bleeding is beyond the scope of this document.

6.24. **Bleeding During Treatment**



6.25. **Bleeding During Treatment Cont.**



7. Dissemination and Implementation

7.1. This document will be disseminated electronically se relevant stakeholders once published. It will also be available on the RCHT Document library.

7.2. These guidelines are widely discussed at the induction meetings of junior doctors especially in the Emergency department, Medical assessment unit and Cardiology department

7.3. User friendly posters with the guideline and pathways are displayed in all the relevant clinical areas.

8. Monitoring compliance and effectiveness

Element to be monitored	All of it
Lead	Clinical lead in Cardiology
Tool	Audit of the management of patients with acute coronary syndrome
Frequency	6 monthly audit for monitoring the guideline, pathways and recommendations. Future reviews guided by the audit outcomes.
Reporting arrangements	The Annual report will be reviewed through the Cardiology Speciality audit & governance frameworks
Acting on recommendations and Lead(s)	The Clinical lead in Cardiology and Cardiology department will undertake subsequent recommendations and action planning for any or all deficiencies and recommendations within reasonable timeframes.
Change in practice and lessons to be shared	Required changes to practice will be identified and action will commence within 1 month of report review A lead member of the Cardiology department will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders via the Cardiology Speciality audit & governance frameworks.

9. Updating and Review

This policy will normally be reviewed no less than every three years by the Trust's Corporate Records Manager (Records Management) unless an earlier review is required.

10. Equality and Diversity

10.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the 'Equality, Inclusion & Human Rights Policy' or the Equality and Diversity website.

10.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.

Appendix 1. Governance Information

Document Title	Management of Acute Chest Pain of Suspected Cardiac Origin (Unstable Angina/ NSTEMI) in Cornwall Policy V7.0		
Date Issued/Approved:	3 March 2020		
Date Valid From:	June 2020		
Date Valid To:	June 2023		
Directorate / Department responsible (author/owner):	Dr Sen Devadathan, Cardiology Consultant Mrs Sian Armstrong Chest Pain Nurse Specialist		
Contact details:	01872 252678		
Brief summary of contents	This guideline applies to 'ST elevation MI / Non ST elevation MI / Unstable angina/ NSTEMI. This document provides guidance for any professional involved in the clinical management of patients, presenting to either secondary or primary care NHS care providers in Cornwall, with chest pain due to suspected or proven acute coronary syndrome.		
Suggested Keywords:	Cardiology, Chest pain Acute Coronary Syndrome, Ticagrelor Early Rule Out TNI, 'ST Elevation MI, Non ST Elevation MI, Unstable Angina'		
Target Audience	RCHT	CFT	KCCG
	✓		
Executive Director responsible for Policy:	Medical Director		
Date revised:	February 2020		
This document replaces (exact title of previous version):	Chest pain and Acute Coronary Syndrome (ACS) Pathway Guideline V6.1		
Approval route (names of committees)/consultation:	Consultant Cardiologists Members of the Cardiology Speciality Cardiology Governance Meeting		
Care Group General Manager confirming approval processes	Sharon Matson		
Name and Post Title of additional signatories	Not Required		
Name and Signature of Care Group/Directorate Governance Lead	{Original Copy Signed}		

confirming approval by specialty and care group management meetings	Becky Osborne			
Signature of Executive Director giving approval	{Original Copy Signed}			
Publication Location (refer to Policy on Policies – Approvals and Ratification):	Internet & Intranet	✓	Intranet Only	
Document Library Folder/Sub Folder	Clinical / Cardiology			
Links to key external standards	None			
Related Documents:	3. Stefan Agewall, John F. Beltrame, Harmony R. Reynolds, Alexander Niessner, Giuseppe Rosano, Alida L. P. Caforio, Raffaele De Caterina, Marco Zimarino, Marco Roffi, Keld Kjeldsen, Dan Atar, Juan C. Kaski, Udo Sechtem, Per Tornvall, on behalf of the WG on Cardiovascular Pharmacotherapy, ESC working group position paper on myocardial infarction with non-obstructive coronary arteries, *European Heart Journal*, Volume 38, Issue 3, 14 January 2017, Pages 143–153, https://doi.org/10.1093/eurheartj/ehw149 4. Fourth Universal Definition of Myocardial Infarction Guidelines ESC Clinical Practice Guidelines.			
Training Need Identified?	No			

Version Control Table

Date	Version No	Summary of Changes	Changes Made by *(Name and Job Title)*
10 Jun 10	V1.0	Initial Issue	Andrew Rogers Corporate Records Manager
29 Oct 10	V2.0	Amendment of Governance coversheet to include 'Suggested Keywords', 'Training Need' and 'Publication Location'.	Andrew Rogers Corporate Records Manager
1 Feb 11	V3.0	Addition of Monitoring Compliance table.	Andrew Rogers Corporate Records Manager
15 Jan 12	V4.0	Governance information moved to an appendix. EIA updated.	Andrew Rogers Corporate Records Manager
25 Jan 12	V4.1	Governance information amended to align with format of Document Manager Upload Form.	Andrew Rogers Corporate Records Manager
24 Jul 13	V4.2	Updated Target Audience options in App 1.	Andrew Rogers Corporate Records Manager
10 Nov 15	V5.0	Amendments to changes in practise in accordance with NICE guidelines 167, CG95 and CG94. Addition of early rule out low risk patient using a 3hr definitive test.	Dr Robin Van Lingen Consultant Cardiologist
10 Jan 16	V6.1	Amendments to structure and formatted to trust document format	Dr Sen Devadathan Consultant Cardiologist
27 Feb 20	V7.0	Amendments to combine triple therapy. Transferred onto new Trust template.	Dr Sen Devadathan Consultant Cardiologist

Appendix 2. Equality Impact Assessment

<table>
<tr><th colspan="6">Section 1: Equality Impact Assessment Form</th></tr>
<tr><td colspan="6">Name of the strategy / policy /proposal / service function to be assessed
Management of Acute Chest Pain of Suspected Cardiac Origin (Unstable Angina/ NSTEMI) in Cornwall Policy V7.0</td></tr>
<tr><td colspan="3">Directorate and service area:
Specialist Medicine, Cardiology</td><td colspan="3">Is this a new or existing Policy?
Existing</td></tr>
<tr><td colspan="3">Name of individual/group completing EIA
Dr Sen Devadathan, Cardiology Consultant</td><td colspan="3">Contact details:
01872 252678</td></tr>
<tr><td>1. Policy Aim
Who is the strategy / policy / proposal / service function aimed at?</td><td colspan="5">To improve the outcome of patients presenting with chest pain due to acute coronary syndrome</td></tr>
<tr><td>2. Policy Objectives</td><td colspan="5">To provide clear speciality agreed guidelines and pathways for the diagnosis and clinical management of patients with acute coronary syndrome presenting to Royal Cornwall hospitals NHS trust</td></tr>
<tr><td>3. Policy Intended Outcomes</td><td colspan="5">Availability of a robust, measureable, Speciality agreed pathways and guidelines for the diagnosis and clinical management of patients with acute coronary syndrome</td></tr>
<tr><td>4. How will you measure the outcome?</td><td colspan="5">Outlined in section 8 of this document.</td></tr>
<tr><td>5. Who is intended to benefit from the policy?</td><td colspan="5">Patients presenting with acute coronary syndrome and health care professionals involved in their care.</td></tr>
<tr><td rowspan="3">6a). Who did you consult with?

b). Please list any groups who have been consulted about this procedure.</td><td>Workforce</td><td>Patients</td><td>Local groups</td><td>External organisations</td><td>Other</td></tr>
<tr><td>X</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Please record specific names of groups:
All Consultant Cardiologists
Cardiology Speciality Group
Cardiology Governance Meeting</td></tr>
<tr><td>c). What was the outcome of the consultation?</td><td colspan="5">Approved</td></tr>
</table>

7. The Impact

Please complete the following table. If you are unsure/don't know if there is a negative impact you need to repeat the consultation step.				
Are there concerns that the policy **could** have a positive/negative impact on:				
Protected Characteristic	Yes	No	Unsure	Rationale for Assessment / Existing Evidence
Age		X		
Sex (male, female non-binary, asexual etc.)		X		
Gender reassignment		X		
Race/ethnic communities /groups		X		
Disability (learning disability, physical disability, sensory impairment, mental health problems and some long term health conditions)		X		
Religion/ other beliefs		X		
Marriage and civil partnership		X		
Pregnancy and maternity		X		
Sexual orientation (bisexual, gay, heterosexual, lesbian)		X		

If all characteristics are ticked 'no', and this is not a major working or service change, you can end the assessment here as long as you have a robust rationale in place.

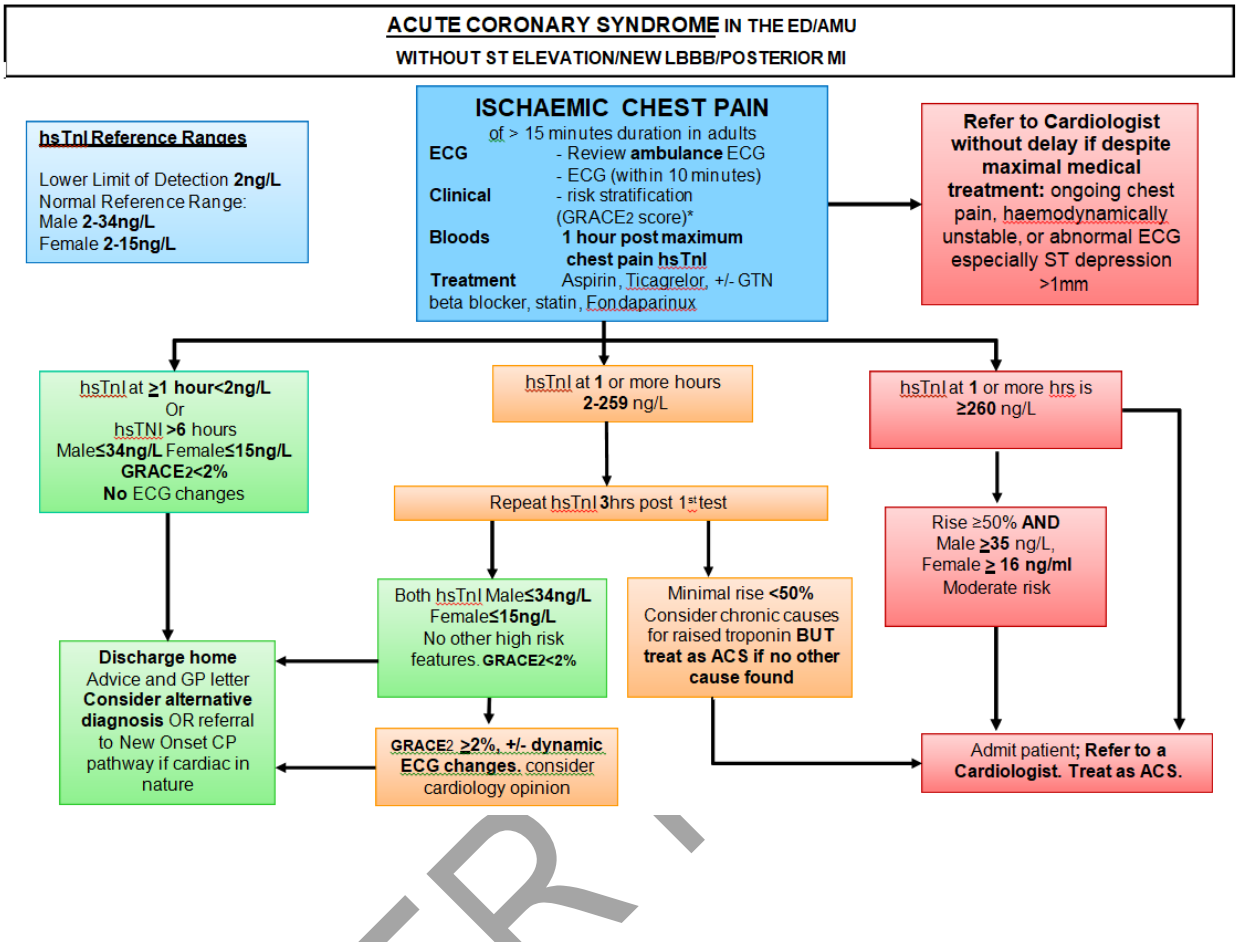
I am confident that section 2 of this EIA does not need completing as there are no highlighted risks of negative impact occurring because of this policy.

Name of person confirming result of initial impact assessment:	Dr Sen Devadathan, Cardiology Consultant

If you have ticked 'yes' to any characteristic above OR this is a major working or service change, you will need to complete section 2 of the EIA form available here: Section 2. Full Equality Analysis

For guidance please refer to the Equality Impact Assessments Policy (available from the document library) or contact the Human Rights, Equality and Inclusion Lead debby.lewis@nhs.net

Appendix 3. RCH Assessment of Suspected Acute Coronary Syndrome in the ED/MAU/AEC without ST Elevation/New LBBB/Posterior MI



- Remember that these are guidelines and patients can still have significant heart disease despite negative screening tests.
- A hsTnI rise of ≥50% has a strong positive predictive value for an ischaemic event.
- A +ve hsTnI without comparative rise is not –ve. Ensure you have accounted for hsTnI result if not thought to be cardiac in origin.
- Seek Cardiology advise and treat as an ACS if an explanation for a +ve hsTnI not identified. #