STEMI: S-T Elevation Myocardial Infarction

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STEMI is an important diagnosis, potentially fatal, not difficult to diagnose and be treated effectively, thus saving lives and improving morbidity. Being the core of acute coronary syndrome (ACS) and coronary artery disease, it ranks number one under non-communicable diseases in South Africa. Despite the presence of HIV and other infections, this will soon be the case in the rest of Africa.

Until recently, we were not doing well in managing STEMI. In public health, 60% of patients do not receive appropriate therapy in time, and 30% of those who die of STEMI could have been saved if treated according to the international guidelines. Understanding the diagnosis and treatment of STEMI also assists in treating patients with ACS and those who present with chest pain.

We know how to diagnose and treat STEMI, why then are we failing, considering that many documents and guidelines are available and frequently discussed? Our STEMI management systems fail to provide the necessary care. Vital to improving STEMI management is at the first medical contact (FMC), where the diagnosis needs to be made immediately including timely medication and transfer to a central capable hospital. In STEMI management, the clinic doctor, professional nurse and healthcare workers, porters, administrators and emergency services play a more important role than the specialist.

The South African Heart Association (SA Heart) and South African Society of Cardiovascular intervention (SASCI) run a project called "STEMI SA – Time is Muscle", working with the international project "Stent Save a Life" to improve systems of care and particularly assist those at the FMC. Should there be a need for more information about educational opportunities or you wish to participate/ contribute to this programme, you are invited to locate the STEMI SA activities' link and contact details on the www.SASCI.co.za website.

Typical chest pains are central to the diagnosis of STEMI. A central retrosternal, pressing, burning, discomfort spreading to the shoulder, neck, jaw and left arm associated with sweating, nausea and dizziness can hardly be anything else than myocardial infarction. Atypical chest pains, however, do not exclude the presence of an infarct, particularly in high-risk patients and those who have already had an event. Certain females are unique, so be careful not to miss an infarct when they present with symptoms one cannot explain! Any person experiencing similar symptoms should immediately seek medical assessment.

Management most often goes astray at the FMC. All patients with chest pains should immediately have an ECG done. Clear S-T elevation, particularly with a typical history, is all that is needed to make the diagnosis. No need to wait for blood results or chest X-rays. Apart from routine resuscitation therapy, a decision as to how to reperfuse the blocked coronary artery must be taken. Any reperfusion beyond 120 minutes of artery blockage will save very little heart muscle from undergoing necrosis. The guidelines are clear.

The guidelines on this are clear:

- If the symptoms started within less than 60 minutes and the patient can be at a cath lab for primary intervention, this strategy should be followed. Direct communication with the treating cardiologist and emergency healthcare workers would be needed. If the transfer time to the cath lab is more than 30 minutes, alternative therapy is indicated.
- If this is not possible or the pain persists for more than 6–12 hours or comes and goes, thrombolysis needs to be administered if no contraindications are present. Administering thrombolysis requires knowing the indications and contraindications. Thrombolysis should be available, and confidence in administering exist at FMC. Assistance is only a phone call away, and you should know whom to phone.

STEMI SA can provide a wall poster guiding you through the algorithm and is finalising a one-day training course that will be presented at centres participating in our drive. This initiative for speedy, appropriate systems to open a blocked coronary artery, saves lives leaving the victim with a much better prognosis to continue working and being part of the economy for years to come.

To make a difference, healthcare workers at FMC need to be competent in taking and interpreting an ECG. The STEMI SA training course will assist in doing just that. To treat STEMI efficiently, having thrombolytics available should not be an option but obligation. Adjunctive therapy includes aspirin 300 mg, low-molecular-weight heparin 30–40 mg IV and 60–80 mg subcutaneous, and clopidogrel 300 mg. A beta-blocker like bisoprolol 5 mg, if not contraindicated, is not as critical as thought previously but still recommended. Oxygen is only necessary when needed with low O_2 saturation. Morphine is given only in the presence of severe pain and discomfort but beware of nausea. Observe restless patients with/without neurologic derangement and those with a very weird-looking ECG. Do not turn your back as you may need to start resuscitation. Consider ventilation if the patient is very restless. Knowledge about the renal function is important. Nevertheless, blood tests should not delay treatment. When in a central hospital, statin will be given.

What if you do not have thrombolysis and cannot have your patient at a cath lab in less than 30 minutes? The patient will surely suffer damage to the heart muscle because effective management was not available. Be informed and confident to manage the STEMI and have the

necessary medication at hand to avoid contributing to unnecessary morbidity. In such a case do what you can, i.e. administer the adjunctive medication and transfer to a centre capable of managing STEMI – preferably a cath lab as soon as possible. Know where to find a cath lab and whom to contact.

What if thrombolysis was administered?

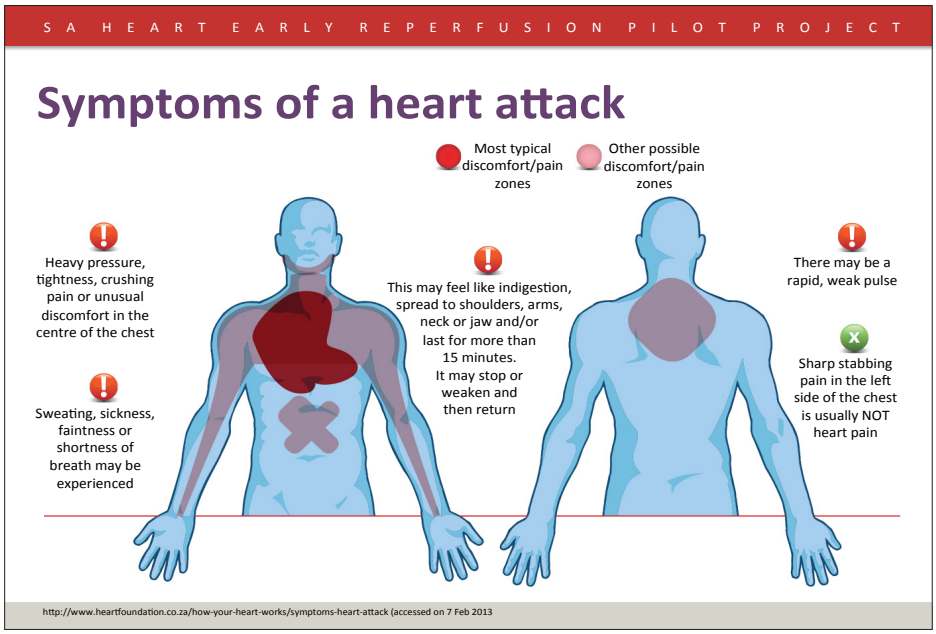
After haemodynamically stabilising the patient, transfer him/her to a cath lab hospital as soon as possible. Thrombolysis is not the end of therapy. Follow-up angiography is necessary even if reperfusion occurred, as reperfusion may not be optimal with adequate free coronary flow (TIMMI III) an assessment of the other arteries is important for future management. If angiography is not done within 24 hours of the event, only ischaemia-driven interventions would be of any benefit.

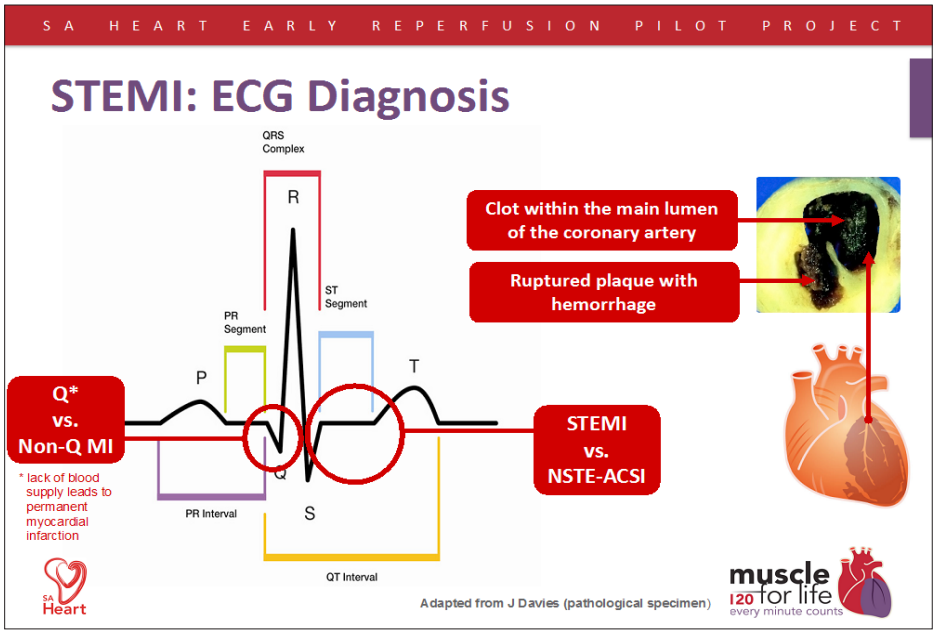
Post-coronary intervention management includes optimised medication, good lifestyle counselling, physical activity and regular evaluation. Target LDL cholesterol needs treatment to a level <1,8 mmol/L. Smoking is out, i.e. not negotiable! The early morning blood pressure reading, before medication, should be 130/80 mmHg in hypertensive cases. Regular, moderate exercise is the key to a symptom- and event-free future.

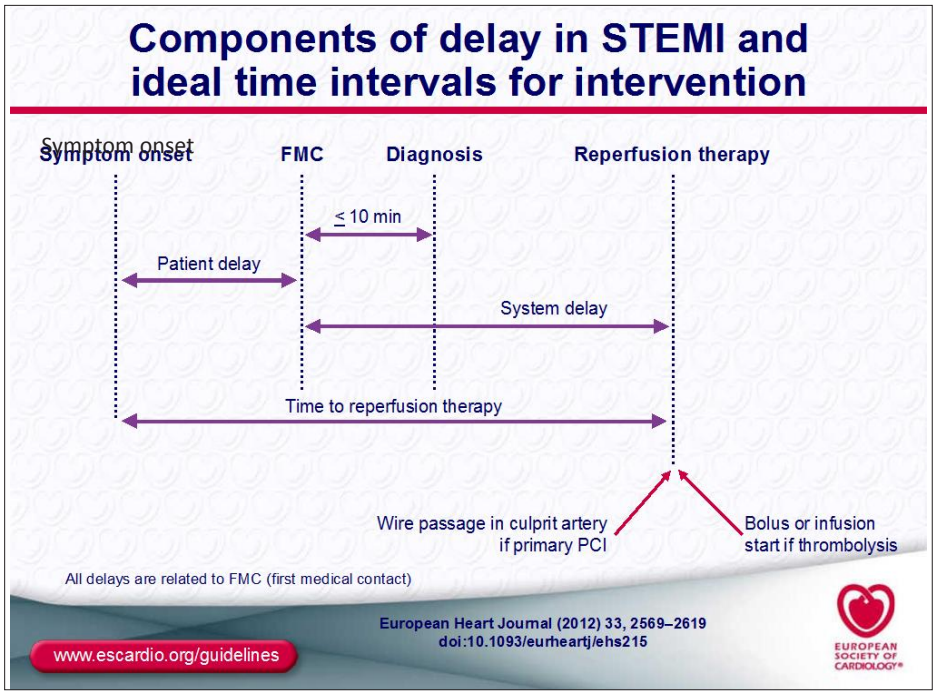
With effective management, the patient can be home and return to everyday life within a short time. However, delaying treatment causes frequent complications, which include renal impairment, pneumonia, decreased functional status, depression and emotional strain, and unfortunately also creating medically unfit persons who become a burden to others.

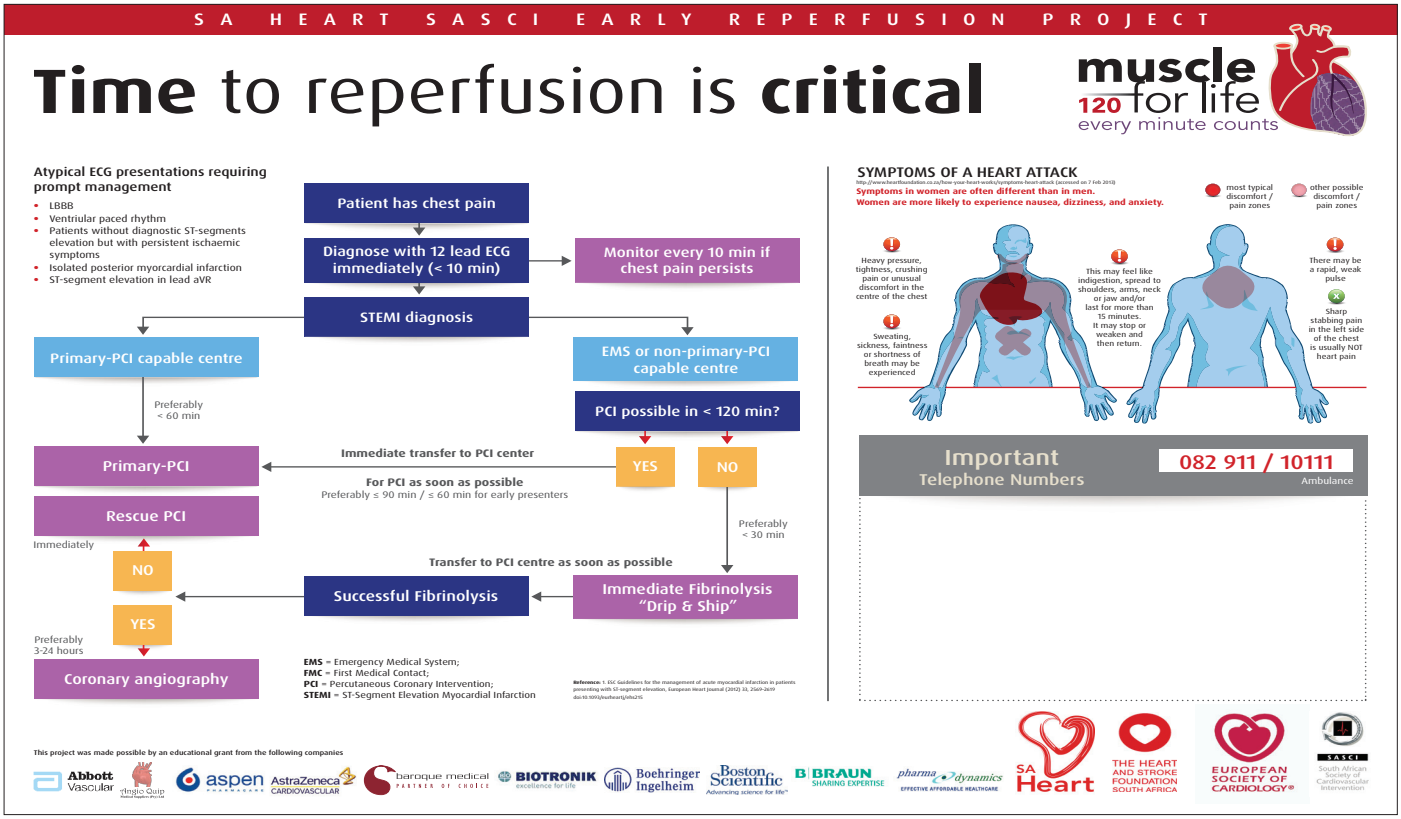
To summarise the Key Rules

- Educate patients to recognise STEMI symptoms and understand the urgency of immediate treatment.
- Patients should preferably contact EMS (Emergency Medical Services) and/or go to the nearest PCI-capable hospital or emergency room .
- Immediately perform an ECG on all patients presenting with chest pain unless a very clear alternative cause is obvious.









- Healthcare professionals should be able to diagnose STEMI, based on clinical observations and supported by ECG findings.
- Healthcare professionals should be familiar with the treatment options for STEMI and immediately commence appropriate therapy, depending on the time of onset of pain and the PCI-capability of the hospital. Transfer of the patient to a PCI-capability hospital for rescue PCI should be considered.
- Tenecteplase, actilyse or streptokinase should be available at all secondary healthcare facilities for primary thrombolysis.
- Healthcare professionals should have access to a cardiologist or other trained professionals to assist with decision making and appropriate transfer.
- All specialist facilities should contribute to the SA Heart/SASCI STEMI Early Reperfusion Registry to monitor treatment and outcome of STEMI cases for the optimisation of STEMI care nationally.

A Few Heart Health Tips from my back pocket

- Everyone needs to spend time to ensure that he/she obtains a good cardiovascular health prognosis.
- Exercise at least 3–5 hours per week.
- If smoking, you are wasting your time.
- Spend time to monitor your blood pressure, glucose and cholesterol levels.
- Early morning blood pressure readings should not be more than 135/85 mmHg before taking medication.
- LDL cholesterol above 4 mmol/L carries a high risk. With cardiovascular risk factors like hypertension this should be less than 3 mmol/L; having diabetes, this should be less than 3,5 mmol/L. If you already have had a cardiovascular event, the LDL should be less than 1,8 mmol/L.
- Get enough hours of sleep but rise early.
- Take time to finish your meals, do not rush!
- Recognise danger signs in time.
- Any symptoms, even if benign but progressive or associated with others or affecting your quality of life, are serious and should be reported to your doctor.
- Any symptom that improves or does not worsen with activity is unlikely to be significant.
- An occluded coronary artery should be opened within 120 minutes or less to limit damage to the heart.
- Do not delay seeking help if you wake up with a burning pressing discomfort in the chest, feeling as if someone is sitting on your chest and associated with nausea, sweating, dizziness, weakness or discomfort in the arms, particularly without improving within minutes. Report and have an ECG done within 10 minutes.
- Most overweight persons have insulin resistance (no testing is necessary), rather start losing weight and exercise regularly.
- Everybody has heart arrhythmias at times, which is unlikely to be significant if this improves with activity, (only robots never have heart palpitations/ arrhythmias).
- Tiredness is rarely of cardiac origin, but the inappropriate shortness of breath during activity should always be investigated.
- Do not ignore early morning headaches not associated with the previous night's activities as these may indicate uncontrolled hypertension.
- The most important risk factor for vascular events is a family history of vascular disease before age 50 or 60 years.
- Smoking and hormone replacement medication carry a high risk for cerebral infarction, particularly in women.
- Smoking 20 cigarettes/day costs as much as a week's holiday in Seychelles.
- Having a home blood-pressure monitor costs less than spending one night in hospital.
- You are not paying your doctor for the minutes or hours spent with you, but for the years of training and experience.
- The effect of years of bad lifestyle habits cannot be reversed within hours or days.