Conseil Cri de la santé et des services sociaux de la Baie James
Cree Board of Health and Social Services of James Bay

Acute Myocardial Infarction Pre-Printed Order Sheet: Tenecteplase (TNKase™)

ONSET SYMPTOMS:_____
TIME ARRIVAL :_____
TIME OF DIAGNOSTIC ECG:_____

AGE_____ Weight _____

E 1. Eligibility criteria:

Symptoms of myocardial infarction: chest pain of less than 12 hours *NB pain for 12-24 may still be an indication[10]*	Y ☐ N ☐
Evidence of myocardial infarction: >1 mm ST elevation in at least 2 contiguous leads *NB (may also be candidates for thrombolysis)* *Posterior infarctions: ST depression in V1 - V4 with R wave in V -V2 or ST elevations in posterior leads V8 and V9* *And* *Right ventricular infarction: ST elevation in right sided leads especiallyV4R*	Y ☐ N ☐
New Left Bundle Branch Block (LBBB)	Y ☐ N ☐ **Unknown** ☐
If No for any of these questions thrombolysis probably not indicated[9]	

1. Absolute Contraindications

Previous hemorrhagic stroke at any time; other strokes or cerebrovascular events within 1yr	Y ☐ N ☐
Known intracranial neoplasm	Y ☐ N ☐
Active internal bleeding (excluding menses)	Y ☐ N ☐
Suspected aortic dissection or pericarditis	Y ☐ N ☐
If YES to any of these questions thrombolysis not indicated	

1. Relative Contraindications (if Y–consider discuss with cardio)

Severe uncontrolled hypertension on presentation (systolic >180 or diastolic >110 mm Hg or both)	☐	☐
History of prior cerebrovascular accident or known intracerebral pathology not covered in contraindications	☐	☐
Current use of anticoagulants in therapeutic doses (INR ≥ 2-3); known bleeding diathesis	☐	☐
Recent trauma (within 2-4 weeks), including head trauma or traumatic or prolonged (>10 min) CPR or major surgery (< 3 wk)	☐	☐
Non compressible vascular punctures	☐	☐
Recent (within 2-4 weeks) internal bleeding	☐	☐
Pregnancy, postpartum < 6 weeks	☐	☐
Active peptic ulcer	☐	☐
History of chronic severe hypertension	☐	☐
Diabetic retinopathy	☐	☐

Approved by CBHSSJB pharmacology committee on XX.2011 and Executive committee on XX.2011

	Acute Myocardial Infarction Pre-Printed Order Sheet: Tenecteplase (TNKase™)	*a d d r e s s o g r a p h*

Treatment Regimen:

1. ASA 320 mg (4 tabs 80 mg) chewed stat (unless allergic) then ECASA 80 mg qD.
   If allergic to ASA: clopidrogel 300 mg PO stat, then clopidrogel 75 mg PO qD (skip #2 below)

2. Age ≤ 75 yrs: Clopidrogel 300 mg PO stat Age > 75 yrs: Clopidrogel 75 mg PO stat

3. cardiac monitor, O_2 as required by 0_2sat.

4. Open two IV NS TKVO (500 cc bags) on IVAC pump:
   Open NS lock on other arm for blood tests (see # 5 below)

5. Pre-thrombolysis blood tests:
   CBC, INR, PTT, CK, troponin, E+, glu, Creat, BUN, Xmatch, ECG.

6. IV heparin or IV Enoxaperin ***prior to TNKase***:

   Enoxaparin: Age < 75 and normal creatinine (eGFR > 30) and wt < 145 kg
   Bolus 30 mg IV enoxaparin (0.3 cc from 100mg/ml vial) in 1 cc tuberculin syringe
   Irrigate IV line immediately with 10 cc NS

   Heparin: (appendix 1): Age > 75, or elevated creatinine (eGFR ≤ 30) and wt > 145 kg
   Start IV **heparin bolus *and initial IV infusion* prior to TNKase** as per protocol

   Time _____

7. Rapid IV Bolus TNKase _____ mg = ____ ml over 5 seconds.
   Irrigate IV line with 10 cc NS before and after TNKase administration.

Patient weight_____ ***NOTE: TNKase not compatible with D5W. Flush only with NS.***

Patient weight	TNK Dose	volume
< 60 kg	30 mg	6 ml
60 to ≤ 69 kg	35 mg	7 ml
70 to ≤ 79 kg	40 mg	8 ml
80 to ≤ 89 kg	45 mg	9 ml
≥ 90 kg	50 mg	10 ml

Time _____

8. For patients who received bolus enoxaparin prior to TNKase:
   Enoxaparin 1 mg/kg = _____ mg SC 15 min after IV enoxaparin bolus
   Then q 12 hr until discharge (or max 8 days).
   Note: **maximum 100 mg SC for the first two doses** post TNKase
   Then maximum of 140 mg until end of treatment.

Time _____

9. **Adjuvent therapy – can be given prior to thrombolysis or during thrombolysis for management of ongoing chest pain.**

Metoprolol Metoprolol 5 mg IV over 5 min. x 3 doses (total of 15mg) **OR** metoprolol 25 mg po q12h if not contraindicated ; **CAUTION if BP< 100/60 OR pulse< 70 OR patient with COPD or asthma.**	***(MD initials required):***
•Nitroglycerin 0.4 mg SL x 1; repeat q5-10 min x 2 if SBP >90 mm HG •Nitroglycerin drip prn for chest pain refractory to nitro spray X 3; titrate as per regular CCSSSBJ (Chisasibi) protocol. **CAUTION with NITRO (SL and IV): if Viagra, Cialis or Levitra received < 24 hours OR in right ventricular MI**	***MD initials required***

Nursing Interventions and Monitoring

- ECG 90 min and 4 hr post bolus TNKase. ECG stat if any recurrence of chest pain.
- Blood tests**: 6 hr** post TNKase – CK, PTT**,** **12 hr** post TNKase – CK, troponin
  24 And 48 hr post TNKase : ECG, CBC, E+, Creatinine, CK, PTT
- Vital signs: q15 min X 4; q30 min X 2; q1h X 2; q4h x 24 hours
  (Blood pressure should be taken from both arms *at initial presentation*).
- *Neuro Vital signs pre-thrombolytic therapy*; then q 15min X 4; if stable q4h x 24 hrs.
- Apply pressure dressing to puncture sites (including venipunctures)
- Avoid unnecessary invasive procedures
- Do not give any IM injections

Physician signature: _____ Licence #:_____ Date: _____

Nurse transcription signature:_____ Time: _____

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Appendix 1
Unfractionated Heparin administration with TNKase

INDICATIONS (any one of three indications):
i) age > 75 yrs old
ii) abnormal serum creatinine (eGFR ≤ 30 ml/min)
iii) weight > 145 kg

For all other patients, enoxaparin is the preferred therapy **WEIGHT: _____**

1.IV bolus : 60 units/kg = _____ units heparin IV bolus (max 4000 units) (see table 1 below).

2.Initial IV infusion (to start *prior* to TNKase bolus)

Heparin 25,000units/500 ml D5W at 12 units/kg/h = _____ units/hr or _____ cc/h x 48 hr (see table 1 below) (max 1000 u/hr or 20 ml/hr)

- start initial infusion after the heparin bolus but before the TNKase bolus.
- Adjust heparin to keep PTT between 50-75 sec (see nomogram below).

Table 1: bolus and initial infusion rate calcuation

Weight (kg)	*Bolus (units) 60u/kg**	*Initial IV Infusion (units/hr) 12u/ kg/hr***	*Infusion (cc/hr) (50 u/ml)*
< 40	2200	450	9
40.0 - 43.8	2500	500	10
43.9 - 47.9	2750	550	11
48.0 - 52.1	3000	600	12
52.2 - 56.3	3250	650	13
56.4 - 60.4	3500	700	14
60.5 - 64.6	3750	750	15
64.7 - 68.8	4000	800	16
68.9 - 72.9	4000	850	16
73.0 - 77.1	4000	900	18
77.2 - 81.3	4000	950	19
>81.3	4000	1000	20

*Bolus – rounded to nearest 125 units
**initial infusion – rounded to nearest 50units.

Table 2: Heparin Adjustment nomogram for first 48 hrs post TNKase.
For heparin 25,000 units/500 cc D5W infusion

PTT (sec)	*Bolus*	*Stop perfusion*	*Change rate*	*Repeat PTT*
<45	30 units/kg	--	↑ 3 ml/hr	after 6 hr
45 - 49	--	--	↓ 2 ml/hr	after 6 hr

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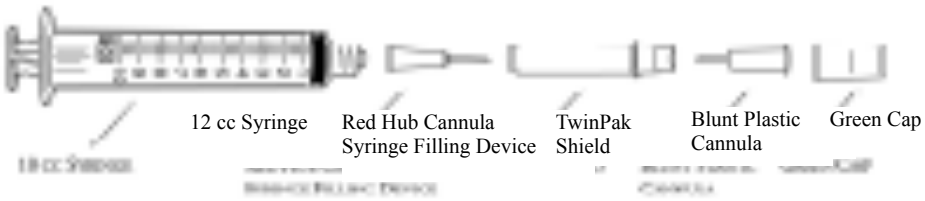
50 - 75	--	--	--	after 6 hr
76 - 85	--	--	↓ 1 ml/hr	after 6 hr
86 - 100	--	30 min	↓ 2 ml/hr	after 6 hr
>100	--	60 min	↓ 3 ml/hr	after 6 hr

TENECTEPLASE Reconstitution:



1. Remove the shield assembly from the supplied B-D® 10 cc Syringe with TwinPak™ Dual Cannula Device (see figure) and aseptically withdraw 10 mL of Sterile Water for Injection (SWFI), USP **from the supplied diluent vial** using the red hub cannula syringe filling device. **Do not use Bacteriostatic Water for Injection, USP.**

   Note: Do not discard the shield assembly.

2. Inject the entire contents of the syringe (10 mL) into the TNKase™ vial directing the diluent stream into the powder. DO NOT SHAKE. Slight foaming upon reconstitution is normal and will dissipate if left standing for several minutes.

3. Gently swirl until contents are completely dissolved. DO NOT SHAKE. The reconstituted preparation results in a colourless to pale yellow transparent solution containing TNKase™ at 5 mg/mL.

4. Determine the appropriate dose of TNKase™ and withdraw this volume (in millilitres) from the reconstituted vial with the syringe. Any unused solution should be discarded.

5. Once the appropriate dose of TNKase™ is drawn into the syringe, stand the shield vertically on a flat surface (with green side down) and passively recap the red hub cannula.

6. Remove the entire shield assembly, including the red hub cannula, by twisting counter-clockwise. Note: The shield assembly also contains the clear-ended blunt plastic cannula; retain for split septum IV access.

Administration:

1. The product should be visually inspected prior to administration for particulate matter and discoloration. TNKase™ may be administered as reconstituted at 5 mg/mL.

2. Precipitation may occur when TNKase™ is administered in an IV line containing dextrose. Dextrose-containing lines should be flushed with a saline-containing solution prior to and following single bolus administration of TNKase™.

3. Reconstituted TNKase™ should be administered as a single IV bolus over 5 seconds.

4. TNKase™ should be reconstituted immediately before use. If the reconstituted TNKase™ is not used immediately, refrigerate the TNKase™ vial at 2-8°C and use within 8 hours. **If TNKase™ not used within 8 hours then please return reconstituted medication to pharmacy.**

5. The supplied syringe is designed to be used with needleless IV systems.

TNK is incompatible with dextrose-containing solutions. Therefore, any dextrose containing lines must be flushed with NS before and after administration.

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If TNKase™ is not used within 8 hours or diluted by mistake, return the reconstituted medication to the Chisasibi pharmacy. If the patient bodyweight is less than 90 kg, please send the unused part of TNKase™ to the Chisasibi pharmacy as well. Please pack the returned medication with an explicative note and signature of the contact person (nurse or doctor). Reason: there is a refund from the company for diluted or partially used TNKase vial and one kit cost about 2600$.

References:

1. Antman, EM, Anbe, DT, Armstrong, PW, et al. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction--executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 1999 Guidelines for the Management of Patients With Acute Myocardial Infarction). Circulation 2004; 110:588.

(A2004 task force of the American College of Cardiology (ACC) and the American Heart Association (AHA) recommended thrombolytic therapy for patients without contraindications presenting within 12 hours of onset of symptoms [29]. They also concluded that it is reasonable to administer thrombolytic therapy to patients presenting 12 to 24 hours after the onset of symptoms if they have continuing symptoms and persistent ST segment elevation on the ECG. In all cases, it was recommended that the time from presentation to drug administration should be less than 30 minutes.)

1. Circulation. 2004;110:588-636.)

ACC/AHA Practice Guidelines
ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction
Adanced Cardiac Life Support, American Heart Association 2000

(PHARMACOLOGICAL REPERFUSION.
Indications for Fibrinolytic Therapy
Class I
1. In the absence of contraindications, fibrinolytic therapy should be administered to STEMI patients with symptom onset within the prior 12 hours and ST elevation greater than 0.1 mV in at least 2 contiguous precordial leads or at least 2 adjacent limb leads. (Level of Evidence: A)

2. In the absence of contraindications, fibrinolytic therapy should be administered to STEMI patients with symptom onset within the prior 12 hours and new or presumably new LBBB. (Level of Evidence: A)

Class IIa
1. In the absence of contraindications, it is reasonable to administer fibrinolytic therapy to STEMI patients with symptom onset within the prior 12 hours and 12-lead ECG findings consistent with a true posterior MI. (Level of Evidence: C)

2. In the absence of contraindications, it is reasonable to administer fibrinolytic therapy to patients with symptoms of STEMI beginning within the prior 12 to 24 hours who have continuing ischemic symptoms and ST elevation greater than 0.1 mV in at least 2 contiguous precordial leads or at least 2 adjacent limb leads. (Level of Evidence: B)

Class III
1. Fibrinolytic therapy should not be administered to asymptomatic patients whose initial symptoms of STEMI began more than 24 hours earlier. (Level of Evidence: C)
2. Fibrinolytic therapy should not be administered to patients whose 12-lead ECG shows only ST-segment depression except if a true posterior MI is suspected. (Level of Evidence: A)