ANZCOR Guideline 14.3 – Acute Coronary Syndromes: Reperfusion Strategy

Guideline

Who does this guideline apply to?
This guideline applies to adult victims.

Who is the audience for this guideline?
This guideline is for use by health professionals.

1 Introduction

STEMI occurs in the majority of the patients due to the acute thrombotic occlusion of a major epicardial artery[1-3]. This is part of a spectrum of acute syndromes that are the result of disruption or erosion of typically lipid rich atherosclerotic plaque which leads to thrombus formation that occludes the vessel. Myocardial necrosis ensues in a time dependent fashion. Therefore strategies aimed at restoring myocardial perfusion at the earliest possible moment are an important part of the management of these patients. The longer the vessel remains occluded the higher the mortality for this patient group. Restoring coronary blood flow and myocardial reperfusion either by percutaneous coronary intervention (PCI) or fibrinolytic therapy has been demonstrated to improve outcomes in patients presenting within 12 hours of symptom onset[4,5]. It has also been shown to be beneficial in other patient groups beyond 12 hours of symptom onset such as those with cardiogenic shock[1,3,6,7].

In general the creation of cardiac clinical networks including emergency and medical providers, non capable and capable PCI hospitals is important to facilitate a regional strategy for the delivery of timely revascularisation[3,6-13]. The development of these networks has allowed timely institution of reperfusion therapy and reduced mortality from STEMI over the last decade[14].

Related to the issue of STEMI systems of care is a growing body of observational data suggesting out of hospital cardiac arrest (OHCA) patients should be considered for transport to a specialist cardiac arrest centre as part of wider regional system of care for management of patients with OHCA. Such centre would need to have capacity to undertake Primary PCI[15].

1.1 Primary PCI

Primary PCI (PPCI) is the preferred perfusion strategy with the best outcomes demonstrated in a number of large meta-analyses provided it is performed in a timely manner by an experienced team[16,17]. The benefit is mostly driven by reduced rates of recurrent myocardial infarction and reduced rates of intracranial haemorrhage (ICH) in the PPCI treated patients compared to those receiving fibrinolysis. (LOE I).

Hence where immediate PCI is available the combination of routine administration of fibrinolysis in conjunction with PPCI is without benefit and is associated with increased risk of ICH. It is not recommended (CoSTR 2015, strong recommendation, moderate-quality evidence)[14].

In many parts of Australia and New Zealand, PPCI is not widely available. PPCI is limited by accessibility to a catheterisation laboratory facility, access to appropriate skilled clinician and delays related to the time taken to obtain reperfusion[18].

For PPCI to maintain superiorly over fibrinolytic therapy the PCI related delay must be between 45 and 180 minutes depending on the patient's condition e.g. patient age, site of infarction and duration of symptoms[19-21]. (LOE II).
The Cardiac Society of Australia and New Zealand recommends in general, the maximum acceptable delay from presentation to balloon inflation is[22]:

- 60 minutes if a patient presents within 1 hour of symptom onset; or
- 90 minutes if a patient presents later.

(LOE II)

There are a number of strategies that can be undertaken to reduce the time delay to PPCI[11]. These are strategies to improve the systems of care arising from and they include pre-hospital 12 lead ECGs to facilitate earlier diagnosis, advanced notification of the results of the 12 lead ECG at the receiving institute for rapid reperfusion on arrival of the STEMI patient. Techniques that have evidence to support implementation include[23-29] (LOE III-2):

- Arranging suitable activation of the catheter laboratory
- Requiring the catheter laboratory to be ready in 20 minutes
- Having the interventional cardiologist immediately available at the hospital
- Providing real time data feedback
- Support for the treatment strategy by senior medical clincians
- Encouraging a team based approach.

Where PPCI capable facilities are available as part of a system of care, direct triage and transport to those centres for PCI is preferred (CoSTR 2015, weak recommendation, low-quality evidence)[14].

In addition to patients with contraindications for fibrinolysis, PCI should be pursued even if there is a delay rather than opting for a no treatment strategy[3,6].

For patients with STEMI presenting with shock, primary PCI or coronary artery bypass is clearly a preferred treatment option. Treatment with fibrinolysis should only be considered if there is a substantial delay to PCI[30,31]. (LOE II).

1.2 PCI in patients with ROSC

We recommend performing immediate angiography and if necessary PCI in patients with ST elevation or new left bundle branch block on the standard 12 lead electrocardiograph who respond to cardio-pulmonary resuscitation with spontaneous return of circulation after cardiac arrest[32-35] (LOE II) (CoSTR 2015, strong recommendation, low-quality evidence)[14]. Coma is common and should not be a contraindication to angiography and PCI. We suggest immediate angiography and if necessary PCI in selected patients who do not have evidence of ST elevation on their ECG nor prior clinical features such as chest pain, if coronary ischaemia is considered the likely cause on clinical grounds . (LOE III-1) (CoSTR 2015, weak recommendation, very-low-quality evidence)[14].

Targeted temperature management is recommended in combination with PCI and can be commenced as part of the initial treatment preferably prior to PCI[36]. Angiography and PCI can be incorporated as part of a standardised post cardiac arrest protocol[37]. (LOE III-3).

Immediate angiography implies these patients should be managed to minimize door-to-reperfusion times in a manner similar to the general STEMI patient population. However, the complexity and heterogeneity of this patient group may delay their resuscitation, management and time to angiography[14].

A number of complex clinical factors may influence the decision to proceed to angiography and intervention. These include patient age, the presenting rhythm, whether the arrest was witnessed, the requirement for haemodynamic support and the known presence of co morbidities such diabetes mellitus, renal failure, and chronic heart failure[14].

1.3 Fibrinolytic Therapy

Fibrinolytic therapy is more widely available and is beneficial in a wider range of patients who may not have access to PPCI[38-40]. Fibrinolytic therapy can be safely given by a trained paramedic, nurse or physician using established protocols[41-45]. (LOE I) The efficacy is greatest given the first three hours of the onset of symptoms. Without timely access to primary PPCI, patients with symptoms of ACS and ECG evidence of ST elevation infarction or true new bundle branch block or true posterior infarction should be treated with fibrinolytic therapy as soon as possible.

In patients presenting early after the onset of chest pain (<1-2 hours) and in certain clinical subsets (<65 years-of-age, anterior STEMI), prehospital fibrinolysis may offer similar outcomes compared to PPCI[20,46,47]. (LOE II)

There are a number of contraindications to fibrinolysis that health care practitioners need to be well aware of (see Table 1)[1,48]. In addition, the older patients are a difficult patient group. They have a high absolute risk of death from their STEMI, have an increased absolute benefit from fibrinolytic therapy but the risk of intracranial bleeding from fibrinolysis is also higher. This is increased in the presence of systolic hypertension of over 180 mmHg. The benefits of fibrinolytic therapy are less impressive in areas of infarction other than an anterior STEMI location.

2 Table 1

Contraindications for fibrinolysis[48]

2.1 Absolute contraindications

- Haemorrhagic stroke or stroke of unknown origin at any time
- Ischaemic stroke in the preceding 6 months
- Central nervous system damage, neoplasms or structural vascular lesions (e.g. ateriovenous malformation)
- Recent major trauma/surgery/head injury (within the preceding 3 weeks)
- Gastro-intestinal bleeding within the last month
- Known bleeding disorder (excluding menses)
- Aortic dissection

2.2 Relative contraindications

- Transient ischaemic attack in preceding 6 months, dementia
- Oral anticoagulant therapy
- Pregnancy within 1-week post-partum
- Non-compressible punctures

- Traumatic resuscitation
- Refractory hypertension (systole. blood pressure >180mmHg
- Advanced liver disease
- Infective endocarditis
- Active peptic ulcer

In patients with STEMI diagnosed in the pre-hospital setting, reperfusion can be achieved by the administration of fibrinolytics by health care providers in the field. If fibrinolysis is chosen as a reperfusion strategy and transport to hospital estimated to be greater than 30 min from first medical contact, we recommend prehospital fibrinolysis if this capability exists (CoSTR 2015, strong recommendation, moderate-quality evidence)[14]. This requires paramedics, nurses or doctors to use well established protocols, have competency based training programs, a quality assurance program and be under medical oversight[43,49,50]. (LOE II).

This strategy may be particularly important in rural areas where there are long transit times to hospital[44,51-53].

2.3 Triage and inter facility transfer for PPCI

It is reasonable to consider direct transport to PCI capable facilities for PPCI for patients diagnosed with STEMI by emergency medical services in the prehospital setting, bypassing closer hospitals as necessary, in systems where time intervals between first medical contact and balloon time are brief (<2 hours) [4,26,54-56].

Transfer of STEMI patients for PPCI from community hospitals is reasonable for those presenting more than 3 h but less than 12 h after the onset of symptoms, provided that the transfer can be achieved rapidly (<2 hrs). The risk of death, reinfarction or stroke is reduced if patients with STEMI are transferred promptly from community hospitals to tertiary care facilities for PPCI[55-57]. (LOE I) (CoSTR 2015, strong recommendation, moderate-quality evidence)[14].

When long delays to PPCI are anticipated (more than 120 minutes), a strategy of immediate fibrinolysis followed by routine early (within 3–24 hours) angiography and PCI, if indicated, is reasonable (CoSTR 2015, weak recommendation, very-low-quality evidence)[14]

2.4 Rescue PCI

It is reasonable to perform coronary angiography and PCI in patients who have failed fibrinolysis according to clinical signs and insufficient ST segment resolution[58-63].
(LOE I).

2.5 Pharmaco-Invasive Strategy

Patients with successful fibrinolysis but are not treated at a PCI capable centre should be encouraged to be routinely transferred for angiography and PCI performed within 3-24 hours after fibrinolysis. The optimal timing has not been determined but intervention in under 24 hours has been shown to reduce re-infarction rates. It is recognised that there may be situations and geography where transfer within 24 hours may be difficult or not available.[64-68] (LOE II) (CoSTR 2015, weak recommendation, very-low-quality evidence)[14] .

2.6 Facilitated PCI

Facilitated PCI refers to the routine use of fibrinolysis prior to PPCI. The strategy of facilitated PCI compared with PPCI is not recommended in STEMI.

A number of studies have examined the strategy of facilitated PCI and they have shown no benefit of PPCI and some studies have shown poor outcomes with routine PCI shortly after fibrinolysis[69,70]. (LOE II) (strong recommendation, moderate-quality evidence)[14]

2.7 Cardiac Arrest Centres

A cardiac arrest centre is a hospital that has the facilities to provide a comprehensive package of post resuscitation care including percutaneous coronary intervention and targeted temperature management. There is evidence from observational studies that such centres appear to have better survival and better neurologically intact survival. The evidence supporting triaging to such centres is however weak with an absence of randomised studies supporting such a strategy. It is reasonable to consider transport patients with OHCA directly to a cardiac arrest centre. This would need to take into account geographic, population and resource factors. (CoSTR 2015, weak recommendation, low level of evidence)[15]

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