

HEMS
System Protocols
NITROGLYCERIN AND HEPARIN DRIP INTERFACILITY PROTOCOLS

Date: April 2013
Last Revised Date: 1/8/2024

Section 8.15 (S4)

Nitroglycerin and Heparin Drip Interfacility Protocols

EMS Protocol

This protocol applies to nitroglycerin and Heparin drips that are initiated at the transferring facility prior to transport and are not intended to allow ALS-level paramedics to initiate such treatments independently.

Nitroglycerin Drip

The use of nitroglycerin by paramedic personnel exists commonly in the inter-facility transport arena, primarily in the sublingual form. However, the occasion may arise when a hemodynamically stable patient needs to be transported from one hospital to another on a nitroglycerin infusion (i.e. unstable angina, now pain free or with a significant reduction in pain, on a nitroglycerin drip, who needs to be transported to a hospital with a cardiac catheterization laboratory). This protocol provides guidelines for the safe transport of these patients on a nitroglycerin infusion via Advanced Life Support Ambulance.

Pharmacology and actions of nitroglycerin

Cardiovascular effects:

Decreases preload: reduces venous tone, decreasing venous load on the heart. Reduces cardiac oxygen demand.

Decreases afterload: reduces peripheral vascular resistance.

Increases myocardial oxygen supply: causes dilatation of coronary arteries and relief of coronary artery spasm.

Generalized effect: causes generalized smooth muscle relaxation.

Indications for Nitroglycerin Drip

Chest pain secondary to presumed cardiac ischemia, acute coronary syndrome or acute myocardial infarction.

Acute pulmonary edema / CHF.

Training requirements for paramedics

Nitroglycerin training = 1 hour

Pump training = 1 hour

Patient requirements for consideration of transfer of a patient on a nitroglycerin drip by Advanced Life Support Ambulance

Systolic BP >90 mmHg

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Hemodynamically stable

Pain free or significant pain reduction

If the patient is still having pain, s/he may still be transferred, but pain should be significantly improved from the initial presentation.

Equipment

At least one functioning IV, preferably (2) two.

Pump and tubing supplied by the transporting ambulance agency. Pump may also be supplied by the hospital, provided the paramedics have been previously trained in the use of the hospital pump.

Nitroglycerin drip, supplied by the sending facility. Ensure sufficient volume is taken to complete the transport.

Administration Guidelines Dosing

Continue nitroglycerin infusion at rate set by transferring physician.

Dosing Chart: see Table 1 for example charts. Nitroglycerin may be mixed in either NS or D5W.

Patient Monitoring

If pain resolves completely, maintain drip at current rate of administration.

If pain continues, increase drip by 5-10 mcg/min every 5 minutes until pain resolves or systolic BP fall below 90 mmHg.

Maximum dose for nitroglycerin is 200 mcg/min.

If systolic BP falls below 90 mmHg during titration, decrease the drip rate by 10 mcg and give a 250 mL NS bolus IV. If BP remains below 90 mmHg, discontinue drip.

Vital signs must be rechecked q 5-10 minutes and after each dosing change.

Side effects and special notes

Peripheral vasodilatation can cause profound hypotension and reflex tachycardia. Common side effects: throbbing headaches, flushing and dizziness.

Less common side effects: orthostatic hypotension, sometimes marked.

Nitroglycerin does not provide controlled hypotension.

Because nitroglycerin causes smooth muscle relaxation, it may be effective in relieving chest pain caused by esophageal spasm.

Nitroglycerin Drip

Table 1

This is a sample dosing chart for nitroglycerin. Other dosing concentrations may be used and a dosing chart should be obtained prior to transport.

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NITROGLYCERIN CONVERSION TABLE				
STRENGTH:	25 mg/250 mL	50 mg/250 mL	100 mg/250 mL	50 mg/500 mL
	100 mcg/1 mL	200 mcg/1 mL	400 mcg/1 mL	100 mcg/1 mL
DOSE ORDERED:	INFUSION RATE			
5 mcg/min	3 mL/hr	1.5 mL/hr	0.75 mL/hr	3 mL/hr
10 mcg/min	6 mL/hr	3 mL/hr	1.5 mL/hr	6 mL/hr
15 mcg/min	9 mL/hr	1.5 mL/hr	0.75 mL/hr	9 mL/hr
20 mcg/min	12 mL/hr	4 mL/hr	1.5 mL/hr	12 mL/hr
25 mcg/min	15 mL/hr	1.5 mL/hr	0.75 mL/hr	15 mL/hr
30 mcg/min	18 mL/hr	5 mL/hr	1.5 mL/hr	18 mL/hr
35 mcg/min	21 mL/hr	1.5 mL/hr	0.75 mL/hr	21 mL/hr
40 mcg/min	24 mL/hr	6 mL/hr	1.5 mL/hr	24 mL/hr
45 mcg/min	27 mL/hr	1.5 mL/hr	0.75 mL/hr	27 mL/hr
50 mcg/min	30 mL/hr	7 mL/hr	1.5 mL/hr	30 mL/hr
55 mcg/min	33 mL/hr	1.5 mL/hr	0.75 mL/hr	33 mL/hr
60 mcg/min	36 mL/hr	8 mL/hr	1.5 mL/hr	36 mL/hr
65 mcg/min	39 mL/hr	1.5 mL/hr	0.75 mL/hr	39 mL/hr
70 mcg/min	42 mL/hr	9 mL/hr	1.5 mL/hr	42 mL/hr
75 mcg/min	45 mL/hr	1.5 mL/hr	0.75 mL/hr	45 mL/hr
80 mcg/min	48 mL/hr	10 mL/hr	1.5 mL/hr	48 mL/hr
85 mcg/min	51 mL/hr	1.5 mL/hr	0.75 mL/hr	51 mL/hr
90 mcg/min	54 mL/hr	11 mL/hr	1.5 mL/hr	54 mL/hr
95 mcg/min	57 mL/hr	1.5 mL/hr	0.75 mL/hr	57 mL/hr
100 mcg/min	60 mL/hr	12 mL/hr	1.5 mL/hr	60 mL/hr

Heparin Drip

The use of heparin by paramedic personnel routinely occurs in the inter-facility transport setting. In the occasion that a patient needs to be transported from one facility to another for the purpose of definitive care, this protocol provides uniform guidelines for the safe transport of those patients via Advanced Support Ambulances.

Pharmacology and actions of Heparin.

Heparin is an anticoagulant used to prevent the formation of blood clots.

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Indications: Acute myocardial infarction, DVT (deep vein thrombosis), DIC (disseminated intravascular coagulation), pulmonary embolism, atrial fibrillation, prophylactically for prevention of blood clots.

Training requirements for paramedics

Heparin training = 1 hour

Pump training = 1 hour (may be combined with other pump training)

Equipment

At least one functioning IV, preferably (2) two.

Pump and tubing supplied by the transporting ambulance agency. Pump may also be supplied by the hospital, provided the paramedics have been previously trained in the use of the hospital pump.

Heparin drip, supplied by the sending facility. Ensure sufficient volume is taken to complete the transport.

Cardiac monitor.

Administration Guidelines

Dosing

Continue Heparin infusion at rate set by transferring physician.

Recommended mixing instructions are 25,000 units in 250cc of NS.

Dosing Chart: see Table 1 for example chart. Heparin may be mixed in either NS or D5W.

Patient Monitoring

Patients should be monitored for ECG (Ventricular tachycardia).

Patients should be monitored for bleeding (petechia or bruising, bleeding from the gums, epistaxis, GI Bleeding)

Hypotension

Side effects and special notes:

Care should be used when handling patients who are receiving Heparin infusions, as rough handling can cause bleeding.

Heparin should not be used with patients who are actively bleeding.

Heparin should not be used on patients with known or suspected intracranial hemorrhage. Concurrent use of Heparin and oral anticoagulants, thrombolytic and salicylates or IIb/IIIa antagonists can increase the chances of bleeding.

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Heparin Drip

Table 1

Example dosing chart for Heparin. Other dosing concentrations may be used and a dosing chart should be obtained prior to transport.

HEPARIN DOSING CHART			
STRENGTH:	25,000 units in 250 mL of NS	25,000 units in 500 mL of NS	
DOSE ORDERED :	INFUSION RATE		
500 units	5 mL/hr	10 mL/hr	
600 units	6 mL/hr	12 mL/hr	
700 units	7 mL/hr	14 mL/hr	
800 units	8 mL/hr	16 mL/hr	
900 units	9 mL/hr	18 mL/hr	
1000 units	10 mL/hr	20 mL/hr	
1100 units	11 mL/hr	22 mL/hr	
1200 units	12 mL/hr	24 mL/hr	
1300 units	13 mL/hr	26 mL/hr	
1400 units	14 mL/hr	28 mL/hr	
1500 units	15 mL/hr	30 mL/hr	
1600 units	16 mL/hr	32 mL/hr	
	1700 units	17 mL/hr	34 mL/hr
	1800 units	18 mL/hr	36 mL/hr
	1900 units	19 mL/hr	38 mL/hr
	2000 units	20 mL/hr	40 mL/hr