
Clinical Guidance

Paediatric Critical Care: Peripheral Inotropes

Summary

This guidance related to the management of peripheral inotropes: adrenaline and noradrenaline. It includes information on indications for the use of vasoactive infusions, monitoring and management of the patient and lines. Guideline has been aligned with current practice at The Royal Brompton Hospital.

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Relevant external law, regulation, standards		
<p>This clinical guideline has been produced by the South Thames Retrieval Service (STRS) at Evelina London for nurses, doctors and ambulance staff to refer to in the emergency care of critically ill children.</p> <p>This guideline represents the views of STRS and was produced after careful consideration of available evidence in conjunction with clinical expertise and experience. The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient.</p>		
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Glossary

CVC: central venous catheter, PIVC: peripheral intravenous cannula

Emerging safety evidence for delivering inotropes via PIVC in children supports the use of peripheral noradrenaline/adrenaline in a carefully selected population of children¹. It is particularly useful in the initial phase of resuscitation before a child is ventilated and sedated. CVCs can be placed later in a more optimal situation. Caution should however be taken as children are more prone to extravasation injury due to the relatively small size of their peripheral veins and increased capillary leak rate².

<p>Indications for peripheral inotropes:</p> <ul style="list-style-type: none"> • Short-term for stabilisation prior to insertion of CVC • As an alternative to CVC insertion in patients unlikely to require a CVC for long – e.g. those with hypotension without other organ dysfunction • In patients where central access is problematic <p>All decisions to use peripheral inotropes should be discussed with the responsible consultant/ STRS consultant</p>	<p>Management of patient and lines:</p> <ul style="list-style-type: none"> • A CVC is the first choice for inotropes. If using peripheral inotropes medications they should be administered via the “best peripheral” line, preferably in a large vein • Adrenaline and noradrenaline are compatible so can be infused via the same cannula using a 3 way tap. Inotropes should not be infused with any other drug. • An additional 3 way tap should be placed in the line to allow infusions to be changed over by ‘double pumping’ without interruption to flow • Label infusion lines clearly at patient end to ensure line is not used for other drugs • Infusion should be commenced at a rate of 0.1 microgram/kg/minute, then titrated to the desired effect in discussion with STRS • Infusion should be increased/ decreased at intervals of 5-10 minutes to achieve the target blood pressure <p>Additional IV access MUST be present to ensure there is a dedicated line to give other infusions/ bolus drug</p>
<p>Monitoring of patients on peripheral inotropes:</p> <ul style="list-style-type: none"> • Continuous ECG monitoring in high-observation area • Frequent non-invasive blood pressure measurements (at least every 3-5 minutes until stability achieved, thence every 10 minutes) or preferably site arterial line • Documented review of insertion site every 15 minutes for first hour, then at least hourly: <ul style="list-style-type: none"> ○ VIP score ○ Infiltration scale ○ Pump pressure – rise could indicate potential extravasation/ disruption to infusion 	

Standard peripheral inotrope infusion concentrations

Drug	Concentration	Diluent	Rate of Infusion
Adrenaline (peripheral) 0.02-0.5 micrograms/kg/minute (higher doses on consultant approval)	< 5kg 1mg in 50mL	Sodium chloride 0.9% or glucose 5/10%	0.1 microgram/kg/minute= 0.3mL/kg/h
	5-20kg 2mg in 50mL	Sodium chloride 0.9% or glucose 5/10%	0.1 microgram/kg/minute= 0.15mL/kg/h
	> 20kg 4mg in 50mL	Sodium chloride 0.9% or glucose 5/10%	0.1 microgram/kg/minute= 0.075mL/kg/h
Noradrenaline (peripheral) 0.02-0.5 micrograms/kg/minute (higher doses on consultant approval)	< 5kg	Not recommended	
	5-20kg 1.5mg in 50mL	Sodium chloride 0.9% or glucose 5/10%	0.1 microgram/kg/minute= 0.2mL/kg/h
	> 20kg 7.5mg in <u>250mL</u>	Sodium chloride 0.9% or glucose 5/10%	0.1 microgram/kg/minute= 0.2mL/kg/h

<p>Management of extravasation:</p> <ul style="list-style-type: none"> • Assess patient and resuscitate using APLS ABCDE approach • Stop infusion and change immediately to alternative access • Assess site and leave cannula in situ • Aspirate any residual drug through the cannula • Mark edges to allow comparison and elevate limb if possible to reduce swelling • Contact plastic surgery team for review – if retrieval patient ensure handover to receiving team of need for review • Ensure extravasations are managed by following extravasation treatment guide or follow local guidance • Document injury in local incident reporting system, document on STRS retrieval form 	<p>Practical points:</p> <ul style="list-style-type: none"> • Peripheral noradrenaline is one concentration only and administration is from a 50mL syringe or a 250mL bag • The weight band concentrations are a guide, choose the appropriate concentration for the volume you are delivering • Dosing safety parameters should be used if available e.g. guardrails. Pump programming/ infusion rates must always be manually checked to ensure correct dose is delivered • Ensure additional infusions are pre-prepared if pump is running at a high rate • Inotropes have a very short half-life. To avoid disruption of the infusion during changeover double pumping is advised or follow local guidance • At completion of infusion PIVC should be flushed with 0.9% sodium chloride at same rate to ensure line is clear
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