

PROTOCOL #14B - Maternal Fetal Medicine, University of New Mexico

NITROPRUSSIDE INFUSION
Revised 7/9/03

GENERAL INFORMATION:

1. Once it is deemed necessary to institute nitroprusside for control of the patient's blood pressure, **PLANS FOR DELIVERY SHOULD BE UNDERWAY.**
2. This is a rapidly effective drug; injudicious administration will result in hypotension
3. Nitroprusside must be run as a separate IV, and piggybacked into a mainline IV of D5W.
4. Sodium nitroprusside (SNP) is a potent, vasodilator with more effect on preload than afterload. Both onset and offset are 1-3 minutes
5. It is described as "an iron core bristling with 5 cyanides and one nitroso group": the latter probably accounts for its mechanism of action as a vasodilator. Because of its charge and low molecular weight it readily crosses the placenta. Fetal levels of cyanide are typically higher than maternal levels. The fetal liver is less efficient at converting cyanide to thiocyanide. Fetal bradycardias have been described, which resolve with discontinuation of the drug.
6. SNP is metabolized to cyanide, which is then combined with thiosulfate in the liver to form thiocyanide, which is subsequently excreted by the kidneys. Both cyanide and thiocyanate are toxic.
7. If thiosulfate levels are depleted (poor nutrition, liver disease, recent surgery, or chronic diuretic use), cyanide (CN) levels increase rapidly since conversion to thiocyanate is limited. This tends to manifest early in treatment or with high doses. Signs of cyanide toxicity: agitation or lethargy, seizures, coma, tachypnea, hypotension, dysrhythmias, cardiovascular collapse. The confirmatory lab test is the presence of a lactic acidosis. Cyanide levels >3 mcg/ml are lethal to adults, while the fetus is believed to be more sensitive still.
Treatment: **TURN OFF THE NITROPRUSSIDE INFUSION**; break open the Lilly Cyanide Antidote Kit and follow directions. (This will involve inhaled amyl nitrate q15 sec, 300 mg sodium nitrite IV over 5 min, then 12.5 g sodium thiosulfate IV.)
8. Thiocyanate toxicity is more likely in the presence of renal impairment, especially in case of prolonged treatment (i.e., days).. Signs of thiocyanate toxicity include agitation, delusions, disorientation, tremors, seizures, coma. The treatment is discontinuation of SNP, followed by hemodialysis.
11. Most pregnant or newly postpartum women are quite sensitive to SNP and respond well to doses lower than would be expected in a nonpregnant population. The lowest possible dose that produces the effect should be used for the shortest possible period; this maximizes safety for mother & fetus.

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PROCEDURE:

REQUIREMENT: Preeclamptic or chronic hypertensive obstetrical patients with hypertensive emergency (for definition see protocol #14) who have failed BP control on labetalol or hydralazine.

1. Patient will require 1:1 nursing care.
2. Monitors: EKG, pulse oximeter, EFM.
3. Place arterial line and transduce for beat-to-beat BP monitoring
4. Give 500cc IV bolus of NS or RL. if clinical condition warrants.
5. Check patency of vein; avoid extravasation.
6. Use only freshly prepared solutions.
7. Bedrest, left lateral position.
8. Place Foley cath. STRICT I&O'S
9. Check blood pressures q 1 minute during titration. Onset of action is immediate.
10. Once infusion rate stabilized, record blood pressures q 15 minutes. Maintain diastolic blood pressures below 110 mm Hg.
11. Treatment should begin with an infusion rate of 0.3 mcg/kg/min. The average therapeutic dose in pregnancy ranges from 0.3 mcg/kg/min. to 2.0 mcg/kg/min, which is lower than the dose range required in the nonpregnant individual (typically 0.5 to 8 mcg/kg/min). DO NOT EXCEED 10 mcg./kg/min.

NOTE: MCG. NOT MG.

NITROPRUSSIDE DOSAGE & ADMINISTRATION

The solution is quite sensitive to light and must be protected: cover it with the foil bag provided with the drug. It will be a brownish color. If it is orange, red, green, or anything else, send it back to pharmacy and make up another.

Mix 50 mg in 250 ml D5W

This gives a concentration of 200 mcg/ml/

Sample starting dose for a 70 kg patient (to estimate patient weight, use current weight less 2x estimated fetal weight) :

$0.3 \text{ mcg/kg/min} \times 70 \text{ kg} = 21 \text{ mcg/min}$, divided by 200 mcg/ml = 0.105 ml/min , or approximately 6 ml/hr

Increase every few minutes by 0.3 to 0.5 mcg/kg/min, aiming for a BP no more than 25% lower than the starting BP.

When stopping this drug, rebound hypertension can occur, so except in cases of toxicity, taper it.

CONSULTATION: Twenty-Four hour consultation is available by calling the Maternal Fetal Medicine service at the University of New Mexico Hospital, 1-888-866-7257.