I. PURPOSE

To describe the policy and procedure at the University Hospital of Brooklyn related to the titration of continuous infusion medications.
To delineate responsibilities of clinicians when prescribing, verifying, administering, and monitoring titratable continuous infusion medications.

II. POLICY

It is the policy of the University Hospital of Brooklyn to ensure medication orders are clear and accurate to promote safe and effective medication use. This includes appropriate procedures/guidelines for prescribing, dispensing, administering, titration, and monitoring.

III. DEFINITION(s)
Titration of Continuous Infusion Medications: Progressively adjusting the rate of a continuous infusion medication (increasing or decreasing) using pre-defined parameters to meet objective clinical goals set by the provider. Typical medications requiring titration include vasoactive agents, analgesics, sedatives, paralytics, anticoagulants, antiarrhythmics, antihypertensives, and insulin.

Titratable Continuous Infusion Order: A clearly defined medication order from the prescriber allowing the continuous infusion medication to be titrated by the registered nurse, based on the parameters, goals, and limits stated within the order.

IV. RESPONSIBILITIES

Prescriber: It is the responsibility of the prescribing provider to ensure that the complete medication order complies with the Patient Medication Orders policy (PHA-2) and contains the required elements for a titratable continuous infusion order. Any orders lacking the required information shall be referred back to the prescriber for correction or completion.

Nurse: It is the responsibility of the registered nurse to check all medication orders for completeness and clarity prior to acknowledging orders. The registered nurse should clarify with the prescriber if there are any uncertainties or discrepancies. The registered nurse caring for a patient is responsible for titration based on the medication order, monitoring for clinical response and adverse effects, and appropriate documentation in the medical record. If the registered nurse deems it clinically necessary to exceed or deviate from the titration parameters, he/she will first contact the provider.

Pharmacist: It is the responsibility of the registered pharmacist to review any titratable continuous infusion order for appropriateness and safety prior to dispensing. The registered pharmacist is responsible for contacting prescribers if a titration order requires clarification or correction, and will also serve as a drug information resource as needed. Pharmacists will make recommendations to ensure that the order is clear and specific as to patient goals for nursing administration and med dose adjustment based on the titration order. The pharmacist will review the nursing flow sheet at the initiation and or change in a titration order to ensure appropriateness of the order or adjustment in the titration order based on patient response.

V. PROCEDURES/GUIDELINES

1. The required elements for a titration order include:
   - Medication name
   - Medication route
   - Initial or starting rate of infusion
   - Incremental units the rate can be increased or decreased
   - Frequency for incremental doses (how often dose/rate can be increased or decreased)
   - Maximum rate/dose of infusion
   - Objective clinical endpoint (e.g., RASS score, MAP, SBP)

Example: Start propofol IV infusion at 10 mcg/kg/min. Titrate by 5 mcg/kg/min every 5 minutes to RASS (0 to -2). Maximum rate: 50 mcg/kg/min.

Please Note:
- Per the University Hospital of Brooklyn, continuous infusion orders will also have a default duration.
- If a bolus dose is desired, the provider must enter a separate bolus order.

2. Registered nurses in critical care areas (ED, MICU, CTICU, CCU, PICU, OR, PACU) may titrate continuous infusions with critical care monitoring. Nurses in StepDown/Progressive Care and non-critical care areas may administer maintenance continuous infusions with appropriate equipment and trained personnel, but are not responsible for the titration, except during emergent post-cardiac arrest situations.

3. All continuous infusion medications requiring titration and monitoring shall be infused using the smart infusion pumps in all areas.

4. The frequency of monitoring for the effect of medications will be determined by the prescriber and nurse, the clinical condition of the patient, and pharmacokinetic properties of the medication. Established unit-specific protocols may also dictate the frequency of monitoring.

5. The clinician responsible for documenting in the medical record will appropriately enter patient-specific information including vital signs, objective response to the titratable continuous infusion medication, rate of the infusion, and other subjective or objective parameters as necessary.

6. During emergent situations in non-critical care areas:
   a. During or after cardiopulmonary resuscitation (CPR), any intravenous lifesupporting medication required to sustain perfusion may be administered, including the titration of continuous infusion medications.
      i. If transfer to a higher level of care is delayed, personnel with the requisite knowledge and skill to titrate continuous infusion medications and utilize the necessary monitoring equipment must be made available. A critical care nurse shall be designated by the nursing supervisor/manager.
      ii. Necessary monitoring equipment includes cardiac monitoring/telemetry, noninvasive blood pressure monitoring, and pulse oximetry. Monitor alarm limits must be set as prescribed and audible.
      iii. Vital signs and other objective clinical endpoints should be monitored at least every hour, and as needed as indicated by the patient’s condition.
   b. If a central venous catheter is not immediately available for vasopressor infusion, an adequate peripheral venous catheter, preferably an 18 gauge, may be used for up to 24 hours until a central venous catheter can be placed (see section VI below).
   c. During emergent situations, providers may issue verbal orders for a titratable continuous infusion. Providers should enter orders in the electronic medical record in a timely manner, and must still comply with the required elements listed above.

VI. INTRAVENOUS ACCESS

1. Vasopressors (e.g., norepinephrine, epinephrine, phenylephrine, vasopressin) should be infused via central access. However, if central access is not immediately available, alternatives listed below in order of preference, may be used for up to 24 hours until a central venous catheter is placed.
a. Intraosseous (IO) cannulation placed by a physician or certified clinician is considered central access. All concentrations and medications may be administered via IO. Refer to “Protocol/Guidelines for Intra-Osseous Placement and Use” (POC-30).

b. Midline catheter may be used, but is not considered central access. Utilize most dilute concentration if possible.

c. Peripheral IV may be used, preferably an 18 gauge or greater in a larger diameter vein. Utilize most dilute concentration if possible.

2. Assess and monitor peripheral IV site at least every 2 hours as per “Insertion & Management of a Patient with Peripheral Intravenous Therapy (Adults and Pediatrics)” (POC-44).

3. If extravasation occurs during administration of vasopressors, refer to “Management of Extravasation Injuries” (PHA-20).

VII. ATTACHMENTS

Titration of Medication Drips for Continuous Infusion

<table>
<thead>
<tr>
<th>Date Reviewed</th>
<th>Revision Required (Circle One)</th>
<th>Responsible Staff Name and Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/2010</td>
<td>(Yes)</td>
<td>No</td>
</tr>
<tr>
<td>03/2012</td>
<td>(Yes)</td>
<td>No</td>
</tr>
<tr>
<td>10/2015</td>
<td>(Yes)</td>
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<td>10/2018</td>
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<td>No</td>
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<tr>
<td>11/2019</td>
<td>(Yes)</td>
<td>No</td>
</tr>
<tr>
<td>05/2021</td>
<td>Yes (No)</td>
<td>Teresa Chan, PharmD</td>
</tr>
<tr>
<td>06/2021</td>
<td>(Yes)</td>
<td>No</td>
</tr>
</tbody>
</table>

Maria S. Ribisi, TH Director of Pharmacy
### SUNY Downstate Medical Center - Department of Pharmacy

**PLEASE NOTE:** SUNY DMC Policy prohibits range orders. Dosing ranges provided as references ONLY. Titration frequency & increments as indicated & may be adjusted if needed per physician order. 

Areas allowed does NOT apply during immediate post-cardiac arrest period

### STANDARD ADULT CRITICAL CARE IV DRIP

<table>
<thead>
<tr>
<th>MEDICATIONS</th>
<th>STANDARD DILUTIONS</th>
<th>DILUENTS</th>
<th>DOSING RANGES</th>
<th>TITRATION DIRECTIONS</th>
<th>COMMENTS</th>
<th>Areas Allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALTEPLASE (tPA)</td>
<td>100 mg/100 mL</td>
<td>Sterile Water</td>
<td>PE non-arrest: 100 mg over 2 hours PE cardiac arrest: 50 mg IV push over 1-2 minutes, may repeat dose in 15 minutes if no ROSC Ischemic stroke: 0.09 mg/kg over 1 min then 0.81 mg/kg over 1 hr (total 0.9 mg/kg, max 90 mg)</td>
<td>Not Titrated</td>
<td>Peripheral</td>
<td>CRITICAL CARE or STROKE UNIT</td>
</tr>
<tr>
<td>AMIODARONE (CORDARONE*)</td>
<td>360 mg/200 mL</td>
<td>DSW (premix)</td>
<td>Loading: 150mg IV bolus over 10min Maintenance: 1mg/min x 8hrs then 0.5mg/min x 16hrs (Max 2.2g/day)</td>
<td>Not Titrated</td>
<td>Peripheral line</td>
<td>CRITICAL CARE* or STEPDOWN only</td>
</tr>
<tr>
<td>ARGATROBAN</td>
<td>250 mg/250 mL</td>
<td>DSW or NS</td>
<td>0.5– 2 mcg/kg/min (See Argatroban Protocol)</td>
<td>Titrati by 0.5 mcg/kg/min every 15 minutes as needed. Refer to order for goal parameters. If need to exceed maximum rate, a new order is required from the provider.</td>
<td>Peripheral line</td>
<td>ALL INPATIENT UNITS</td>
</tr>
<tr>
<td>CISATRACURUM (NIMBEX*)</td>
<td>100 mg/100 mL</td>
<td>DSW or NS</td>
<td>Initial IV Bolus: 0.15–0.2 mg/kg (IBW) (Higher initial doses-up to 0.3 mg/kg-may be used for rapid onset) Initial Infusion Rate: 1-3 mcg/kg/min Maximum Infusion Rate: 5-10 mcg/kg/min</td>
<td>Titrati by 0.5 mcg/kg/min every 15 minutes as needed. Refer to order for goal parameters. If need to exceed maximum rate, a new order is required from the provider.</td>
<td>Peripheral line</td>
<td>CRITICAL CARE only</td>
</tr>
<tr>
<td>CLEVIDIPINE (CLEVIPREX*)</td>
<td>50 mg/100 mL</td>
<td>Lipid Emulsion (premix)</td>
<td>Initial Infusion Rate: 1–2 mcg/hr Usual Infusion Rate: 4-6 mcg/hr Maximum Infusion Rate: 21 mcg/hr for up to 24 hours (1000 mL/24h due to lipid load restriction) <em><strong>AVOID IN SOY OR EGG ALLERGY</strong></em></td>
<td>Titrati by 1 mg/hr every 90 seconds to goal SBP. If need to exceed maximum rate, a new order is required from the provider. Consider checking triglycerides q24h if remains on rates &gt;12 mg/hr.</td>
<td>Peripheral line</td>
<td>CRITICAL CARE only</td>
</tr>
<tr>
<td>DEXMEDETOMIDINE (PRECEDEX*)</td>
<td>200 mcg/50 mL</td>
<td>NS</td>
<td>Initial Infusion Rate: 0.2 mcg/kg/hr Maximum Infusion Rate: 1.5 mcg/kg/hr</td>
<td>ICU sedation: titrate by 0.1 mcg/kg/hr q 15 mins to goal RASS 0 to -2 Code ICE: titrate by 0.1 mcg/kg/hq 15 mins to goal BSAS of 0 to ≤ 1</td>
<td>Peripheral line</td>
<td>CRITICAL CARE only</td>
</tr>
<tr>
<td>DILTIAZEM (CARDIZEM*)</td>
<td>125 mg/125mL</td>
<td>DSW or NS</td>
<td>Initial Infusion Rate: 5 mg/hr Maximum Infusion Rate: 15 mg/hr</td>
<td>Titrati by 2.5 mg/hr every 15 minutes to goal HR.</td>
<td>Peripheral line</td>
<td>CRITICAL CARE* or STEPDOWN only</td>
</tr>
<tr>
<td>DOBUTAMINE (DOBUTREX*)</td>
<td>500 mg/250 mL 1000 mg/250 mL</td>
<td>DSW (premix) or NS</td>
<td>Initial Infusion Rate: 1 mcg/kg/min Maximum Infusion Rate: 20 mcg/kg/min</td>
<td>Titrati by 1–2 mcg/kg/min every 5 minutes. Refer to order for goal parameters.</td>
<td>Central venous catheter (CVC) for ALL concentrations However, acceptable to use most dilute concentration in adequate peripheral veins during emergencies until CVC is placed</td>
<td>CRITICAL CARE* or STEPDOWN only</td>
</tr>
<tr>
<td>DOPAMINE</td>
<td>400 mg/ 250 mL 800 mg/ 250 mL</td>
<td>DSW (premix) or NS</td>
<td>Initial Infusion Rate: 5-10 mcg/kg/min (β-1) Maximum Infusion Rate: 20 mcg/kg/min (α)</td>
<td>Titrati by 1-2.5 mcg/kg/min every 1 minute. Refer to order for goal parameters.</td>
<td>Central venous catheter (CVC) for ALL concentrations However, acceptable to use most dilute concentration in adequate peripheral veins during emergencies until CVC is placed</td>
<td>CRITICAL CARE* or STEPDOWN only</td>
</tr>
<tr>
<td>EPINEPHRINE</td>
<td>2 mg/250 mL 4 mg/250 mL 8 mg/250 mL</td>
<td>DSW or NS</td>
<td>Initial Rate for Shock: 3-5 mcg/min Initial Rate for Anaphylaxis: 1-3 mcg/min Maximum Infusion Rate: 10 mcg/min</td>
<td>Titrati by 0.5–1 mcg/min every 1 minute. Refer to order for goal parameter. If need to exceed maximum rate, a new order is required from the provider.</td>
<td>Peripheral line</td>
<td>CRITICAL CARE* or STEPDOWN only</td>
</tr>
<tr>
<td>EPOPROSTENOL (VELETRI*)</td>
<td>0.25 mg/50 mL 0.5 mg/100 mL 3 mg/ 100 mL</td>
<td>NS or SW</td>
<td>PAH: IV (initiation) 2 ng/kg/min; lower initial dose may be used if intolerant of starting dose. Usual optimal dose (monotherapy): 25–40 ng/kg/min. Max dose with chronic therapy not defined.</td>
<td>Not titrated by RN. Provider must enter new order with each titration. PAH: IV (initiation) Titrate by 1–2 ng/kg/min at ≥15 min intervals until dose limiting side effects or response plateau PAH: IV (chronic) Titrate by 1–2 ng/kg/min at ≥15 min intervals. May also increase at 24–48h intervals or longer. Avoid abrupt withdrawal or sudden large</td>
<td>Peripheral line</td>
<td>CRITICAL CARE* or STEPDOWN only for initiation; ALL PATIENT UNITS for continuation of (home) therapy</td>
</tr>
</tbody>
</table>

### Dosing Ranges

- **Alteplase (tPA)**
  - Initial Dose: 100 mg
  - Maximum Dose: 1000 mg
- **Amiodarone (Cardarone*)**
  - Initial Dose: 360 mg
  - Maintenance Dose: 360 mg
- **Argatroban**
  - Initial Dose: 250 mg
  - Maintenance Dose: 250 mg
- **Cisatracurium (Nimbex*)**
  - Initial Dose: 100 mg
  - Maintenance Dose: 100 mg
- **Clevidipine (Cleviprex*)**
  - Initial Dose: 50 mg
  - Maintenance Dose: 50 mg
- **Dexmedetomidine (Precedex*)**
  - Initial Dose: 200 mcg
  - Maintenance Dose: 200 mcg
- **Diltiazem (Cardizem*)**
  - Initial Dose: 125 mg
  - Maintenance Dose: 125 mg
- **Dobutamine (Dobutrex*)**
  - Initial Dose: 500 mg
  - Maintenance Dose: 500 mg
- **Dopamine**
  - Initial Dose: 400 mg
  - Maintenance Dose: 400 mg
- **Epinephrine**
  - Initial Dose: 2 mg
  - Maintenance Dose: 2 mg
- **Epoprostenol (Veletri*)**
  - Initial Dose: 0.25 mg
  - Maintenance Dose: 0.25 mg

### Titration Directions

- **Alteplase (tPA)**
  - Initial Infusion Rate: 0.2 mcg/kg/hr
  - Maximum Infusion Rate: 20 mcg/kg/min
- **Amiodarone (Cardarone*)**
  - Initial Infusion Rate: 1 mcg/kg/min
  - Maximum Infusion Rate: 20 mcg/kg/min
- **Argatroban**
  - Initial Infusion Rate: 0.2 mcg/kg/hr
  - Maximum Infusion Rate: 20 mcg/kg/min
- **Cisatracurium (Nimbex*)**
  - Initial Infusion Rate: 5 mcg/kg/hr
  - Maximum Infusion Rate: 15 mcg/kg/hr
- **Clevidipine (Cleviprex*)**
  - Initial Infusion Rate: 1–2 mcg/hr
  - Maximum Infusion Rate: 21 mcg/hr
- **Dexmedetomidine (Precedex*)**
  - Initial Infusion Rate: 0.2 mcg/kg/hr
  - Maximum Infusion Rate: 1.5 mcg/kg/hr
- **Diltiazem (Cardizem*)**
  - Initial Infusion Rate: 5 mg/hr
  - Maximum Infusion Rate: 15 mg/hr
- **Dobutamine (Dobutrex*)**
  - Initial Infusion Rate: 1 mcg/kg/min
  - Maximum Infusion Rate: 20 mcg/kg/min
- **Dopamine**
  - Initial Infusion Rate: 5-10 mcg/kg/min (β-1)
  - Maximum Infusion Rate: 20 mcg/kg/min (α)
- **Epinephrine**
  - Initial Infusion Rate: 3-5 mcg/min
  - Maximum Infusion Rate: 10 mcg/min
- **Epoprostenol (Veletri*)**
  - Initial Infusion Rate: 2 ng/kg/min
  - Maximum Infusion Rate: 10 mcg/min
- **PAH**
  - Initial Infusion Rate: 2 ng/kg/min
  - Maximum Infusion Rate: 5 mg/hr

### Dosing Notes

- **SUNY DMC Policy** prohibits range orders. Dosing ranges provided as references ONLY. Titration frequency & increments as indicated & may be adjusted if needed per physician order.
- Areas allowed does NOT apply during immediate post-cardiac arrest period.
<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Concentration</th>
<th>Route</th>
<th>Bolus/Infusion Details</th>
<th>Dose Titration Details</th>
<th>Medication Administration</th>
<th>Additional Notes</th>
</tr>
</thead>
</table>
| ESMOLOL (BREVIBLOC®)      | 2 g/100 mL    | D5W or NS | Initial IV Bolus (optional): 0.5 mg/kg over 1 min  
Initial Infusion Rate: 25-50 mcg/kg/min  
Maximum Infusion Rate: 200 mcg/kg/min |
Titrated by 25–50 mcg/kg/min every 5 minutes to goal HR.  
Central line preferred                                         | CRITICAL CARE* or STEPDOWN only                                      |
| ESOMEPRAZOLE (NEXIUM®)   | 80 mg/100 mL  | NS    | 80 mg IV bolus then 8 mg/hr x 72 hr                                      | Not Titrated.                                                                                                                                            | Peripheral line            | ALL INPATIENT UNITS                                                              |
| FENTANYL                 | 1250 mcg/250 mL (premix) | NS | Initial Infusion Rate: 25-50 mcg/hr  
Maximum Infusion Rate: 150 mcg/hr |
Titrated by 25 mcg/hr every 10-15 minutes. Refer to order for goal parameters. If need to exceed maximum rate, a new order is required from the provider. |
Peripheral line | CRITICAL CARE* or STEPDOWN only |
| FUROSEMIDE (LASIX®)      | 100 mg/100 mL | D5W or NS | Initial IV Bolus: 40–100 mg over 1–2 min  
Initial Infusion Rate: 5-10 mg/hr  
Maximum Infusion Rate: 40 mg/hr |
Not titrated by RN. If need to exceed maximum rate, a new order is required from the provider. Caution with rates >40 mg/hr due to risk of irreversible ototoxicity. |
Peripheral line | CRITICAL CARE* or STEPDOWN only |
| HEPARIN                  | 25,000 Units/250 mL (premix) | D5W | Heparin weight-based nomogram (Titrate to target aPTT) |
See anticoagulation nomogram                                           | Peripheral line | ALL INPATIENT UNITS |
| INSULIN                  | 100 Units/100 mL | NS | DKA* Bolus (optional) 0.1 unit/kg; Infusion: 0.05–0.1 unit/kg/hr |
Titrate per DKA protocol or MICU |
Glucose control in critically-ill (non-DKA patients): see MICU protocol |
Hyperglycemia Protocol (non-DKA patients) |
Peripheral line | CRITICAL CARE* only |
| ISOPROTERENOL            | 1 mg in 250 mL | D5W or NS | Initial Infusion Rate: 1 mcg/min  
Maximum Infusion Rate: 10 mcg/min |
Titrated by 0.5-1 mcg/min every 5 minutes to goal HR. |
Peripheral line | CRITICAL CARE* only |
| KETAMINE                 | 500 mg/250 mL | D5W or NS | Super Refractory Status Epilepticus: Bolus 1.5–4.5 mg/kg; Infusion: 0.9–10 mg/kg/hr |
Super Refractory Status Epilepticus: Not titrated by RN. Rate adjusted per MD order ONE-Y. |
Peripheral line | RESTRICTED TO NEUROLOGY/EPILEPSY APPROVAL ONLY |
| LABETALOL                | 200 mg/100 mL | D5W or NS | Initial IV Bolus: 5-10 mg  
Initial Infusion Rate: 0.5 mg/min  
Maximum Infusion Rate: 2 mg/min  
(Cumulative max IV dose = 300 mg) |
Titrated by 0.5–1 mg/min every 15 minutes to goal HR or SBP. If need to exceed maximum rate, a new order is required from the provider. In rare cases, up to 6–8 mg/min have been used although at these concentrations may need to consider use of an alternative agent. |
Peripheral line | CRITICAL CARE* or STEPDOWN only |
| LIDOCAINE                | 2 gm/500 mL   | Premix | Initial IV Bolus: 100 mg  
Initial Infusion Rate: 1 mg/min  
Maximum Infusion Rate: 4 mg/min  
(Do not exceed 4 mg/min) |
Not titrated by RN. If need to increase rate, provider must enter new order.  
Titrated by 1 mg/min (up to 4 mg/min) every 10-20 minutes until cessation of arrhythmia. |
Peripheral line | CRITICAL CARE* or STEPDOWN only |
| LORAZEPAM (ATIVAN®)      | 40 mg/40 mL 60 mg/60 mL | D5W preferred | Initial IV Bolus: 2-4 mg  
Initial Infusion Rate: 1 mg/hr  
Maximum Infusion Rate: 10 mg/hr |
Titrated by 0.5 mg/hr every 5 minutes to goal RASS. Caution with propylene glycol toxicity at rates approaching 10 mg/hr for a prolonged period of time. |
Peripheral line | CRITICAL CARE* or STEPDOWN only |
| MIDAZOLAM (VERSED®)      | 100 mg/100 mL (1mg/mL) (premix) | NS | Initial IV Bolus: 2-4 mg  
Initial Infusion Rate: 1 mg/hr  
Maximum Infusion Rate: 10 mg/hr |
ICU sedation: Titrated by 0.5-1 mg/hr every 5 minutes to goal RASS. Caution with drug accumulation in renal or |
Peripheral line | CRITICAL CARE* or STEPDOWN only |
<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose/Concentration</th>
<th>Route</th>
<th>Initial Infusion Rate</th>
<th>Maximum Infusion Rate</th>
<th>Titration Details</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MILRINONE</strong> (PRIMACOR®)</td>
<td>20 mg/100 mL (premix)</td>
<td>DSW</td>
<td>Initial Infusion Rate: 0.2-0.375 mcg/kg/min</td>
<td>Maximum Infusion Rate: 0.75 mcg/kg/min</td>
<td>Not titrated by RN. Dose/rate adjusted per MD order. Titrate by 0.125 mcg/kg/min every 30-60 minutes to goal parameters. Caution in renal insufficiency.</td>
<td>Peripheral line CRITICAL CARE* or STEPDOWN only</td>
</tr>
<tr>
<td><strong>NICARDIPINE</strong> (CARDENE®)</td>
<td>20 mg/200 mL</td>
<td>DSW or NS</td>
<td>Initial Infusion Rate: 5 mcg/hr</td>
<td>Maximum Infusion Rate: 15 mcg/hr</td>
<td>Titrate by 2.5-5 mcg/hr every 10-15 minutes to goal SBP.</td>
<td>Peripheral line CRITICAL CARE* or STEPDOWN only</td>
</tr>
<tr>
<td><strong>NITROGLYCERIN</strong> (TRIDIL®)</td>
<td>100 mg/250 mL (premix bottle)</td>
<td>DSW or NS</td>
<td>Initial Infusion Rate: 10-20 mcg/min (consider higher initial rates up to 400 mcg/min in the first 30 minutes for severe flash pulmonary edema, maximum 12,000 mcg total dose)</td>
<td>Maximum Maintenance Infusion Rate: 400 mcg/min</td>
<td>Titrate by 20 mcg/min every 1-3 minutes to goal SBP or resolution of symptoms.</td>
<td>Peripheral line CRITICAL CARE* or STEPDOWN only</td>
</tr>
<tr>
<td><strong>NITROPRUSSIDE</strong> (NIPRIDE®)</td>
<td>50-100 mg/250 mL</td>
<td>DSW preferred</td>
<td>Initial Infusion Rate: 0.3-0.5 mcg/kg/min (may go up to 10 mcg/kg/min for maximum 10 minutes in refractory hypertension)</td>
<td>Maximum Infusion Rate: 2 mcg/kg/min</td>
<td>Titrate by 0.5 mcg/kg/min every 5-10 minutes to goal SBP. Risk of cyanide toxicity increases with rates ≥3 mcg/kg/min, liver dysfunction, and prolonged duration.</td>
<td>Peripheral line CRITICAL CARE* or STEPDOWN only</td>
</tr>
<tr>
<td><strong>NOREPINEPHRINE</strong> (LEVOPHED®)</td>
<td>4 mg/250 mL / 16 mg/250 mL</td>
<td>DSW or NS</td>
<td>Initial Infusion Rate: 5-10 mcg/min</td>
<td>Maximum Infusion Rate: 30 mcg/min</td>
<td>Titrate by 1-5 mcg/min every 1 minute to MAP &gt;65 mmHg. Need to exceed maximum rate, a new order is required from the provider.</td>
<td>Central venous catheter (CVC) for ALL concentrations. Central venous catheter (CVC) for ALL concentrations. However, acceptable to use most dilute concentration in adequate peripheral veins during emergencies until CVC is placed</td>
</tr>
<tr>
<td><strong>OCTREOTIDE</strong> (SANDOSTATIN®)</td>
<td>500 mcg/100 mL</td>
<td>DSW or NS</td>
<td>Initial IV Bolus (optional): 50–100 mcg</td>
<td>Maximum Infusion Rate: 50 mcg/hr</td>
<td>Not titrated by RN. If need to exceed maximum rate, a new order is required from the provider.</td>
<td>Peripheral line ALL INPATIENT UNITS</td>
</tr>
<tr>
<td><strong>PHENYLEPHRINE</strong> (NEOSTYPhINE®)</td>
<td>40 mg / 250 mL / 80 mg / 250 mL / 100 mg / 250 mL</td>
<td>NS</td>
<td>Initial Infusion Rate: 10-20 mcg/min</td>
<td>Maximum Infusion Rate: 200 mcg/min</td>
<td>Titrate by 10-20 mcg/min every 1 minute to MAP &gt;65 mmHg. If need to exceed maximum rate, a new order is required from the provider.</td>
<td>Central venous catheter (CVC) for ALL concentrations. Central venous catheter (CVC) for ALL concentrations. However, acceptable to use most dilute concentration in adequate peripheral veins during emergencies until CVC is placed</td>
</tr>
<tr>
<td><strong>PROCAINAMIDE</strong> (PRONESTYL®)</td>
<td>1 gm / 250 mL</td>
<td>DSW or NS</td>
<td>Option #1 Bolus: 100 mg IV Bolus every 5 minutes until arrhythmia controlled, hypotension occurs, or QRS widens by 50% (maximum 1,000 mg total)</td>
<td>Maximum Infusion Rate: 200 mcg/min</td>
<td>Consider Cardiology Consult and refer to drug information resources if need additional control and dosing guidance.</td>
<td>Peripheral line CRITICAL CARE* or STEPDOWN only</td>
</tr>
<tr>
<td><strong>PROPOFOL</strong> (DIPRIVAN®)</td>
<td>1000 mg/100 mL</td>
<td>Lipid</td>
<td>Initial IV Bolus (optional): 10-40 mg</td>
<td>Maximum Infusion Rate: 5 mcg/kg/min</td>
<td>Titrated by 5 mcg/kg/min every 5 minutes</td>
<td>Peripheral line CRITICAL CARE* or STEPDOWN only</td>
</tr>
<tr>
<td>Drug</td>
<td>Emulsion/Premix</td>
<td>Initial Infusion Rate: 5-10 mcg/kg/min</td>
<td>Maximum Infusion Rate: 50 mcg/kg/min</td>
<td>to goal RASS. If need to exceed maximum rate, a new order is required from the provider. Consider checking triglycerides if remains on propofol ≥5 days.</td>
<td>Stepdown only</td>
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<tr>
<td>SODIUM BICARBONATE</td>
<td>100 mEq/1000 mL</td>
<td>½ NS</td>
<td>50 milliLiter/Hour = 7.5 MILLiequivalent/Hour</td>
<td>Not titrated by RN. Dose adjusted per MD order.</td>
<td>Central line preferred</td>
<td>CRITICAL CARE* or STEPDOWN only</td>
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<tr>
<td></td>
<td>150 mEq/1000 mL</td>
<td>D5W</td>
<td>100 milliLiter/Hour = 15 MILLiequivalent/Hour</td>
<td>125 milliLiter/Hour = 18.75 MILLiequivalent/Hour</td>
<td>150 milliLiter/Hour = 22.5 MILLiequivalent/Hour</td>
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<tr>
<td>TREPROSTINIL (REMODULIN®)</td>
<td>0.2 mg/50 mL</td>
<td>NS</td>
<td>PAH: IV (initiation) 1.25 ng/kg/min; if intolerant may initiate at 0.625 ng/kg/min. Max 40 ng/kg/min (limited experience with doses &gt;40 ng/kg/min)</td>
<td>Not titrated by RN. Provider must enter new order with each titration. Titration based on clinical response (increments of 1.25 ng/kg/min per week for first 4 weeks of treatment, later 2.5 ng/kg/min per week). Avoid abrupt cessation.</td>
<td>Peripheral line</td>
<td>CRITICAL CARE* or STEPDOWN only for initiation; ALL PATIENT UNITS for continuation of (home) therapy</td>
</tr>
<tr>
<td>VASOPRESSIN (PITRESSIN®)</td>
<td>60 Units/100 mL</td>
<td>D5W or NS</td>
<td>Vasodilatory shock: 0.03 Units/min</td>
<td>Not Titrated by RN.</td>
<td>Central line</td>
<td>CRITICAL CARE* only</td>
</tr>
<tr>
<td>VECURONIUM (NORCURON®)</td>
<td>10–20 mg/100 mL</td>
<td>D5W or NS</td>
<td>Initial IV Bolus: 0.08-0.1 mg/kg Initial Infusion Rate: 0.8 mcg/kg/min</td>
<td>Maximum Infusion Rate: 1.7 mcg/kg/min</td>
<td>Titrated by 0.3 mcg/kg/min every 30 minutes as needed. Refer to order for goal parameters.</td>
<td>Peripheral line</td>
</tr>
</tbody>
</table>