Guideline for PERIPHERAL use of agents with INOTROPIC & VASOPRESSOR properties in patients without available central access in EMERGENCY situations

Refer EARLY to KIDS NTS for advice - 0300 200 1100

Introduction:

- Agents with vasopressor actions have a high risk of injury if there is an extravasation.
- Insertion of central venous catheters are also associated with risk of harm to patients. There is lack of good quality evidence around the peripheral use of inotropes. Recent adult systematic review and meta-analysis have shown that administration of vasopressors via peripheral intravenous catheters for a limited duration and under close observation is unlikely to cause major complications (1,2).
- The paediatric evidence although limited has shown similar results (2,3). **The aim of this guideline is to assist with balancing the options to minimise the risk of harm to the patient and is aimed at use in patients being stabilised before being moved to critical care environment.**

General principles:

- If the patient has central access this must be used for inotropes due to their extravasation risk. Inotropes must take priority for the need for central administration over other continuous IV infusions.
- Escalating doses of vasopressors are a sign that obtaining central access for administration is more urgent.
- Extravasation of agents with vasopressor actions has a high likelihood of causing tissue damage, ischaemia and necrosis.

- If there is no central access and the delay of vasopressors will compromise the patient, use peripheral access:

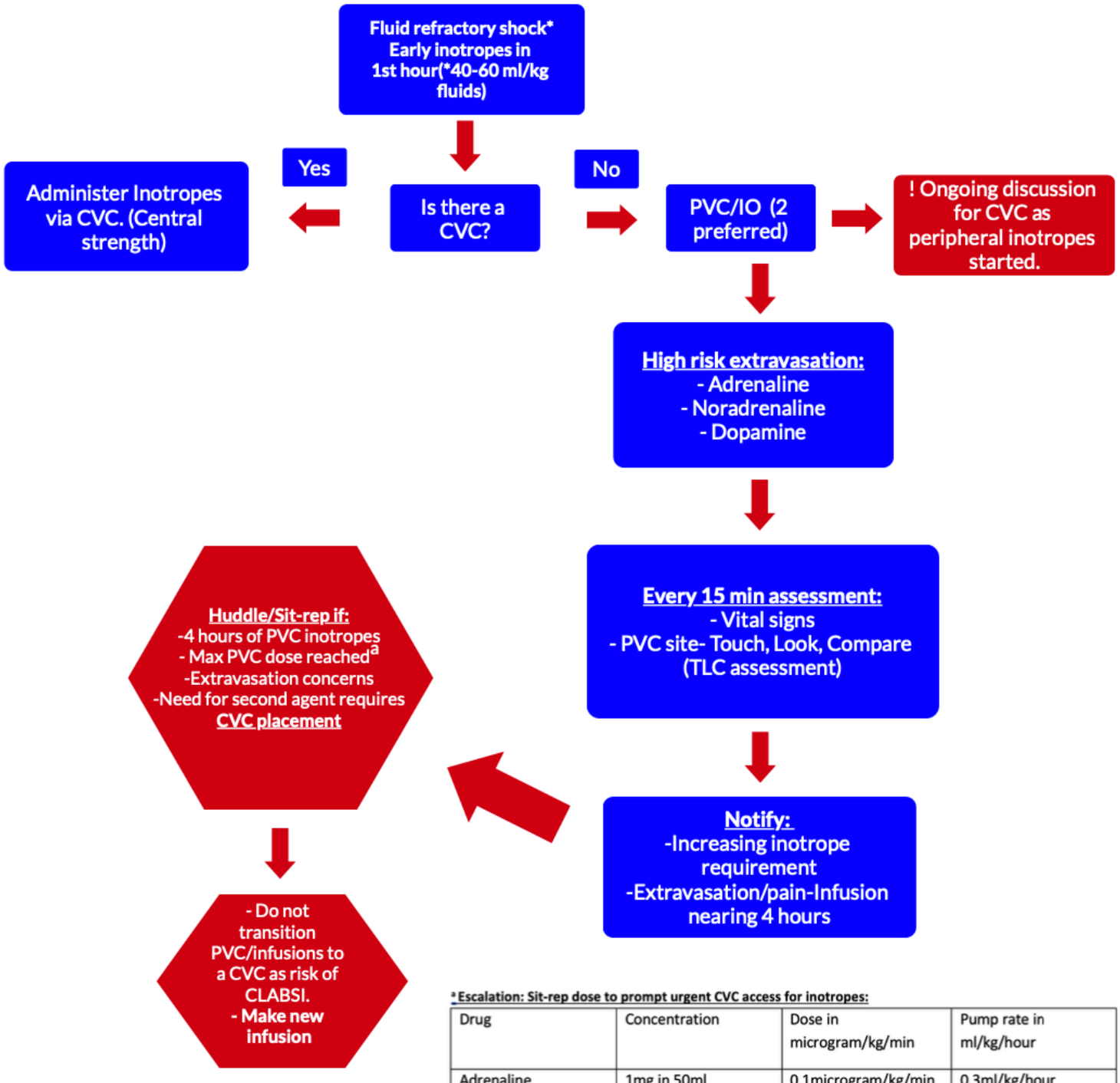
  - **Avoid cannula use in hands over joint areas.**
  - **Opt for proximal, well placed IV peripheral cannula, avoiding scalp cannulae.**
  - **Intraosseous access can be used for peripheral strength inotropes.**
  - **Only one agent with vasopressor action may run via a peripheral cannula.**

- Please monitor the cannula site every 15 minutes and record any signs of extravasation or pain using your local extravasation guidance. Stop and change the site of inotrope infusion if any concerns like erythema, tracking (redness along the course of the vein), swelling or pain.
- If there is an expectation that the inotrope/vasopressor is needed for over 4 hours, central access must be sought.
- Doses of adrenaline and noradrenaline above 0.1microgram/kg/min increase urgency for gaining central access, for patient haemodynamic stability in addition to risk of tissue harm if the cannula tissues.
- Use of peripheral cannula noradrenaline or adrenaline must be agreed by most senior member of staff present at time of patient impeding deterioration.
- Following stabilisation of patient, an entry into patient medical notes must document the risks of delaying therapy versus using peripheral cannula and the frequency of line site inspection e.g. “peripheral cannula used for noradrenaline as no central access. Team decision that further delay to insert central catheter was higher risk than use of peripheral cannula."
- If patient requiring higher dose or infusion longer than 4 hours, central catheter may be required.
- If patient is uncooperative/thrashing/pulling at lines then central or midline access should be sought to minimise displacing of cannula and therefore increasing risk of extravasation.

Concentration of vasopressors for emergency/short term/ lower dose peripheral use:

Drug	Concentration	Diluents	Pump rate calculation
Adrenaline	1mg in 50ml	Sodium Chloride 0.9% Glucose 5%	0.1microgram/kg/min= 0.3ml/kg/hour
Dopamine	80mg in 50ml	Sodium chloride 0.9% Glucose 5%	10microgram/kg/min= 0.375 ml/kg/hour
Noradrenaline	1mg in 50ml	Sodium Chloride 0.9% Glucose 5%	0.1microgram/kg/min= 0.3ml/kg/hour

Flowchart for decision making around use of peripheral inotropes:



[a] Escalation: Sit-rep dose to prompt urgent CVC access for inotropes:

Drug	Concentration	Dose in microgram/kg/min	Pump rate in ml/kg/hour
Adrenaline	1mg in 50ml	0.1microgram/kg/min	0.3ml/kg/hour
Dopamine	80mg in 50ml	10 microgram/kg/min	0.375 ml/kg/hour
Noradrenaline	1mg in 50ml	0.1microgram/kg/min	0.3ml/kg/hour

CVC- Central Venous Catheter
PVC- Peripheral Venous Cannula
IO- Intra Osseous
CLABSI- Central Line Associated Blood Stream Infection

References:
1. Tian, D., Smyth, C., Keijzers, G., Macdonald, S., Peake, S., Udy, A., & Delaney, A. (2019). Safety of peripheral administration of vasopressor medications: A systematic review. Emergency Medicine Australasia, 32. 10.1111/1742-6723.13406.
2. Owen, V.S., Rosgen, B.K., Cherak, S.J. et al. Adverse events associated with administration of vasopressor medications through a peripheral intravenous catheter: a systematic review and meta-analysis. Crit Care 25, 146 (2021). https://doi.org/10.1186/s13054-021-03553-1
3. Patregnani JT, Sochet AA, Klugman D. Short-Term Peripheral Vasoactive Infusions in Pediatrics: Where Is the Harm? Pediatr Crit Care Med. 2017 Aug;18(8):e378-e381. doi: 10.1097/PCC.0000000000001230. PMID: 28617763.