Adult Guidelines for Peripheral Administration of Vasopressor Therapy and the Management of Extravasation Events

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Goal

Provide guidelines for providing care to adult patients who are receiving intravenous vasopressors through a peripheral venous line (PVL). Emphasize, accurate assessment and interventions based on the available evidence to manage a vasopressor induced extravasation event

Introduction

- The decision to use a PVL for vasopressors infusion must be assessed and approved by an attending physician trained in emergency medicine or critical care (or surrogate LMP in an emergent situation)
- Vasopressor infusion through a PVL may be utilized in the following areas
    - Any location in the hospital is acceptable in an emergency setting
    - Upon stabilization, they must be monitored in the ICUs, Step down unit, or PACU
    - Other allowable areas include the ED or "Vent-Pressor" floor bed
- Peripheral venous access may be used for only one vasopressor
- Two working PVLs must be present
    - If access is lost and new access will be delayed, placement of an intra-osseous (IO lie emergently by the LIP is suggested
- The maximum duration recommended for peripheral vasopressor use is 24 hours
    - Durations greater than 24 hours, must have attending approval and reasoning must be documented in the patient's medical chart

Physician Responsibility

- Make the bedside nurse and medical team aware of the following:
    - Provide the hospital protocol for peripheral vasopressor administration and extravasation management
    - Review the steps needed in case of an extravasation event
- Choose the vasopressor and dosage of the infusion and ensure the appropriate order is entered in EPIC 9see below)
    - In the medication order, "peripheral administration" must be placed in the order comments section

Pharmacist Responsibility

- Verify the following parameters upon dispensing a vasopressor for peripheral administration (Table A1)
    - The lowest concentration of the vasopressor is being used
    - That the initial max dose for peripheral administration is not exceeded
    - The duration of the vasopressor does not exceed 24 hours
        - If the duration is greater than 24 hours, verify the reason for continuance
- Maintain the extravasation kit and ensure that it will be readily accessible for use

Table A1. Vasopressors for Peripheral Administration

Vasopressor	Concentration	Indication	Starting Dose	Max Peripheral Dose[a]
Norepinephrine	4 mg/250 mL (16 μg/mL) NS	Septic shock	0.05-0.1 μg/kg/min	25 μg/min
Epinephrine	4 mg/250 mL (16 μg/mL) NS	Anaphylaxis	0.05-0.1 μg/kg/min	25 μg/min
Dopamine	200 mg/250 mL (800 μg/mL) D5W	Symptomatic bradycardia	2 μg/kg/min	10 μg/kg/min
Phenylephrine	100 mg/250 mL (400 μg/mL) NS	Second-line agent for septic shock	50 μg/min	250 μg/min

[a]Consider placing a central line if vasopressor dose exceeds 25 μg/min of norepinephrine equivalents.

Registered Nurse Responsibility

- Establish a peripheral access site for vasopressor administration
- The preferred PVL for vasopressor infusion must be placed in the forearm, or upper arm
    - The antecubital fossa and veins next to joints, tendons, nerves, or arteries should be avoided as well as any IV sites requiring more than one venipuncture
- Clearly label the dedicated PVL at the site of the connection, indicating peripheral vasopressor
- The IV catheter must be 20 gauge or larger and must always be visible
    - There must be blood return from the IV catheter prior to vasopressor administration in order to confirm placement
    - Administer 5 to 10 mL 0l.9% normal saline and withdraw a small amount of blood to test venous integrity and flow
    - This will be performed twice during the nursing shift
- Continue to monitor/assess the IV site every 1 hour for signs and symptoms of extravasation (Table A2) along with grade of injury according to Table A3 and document these findings in the nursing flow sheet

Table A2. Parameters to Monitor for Peripheral Vasopressor Use (Based on Charts Below):

Signs	Symptoms
Swelling	Tightness
Redness or blanching	Burning
Blister formation	Pain or aching tingling sensation
Unexplained reduced IV flow rate	Itchiness
Necrosis (2-4 days later)	
Lack of blood return	
Ulceration	

Table A3. Grading of Extravasation Injury Severity

Grade	Clinical Severity
0	• No symptoms
1	• Blanched skin or cool to touch • Edema <1 inch in any direction • With or without pain
2	• Blanched skin or cool to touch • Edema 1-6 inches in any direction • With or without pain
3	• Blanched skin, translucent skin • Gross edema >6 inches in any direction • Mild to moderate pain • Possible numbness
4	• Blanched skin, tight leaking skin • Gross edema >6 inches in any direction • Deep pitting edema • Moderate to severe pain

Note: This protocol was developed when phentolamine was not available. Phentolamine is the preferred antidote for vasopressor extravasation when available.

Management of Extravasation

- On suspecting extravasation, the infusion must be stopped immediately
- The ED attending or intensive (or surrogate) must be contacted immediately in order to assess the site and initiate treatment
- Leave the catheter in place
- Slowly aspirate as much drug as possible
- Don not apply pressure to the area
- The physician will initiate and administer both reversal agents in the following order:
    - Phentolamine:
        - 5mg/mL in 9mL of 0.9% NaCl
        - 10mg (5mg/mL x2) in 8mL of 0.9% NaCl
        - Inject 5mL through the indwelling catheter at the IV site
        - Inject the remaining 5mL subcutaneously with a 27-gauge needle into the affected area around the leading edge of the extravasation site
    - OR Terbutaline:
        - 1mg diluted in 10mL of 0.9% NaCl
        - Inject 5 mL through the indwelling catheter at the IV site
        - Inject the remaining, 5 mL subcutaneously with a 27-gauge needle into the affected area around the leading edge of the extravasation site
            - Blanching should reverse immediately
            - Additional doses may be required if blanching returns
    - PLUS, Topical Nitroglycerin 2%:
        - Apply 1-inch strip to the site of ischemia
        - May re-dose every 8 hours as needed
- Remove the catheter
- Establish a new peripheral access site for vasopressor administration and consider a central line
- Elevate the affected limb to minimize swelling
- Apply warm compresses for 20 minutes every 6 to 8 hours for the first 24 to 48 hours after extravasation occurs
- Advise patient to resume activity with affected limb as tolerated
- Depending on the extent of the injury, debridement and excision of necrotic tissue should be considered if pain continues and surgery should be consulted