

INTERFACILITY TRANSFER PROTOCOL

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- b. *Documentation*
- c. *Transport Crew Levels*
- d. *Contacting Medical Control*
- e. *Transferring Patients with Drugs and Devices*
- f. *Requesting Additional Personnel*

a. Introduction

The decision to transfer a patient rests with the transferring physician (or other care provider, such as a physician assistant). This physician bears responsibility for the transfer decisions. It is the transferring physician who must:

- 1) Determine whether the benefits of transfer outweigh the risks.
- 2) Ensure that the patient is properly stabilized prior to departure.
- 3) Be responsible for complying with currently accepted community standards of practice regarding interfacility transfer.

The Paramedics/CCs and Medical Control Physician (MC) assume responsibility for management of the patient, given the circumstances of the patient's condition, while en route between facilities.

This protocol recognizes there will be situations where potentially unstable patients will require transfer to another facility to obtain a higher level of care.

It should be noted that the Interfacility Transfer Protocol is a supplement to the Regional 911 Protocols and requires additional training. In this light, patient care during transport can be defaulted to that delineated by the Regional 911 Protocols.

b. Documentation

It is the responsibility of the transferring hospital/physician to provide appropriate documentation which includes a transfer form or other documentation indicating compliance with current statutes or laws regarding patient transfers. Included should be patient

identifying information (name, address, date of birth, etc.), treatments, test results, preliminary diagnosis, reason for transfer, names of transferring/accepting physicians/institutions, pertinent medical records and orders.

c. Transport Crew Levels

The following is a description of which levels of care may transport what drugs and devices.

EMT Saline lock
Patients with PCA pumps with settings unchanged for > 6 hours
Stable patient with no anticipation of further interventions en route

EMT-I Above listed plus:
Peripheral IV lines with no added drugs
Stable, intubated patients with no anticipation of further interventions en

route

EMT-CC Above listed plus:
Peripheral IV lines
Indwelling Lines /PICC lines that are already accessed and running
Central venous lines that are running
Cardiac monitor/defibrillator
Intubated patients with stable ventilator settings
Up to 3 IV drips and drugs except for those excluded from the list
Only may transport patients on drugs SPECIFICALLY listed in the

protocol

EMT-P Above listed plus:
All Intubated patients
Arterial and Swann-Ganz lines- not to be used for monitoring by

paramedic

The medical director of the transporting service shall insure that all transporting providers are credentialed and trained for interfacility transfer and may transport drugs in the so-named categories at their discretion.

d. Contacting Medical Control by Paramedics/CCs

Medical Control **MUST** be contacted in the following circumstances:

1. Ongoing administration of blood products or resuscitative medications
2. Intubated patients
3. Patients with chest tubes
4. Patients with temporary pacemakers
5. Changes in symptoms/ signs/ conditions potentially indicating deterioration
6. Unstable vital signs
7. Medications not specifically listed in the protocol

Patients with the first four listed items should be contacted before arrival, and preferably before the patient leaves the sending facility. Patients with the 5th and 6th listed items should have MC called en route as these occur.

Patients on medications not specifically listed in the protocol may be transported by **EMT-Ps ONLY**. These medications will need to be reviewed by MC and must fall into a similar category as other drugs **ALREADY LISTED** in the protocol. A patient receiving a completely new category of drug **may not be transported without further personnel** trained in the use of that drug.

Medical Control (MC) may be defined as either the transporting service agency Medical Director, the transferring or receiving MD and as a last resort the ED physician of the transferring or receiving hospital.

The Medical Director of the transporting service may set additional standards regarding contacting MC.

e. Transferring Patients with Drugs and Devices

During interhospital transfer crew members shall follow all regionally approved BLS/ALS protocols. In addition, the patients on the stated drugs and devices may only be transported **if the respective drugs have been initiated at the transferring hospital by the transferring physician/care provider.** None of these may be initiated en route. At the discretion of MC, the drug rates/doses may be altered or discontinued depending on the patient's clinical condition. Where indicated, EMT-Ps may titrate a drug up or down once depending on parameters delineated in the specific protocol.

The following precautions should be kept in mind by transferring providers:

1. All medications have potential to cause allergic reactions.
2. Some medications cause local irritation around the IV site. Several may even cause tissue necrosis if there is infiltration. If there is infiltration of any line, the IV should be immediately discontinued.
3. Many of the listed drugs are incompatible with other medications. Therefore, additional medication should be given through a separate IV line, or, if one is not established, the infusion should be stopped and the line flushed before administering a second medication. This should only be done under direct MC guidance.
4. Most require infusion pumps and/or cardiac monitoring.
5. MC should be contacted if there is any change in patient condition or if any medication needs to be emergently discontinued during transport.
6. If the need arises for emergency medications to be given, infusions may need to be discontinued; contact MC.
7. The MC physician may determine that the number or types of drugs/devices may require the presence of additional personnel (such as a second paramedic, nurse or physician).
8. Transfer of patients with ongoing infusion of medication outside the scope of practice and training of the transporting crew (either because of lack of credentialing or medication not listed in the protocol) can not be accomplished without additional personnel who possess a higher level of training.

f. Requesting Additional Personnel

When the EMS provider anticipates that they will require more assistance to appropriately care for the patient during transfer, they shall request the transferring

physician/health care provider to provide appropriately trained hospital staff to accompany the patient and assist.

The EMS provider must contact MC for medical direction in all situations where they are not comfortable with the circumstances of the transfer. **The transfer will not occur unless the EMS provider and MC are confident the personnel and equipment are appropriate for transfer.**

- II. **Drugs**
 - a. **Cardiovascular Drugs**
 - b. **Sedation and Paralytic Agents**
 - c. **CNS Drugs**
 - d. **HAL/TPN, Insulin and Electrolytes**
 - e. **Obstetric Drugs**
 - f. **Anti-infective Therapy**
 - g. **Pain Control**
 - h. **Antidotes**
 - i. **GI Drugs**

a. Cardiovascular Drugs

- i. Antiarrhythmic Drugs*
- ii. Beta Blockers*
- iii. Blood Pressure Lowering Drugs*
- iv. Calcium Channel Blockers*
- v. Glycoprotein Iib/IIIa Inhibitors*
- vi. Heparin Drip*
- vii. Inotropes*
- viii. Nitroglycerine Drip*
- ix. Thrombolytic Therapy*

Cardiovascular Drugs

Antiarrhythmics

Use: Treatment and cardioversion of Atrial Fibrillation or Atrial Flutter
Treatment and prophylaxis of refractory Ventricular Tachycardia

Adverse Effects:

Hypotension,
QT prolongation, Torsades, Ventricular Tachycardia
AV Block

Dosing:

Flecainide (Tambocor)

Infuse: 2 mg/kg over 20 minutes

Ibutilide (Corvert)

Infuse: 1 mg IV over 10 minutes

Magnesium Sulfate

Bolus: 1-2 grams over 5 minutes

Infusion: 6-12 grams over 24 hours

Propafenone (Rhythmol)

Bolus: 2 mg/kg in 15-20 minutes; followed by

Infusion: 0.0067 - 0.0078 mg/kg/minute

Special Considerations:

Use infusion pump for drips

May not be compatible with heparin, lidocaine, amiodarone or bicarb

Frequent BP checks for hypotension

Increased risk for ventricular dysrhythmias if on certain antihistamines or anti-nausea medications

Transport by EMT-Ps only

(with exception of Magnesium Sulfate: may be transported by EMT-CC)

Cardiovascular Drugs

Beta- Blockers

Uses: Slow ventricular response in SVT, Atrial Fibrillation and Atrial Flutter
Slow sinus node rate

Adverse Effects:

Hypotension, bradycardia
Hypoglycemia (diabetics on medications); usual signs and symptoms are masked
Bronchospasm
Sinus node arrest

Dosing:

Atenolol (Tenormin)

Infuse: 5 mg over 5 minutes
May be repeated in 10 minutes

Esmolol (Brevibloc)

Bolus: 500 mcg/kg (0.5 mg/kg) over one minute
Infusion: 50 mcg/kg/minute for 4 minutes

If inadequate response, repeat bolus and increase drip rate by 50 mcg/kg/minute up to 3 times
(total dose of 2000 mcg bolus and in fusion @ 200 mcg/kg/minute)

Drug comes in a 100 mg (10 mg/ml) vial or 2500 mg ampule into 250 ml (10 mg/ml) or 500 ml (5 mg/ml) NS or D5W

Labetalol (Normodyne)

Infusion: 2 mg/minute (concentration 1mg/ml; 2ml/min)
duration from 25 minutes to 2.5 hours

Metoprolol (Lopressor)

Inject: 2.5 mg IV slow push over 2 minutes
May repeat dose up to 5 times every 5 minutes
for a **total dose of 15 mg**

Sotalol (Betapace)

Bolus: 1-1.5 mg/kg; followed by
Infusion: 0.008 mg/kg/minute = 8 mcg/kg/min

Special Considerations:

Use infusion pump
Check BP frequently; monitor heart rate
Carefully monitor for hypotension, excessive bradycardia or new AV blocks
Patient with DIABETES may have symptoms of hypoglycemia masked; watch carefully

Do not mix other medications in the same line

Check BP and heart rate every 5 minutes

Hypotension can be alleviated by decreasing the infusion rate

Nesiritide:

Caution in pregnant or lactating patients

Contact MC for worsening signs/symptoms, significant BP change or if BP<90

NITROPRUSSIDE DOSING CHART

CONCENTRATION 200MCG/ML

100MG/500ML

50MG/250ML

Pat Wt in Kg	MCG/KG/MINUTE															
	0.5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
35	5	11	21	32	42	53	63	74	84	95	105	116	126	137	147	158
40	6	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180
45	7	14	27	41	54	68	81	95	108	122	135	149	162	176	189	203
50	8	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225
55	8	17	33	50	66	83	99	116	132	149	165	182	198	215	231	248
60	9	18	36	54	72	90	108	126	144	162	180	198	216	234	252	270
65	10	20	39	59	78	98	117	137	156	176	195	215	234	254	273	293
70	11	21	42	63	84	105	126	147	168	189	210	231	252	273	294	315
75	11	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338
80	12	24	48	72	96	120	144	168	192	216	240	264	288	315	336	360
85	13	26	51	77	102	128	153	179	204	230	255	281	306	332	357	383
90	14	27	54	81	108	135	162	189	216	243	270	297	324	351	378	405
95	14	29	57	86	114	143	171	200	228	257	285	314	342	371	399	428
100	15	30	60	90	120	150	180	210	240	270	300	330	360	390	420	450
105	16	32	63	95	156	158	189	221	252	284	315	347	378	410	441	473
110	17	33	66	99	132	168	198	231	264	297	330	363	396	429	462	495
115	17	35	69	104	138	173	207	242	276	311	345	380	414	449	483	518
120	18	36	72	108	144	180	216	252	288	324	360	396	432	468	504	540

Blood Pressure Lowering Drugs should be transported by EMT-Ps only.

Cardiovascular Drugs

Calcium Channel Blockers

Uses: Ventricular Rate Control in A Fib, Atrial Flutter, MAT or SVT

Adverse Effects:

May cause Atrial Flutter, AV Block, Bradycardia, Chest Pain, CHF,
Ventricular Arrhythmias , nausea/vomiting, dyspnea or hypotension

Dosing:

Diltiazem (Cardizem)

Bolus: 0.25 mg/kg over 2 minutes (20 mg for average patient)
If needed may repeat bolus in 15 minutes @ 0.35 mg/kg
(25 mg in the average patient) over 2 – 5 minutes

Infusion: Dilute 125 mg (25ml) in 100 ml NS/D5W
Drip @ 5 – 15 mg/hour titrated to heart rate

Nicardipene(Cardene)

Dilute to: 0.1 mg/ml
Infusion: Start @ 50 ml/hr (5 mg/hr)
May increase rate by 2.5 mg/hr every 15 minutes until

desired

BP is reached for a **maximum dose of 15 mg/hr**

Special Considerations:

Carefully monitor for hypotension/excessive bradycardia/ new A/V block
PVC's can occur with conversion to NSR
Don't use in the presence of a WIDE COMPLEX TACHYCARDIA

Nicardipene:

If hypotensive or tachycardic, discontinue drip.

May resume when stable @ 3-5 mg/hr

Infusion site must be changed after 12 hours

Use with caution in patients with liver failure, since it is metabolized in

the liver.

May be contraindicated in severe Aortic Stenosis as may decrease preload.
Should not be infused in same IV with other drugs

193-210	88-95	44 ml/hr	22 ml	11 ml/hr
211-229	96-104	48 ml/hr	24 ml	12 ml/hr
230-247	105-112	52 ml/hr	26 ml	13 ml/hr
248-265	113-120	56 ml/hr	28 ml	14 ml/hr
266-283	121-128	60 ml/hr	30 ml	15 ml/hr
284-302	129-137	64 ml/hr	32 ml	16 ml/hr
303-319	138-145	68 ml/hr	34 ml	17 ml/hr
320-337	146-153	72 ml/hr	36 ml	18 ml/hr

Eptifibatide (Integrilin)

Loading bolus: 180 mcg/kg over 1-2 minutes

Maintenance infusion: 2 mcg/kg/min up to 72 hours

Dosing table for Eptifibatide

Bolus drawn directly from “**bolus-vial**” (2 mg/ml)

Maintenance given directly from “**infusion vial**” (0.75 mcg/ml)

<u>Patient Weight</u>	<u>(kg)</u>	<u>Bolus Volume (mL)</u>	<u>Infusion Rate</u>
37-41		3.4 ml	6 ml/hr
42-46		4.0 ml	7 ml/hr
47-53		4.5 ml	8 ml/hr
54-59		5.0 ml	9 ml/hr
60-65		5.6 ml	10 ml/hr
66-71		6.2 ml	11 ml/hr
72-78		6.8 ml	12 ml/hr
79-84		7.3 ml	13 ml/hr
85-90		7.9 ml	14 ml/hr
91-96		8.5 ml	15 ml/hr
97-103		9.0 ml	16 ml/hr
104-109		9.5 ml	17 ml/hr
110-115		10.2 ml	18 ml/hr
116-121		10.7 ml	19 ml/hr
>121		11.3 ml	20 ml/hr

Special Considerations:

Use infusion pump

Should always be given WITH heparin; if bleeding occurs, need to turn off heparin as

well as the GPIIb/IIIa drug

Eptifibatide dose will be decreased in patients with impaired renal function;

settings to

be determined by the patient’s ordering physician

Cardiovascular Drugs

Heparin Drip

Uses: Prevents blood clotting, especially in the following situations:
Acute MI, Pulmonary Embolus, Deep Vein Thrombosis

Adverse Effects:
Hemorrhage from various sites including needle sticks, GI tract, CNS bleeds

Dosing: Bolus: 15-18mg/kg
Infusion: 800-1600 mg/hour
Infusion rates may be outside this range and should not require adjustment during transport

Special Considerations:
Use infusion pump
D/C immediately for onset of major bleeding or acute mental status change
Contact MC for any bleeding such as IV sites or gums

Cardiovascular Drugs

Inotropes

Uses: Short term intravenous treatment of patients with acute decompensated heart failure

Severe CHF/Cardiogenic Shock
 To increase cardiac output by increasing myocardial contractility and stroke volume
 Hemodynamically significant hypotension not resulting from hypovolemia

Adverse Effects:

May develop hypokalemia resulting from increased cardiac output and/or diuresis
 May have tachycardia, ventricular dysrhythmias or ectopy, hypertension, angina or ischemic chest pain
 Dobutamine may also cause hypotension
 Dopamine may cause nervousness, headache, palpitations, dyspnea, nausea or vomiting

Dosing: **Inamrinone (Inacor):** Loading dose over 2-3 minutes: 0.75 mcg/kg
 Maintenance infusion: 5-10 mcg/kg/min

Milrinone (Primacor): Loading dose over 10 minutes: 50 mcg/kg

Patient Weight (kg)	30	40	50	60	70	80	90	100	110	120	
(max)											
Loading Dose (mg)	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	
Maintenance dose (mL/hr)	200 mcg/mL concentration										
mcg/kg/min	0.375	3.4	4.5	5.6	6.8	7.9	9.0	10.1	11.3	13.5	
	0.50	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0	16.5	
18.0	0.75	6.8	9.0	11.3	13.5	15.8	18.0	20.3	22.5	24.8	27.0

Dobutamine: 2.5 – 20 mcg/kg/min continuous infusion;
onset may be 10 minutes

See dosing chart below for different concentration solutions

**DOBUTAMINE DOSING CHART
CONCENTRATION 2MG/ML**

**1G/500ML OR 100MG/50ML
500MG/250ML**

PAT WT IN KG	MCG/KG/MINUTE																																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	25	30	35	40																
35	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17	18	19	20	21	26	32	37	42																
40	1	2	4	5	6	7	8	10	11	12	13	14	16	17	18	19	20	22	23	24	30	36	42	48																
45	1	3	4	5	7	8	9	11	12	14	15	16	18	19	20	22	23	24	26	27	34	41	47	54																
50	2	3	5	6	8	9	11	12	14	15	17	18	20	21	23	24	26	27	29	30	38	45	53	60																
55	2	3	5	7	8	10	12	13	15	17	18	20	21	23	25	26	28	30	31	33	41	50	58	66																
60	2	4	5	7	9	11	13	14	16	18	20	22	23	25	27	29	31	32	34	36	45	54	63	72																
65	2	4	6	8	10	12	14	16	18	20	21	23	25	27	29	31	33	35	37	39	49	59	68	78																
70	2	4	6	8	11	13	15	17	19	21	23	25	27	29	32	34	36	38	40	42	53	63	74	84																
75	2	5	7	9	11	14	16	18	20	23	25	27	29	32	34	36	38	41	43	45	56	68	79	90																
80	2	5	7	10	12	14	17	19	22	24	26	29	31	34	36	38	41	43	46	48	60	72	84	96																
85	3	5	8	10	13	15	18	20	23	26	28	31	33	36	38	41	43	46	48	51	64	77	89	102																
90	3	5	8	11	14	16	19	22	24	27	30	32	35	38	41	43	46	49	51	54	68	81	95	108																
95	3	6	9	11	14	17	20	23	26	29	31	34	37	40	43	46	48	51	54	57	71	86	100	114																
100	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	75	90	105	120																
105	3	6	9	13	16	19	22	25	28	32	35	38	41	44	47	50	54	57	60	63	79	95	110	126																
110	3	7	10	13	17	20	23	26	30	33	36	40	43	46	50	53	56	59	63	66	83	99	116	132																
115	3	7	10	14	17	21	24	28	31	35	38	41	45	48	52	55	59	62	66	69	86	104	121	138																
120	4	7	11	14	18	22	25	29	32	36	40	43	47	50	54	58	61	65	68	72	90	108	126	144																

ml / hr or drops/min. using minidrip tubing = 60 drops / ml

DOUBLE CONCENTRATION

**DOBUTAMINE DOSING CHART
CONCENTRATION 4MG/ML**

**1000MG/250ML
500MG/125ML**

PAT WT IN KG	MCG/KG/MINUTE																																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	25	30	35	40											
35	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	11	13	16	18	21											
40	1	1	2	2	3	4	4	5	5	6	7	7	8	8	9	10	10	11	11	12	15	18	21	24											
45	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	11	11	12	13	14	17	20	24	27											
50	1	2	2	3	4	5	5	6	7	8	8	9	10	11	11	12	13	14	14	15	19	23	26	30											
55	1	2	2	3	4	5	6	7	7	8	9	10	11	12	12	13	14	15	16	17	21	25	29	33											
60	1	2	3	4	4	5	6	7	8	9	10	11	12	13	14	14	15	16	17	18	23	27	32	36											
65	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	24	29	34	39											
70	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17	18	19	20	21	26	32	37	42											
75	1	2	3	5	6	7	8	9	10	11	12	14	15	16	17	18	19	20	21	23	28	34	39	45											
80	1	2	4	5	6	7	8	10	11	12	13	14	16	17	18	19	20	22	23	24	30	36	42	48											
85	1	3	4	5	6	8	9	10	11	13	14	15	17	18	19	20	22	23	24	26	32	38	45	51											
90	1	3	4	5	7	8	9	11	12	14	15	16	18	19	20	22	23	24	26	27	34	41	47	54											
95	1	3	4	6	7	9	10	11	13	14	16	17	19	20	21	23	24	26	27	29	36	43	50	57											
100	2	3	5	6	8	9	11	12	14	15	17	18	20	21	23	24	26	27	29	30	38	45	53	60											
105	2	3	5	6	8	9	11	13	14	16	17	19	20	22	24	25	27	28	30	32	39	47	55	63											
110	2	3	5	7	8	10	12	13	15	17	18	20	21	23	25	26	28	30	31	33	41	50	58	66											
115	2	3	5	7	9	10	12	14	16	17	19	21	22	24	26	28	29	31	33	35	43	52	60	69											
120	2	4	5	7	9	10	13	14	16	18	20	20	23	25	27	29	31	32	34	36	45	54	63	72											

ml/hr or drops/min. using minidrip tubing = 60 drops/ml

Dopamine: 1-20 mcg/kg/min continuous infusion
Onset may be 10 minutes
See dosing chart below for different concentration solutions

Dopamine Dosing Chart
Single Concentration 1.6 mg / ml
 800 mg / 500 ml
 400 mg / 250 ml
 mcg /kg /minute

Pt wt in Kg		1	2	3	4	5	10	15	20
	35	1	3	4	5	7	13	20	26
40	2	3	5	6	8	15	23	30	
45	2	3	5	7	8	17	25	34	
50	2	4	6	8	9	19	28	38	
55	2	4	6	8	10	21	31	41	
60	2	5	7	9	11	23	34	45	
65	2	5	7	10	12	24	37	49	
70	3	5	8	11	13	26	39	53	
75	3	6	8	11	14	28	42	56	
80	3	6	9	12	15	30	45	60	
85	3	6	10	13	16	32	48	64	
90	3	7	10	14	17	34	51	68	
95	4	7	11	14	18	36	53	71	
100	4	8	11	15	19	38	56	75	
105	4	8	12	16	20	39	59	79	
110	4	8	12	17	21	41	62	83	
115	4	9	13	17	22	43	65	86	
120	5	9	14	18	23	45	68	90	

ml/hr or drops/min. using minidrip tubing = 60 drops/ml
Dopamine (Single) Dosing Chart

Dopamine Dosing Chart
Double Concentration 3.2 mg/ml
 800 mg/250 ml
 mcg/kg/minute

Pt wt in Kg		1	2	3	4	5	10	15	20
	35	1	1	2	3	3	7	10	13
40	1	2	2	3	3	7	11	15	
45	1	2	3	3	4	8	13	17	
50	1	2	3	4	5	9	14	19	
55	1	2	3	4	5	10	15	21	
60	1	2	3	5	6	11	17	23	
65	1	2	4	5	6	12	18	24	
70	1	3	4	6	7	13	20	26	
75	1	3	4	6	7	14	21	28	
80	2	3	5	6	8	15	23	30	
85	2	3	5	7	8	16	24	32	
90	2	3	5	7	8	17	25	34	
95	2	4	5	8	9	18	27	36	
100	2	4	6	8	9	19	28	38	
105	2	4	6	8	10	20	30	39	
110	2	4	6	9	10	21	31	41	
115	2	4	6	9	11	22	32	43	
120	2	5	7	9	11	23	34	45	

ml/hr or drops/min. using minidrip tubing = 60 drops/ml
Dopamine (Double) Dosing Chart

Epinephrine: 1-10 mcg/min titrated to desired effect

Norepinephrine: 0.5-1.0 mcg/min

(Levophed)

Titrated up to 30 mcg/min to desired hemodynamic effect

Special Considerations:

Use infusion pump

For Inamrinone/Milrinone:

do not mix with Lasix or dextrose-containing solutions

should be transported by EMT-Ps only

Monitor for cardiac dysrhythmias; these may be caused by hypokalemia, pre-existing

arrhythmias, abnormal drug levels, catheter placement, etc.

Check blood pressure and heart rate frequently. Discontinue briefly if develop hypotension secondary to vasodilatation

EMT-Ps may titrate up/down one increment without calling MC

Contact MC for any adverse affects

Cardiovascular Drugs

Nitroglycerine Drip

Uses: Acute Coronary Syndrome, CHF, Hypertension
Decreases preload, and to a lesser extent, afterload

Adverse Effects:
Excessive hypotension which can provoke angina, headache, restlessness, palpitations, tachycardia or dizziness

Dosing: Continuous infusion titrated to maintain therapeutic effect while avoiding hypotension.
Usual range 10-200 mcg/min. May be higher in treatment of pulmonary edema.

**NITROGLYCERIN DOSING CHART
CONCENTRATION 200MCG/ML
100 MG/500 ML
50 MG/250 ML**

**DOUBLE CONCENTRATION
NITROGLYCERIN DOSING CHART
CONCENTRATION 400MCG/ML
100 MG/250 ML**

MCG/MIN	PUMP SETTING						
10	3	160	48	10	2	160	24
20	6	170	51	20	3	170	26
30	9	180	54	30	5	180	27
40	12	190	57	40	6	190	29
50	15	200	60	50	8	200	30
60	18	210	63	60	9	210	32
70	21	220	66	70	11	220	33
80	24	230	69	80	12	230	35
90	27	240	72	90	14	240	36
100	30	250	75	100	15	250	38
120	36	260	78	120	18	260	39
130	39	270	81	130	20	270	41
140	42	280	84	140	21	280	42
150	45			150	23		

Special Considerations: Use Infusion pump
Monitor heart rhythm
Check BP and HR frequently (every 5 minutes);
may decrease to every 10 minutes if at the same rate for >1 hour
Do not mix other medications in the same line
Hypotension can be alleviated by decreasing the rate of infusion
D/C infusion if BP systolic is <60mm Hg and contact MC
Contact MC for worsening or persisting adverse signs/symptoms

or for

persisting BP < 90 mmHg

***EMT-CCs* may transport patients with a **MAXIMUM** rate of 100 mcg/min
EMT-Ps may perform one titration of 10 mcg for escalating chest pain without contacting MC**

Cardiovascular Drugs

Thrombolytic Therapy

Uses: Dissolves clots in blood vessels
Generally used in the setting of Acute MI or CVA; occasionally used Pulmonary Embolus

Adverse Effects:

Minor hemorrhages from IV sites and gums
Major hemorrhage from GI and intracranial or spinal sites
Reperfusion dysrhythmias often occur about 30-60 minutes after starting infusion
Allergic reactions including anaphylaxis may occur with Streptokinase or APSAC

Dosing:

Streptokinase, APSAC or TPA:

Dose to be determined by transferring physician
(determined by patient weight and indication for therapy)
Rate should not require adjusting en route

Tenecteplase (TNK): weight-based one time dose, administered over 5 seconds

Pt weight:	<60 kg	Dose:	30 mg
	≥60 - <70 kg		35 mg
	≥70 - <80		40 mg
	≥80 - <90		45 mg
	≥90		50 mg

Occasionally used as continuous infusion for peripheral arterial thrombus
0.25-0.5 mg/hour up to 48 hours

Retevase: Given in 2 doses of 10 mg each, 30 minutes apart
Given as a 2 minute IV push

Special Considerations:

Use infusion pump
Monitor heart rhythm
Check BP and HR frequently
Do not mix with other medications in the same line
D/C infusion immediately if there is cardiac arrest, major

hemorrhage,

anaphylaxis or change in mental status **AND call MC.**

b. Sedation and Paralytic Agents

i. Benzodiazepine Drips

ii. Moderate Sedation Agents

iii. Opioid Drips

iv. Paralytic Agents

Sedation and Paralytic Agents

Benzodiazepine Drips

Uses: Sedation for patients who are intubated (and often concurrently on a paralytic drip)

May be used to treat Status Epilepticus

Adverse Effects:

May be more prone to hypotension if used with an opioid drug

Can cause paradoxical agitation, hypertension or tachycardia

Dosing: **Lorazepam (Ativan):** Loading dose: 0.5- 4.0 mg IV bolus; may be repeated in 10 min

Infusion: 0.02- 0.1 mg/kg/hour

Midazolam (Versed): Loading dose: 0.01- 0.1 mg/kg IV bolus

Infusion 0.02-0.1 mg/kg/hour

Special Considerations:

Only to be used in intubated patients

Sedation and Paralytic Agents

Moderate Sedation Agents

Uses: Sedation for patients who are intubated (and often concurrently on a paralytic drip)

May also be used for refractory seizures or therapeutic coma

Adverse Effects:

May be more prone to hypotension if used with an opioid drug
Can cause paradoxical agitation, hypertension or tachycardia

Dosing:

Propofol: Loading dose: 0.5-5 mg/kg
Maintenance infusion: 2-10 mg/kg/hour

Barbiturates: *Pentobarbital* is most commonly used
Loading dose: 10 mg/kg; infuse up to 25 mg/min
Maintenance: 1-2 mg/kg/hour

Ketamine: Loading dose: 1-5 mg/kg
Maintenance infusion: 0.01-0.05 mg/kg/hour

Special Considerations:

Only to be used in intubated patients

Sedation and Paralytic Agents

Opioid Drugs/Drips

Uses: Typically **part of a sedation combination** for patients who are intubated
Occasionally for pain control

Adverse Effects:

May cause hypotension, especially in volume depleted patients or those with
right-sided
heart failure

Dosing:

until

Morphine: Loading dose: 2 mg increments given every 5-10 minutes

adequate pain control; typically max dose is 10 mg- may be higher

in

patients on chronic pain therapy

Infusion: 1-10 mg/hour

Fentanyl: Loading dose: 1-5 mcg/kg given IV push

Infusion: 1-5 mcg/kg/hour

Special Considerations:

Not advisable to give patients on narcotic drips Naloxone, as this may precipitate
acute

withdrawal

Antihistamines (both H1 and H2) may counteract hypotension; this is an MCO

Sedation and Paralytic Agents

Paralytic Agents

- Uses:** Total muscular paralysis when patient movement may:
1. Compromise airway control (e.g. causing unwanted extubation)
 2. Exacerbate a real or potential illness or injury (e.g. spinal cord injury from a spine fracture)
 3. Endanger the patient, EMS care provider or others

Adverse Effects:

Bronchospasm, flushing, hypotension and tachycardia have been rarely reported

Dosing:

Pancuronium:

Loading dose: 10 mg/kg

May repeat dose every 1-2 hours as needed

Vecuronium:

Initial dose 10 mg IV push

Repeat dose of 10 mg IV push every 20-40 minutes as

needed

Maintenance infusion may be an alternative:

1.1 mg/kg/min

Rocuronium:

Loading dose 0.6 mg/kg

May rebolus 0.2 mg/kg every 30-45 minutes

Maintenance infusion may be an alternative:

1.1 – 0.15 mg/kg/min

Special Considerations:

Produces COMPLETE APNEA; therefore an intact airway (e.g. endotracheal intubation),

and adequate ventilation/oxygenation **MUST BE ESTABLISHED PRIOR TO ADMINISTRATION**. Likewise, personnel and equipment with the ability to restore an airway, ventilation and oxygenation must be available during transport.

Causes paralysis only; **therefore concomitant use of a sedative/hypnotic is indicated**

Note: Paralysis may alter the clinical exam. For example, motor seizure activity will not

be seen, but the brain will continue to undergo seizure activity, and this must be treated! Also, conditions such as shock, hypoxia, pain, intracranial injury, hypoglycemia, etc. maybe the cause of this unwanted, spontaneous patient movement in the first place. **These conditions must be addressed but may be masked by the paralytic agent!**

c. CNS Drugs

i. Anticonvulsants

ii. Mannitol

iii. Steroids

CNS Drugs

Anticonvulsants

Uses: Prevention and treatment of seizures

Adverse Effects:

If intravenous phenytoin is given too rapidly, may result in:

- 1) Cardiac dysrhythmias including ventricular fibrillation or asystole
- 2) Hypotension

Subcutaneous extravasation of intravenous phenytoin may cause tissue necrosis or pain at the IV site

Dosing:

Phenytoin: 100-1200mg IV piggy back in normal saline;
Rate not to exceed 50 mg/min

Fosphenytoin: *dose expressed in phenytoin equivalents (PE)*
15-20 PE/kg ; rate up to 100-150 PE/min

Valproic Acid: 40-60 mg/kg
Rate up to 3 mg/kg/min

Special Considerations:

Use infusion pump

Monitor heart rhythm

Check BP frequently; vital sign monitor recommended

D/C infusion and contact MC for any adverse effects

CNS Drugs

Mannitol

Uses: Treatment of increased intracranial pressure or selected fluid overload states

Adverse Effects:

Hypernatremia
Volume Depletion

Dosing: 25- 50 grams IV push or bolus infusion (in 50cc D5W over 20 minutes)

Special Considerations:

Patients receiving mannitol should have a Foley to monitor fluid status

CNS Drugs

Steroids

Uses: Spinal cord injury to decrease edema
Cerebral edema due to injury or CNS mass or lesion

Adverse Effects:

GI Bleed
Electrolyte disturbance and hyperglycemia
Hypertension or Acute CHF
Agitation
Corticosteroid hormonal suppression (hypoglycemia, hypotension, hypothermia)
Higher risk for infection or masking symptoms of infection

Dosing: **Methylprednisolone (Solumedrol):** Initial bolus: 30 mg/kg over 15
minutes
Start infusion 45 minutes later: 5.4 mg/kg/hour for 23
hours

Dexamethasone: 0.1-0.6 mg/kg day
(Decadron) May be given as IV drip of 2 mg/kg over 2 hours

Special Considerations:

Contact MC for question of adverse effects

d. Hyperalimentation/TPN, Insulin and Electrolytes

i. *Hyperalimentation/TPN*

ii. *Insulin Drip*

iii. *Potassium Chloride*

Hyperalimentation/TPN, Insulin, Electrolyte solutions

Hyperalimentation/TPN

Uses: Intravenous nutrition

Adverse Effects:

Catheter related sepsis

Air embolism if central venous IV tubing becomes disconnected

Subcutaneous extravasation of solution can cause tissue necrosis

Discontinuation of infusion may cause hypoglycemia

Dosage: Continuous infusion usually through central venous catheter but occasionally through a peripheral IV line.

Rate should not require adjustment enroute.

Special Considerations:

Use infusion pump.

Do not administer any other medication through the same IV line.

Contact MC for any adverse effects listed above

Consider use of a cardiac monitor

Hyperalimentation/TPN, Insulin, Electrolyte solutions

Insulin

Uses: Lowers blood glucose
Used in diabetics especially with ketoacidosis or hyperosmolar nonketonic coma.

Adverse Effects:
Hypoglycemia related (tachycardia, diaphoresis, mental status changes, and seizures)

Dosage: 5-15 units per hour but dosages outside this range may be used.

Special Considerations:

Use infusion pump

Do not administer medications in the same IV line except D50.

If symptoms of hypoglycemia develop:

- turn off infusion,
- perform a D-Stick
- administer 25 grams, (one AMP) D50) if glucose <80,
- contact MC.

Monitor blood sugar every 30 minutes during transport

Cardiac monitoring required

EMT-CCs may manage isolated insulin drip or with one additional drip

Hyperalimentation/TPN, Insulin, Electrolyte solutions

Potassium Chloride

Uses: Replacement therapy for hypokalemia

Adverse Effects:

Cardiac dysrhythmias (prolonged PR interval; wide QRS complex; depressed ST segment;

tall, peaked T-waves; heart block; cardiac arrest)

Subcutaneous extravasation of solution can cause tissue necrosis

Dosage: Usual range is up to 20 mEq / hr., continuous infusion. May be mixed with various IV solutions in various sized bags including “piggy back” solutions. Rate should not require adjustment en route.

Special Considerations:

Monitor heart rhythm

Often causes burning during infusion; contact MC if this is problematic

Contact MC for changes in EKG configuration and/or dysrhythmias.

e. Obstetric Drugs

i. Magnesium Sulfate

ii. Oxytocin

Obstetric Drugs

Magnesium Sulfate

Uses: Treatment of pre-eclampsia and eclamptic seizures
Premature rupture of membranes

Adverse Effects:

Lethargy, nausea, vomiting, hypotonia, respiratory depression, dysrhythmia

Dosing:

Loading dose: 2-6 grams IV over 15 minutes
(may give 2 grams over 5 minutes)
Followed by either: 5 grams IM in each buttock
Maintenance infusion: 1-2 grams/hr

Special Considerations:

Monitor reflexes
For symptomatic toxicity: 10 mLs of 10% Calcium Chloride and contact MC
MC may also request furosemide and/or NS bolus as MCO
In renal failure, patient may require emergency dialysis

Obstetric Drugs

Oxytocin (Pitocin)

Uses: Stimulates post-partum contraction of the uterus to control bleeding

Adverse Effects:

Hypertension, tachycardia, dysrhythmias

Dosing: 10-40 units added to 1000 mL IV Fluid to control hemorrhage
Usual rate is 10-20 milliunits/min

Special Considerations:

Use infusion pump

Monitor heart rhythm

Check BP frequently; vital sign monitor recommended

Contact MC for any adverse effects

f. Anti-Infective Therapy

- i. Antibiotics*
- ii. Antifungals*

Anti-Infective Therapy

Antibiotics and Antivirals

Uses: Bacterial or Viral infections (treatment and prophylaxis)

Adverse Effects:

Allergic signs and symptoms, including anaphylaxis

Dosage:

Vary depending on the antibiotic
Generally given as a “piggyback” solution
Rate should not require adjustment en route

Special Consideration:

D/C infusions if there are any allergic signs or symptoms, then contact MC.

Most Commonly used:

Acyclovir
Azithromycin (Zithromax)
Cefazolin (Ancef)
Ceftriaxone (Rocephin)
Gentamicin
Levofloxacin (Levaquin)
Metronidazole (Flagyl)
Piperacillin/Tazobactam (Zosyn)
Vancomycin

Anti-Infective Therapy

Antifungals

Uses: Fungal infections
Often in immune-compromised patients, those on chemotherapy or chronic antibiotics

Adverse Effects:
Nausea or diarrhea
Amphotericin- fever, rigors, chills

Dosing: **Amphotericin B, Azoles or “Fungins”:**
Usually given as bolus dosing once daily to TID
May be given as continuous bladder irrigation: 50 mg/liter
Over 24 hours @ 42 ml/hour

Special Considerations:
Drug interactions may occur with statins, coumadin, antivirals, benzodiazepines,
oral hypoglycemic drugs and transplant anti-rejections drugs
Side effects can be pre-treated with Acetaminophen or Diphenhydramine

g. Pain Control

- i. Opioid Drips*
- ii. PCA Pumps and Subcutaneous Pumps*
- iii. Anesthetic Sprays or Topical Gels*

Pain Control

Opioid Drips

Uses: Control of pain

Adverse Effects:

May cause hypotension, especially in volume depleted patients or those with right-sided

heart failure

Respiratory Depression

Dosing:

until

in

Morphine: Loading dose: 2 mg increments given every 5-10 minutes

adequate pain control; typically max dose is 10 mg- may be higher

patients on chronic pain therapy

Infusion: 1-10 mg/hour

Fentanyl: Loading dose: 1-5 mcg/kg given IV push

Infusion: 1-5 mcg/kg/hour

Hydromorphone (Dilaudid): Loading dose: 0.5-4 mg IV slow

push

Continuous infusion: 1-10 mg/hour

Special Considerations:

Avoid Naloxone as this could precipitate acute withdrawal

Pump malfunction could precipitate withdrawal

Antihistamines (both H1 and H2) may counteract hypotension; this is an MC

option

Pain Control

PCA (Patient Controlled Anesthesia) Pumps and Subcutaneous Pumps

Uses: Treatment for patients with palliative care or chronic pain conditions
Often PO analgesia is not feasible

Adverse Effects:

Hypotension
Respiratory depression
Catheter site infection or irritation

Dosing:

PCA (Patient Controlled Analgesia) Pumps

Morphine, Fentanyl and Hydromorphone are most commonly used.

Pre-programmed settings for patient

Patient may require assistance to “self-administer” medication

Subcutaneous Catheter Pumps

Morphine most commonly used.

Up to 2 mLs volume at a time regardless of concentration

May also give IV fluids at a usual rate of 1-10 mLs/hour; MAX of 25 mLs/hr

Special Considerations:

Encourage patient to use medication as needed

Avoid Naloxone as this could precipitate acute withdrawal

Pump malfunction could precipitate withdrawal

Subcutaneous catheter sites need to be changed every 7 days

Pain Control

Sprays and Gels

Uses: Topical pain control- usually prior to a procedure

Adverse Effects:

Allergy to medication
Depressed gag reflex if used orally

Dosing: **Sprays:** Usually 2-3 sprays to desired area
Topical gels: Enough to thinly cover area

Duration can be minutes to hours

Special Considerations:

Some can induce *Methemoglobinemia*. Watch for hypoxia

h. Antidotes

- i. *NAC*
- ii. *Sodium Thiosulfate*
- iii. *Thiamine*
- iv. *Bicarbonate Drip*
- v. *Pyridoxine*
- vi. *Atropine/2-PAM*

Antidotes

N-Acetyl Cysteine or NAC (Acetadote)

Uses: Acetaminophen overdose- toxic quantities

Adverse Effects:

Anaphylactoid type reactions (urticaria, flushing, hypotension and bronchospasm)

Dosing:

Loading dose: 150 mg/kg over 15-20 minutes
Maintenance infusion: 50 mg/kg over 4 hours
then 100 mg/kg over 16 hours

Special Considerations:

Ideal time of onset of treatment is within 8-10 hours of ingestion
Anaphylactoid reactions may be treated with IV diphenhydramine
Maintenance infusion must be doubled at the 4 hour period

Antidotes

Cyanide Antidote Kit (Amyl Nitrate, Sodium Nitrate, Sodium Thiosulfate)

Uses: Cyanide poisoning

Adverse Effects:

May cause methemoglobinemia

Dosing: Dosing as described in kit; weight based for children

Special Considerations:

Not to be used with *Carbon Monoxide* poisoning

Antidotes

Thiamine

Uses: Wernicke's Encephalopathy

Adverse Effects:
Possible anaphylactic reactions

Dosing: 100 mg IV over 15-30 minutes

Special Considerations:
Glucose administration in nutritionally depleted patients should be accompanied
by
thiamine

Antidotes

Bicarbonate Drip

Uses: Tricyclic, aspirin or other acidotic overdoses
Renal protection after IV contrast or with severe muscle breakdown
(rhabdomyolysis)

Adverse Effects:
Sodium load

Dosing: Titrated to urine pH >7 by hospital staff

Special Considerations:
Usually will have a Foley to check urine pH and output
May be associated with hypokalemia

Antidotes

Pyridoxine (Vitamin B6)

Uses: Isoniazide (INH) Overdose

Adverse Effects:

GI upset

Headache or sleepiness

Tingling or burning of hands/feet

Dosing: 5 grams IV over 3 – 5 minutes; repeat every 5-20 minutes until seizures resolve

Special Considerations:

Often patient is in status epilepticus; seizures may respond to benzodiazepines

i. GI Drugs

i. Antiemetic Agents

ii. Acid Reduction

iii. GI Bleed Related Medications

GI Drugs

Antiemetic Agents

Uses: For control of severe nausea and vomiting

Adverse Reactions:

Drowsiness, dizziness, blurred vision, skin reactions, hypotension
Extrapyramidal symptoms (EPS) – motor restlessness, dystonic reactions, pseudo-
parkinsonism, tardive dyskinesia with metaclopramide, prochlorperazine,

or

promethazine

Headache or dizziness may occur with ondansetron

Dose: Metaclopramide (Reglan)

10 mg IV over 2 minutes

If needed, dose may be repeated once in 10 minutes

Prochlorperazine (Compazine)

5 mg IV over 2 minutes

If needed, dose may be repeated once in 10 minutes

Promethazine (Phenergan)

25 mg IV over 2 minutes

If needed, dose may be repeated once in 10 minutes

Ondansetron (Zofran)

4 mg slow IV over 2 minutes *or* IM

If needed, dose may be repeated once in 10 minutes

Special Considerations:

Extra-pyramidal symptoms may be treated by administering Diphenhydramine
(Benadryl) 50 mg IV over 2 minutes

Confirm with MD regarding IV administration of Promethazine due to “black box
warning”

GI Drugs

Acid Reduction

Uses: Decrease secretion of gastric acid or chronic reflux
Patients with UGI Bleed

Adverse Effects: (all rare)
Occasional CNS symptoms- more so in the elderly
Jaundice
GI upset

Dosing:	Pantoprazole (Protonix)	Bolus:	80 mg over 5 minutes;
		Infusion:	8 mg/hour
	Lansoprazole (Prevacid)	Bolus:	30- 60 mg over 30 minutes
		Infusion:	6 mg/hour
	Ranitidine (Zantac)	Bolus:	50 mg over 20-30 minutes
		Infusion:	150 mg over 24 hours

Special Considerations:
May be used for antihistamine effects

GI Drugs

GI Bleed Related Medications

Uses: Variceal Upper GI Bleed

Adverse Effects:

Gall Bladder sludging or stones
Diarrhea and GI Upset
Hypoglycemia

Dosing: **Octreotide:** 50 mcg IV bolus, then 50 mcg/hour

Special Considerations:

Alters the balance between insulin/glucagon; could result in either hypoglycemia or hyperglycemia

Vasopressin is presently rarely used due to its potent vasoconstrictive and catecholamine inducing properties

III. Devices

- a. Temporary Cardiac Pacing***
- b. Chest Tubes***
- c. VADs***
- d. Trachesotomy Care***
- e. BiPap Machines***
- f. Invasive Cardiovascular Monitoring***
- g. ICP Monitors***
- i. Insulin Pumps***
- j. Central Vascular Access***

Devices

Temporary Cardiac Pacing

Uses: To ensure adequate heart rate; Most common use is for symptomatic bradycardia or heart block

Adverse Effects:

Problems related to transvenous/transthoracic insertion: pericardial tamponade, pneumothorax, myocardial perforation, air embolus sepsis and thrombophlebitis

Failure to pace due to: displacement of pacing electrode (most common complication),

loose connection, faulty generator, myocardial ischemia

Failure to sense due to: patient's native beats not sensed by the pacemaker and the output pulse may occur after a spontaneous beat which may induce dysrhythmias

Catheter induced dysrhythmias

Pacer Box Settings:

Rate control: usually between 60-100 beats/minute

Output (electric current used to stimulate myocardium): usually between 5-20 mAmps

Sensitivity control: used to sense heart's native electric activity (QRS deflection)

Special Considerations:

Monitor heart rhythm. A functioning pacemaker usually reveals a pacer spike followed

by a bundle branch pattern on the monitor strip

Contact MC if develops a bradycardia with no pacer spikes or non capturing of the QRS;

consider initiating transthoracic pacing if patient is unstable

Devices

Thoracostomy Tubes (Chest Tubes)

Uses: To evacuate an abnormal collection of air (pneumothorax), blood (hemothorax) or fluid (pleural effusion) from the pleural space

Complications:

drainage Mechanical problems: tube dislodgement from the wall, air leaks from tubing, site or skin site
Blocked drainage: kinked tube or clots
Bleeding: local incision hematoma, artery or vein laceration
Visceral perforation
Re-expansion pulmonary edema

Procedure: Usually placed in the midaxillary line at the fifth-seventh intercostal space, or in the midclavicular line at the second intercostal space
Tube is sutured to the chest wall and Vaseline gauze and an adhesive bandage are placed over the site
The distal part of the chest tube is connected to a chest drainage system (under a water seal) which includes an air seal, a drainage reservoir and suction capability

Special Considerations:

Avoid traction on the chest tube; this could dislodge the tube
The chest tube drainage system should remain below the chest level
Avoid kinking or clamping the drainage system
Contact MC if any of the above complications develop, or if the patient develops shortness of breath or change in vital signs

Devices

Ventricular Assist Devices (VADs)

Uses: Implantable external heart pump used to treat patients with debilitating heart failure
awaiting transplant
May be used in patients who are not candidates for transplant as well as those awaiting transplant

FAQs: There are many types of VAD units;
some have pulses (usually pulse will not be in sync with the patient's rhythm) and some are continuous flow units resulting in no pulse

Complications:

VAD Pump Failure: Need to initiate hand pumping at a rate of 60-90 strokes/min;
may be a Bi-VAD with two pumps
Disconnect power source first; prime pump with a purge valve before use

VAD Working- Blood Flow Low- ECG Abnormal:
arrhythmia- Usually with a single VAD device; patient's function is influenced by
may need to treat the rhythm if patient is symptomatic
LVAD (Left-sided VAD) patient may require large amounts of IV fluids
RVAD (Right-sided VAD) patient should not get IV fluids

VAD Working- Blood Flow Low- ECG Normal:
appropriate Hypovolemia; could be internal bleeding. If symptomatic initiate
therapy to treat cause of hypovolemia

Procedures: *If need to transport a STABLE patient...*
Heart monitor: *ECG may not match pulse*
Large bore IV should be started

Bring companion with patient if available who is able to hand pump the VAD
if needed
Bring backup equipment: Hand pumps, extra batteries, primary and backup
drivers, if
available

Special Considerations:

Need to ask patient:

1. Can I perform CPR on you?
2. IF not- is there a hand pump?
3. If the device slows down- will alarms go off for low flow state?
4. How can I speed up the device?
5. Does patient need heparin if the device slows down?
6. Can patient be defibrillated while connected to the device?
7. If can be defibrillated, do I need to disconnect anything first?
8. Does the patient usually have a pulse with the device?
9. What are acceptable vital sign parameters?
10. Can patient be externally paced?

Contact Patient's Cardiac Care Team ASAP for problems and prior to transfer

Unstable VAD patients should be transferred with a higher level of care

Devices

Tracheostomy Care

Uses: Inadequate airway
Respiratory Insufficiency
Excessive secretions
Need for prolonged mechanical ventilation

Adverse Effects:

Dislodgement of tracheostomy tube
Obstruction of tube or stoma
Malfunction of mechanical ventilator or loss of O2 supply

Procedures: Suctioning:

Sterile gloves
Suction with 120-150mmHg (adults); 80-100mm Hg (pediatric)
Hyperventilate with 100% O2
Suction up to 10 seconds (adult); up to 3-4 seconds (pediatric)
If mucus plugs/thick secretions- may instill 3-5cc sterile saline

Bronchodilator Administration:

Assemble nebulizer assembly as usual
Attach trach collar to reservoir tubing
Connect to oxygen source at a flow rate sufficient to produce misting
Fit trach collar over stoma and have patient breathe slowly and deeply

Stoma Intubation:

uncuffed
Select largest tube able to fit in stoma without force; cuffed for adult,
for pediatric
Sterile gloves
Hyperventilate with 100% O₂
Suction, if necessary.
Pass the ET tube and inflate the cuff. The tube will protrude several
inches.
Hold the tube and watch for chest rise with ventilation; secure the tube.
Auscultate the lung fields. Check for subcutaneous emphysema.
Allow no longer than 30 seconds for the procedure.

Special Considerations:

Avoid oral intubation if possible
DO NOT USE DEMAND VALVE WITH BVM!

Devices

BiPAP Machines

Uses: Obstructive Apnea
Respiratory Insufficiency

Adverse Effects:

Chance of Pneumothorax
Mechanical failure
Disconnected tubing
Misfit of facial/nasal mask
Drying of mouth/nasal passages

Special Considerations:

Usually will not involve intervention by EMS- should be pre-set
If fails, may need to switch to CPAP or supplemental O₂; contact MC

Devices

Invasive Cardiovascular Monitoring

Uses: Usually used to monitor Cardiac Output
Used in ICU setting with ICU monitors- not for EMS use

Complications:

Arterial Line Pressure Monitor:

- Hematomas
- Distal ischemia/ thrombosis
- Disconnection and hemorrhage
- Inadvertent drug injection

Swan-Ganz catheter:

- Arrhythmias
- Knotting and displacement
- Cardiac Valve trauma
- Pulmonary Artery Rupture
- Balloon Rupture
- Catheter thrombosis or embolism

Monitor components:

Arterial Line Pressure Monitor:

Arterial cannula
Monitoring line
Transducer
Monitoring system

Swan-Ganz catheter:

heart Balloon tipped catheter through central vein; floated through right side of

into pulmonary artery

Monitoring line
Transducer
Monitoring System

Special Considerations:

Require prolonged pressure if lines are pulled out

Devices

Intracranial Pressure (ICP) Monitors

Uses: Measurement of Intracranial Pressure in ICU setting
May also be used to relieve pressure as well

Adverse Effects:
Infection at skin site into brain
Dislodgement of catheter

Special Considerations:
If pulls out- apply sterile dressing; may have CSF leaking from site

Devices

Insulin Pumps

Uses: Computerized device delivering a steady dose of insulin (basal rate) through a flexible subcutaneous catheter

Adverse Effects: Hypoglycemia can occur

Dosing: Patient has a pre-set basal rate and pre-programmed corrections

Special Considerations:
If hypoglycemic treat as per protocol
If seemingly in DKA (Diabetic Ketoacidosis), make sure the pump is working or the catheter is intact

SHOULD NOT REQUIRE ANY DIRECT INTERVENTION BY
TRANSPORTING CREW UNLESS
PATIENT BECOMES HYPOGLYCEMIC; IN THAT SCENARIO, TURN
OFF THE PUMP

Devices

Central Vascular Access

Uses: Specialty vascular access in patient with problematic access or requiring frequent infusion of medication or parenteral nutrition

Adverse Effects:

Line infection can cause bacteremia/sepsis
Complications can be related to insertion of line such as pneumothorax, hematomas, vascular rupture

Different Types:

Triple Lumen Central Venous Catheter:

Can be in Femoral, Internal Jugular or Subclavian location
Usually red hub is for blood draws- it is typically the most certain line of the three ports in emergency situations

Indwelling Catheter

External Access (Broviac, Hickam, Groshung) catheters:

Usually placed in Subclavian region
Usually contains heparin; draw 10 mL waste before infusions

Implanted ports (Part-a-cath, Bard Port):

Require Huber needle to access

Shiley: Usually used for dialysis

Usually contains heparin; draw 10 mL waste before infusions, then flush with saline if needed in emergency situations

Peripherally Inserted Central Catheter (PICC) line:

Location usually in the antecubital regions
Usually contains heparin; draw 10 mL waste before infusions

Special Considerations:

STERILE TECHNIQUE is imperative!

Only to be accessed in emergency situations

IV. Pediatric Transfer Protocols

- a. *Anticonvulsants*
- b. *Continuous Albuterol Nebulization*
- c. *Insulin Drip*
- d. *IV Antibiotics*

Pediatric Transfers

Anticonvulsants

Uses: Prevention and treatment of seizures

Adverse Effects:

Ventricular dysrhythmias or hypotension if phenytoin given too rapidly
Respiratory depression, especially with benzodiazepines or phenobarbital
Subcutaneous extravasation may cause tissue necrosis

Dosing: **Phenytoin:** 10-20 mg/kg; IV piggy back in NS
Rate not to exceed 50 mg/min

Fosphenytoin: 15-20 PE /kg (phenytoin Equivalents)
Up to 150 PE/min

Propofol: Loading dose: 3 mg/kg
Maintenance infusion: 50 mcg/kg/min
May increase up to 250 mcg/kg/min

Special Considerations:

Monitor heart rhythm
Use infusion pump
Check BP frequently; vital sign monitor if available
D/C Infusion and contact MC for adverse reactions

Pediatric Transfers

Continuous Albuterol Nebulization

Uses: Treatment of status asthmaticus

Adverse Effects:

Tachycardia
Nervousness, headache, shakiness
Nausea/ vomiting
Hypokalemia

Dosing: 0.5 mg/kg/hour or otherwise directed by MC

Special Considerations:

Need to use a special large volume nebulizer designed for continuous administration

Cardiac monitor
Should have IV running concurrently



Pediatric Transfers

Insulin Drip

Uses: Lower blood glucose and treat diabetic ketoacidosis

Adverse Effects:

Hypoglycemia (tachycardia, diaphoresis, mental status change, seizure)

Hypokalemia (occurs as acidosis improves)

Dosing: 0.05-0.1 units/kg/hour; may be varied depending on glucose response by patient

Special Considerations:

Glucose must be checked every hour

If hypoglycemia occurs, D/C insulin drip and administer D25 (2-4 mL/kg)

Pediatric Transfers

IV Antibiotics

Uses: Treat infections and prophylaxis

Adverse Effects:

Allergic signs and symptoms, including anaphylaxis

Dosing:

Varies depending on antibiotic and patient weight/size

Generally given as a piggyback infusion

Rate should not require change en route

Special Considerations:

D/C infusion if allergic signs and symptoms

Contact MC

V. Special Situations

- a. *The Hospice Patient*
- b. *The Pediatric Patient and Consent Issues*
- c. *The Psychiatric Patient*
- d. *The Therapeutically Cooled Patient*

Special Situations

The Hospice Patient

I. Introduction

The Hospice patient presents a unique situation in regards to care and transport. These patients have often been deemed to be in the terminal stages of a disease process, for which treatment is no longer effective in reversing or arresting the progress of the disease. Care becomes focused on patient and family comfort, which often flies in the face of usual resuscitative care. What might be considered as an unstable patient might well be in line with the course as planned by the patient's caregivers. Family members are often torn between sticking with the recognized treatment plan versus emotion as they see their loved one approach their end.

It is important to keep in mind that these patients do not have a situation that can be fixed. It is often up to us to gently encourage the family to adhere to the goal of patient comfort. The Hospice patient truly has needs that are not those of the usual prehospital patient and special considerations need to be made in the response of the prehospital provider.

II. Assessment

The assessment of the Hospice patient requires a redefinition of what is considered an "unstable" vital sign requiring action. A terminal patient might have either lower or higher parameters in temperature, heart rate, respiratory rate or blood pressure. The ABC's might also be altered. This is not unexpected.

An important part of the assessment is evaluation of the DNR status. If the patient or family do not have a copy of the DNR or MOLST form, Hospice staff is often able to fax a copy, or at least confirm the existence of the DNR status if necessary.

III. Treatment

In general, the only measures that should be implemented are oxygen or stretcher positioning. Narcotic administration might be in order; however, medical control should be contacted if there are questions regarding administration.

Typically, Hospice patients should not receive an IV or be placed on a cardiac monitor, unless there has been direction by Hospice to do so. Their medications are usually given orally (e.g. Roxanol), transcutaneously (e.g. opioid drug patch) or subcutaneously per Hospice. Morphine may be given as per ALS Pain Protocol if this has been approved in the patient's Hospice care plan.

IV. Medical Direction

The Hospice patient is still under Medical Control by a Base Station medical physician. However, since these patients are in a situation that is more similar to an "Interfacility Transport", input may be made by the Hospice physician. The patient's plan of care may be **confirmed** with them.

V. Transport

If the decision is made for the patient to be transported to the Hospice Inpatient Unit either for an acute intervention or for an inpatient bed, then there are considerations to be made.

The destination of the patient should be as directed by Hospice. This might include direct transport to an inpatient unit at a hospital, bypassing the Emergency Dept.

The medications that the patient is on should accompany the patient to the Hospice Inpatient Unit. However, if the patient is being brought to a Hospice Unit in a hospital, family members should bring the medications (a list is adequate). In keeping with the goal of patient comfort, lights and sirens should not be used during transport. If the patient expires in the ambulance anytime during transport, the patient should be taken to the previously instructed facility. **DO NOT** take the patient back home.

Special Situations

The Pediatric Patient and Consent Issues

I. Introduction

Transport and treatment of a pediatric patient is met with unique issues. The pediatric patient is unable to give consent/refusal as they are a minor. Usually, the patient's parent or guardian will be available to give consent. However, there are times when either the legal guardian is not available or does not have legal ability to consent.

In New York State a pediatric patient is considered a minor until the day that they reach 18 years of age.

The following is a review of situations where consent might be given by someone other than the child's legal guardian.

II. The Emancipated Minor

New York's case law defines the status of an **emancipated minor** as being characterized by renunciation of parental rights.

Also, a minor is considered emancipated if the following events have occurred:

He or she is married.

He or she is in the armed services.

He or she has established a home and is financially independent.

His or her parent has failed to fulfill parental support obligations and the minor seeks emancipation.

III. *The CPS patient*

Occasionally a child presents with a picture of abuse or negligence, and the suspected perpetrator is the legal guardian. Mandated reporters must make a report to New York State Child Protective Services (CPS). After a preliminary investigation, CPS might decide to take custody of the child. There should be documentation of the CPS custody with the patient's chart. This will allow care of the child to proceed.

IV. *The Guardian is Unavailable*

In situations where a child's guardian is unable to be reached or are incapacitated, administrative consent might be obtained. This can be confirmed with the transferring facility.

Special Situations

The Psychiatric Patient

I. *Introduction*

Psychiatric patients often present to facilities where there is no ability to perform a psychiatric assessment or offer treatment for psychiatric illness. In these situations, patients need to be transported to a facility able to offer psychiatric intervention.

Needless to say, these patients are often not desirous of such intervention. New York State Mental Hygiene law makes provision to allow caregivers the ability to hold a patient against their will until they are psychiatrically evaluated or treated and deemed safe for discharge with no lethality or risk of harm to self or others. However, in order to assure that a patient's rights are not violated, there exist various NYS forms which must be filled out by a physician or designated peace officer. The

following is a review of what forms are required for which situation. They are required for a transporting agency to transport a patient against their will.

II. *Section 9.27*

This form is called the ***Application for Involuntary Admission of Medical Certification***. This form is filled out by a physician who must certify that a patient requires in-patient psychiatric admission. In order for this to be effected, there must be **TWO** physicians in agreement of the need for admission. Thus, there will be two physicians having signed the form accompanying the patient.

III. *Section 9.37*

This form is titled ***Application for Involuntary Admission on Certificate of a Director of Community Services or Designee***. This form can be filled out when a patient is transferred from a facility with staff able to make an initial psychiatric assessment and deem that the patient requires inpatient psychiatric admission. The originating facility, however, is unable to provide inpatient treatment and has the patient transferred to a facility that is able to provide the inpatient services. This form is completed by the sending facility to apply to send the patient to the inpatient facility.

IV. *Section 9.55 and 9.57*

This form is for ***Custody/Transport of a Person Alleged to be Mentally Ill to a Hospital Approved to Receive Emergency Admissions***. The 9.55 portion is to be filled out by a psychiatrist directing transport of a patient to a facility able to offer Emergency Psychiatric care. The 9.57 portion is to be filled out by an Emergency physician requesting similarly.

Special Situations

The Therapeutically Cooled Patient

I. *Introduction*

There has been a recent resurgence of therapeutic cooling used in patient care scenarios. These require maintenance of specific hypothermic target temperature. The current two most likely indications are those of the post cardiac arrest patient, the stroke patient and the traumatic brain or spinal cord injury patient.

The theory behind therapeutic hypothermia is to decrease circulation of ischemic and injury mediators. Further, metabolism is decreased thus preventing further inflammatory response. The balance that must be maintained is to provide adequate

cooling to achieve the above but to avoid acidosis and damage from the hypothermia itself. Patients must be intubated and paralyzed to prevent shivering.

The hypothermia is achieved by surface and internal cooling. Surface cooling is achieved with ice (applied at head, neck, axillae and groin), cooling blankets and/or heat exchange surface cooling devices. Internal cooling is achieved either by cooled fluids or by endovascular heat exchange catheters. These usually involve a femoral line placement.

II. *Clinical Uses of Therapeutic Hypothermia*

a. *The Post Cardiac Arrest Patient*

In 2005 the American Heart Association offered guidelines regarding the use of hypothermia in unconscious patients with return of spontaneous circulation after out-of-hospital cardiac arrest. It is recommended that these patients be cooled to 32-34 °C for 12-24 hours. The cooling should occur within 6 hours post cardiac arrest. They should have a systolic blood pressure of >90mm Hg.

b. *The Acute Stroke Patient*

There is evidence that hypothermia reduces the volume of infarct and may preserve brain tissue. However, a large study has yet to be done showing clear benefit.

c. *The Traumatic Brain Injury (TBI) Patient*

Mild therapeutic hypothermia has been shown to be effective in TBI with high intracranial pressure. These patients have better outcomes with longer hypothermia (5 days).

d. *The Traumatic Spinal Cord Injury (SCI) Patient*

There have not been large scale reviews or studies to demonstrate benefit of hypothermia with SCI. However, case reports suggest that there may in fact be some advantage in using hypothermia to treat patients with SCI.

III. *Transporting the Therapeutically Cooled Patient*

These patients are often critical and may require additional personnel. Not only must the cooling apparatus be kept in attention, but the patient must be carefully watched with frequent vital signs (every 10-15 minutes during transport). Consideration should be given for backup cooling alternatives should there be device failure.

IV. ***Glossary and Abbreviations***

ALS Provider (Advanced Life Support Provider) Includes EMT-I, EMT-CC and EMT-P

BiPAP Bi-phasic Positive Airway Pressure

BP Blood Pressure

BVM Bag-Valve Mask

CHF Congestive Heart Failure

CNS Central Nervous System

COPD Chronic Obstructive Pulmonary Disease

CPAP Continuous Positive Airway Pressure

D/C Discontinue

DKA Diabetic Ketoacidosis

DNR Do Not Resuscitate

EMT-D (Emergency Medical Technician-Defibrillation) An individual trained to perform patient assessment, handle emergencies using Basic Life Support equipment, perform CPR, control hemorrhage, provide non-invasive shock treatment, fracture and spinal stabilization, manage environmental emergencies, emergency childbirth and use a defibrillator.

EMT-I (Emergency Medical Technician-Intermediate) An individual trained to use all EMT-D skills and utilize Basic Life Support equipment. In addition, may supply Advanced Life Support, using IV therapy and ET or other advanced airway for airway control.

EMT-CC (Emergency Medical Technician-Critical Care Technician) An individual trained to perform all EMT-I skills and utilization of equipment. In addition, is trained to supply Advanced Life Support, using the EMT-I skills and equipment, and administer appropriate medications.

EMT-P (Emergency Medical Technician-Paramedic) an individual trained to perform all EMT-I skills and utilization of equipment. In addition, is able to perform under Advanced Cardiac Life Support (ACLS) and Advanced Trauma Life Support Standards (ATLS), is knowledgeable and competent in the use of cardiac monitor/defibrillator, IV drugs and fluids. The EMT-P has reached the highest level of pre-hospital certification.

EPS (Extrapyramidal Symptoms) A variety of motor and sensory nervous system disorders related to medications or disease processes.

ETA Estimated Time of Arrival

ET tube Endotracheal tube

FB Foreign Body

GI Gastrointestinal

H/O History of

HR Heart rate

Huber needle A needle designed to access an indwelling vascular port. It has a ninety-degree bend.

IM Intramuscular

IV Intravenous

JVD Jugular Venous Distention

KVO Keep Vein Open; usually indicates an IV rate of 20-60mL/hour

Large Bore IV 14 or 16 gauge IV

Loading dose Initial amount of medication required to establish a therapeutic effect

LR Lactated Ringers Solution

MC (Medical Control or Medical Command) 1. A physician (Medical Director or designee) responsible for the care of a patient who is being served by an EMS provider. 2. (aka Medical direction) The process of providing responsibility for the care of a patient who is being served by an EMS provider.

MCO Medical Control Option

Medical Director The physician who has authority and responsibility over all clinical and patient care aspects of the EMS provider. This includes responsibility for off-line MC

Methemoglobinemia a condition where the hemoglobin is altered in a way which decreases its ability to carry and release oxygen to tissues

mg milligram

MI Myocardial Infarction

mL millileter

NS Normal Saline; usually refers to 0.9 normal saline

OD Overdose

Off-line Medical Control Provision of care in accordance with patient care protocols developed and promulgated by physicians. This also includes training, testing, certifications, continuing education, operational policy and procedures development and continuous quality improvement.

On-line Medical Control Provision of care via direct voice communication with a physician

PO Orally

PRN As needed

PVC Premature ventricular contraction

Q Every

SL Sublingual

SQ Subcutaneous

Standing Orders Treatment algorithms for the ALS provider to follow prior to comatcing
MC

Status Epilepticus Ongoing seizure activity or a series of seizures with separation of less than
or equal to one hour

Syst Systolic

TID Three times per day

VS Vital signs

VII. *Interfacility Transfer Checklist*
(May be used as a resource)

WESTERN NEW YORK EMERGENCY MEDICAL SERVICES

INTERFACILITY TRANSFER CHECKLIST

Patient Name: _____ Date of Birth ___/___/___
Diagnosis: _____

Condition: STABLE / UNSTABLE Weight: ___kg Date of Transfer ___/___/___

Transporting

Agency: _____

Hospital Origin: _____ Hospital

Destination: _____

Receiving physician: _____ Bed/Unit location: _____

Check all that apply.

_____ **Intravenous Fluids:** Fluid: _____ Infusion Rate: _____

_____ Medication- Continuous Infusion

Medication Ordered: _____

Infusion Rate: _____

Parameters:

Vital Signs: *Maintain:* BP HR

Above: _____ *and Below:* _____

Other: _____

_____ Medication- PRN

Medication Ordered: _____

Dose: _____ Frequency: _____

Route: IV push IM SQ Other: _____

Parameters:

Vital Signs: *Maintain:* BP HR

Above: _____ *and Below:* _____

Other: _____

Ordering

Physician: _____

PRINT

SIGNATURE

Date: ___/___/___

Time: _____

EMS

Provider: _____

PRINT

SIGNATURE

AEMT#

Date: ___/___/___

Time: _____

PCR#: _____

VIII. Interfacility Crew Capabilities

EMT	Saline lock Patients with PCA pumps with settings unchanged for > 6 hours Stable patient with no anticipation of further interventions en route
EMT-I	<i>Above listed plus:</i> Peripheral IV lines with no added drugs Stable, intubated patients with no anticipation of further interventions en route
EMT-CC	<i>Above listed plus:</i> Peripheral IV lines Cardiac monitor/defibrillator Intubated patients Up to 3 IV drips and drugs except for those excluded from the list: <i>Antiarrhythmic agents as listed</i> <i>Blood Pressure Lowering Drugs</i> <i>Inamirone and Milranone</i> Specific drug limitations: <i>Nitroglycerine up to MAX rate of 100 mcg/minute</i> <i>Insulin drip can be accompanied by any only ONE other drip</i> Only may transport patients on drugs SPECIFICALLY listed in the protocol
EMT-P	<i>Above listed plus:</i> Central venous lines/PICC lines that are running Permanent Lines that are already accessed and running Arterial and Swann-Ganz lines- not to be used for monitoring by paramedic