Vasoactive Medications, Intravenous: Administration in the High Acuity Unit (HAU) and Surgical High Acuity Unit (SHAU)

Site Applicability

SPH Surgical High Acuity Unit (SHAU)

MSJ High Acuity Unit (HAU)

Practice Level

Specialized: Critical Care RN's and/or HAU RN's

Requirements

The physician, HAU attending and/or clinical associate (MSJ) or the perioperative anesthesiologist (SPH), is responsible for ordering vasoactive medication and titration parameters. The RN is responsible for notifying the physician if or when the patient requires high doses of NORepinephrine, up to 15 mcg/min (MSJ) and greater than 10 mcg/min (SPH), to maintain mean arterial pressure (MAP) goal, as this may require transfer to critical care.

Need to Know

Hypotension may be related to a number of different etiologies. Before initiating vasoactive medications assess and treat for possible contributing factors. Possible causes may be:

Hypovolemia	Medications	Distributive Shock	Cardiac
Possibly due to: • Bleeding • Migration of fluid between compartments (third spacing) • Dehydration If no contraindications anticipate an order for intravenous fluid bolus as hypovolemia should be corrected prior to initiation of vasopressor therapy.	Such as: • Local anesthetics • Analgesics • Sedatives, e.g. benzodiazepines, anxiolytics • Sympathetic blocks due to epidural or intrathecal medications	Sepsis: • Systemic Inflammatory Response Syndrome (SIRS) and confirmed or suspected source of infection • See Sepsis: Early Identification and Treatment Anaphylaxis: • Consider indications for reaction to new medication (latex, blood products, etc.)	Hemodynamic instability related to bradycardia or tachyarrhythmia. Cause of the arrhythmia should be identified and treated e.g. hypoxemia, acidemia, anemia, electrolyte abnormalities, myocardial irritability, etc. Consider cardiology consult if indicated.

Vasoactive medications work as agonists to adrenergic receptors throughout the body. These receptors are:

Receptor	Location	Response to Sympathetic Stimulus
α_1	Blood vessels	Vaso**constriction**
β_1	Heart	Inotropic – increases contractility Chronotropic – increases heart rate and rhythm
β_2	Blood vessels, lungs, GI tract	Vaso**dilation** Bronchodilation Decreases GI motility
Dopaminergic	Renal, mesenteric, coronary, cerebral vascular bed	Vasodilation at low doses Vasoconstriction at high doses secondary to the simulation of alpha adrenergic receptors

Equipment and Supplies

1. Alaris CareFusion smart pump
2. Smartsite infusion set
3. Philips cardiac monitor
4. Vasoactive medication reconstituted as per Parenteral Drug Therapy Manual (PDTM) monograph

Guideline

Assessment/Interventions

Initial Assessment:

- Heart Rate (HR), Blood Pressure (BP), Continuous Electrocardiogram (ECG) Monitoring, rhythm strip analysis, Central Venous Pressure (CVP) if needed, volume status, urine output
- With ordering physician:
  - Review patient status
  - Establish Mean Arterial Pressure (MAP) goal
  - Determine need for arterial line, if not already present (arterial line is preferable with administration of vasoactive medication)
  - Determine plan for central venous access if not already present
- Central venous access is preferable; however in urgent/emergency situation peripheral line in large vein may be used pending insertion of central line. Avoid infusion of vasoactive medication via peripheral line in hand, wrist, antecubital fossa. Refer to drug specific PDTM monographs.
- Confirm dose, concentration and rate of vasoactive infusion (rate must be controlled with an infusion pump).
- On initiation of vasoactive infusion monitor BP and HR Q2 to 5 min to monitor response to medication and after titration.

Ongoing Assessment:

Once desired response (no additional bolus doses or titrations are needed) to vasoactive medication is achieved:

- Complete head to toe assessment Q4H and PRN as per: Physical Assessment: Critical Care Areas
- Monitor:
  - HR continuously
  - BP Q1H (at a minimum) and PRN or continuously with arterial line
  - Continue to assess and document, CVP (if available), urine output, respiratory rate, oxygen saturation as per unit standards.
  - If infusing through a peripheral line, assess and monitor site Q1H.
- When handing over patient care (e.g. at end of shift) both RN's review and confirm medication dose, rate and concentration at the IV pump.

Interventions:

***If patient's status deteriorates (i.e. the vasoactive infusion requirements increases or more than single organ support), a discussion with physician must include:

- The patients status and condition
- The need to transfer to critical care

Notify physician if any of the following occur:

Complication	Description
Hypoperfusion	Inadequate perfusion of the extremities, mesenteric organs or kidneys
Dysrhythmias	Associated with β_1 stimulation leading to tachyarrhythmias
Myocardial Ischemia	Secondary to beta-adrenergic receptor stimulation, myocardial oxygen consumption increases and supply may not meet demand
Hyperglycemia	As a result of insulin secretion inhibition (more pronounced with NORepinephrine)
Extravasation	When administering peripherally, can lead to skin necrosis, phentolamine may be administered locally to treat.

Documentation

Vital Signs	Document in iView (Cerner PowerChart)
Medications	Medication Administration Record (MAR)
Assessments	Adult Critical Care Quick View Adult Critical Care Systems Assessment

Patient and Family Teaching

1. Explain the rationale for the vasoactive infusion.
2. Describe possible side effects.
3. Instruct patient to inform you if experiencing shortness of breath, chest pain, dizziness, pain to infusion site, increased thirst, polyuria and nausea.

Related Documents

1. B-00-13-10017 - Physical Assessment (Critical Care Areas)
2. BCD-11-13-41002 - Sepsis – Early Identification and Treatment using Cerner HER – Protocol
3. B-00-11-10011 - Surgical High Acuity Admission Criteria (SPH)
4. B-00-13-10105 - High Acuity Unit Admission or PACU Overnight Stay
5. B-00-13-10109 - Intravenous Medication Administration in Critical Care Areas
6. BD-00-13-40101 - Extravasation Management (Non-Antineoplastic Vesicant/Irritant Medications) –Adults
7. Parenteral Drug Therapy Manual

References

1. Broussard, D., & Ural, K. (2023) Cardiovascular problems in the post-anesthesia care unit (PACU). *UpToDate.* Retrieved July 13, 2023 from https://www.uptodate.com
2. Manaker, S. (2023). Use of vasopressors and inotropes. In F. Geraldine (Ed.). *UpToDate*. Retrieved July 13, 2023 from https://www.uptodate.com
3. Methangkool, E., & Mahajan, A. (2023). Arrhythmias during anesthesia. *UpToDate*. Retrieved July 13, 2023 from https://www.uptodate.com/
4. Westfall TC, Westfall DP. Chapter 12/ Adrenergic agonists and antagonists. In: Brunton LL, Chabner BA, Knollman BC, eds. *Goodman and Gilman's the Pharmacological Basis of Therapeutics*. 12th ed. New York: McGraw- Hill; 277-333.

Persons/Groups Consulted

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