

Nitroglycerin for Peripheral Ischemia
East Bay Newborn Specialists Guideline
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Background:

Tissue ischemia after localized thrombosis, emboli or peripheral vasospasm from arterial catheterization or extravasation of dopamine can lead to significant compromise in neonates. The pharmacological effects of nitroglycerin include relaxation of vascular smooth muscle. Side effects can include hypotension and tachycardia but have been minimal in case reports. These effects are typically seen within 30-60 minutes and can last 6-8 hrs. Local vasodilating effects have been seen in 15-30 minutes. Although there are no randomized controlled trials regarding nitroglycerin for use in tissue ischemia there are several case reports in the literature including ELBW infants. It appears to be well tolerated with minimal hemodynamic effects and successful in improving the blood flow to the ischemic area.

Target population:

Infants with peripheral ischemia from arterial lines or dopamine extravasation.

Indications:

Ischemic area of distal extremity, the affected area becomes pale, cyanotic, cool, and motionless with absent pulses.

Procedure:

- Remove catheter if in place.
- Change site of vasopressive medication if that is the etiology.
- Elevate affected limb.
- Place warm compress on contralateral extremity.
- If due to dopamine infiltration first attempt phentolamine or hyaluronidase injections
- If unsuccessful consider Nitroglycerin.

Nitroglycerine Dose:

To avoid systemic vasodilation, a dose of:

- Nitroglycerin 2% ointment, 4mm/kg *or*
- Nitroglycerine 2 mg measured as 0.1 mL in a syringe
- Give q 8 hrs as needed if persists. Usually no more than 1-3 doses are needed.
- This dose is equivalent to no more than 0.2 to 0.5 mcg/k/min IV.

Nitroglycerin Application:

- Nitroglycerin should be placed by MD.
- Wear gloves when placing
- Two application techniques have been reported:
 - The first is to apply nitroglycerin to the margins of the compromised area
 - The second is to apply nitroglycerin over the major artery supplying the area just above the area of compromise. This uses less nitroglycerin but has been documented as being effective.
- Regardless of application technique, use the smallest amount needed

- Monitor for systemic effects
- If needed repeat in 8 hrs for up to 3 doses. If severe, there have been cases of longer use (Vasquez et al) but would be cautious in more than 3 doses.

References:

- Wong et al. Treatment of peripheral tissue ischemia with topical nitroglycerin ointment in neonates. *J Ped* 1992; 121:980-3
- Vasquez et al. Resolution of Peripheral Artery Catheter-induced Ischemic Injury Following Prolonged Treatment with Topical Nitroglycerin Ointment in a Newborn: A Case Report *J of Perinatology* 23 (4) Jun 2003 348-50.
- Jayashree Ramasethu. Pharmacology Review: Prevention and Management of Extravasation Injuries in Neonates. *NeoReviews* 2004; 5:e491-e497
- Jayashree Ramasethu. Management of Vascular Thrombosis and Spasm in the Newborn. *NeoReviews*, Jun 2005; 6: e298

Fig. 5. Ischemic changes in fingers of extremely preterm infant following an attempt at radial artery catheterization.

