



Fibrinolysis and Management Of Stemi Guidelines

Procedure Number

CHC-PC-0034

Version Nos:

1

1. Purpose

This document provides guidance on Fibrinolysis and the management of Stemi.

2. Application

These Guidelines is to be followed by all WCDHB clinical staff members.

3. Definitions

There are no definitions associated with theses Guidelines

4. Responsibilities

- All WCDHB clinical staff must ensure that these Guidelines are followed correctly.

5. Clinical Guidelines

1.00 Indications for Fibrinolysis

Clinical history consistent with acute myocardial infarction within the last 12 hours (chest pain for more than 20 min that started less than 12 hrs previously)

and

ECG changes: ≥ 1 mm ST elevation in two contiguous limb leads

or

≥ 2 mm in two contiguous chest leads V1 to V3

or

≥ 1 mm in two contiguous chest leads V4 to V6

or

New left bundle branch block

Consideration should be given to using fibrinolytics in patients with left bundle branch block that is not known to be old and who have a convincing clinical history for acute myocardial infarction. The full NZ Guidelines outline the additional ECG evidence for full thickness MI in the presence of LBBB. These patients should be discussed with the Cardiologist on-call before proceeding.

Patients with an inferior MI should have an ECG with a V4R lead.

Beware! Patients with normal variant ST elevation, pericarditis, dissecting aortic aneurysm and even pancreatitis have received Fibrinolysis.



2.00 Contraindications to Fibrinolysis

Absolute Contraindications:

- Previous haemorrhagic stroke (or stroke with haemorrhage not excluded by scanning)
- Known intracranial or spinal tumour or arteriovenous malformation
- Ischaemic stroke within six months
- Neurosurgery within six months
- Recent lumbar puncture
- Suspected aortic dissection
- Active bleeding or bleeding diathesis (excluding menses)
- Significant closed head or facial trauma within three months
- Uncontrolled hypertension (SBP >180mmHg or DPB >110mmHg). (Repeat after GTN/Morphine and reconsider fibrinolysis)
- Internal bleeding within six weeks of major surgery, trauma or bleeding within six weeks

Relative Contraindications:

- Traumatic pulmonary resuscitation <3 weeks
- Non-compressible vascular puncture
- Pregnancy
- Active peptic ulcer
- Advanced liver disease
- Diabetic retinopathy
- Current use of anticoagulants with INR >2 : the higher the INR the greater the risk of bleeding

***NOTE:** The risk of giving thrombolysis needs to be weighed against the benefits. For example: It is possible a patient with a large anterior STEMI with cardiogenic shock who presents early may benefit from Fibrinolysis despite apparent even absolute contraindications. The Cardiologists should be consulted to discuss the risks and benefits before deciding not to give fibrinolytics to a patient on the basis of contraindications.*

The following are not contraindications to Fibrinolysis:

- Hypotension
- Menstruation
- Age

3.00 Early Transfer for Emergency PTCA

There is increasing evidence for the role of emergency PTCA when Fibrinolysis is contraindicated or has failed.

Immediate transfer should be considered in the presence of cardiogenic shock (or a high likelihood of cardiogenic shock on the basis of involvement of massive territory). It may be inappropriate to sit on these patients with the expectation that Fibrinolysis will open the artery and the shock resolve. A cardiologist should be consulted and the retrieval initiated at the same time as the Fibrinolysis is being given.

Immediate transfer should be considered whenever Fibrinolysis is contraindicated.

Be aware that fibrinolytics work less well on older more organised clot (> about 4hrs) and the advantage of primary PTCA vs fibrinolytics is greater in this group of patients. It may be appropriate to immediately transfer some patients who present late, for primary PTCA.



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Transfer for rescue PTCA should be considered in patients who fail to re-perfuse, particularly if a large territory is involved.

Indicators that a large territory are involved: Extensive anterior MI's or inferior MI's with posterior extension as indicated by marked ST depression in the septal leads or left bundle branch block or right bundle branch block.

Other Transfers

Indicators of failed re-perfusion include: Ongoing chest pain and failure to see a reduction of at least 50% in the amount of ST elevation, in the lead with the most initial ST elevation, at 90 minutes after administration of the fibrinolytic.

The ability of rural hospitals to safely manage patients with myocardial infarction varies; both between hospitals and at different times in the same hospital. This depends on the physical resources available (including laboratory and radiology services) as well as the skill and experience of the clinical staff on duty.

If there are concerns about the appropriateness of continuing care in the local hospital, transfer should be discussed with the cardiologist on call.

Later transfer for PTCA is indicated for many other STEMI patients, particularly those with recurrent pain/ischaemia post infarction.

4.00 Tenecteplase

Tenecteplase Is The Preferred Fibrinolytic Agent.

Tenecteplase is administered as a single intravenous bolus over 10 seconds.

Tenecteplase is incompatible with dextrose containing solutions. IV lines should be flushed before and after administration of Tenecteplase with normal saline.

Procedure

Insert two IV lines, one for drugs, the other for drawing blood.

Draw blood for troponin, full blood screen, glucose, U&E's, LFT's prior to therapy.

Bloods for lipids should also be taken, preferably fasting, but definitely within 12 hours of the onset of pain.

Dosage is based on weight of patient:

(30 mg for patients weighing <60 kg, 35 mg for those weighing 60 to 69 kg, 40 mg for those weighing 70 to 79 kg, 45 mg for those weighing 80 to 89 kg, or 50 mg for those weighing ≥90 kg)

If weight is not readily available it should be estimated.

The syringe is pre-marked according to patient weight.

After mixing, the appropriate volume of reconstituted Tenecteplase solution should be drawn back into the syringe from the vial.



5.00 Complications of Fibrinolysis

Bleeding

This can be minimised by the avoidance of unnecessary punctures and careful history taking (see contraindications).

Unsuccessful IV access sites or blood gas sites should have compression bandages applied.

Treatment with fresh frozen plasma and protamine should be considered if serious haemorrhage occurs.

Any deterioration in the level of consciousness needs to be treated as a cerebral bleed until proven otherwise by CT.

6.00 Arrhythmias

Reperfusion arrhythmias are common and include:

Bradycardia complete heart block occurs most commonly with reperfusion of inferior MI. Usually it resolves within minutes. If necessary treat with Atropine and fluids.

Idioventricular rhythm: no treatment is necessary if the heart rate is <120 and the patient is not hypotensive. Keep Potassium between 4-5mmol/L.

Non-sustained VT: runs are common and usually subside with time. Observe for 10 minutes before contemplating antiarrhythmics. Keep Potassium between 4-5 mmol/L.

Sustained VT / VF: Defibrillation and antiarrhythmics (including iv Mg)

7.00 Adjuvant Medications

Oxygen

The role for routine O₂ is much less clear than it was. O₂ is a vasoconstrictor and as such may have detrimental effects

Supplemental oxygen is indicated for patients who are hypoxic or at risk of hypoxia to maintain an O₂ saturations at 96%.

For other patients a short period of O₂ supplementation is reasonable during stabilisation.

Aspirin

300mg chewed.

Immediately, if not already given.

Continue 100-150mg per day.

Consideration should be given to giving additional doses of Aspirin to patients on NSAIDs until the effect of the NSAID wears off.

Morphine

As needed for pain control.



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Clopidogrel

Patients < 75 years of age should be given 300mg stat followed by 75mg daily.

Patients ≥75 years or older should be given 75mg stat and then 75mg daily.

Continue as long as permitted by Pharmac criteria i.e. 3 months (6 months post stenting)

Heparins

Enoxaparin is the Heparin of choice post Tenecteplase.

Enoxaparin

Patient is <75 years of age:

Enoxaparin 30mg *intravenous bolus* after the Tenecteplase.

15 minutes later - Enoxaparin 1mg per kg (up to a maximum dose of 100mg) *subcut* and continue this 12 hourly up to 8 days or until the patient is discharged.

The administration of Enoxaparin intravenously is unlicensed. The Doctor should therefore administer the IV bolus. 40mg Enoxaparin should be injected as 0.4ml into a tuberculin syringe. Waste 0.1ml and inject the remainder, that is 30mg (0.3ml) into the line and flush.

Patient is ≥ 75 years of age:

Older patients who received full doses of Enoxaparin during fibrinolysis trials had an excess amount of bleeding.

Do not give the IV dose of Enoxaparin.

After Tenecteplase, administer Enoxaparin 0.75mg per kg (up to a maximum dose of 75mg) and continue this at 12 hourly intervals up to 8 days or until the patient is discharged.

Renal Impairment:

Enoxaparin dosing should be reduced in renal impairment. Patients with a eGFR of <30mls per minute should have the dosing interval extended to q24hrs.

Unfractionated Heparin

Occasionally it may be preferable to administer a Heparin infusion rather than Enoxaparin. This is likely to be patients who have very severely impaired renal function or for whom there is a high likelihood of bleeding (and it is preferable to use an agent which will both wear off quickly and can be reversed).

Initially administer an IV bolus of Heparin - 60 units per kg up to a maximum of 4000 units.

Commence the Heparin infusion at 12 units per kg per hr up to a maximum of 1000 units per hour. Perform the first APTT at 6 hours and reduce the dose only if the APTT is >150.

After 12 hours aim for an APTT in the range of 50-75 seconds.

Adjust the rate according to the ward protocol.

Continue the Heparin infusion for 48 hours.

Beware of the risk of reactivation of thrombosis in the first 10 hours after Heparin withdrawal.



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Beta Blockers

Early and aggressive beta-blockade is now less favoured than it was in the management of STEMI patients. It may be harmful to administer IV beta blockers to STEMI patients who have contraindications to beta blockade, signs of HF or low-output state, or other risk factors for cardiogenic shock. Beta blockers still have a role in secondary prevention. CHF/Poor LV fn is probably now a stronger indication for the use of betablockers, but only with careful titration.

Oral beta-blocker therapy should be initiated in the first 24 hours for patients who do not have any of the following: 1) signs of heart failure, 2) evidence of a low output state*, 3) increased risk of cardiogenic shock or 4) other contraindication to beta-blockade (PR interval greater than 0.24 seconds, second or third degree heart block, active asthma or reactive airways disease).

I.V. metoprolol can be considered for patients in this group who are also hypertensive or have a tachyarrhythmia or have ongoing chest pain.

Patients who have any of the contraindications listed above should be re-evaluated for beta-blockade for secondary prevention later in the admission.

Patients with moderate or severe LV failure should receive beta-blocker therapy with gradual titration.

IV Metoprolol 15mg (total)

Administer as three doses, each 5mg, with two minutes between doses. Monitor rhythm, rate and BP.

Oral Metoprolol

The usual starting dose is short acting Metoprolol 25 mg tds, though 12.5mg tds may be more appropriate if there are concerns about tolerance.

Aim for Metoprolol CR 95 mg daily by discharge but titrate slowly if there are concerns about haemodynamic stability or poor LV fn. Continue indefinitely

* Risk factors for cardiogenic shock (the greater the number of risk factors present, the higher the risk of developing cardiogenic shock) are age greater than 70 years, systolic blood pressure less than 120mmHg, sinus tachycardia greater than 110 bpm or heart rate less than 60 bpm, and increased time since onset of symptoms of STEMI.

GTN infusion

This is often routinely given for 24-48 hours but particularly if there is any ongoing chest pain or left ventricular failure.

Ace Inhibitors

ACE inhibitors should be considered for all patients.

Patients with evidence of CHF or who are high risk of developing CHF (anterior MI, previous infarctions) should start ACE inhibitors a couple of hours after admission if SBP > 100 mmHg.

Other patients can be started the following morning.

Cilazapril: Initially 0.5 – 1.25mg daily depending on blood pressure / age / renal function. Aim for 5mg daily.

Continue for six weeks or indefinitely if the MI is large and anterior or there is evidence of impaired LV function.



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Because of its shorter half life, consider using low dose Captopril rather than Cilazapril as the initial Ace Inhibitor when hypotension or increased sensitivity to Ace Inhibitors are likely (eg. frail elderly).

Insulin Infusion

All patients with a BSL > 11 mmol/L (regardless of whether or not they are a known diabetic) should receive an insulin infusion to maintain their BSL in the range of 6-10 mmol/L. Monitor K closely.

Statins

Commence Simvastatin 40mg daily within 24 hours.

Aim to reduce LDL to < 2.5 mmol/L but continue on at least 40mg Simvastatin regardless of lipid levels.

Potassium Supplements

Serum K should maintained at ≥ 4.0 mmol/L with K supplements.

Fluids

Patients with RV infarction (as evidenced by inferior MI, low BP, high JVP and no LV failure and supported by ST elevation on V4R lead) may need additional fluids. Aim for oral intake of 2000ml daily. Additional fluid boluses (250ml N/Saline) may be needed to maintain the BP.

Hypertension

Target BPs for STEMI patients are 140/90 or 130/80 for those with diabetes or renal impairment.

ACE Inhibitors, Beta Blockers and Thiazides are the most appropriate agents.

NSAIDs

NSAIDs should be stopped

If it is essential to use an NSAID longer term then a non-selective agent (e.g. Naproxen) should be used.

HRT

HRT should be avoided.

6. References

ST Elevation Myocardial Infarction: NZ Management Guidelines. NZMJ 7 October 2005, Vol 118 No 1223

Guidelines for pre-hospital administration of fibrinolytic therapy by New Zealand general practitioners. 2004

Rescue angioplasty for failed thrombolytic therapy. NEJM 2005: 353(26)

Guideline for Management of Acute Coronary Syndrome. Medical Journal of Australia Volume 184 Number 8 17 April 2006

Enoxaparin vs Unfractionated Heparin with Fibrinolysis for ST-Elevation Myocardial Infarction N Engl J Med 2006;354

Update of Guideline for Management of ST Elevation Myocardial Infarction, American College of Cardiology, J Am Coll Cardiol, 2008; 51:210-247



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7. Related Documents

There are no other documents related to these Guidelines

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