Our Lady of the Lake Pharmacy & Therapeutics (P&T) Committee
Critical IV Infusion Guidelines (August 2021)

Clinical issue:
- **JCAHO requires medication orders to be clear and accurate. The hospital is required to have a written policy defining the requirements of a complete medication order. (MM 04.01.01)**
- **Titration orders without titration and monitoring parameters are incomplete orders.**
- **Pharmacists and nurses must contact prescribers to clarify orders whenever clear parameters are not ordered.**

Plan:
- **Ensure all titratable medications have an initial rate, titration rate, frequency, and goal**
- **Whenever necessary, ensure orders indicate max rates and any other pertinent clinical information**
- **Ensure this information is added to the order comments of all titratable medications.**
- **Providers may adjust the parameters to meet the needs of their patients, these parameters will be used for default**

DRUG (BRAND NAME)	DOSING, TITRATION AND MONITORING
AMIODARONE (CORDARONE)	Start at 1mg/min times 6 hours; then decrease to 0.5mg/min. Maximum cumulative dose of 2.1 grams in 24 hours. **Follow facility guidelines for IV infusion administration **
ATRACURIUM (TRACRIUM)	Start continuous infusion at 5mcg/kg/min; may titrate by 5mcg/kg/min every 15 minutes up to a maximum of 15mcg/kg/min to maintain 1 to 2 twitches on a train of 4. Titrate sedation to maintain BIS < 50. ** Follow facility guidelines for IV infusion administration **
CISATRACURIUM (NIMBEX)	**ICU Paralysis**: Start at 3mcg/kg/min; titrate by 0.5mcg/kg/min every 30 minutes to maintain 1 to 2 twitches on a train of 4. Titrate sedation to maintain BIS < 50. Do not exceed 10 mcg/kg/min ** Follow facility guidelines for IV infusion administration ** **ARDSnet Protocol Paralysis**: 15mg loading dose followed by 37.5mg/hr x 48 hours (not titratable) Titrate sedation to maintain BIS < 50. ** Follow facility guidelines for IV infusion administration **
CLEVIDIPINE (CLEVIPREX)	Initiate at 1mg/hr, titrate by doubling dose every 3 min to maintain SBP of *** to *** mmHg; Maximum dose is 21mg/hr. **Follow facility guidelines for IV infusion administration **
DEXMEDETOMIDINE (PRECEDEX)	Start infusion at 0.2mcg/kg/hr and then titrate by 0.2mcg/kg/hr every 30 minutes for sedation (RASS 0 to -1), pain and anxiety up to a max rate of 1.5mcg/kg/hr **Follow facility guidelines for IV infusion administration **
DILTIAZEM (CARDIZEM)	Start at 5mg/hr; increase by 5mg/hr every 15 minutes to a desired target HR 60-110. Maximum dose is 15mg/hr. **Follow facility guidelines for IV infusion administration**
DOBUTAMINE (DOBUTREX)	Start at 2.5 mcg/kg/min. Contact managing physician for all dose adjustments for hemodynamic instability, clinical unresponsiveness, or cardiac arrhythmia. Maximum dose of 10 mcg/kg/min. **Follow facility guidelines for IV infusion administration**
DOPAMINE	Start at 5 mcg/kg/min; may titrate by 5 mcg/kg/min every 10 minutes to the minimum dose required to maintain a MAP of 65-75 mmHg with a maximum dose up to 20 mcg/kg/min. ** May be titrated in Critical Care Units only ** Follow facility guidelines for IV infusion administration **

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EPINEPHRINE (ADRENALIN)	**For current MAP greater than or equal to 55 mmHg:** Start at 0.05 mcg/kg/min. Adjust by 0.01 mcg/kg/min every 5 minutes to the minimum dose required to maintain a MAP of 65-75 mmHg with a maximum dose up to 1 mcg/kg/min Contact physician for titration above 1 mcg/kg/min. **For current MAP less than 55 mmHg:** If not currently on epinephrine start at 0.3 mcg/kg/min; If current epinephrine dose is less than 0.3 mcg/kg/min, increase to 0.3 mcg/kg/min; If transitioning from MAP greater than 55 mmHg strategy and current dose is greater than 0.3 mcg/kg/min, then begin escalated dose adjustments as follows: Adjust by 0.1 mcg/kg/min every 1 minute to the minimum dose required to maintain a MAP of 65-75 mmHg with a maximum dose up to 1 mcg/kg/min. Contact physician for titration above 1 mcg/kg/min ** Follow facility guidelines for IV infusion administration **
EPTIFIBATIDE (INTEGRILIN)	**Acute Coronary Syndrome:** Bolus 180 mcg/kg (maximum 22.6mg) over 2 minutes followed by continuous infusion of 2 mcg/kg/min (maximum 15 mg/hr) until hospital discharge or initiation of CABG surgery up to 72 hours. **Percutaneous Coronary Intervention (PCI):** Loading dose 180 mcg/kg over 2 minutes, then repeat in 10 minutes. (Max loading dose of 22.6mg) Initial rate 2 mcg/kg/min. Bolus, start infusion, and re-bolus 10 minutes after the initial bolus. Reduce infusion to 1 mcg/kg/min for CrCl <50ml/min. Max duration 72 hours. Do not exceed 15 mg/hr. **Non-PCI:** Loading dose 180 mcg/kg over 2 minutes (Max loading dose of 22.6mg) Initial rate 2 mcg/kg/min. Reduce infusion to 1 mcg/kg/min for CrCl <50ml/min. Max duration 72 hours. Do not exceed 15 mg/hr. For patients with eCrCl < 50 ml/min: reduce rate of continuous infusion to 1 mcg/kg/min (maximum 7.5 mg/hr) ** Follow facility guidelines for IV infusion administration **
ESMOLOL (BREVIBLOC)	Start infusion at 50 mcg/kg/min; increase by 50 mcg/kg/min every 5 minutes to a target HR of *** to ***or systolic blood pressure of *** to ***mmHg. Max dose 300 mcg/kg/min. ** Follow facility guidelines for IV infusion administration **
FENTANYL	Continuous infusion—Start at 25 mcg/hr; increase by 25mcg/hr every 15 minutes for target RASS of 0 to -1. Maximum dose of 200mcg/hr without physician override. ** Follow facility guidelines for IV infusion administration **
FENOLDOPAM (CORLOPAM)	Initial 0.05 mcg/kg/min, titrate by 0.05 mcg/kg/minute every 15 minutes until SBP *** to *** mmHg Maximum dose 1.6 mcg/kg/minute. ** Follow facility guidelines for IV infusion administration **
ISOPROTERENOL (ISUPREL)	Initiate at 2 mcg/min, increase by 2 mcg/min every 5 minutes to a minimum dose required to achieve a target heart rate of ***. Do not exceed 20 mcg/min. ** Follow facility guidelines for IV infusion administration **

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KETAMINE (KETALAR)	Initiate continuous infusion at 0.05 mg/kg/hr. Increase by 0.1 mg/kg/hr every 15 minutes up to 2.5 mg/kg/hr to achieve a target RASS of 0 to -1 in mechanically ventilated patients ** Follow facility guidelines for IV infusion administration **
LABETALOL (TRANDATE)	Start at 2 mg/min; increase by 1mg/min every 10 minutes achieve target systolic blood pressure *** to *** mmHg. Maximum dose is 6 mg/min. ** Follow facility guidelines for IV infusion administration **
LIDOCAINE	Start continuous infusion at 1 mg/min after return of perfusion from VF or VT. If reappearance of arrhythmia occurs, contact ordering provider for titration instructions. Maximum rate of 4 mg/min. ** Follow facility guidelines for IV infusion administration **
LORAZEPAM (ATIVAN)	Start IV infusion at 2 mg/hr; titrate by 1 mg/hr every 30 minutes up to a maximum of 10 mg/hr to achieve desired level of sedation of 0 to -1 on RASS ; ** Follow facility guidelines for IV infusion administration **
MIDAZOLAM (VERSED)	Start maintenance infusion started at 0.02 mg/kg/hr titrated by 0.02 mg/kg/hr every 10 minutes to desired level of sedation of 0 to -1 on RASS. Max rate 0.25 mg/kg/hr ** Follow facility guidelines for IV infusion administration **
MILRINONE (PRIMACOR)	Begin maintenance infusion at 0.25 mcg/kg/min. Contact managing physician all dose adjustments for hemodynamic instability, clinical unresponsiveness, or cardiac arrhythmia. Maximum dose of 0.75 mcg/kg/min. ** Follow facility guidelines for IV infusion administration **
NICARDIPINE (CARDENE)	Start at 5 mg/hr; increase by 2.5 mg/hr every 15 minutes to maintain a SBP of *** to *** mmHg; Maximum dose is 15 mg/hr. ** Follow facility guidelines for IV infusion administration **
NITROPRUSSIDE (NIPRIDE)	Start at 0.5 mcg/kg/min; may titrate by 0.5 mcg/kg/min every 5 minutes up to a maximum of 10 mcg/kg/min to maintain a SBP of *** to *** mmHg. (Do not exceed 10 mcg/kg/min for more than 10 minutes at any given time) Monitor thiocyanate levels if requiring infusion >3 days or dose $\geq$ 4 mcg/kg/min ** Follow facility guidelines for IV infusion administration **
NITROGLYCERIN (TRIDIL)	Start at 5 mcg/min; then increase by 5 mcg/min every 5 minutes up to a maximum of 20 mcg/min to achieve a SBP of *** to *** mmHg. If no response at 20 mcg/min increase by 10 mcg/min every 3 minutes up to a max 200 mcg/minute ** Follow facility guidelines for IV infusion administration **
NOREPINEPHRINE (LEVOPHED)	**For current MAP greater than or equal to 55 mmHg:** Start at 0.05 mcg/kg/min; Adjust by 0.01 mcg/kg/min every 5 minutes to the minimum dose required to maintain a MAP of 65-75 mmHg with a maximum dose up to 1 mcg/kg/min. Contact physician for titration above 1 mcg/kg/min. **For current MAP greater than or equal to 55 mmHg:** If not currently on norepinephrine start at 0.5 mcg/kg/min; If current norepi dose is less than 0.5 mckg/kg/min-increase to 0.5 mcg/kg/min; If transitioning from MAP greater than 55mmHg strategy- and current dose is greater than 0.5 mcg/kg/min then begin escalated dose adjustments as follows: Adjust by 0.1 mcg/kg/min every 1 minute to the minimum dose required to maintain a MAP of 65-75 mmHg with a maximum dose up to 1 mcg/kg/min. Contact physician for titration above 1 mcg/kg/min ** Follow facility guidelines for IV infusion administration **

PHENYLEPHRINE (NEOSYNEPHRINE)	Initial dose 0.5 mcg/kg/min; Adjust infusion by 0.1 mcg/kg/min every 5 minutes to the minimum dose required to maintain a MAP of 65-75 mmHg with a maximum dose up to 2 mcg/kg/min ** Follow facility guidelines for IV infusion administration **
PROPOFOL (DRIPRIVAN)	Initiate rate at 10 mcg/kg/min; titrate by 5 mcg/kg/min every 5minutes up to a maximum of 50 mcg/kg/min to achieve Target RASS 0 to -1; (Once spiked, bottle and tubing only good for 12 hours --- must be replaced every 12 hours) ** Follow facility guidelines for IV infusion administration **
ROCURONIUM (ZEMURON)	Start continuous IV infusion of 8 mcg/kg/minute; adjust rate by 0.8 mcg/kg/min every 60 minutes to maintain 1 to 2 twitches on a train of 4. Do not exceed 12 mcg/kg/min. Titrate sedation to a BIS of < 50. ** Follow facility guidelines for IV infusion administration **
TIROFIBAN (AGGRASTAT)	**Unstable angina/non-ST-elevation myocardial infarction (UA/NSTEMI):** Bolus 25 mcg/kg over 5 minutes or less, followed by continuous infusion of 0.15 mcg/kg/minute for up to 18 hours. For patients with eCrCl < 60 ml/min: Reduce rate of continuous infusion to 0.075 mcg/kg/min ** Follow facility guidelines for IV infusion administration **
VASOPRESSIN	**Shock—**Start drip at 0.03 units/min; Dose titration not recommended in septic shock. Goal MAP 65-75 mmHg ** Follow facility guidelines for IV infusion administration **
VECURONIUM (NORCURON)	Start at maintenance rate of 0.8 mcg/kg/minute which can be increased by 0.3 mcg/kg/minute every 60 minutes up to a maximum of 1.7 mcg/kg/minute to maintain 1 to 2 twitches on a train of 4. Titrate sedation to a BIS of <50. ** Follow facility guidelines for IV infusion administration **

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