Complete Final Version of the Drug Preparation Protocol

(02-0898)

Dr. Kimberly Spence

Title: Precursor Preference in Surfactant Synthesis of Newborns

Preparation Protocol for Stable Isotope Infusion of Potassium Palmitate and Sodium Acetate

Standard Infusion Concentrations:

Acetate 2 μmole/kg/min-→ 120 μmol/kg/hour→ 2.88mmol/kg/24 hours
Palmitate 0.04 μmol/kg/min → 2.4 μmol/kg/hour → 57.6 μmol/kg/24 hours
Albumin 5% (5 grams in 100cc) → 1.5 grams per 30 cc →1.2 grams/kg/24 hours

Infusion rate: 1 cc/kg/hour

Prepare 30 cc/kg 5% Albumin with isotope soln → 6 cc of 25% Albumin in 24 ccD5W stock soln

Isotope Stock Solution Preparation

All isotope infusions to be prepared extemporaneously just prior to infusion. Solution to be prepared in a Level II pharmacy intravenous preparation room. Hand jewelry to be removed. Two-minute hand and forearm scrub with appropriate soap prior to infusion preparation. Hood to be cleansed with 70% alcohol prior to infusion preparation. Heat 25 cc D5 Water in a sterile vial in water bath to 60 degrees Celsius. Isotopes may be weighed on a scale into a sterile cup (not in the hood because the laminar flow in hood may disrupt accurate weighing). Weigh isotopes wearing a mask, shoe covers, hair cover, clean gown and sterile gloves. Add 19 cc of warmed D5W carefully and gently to the palmitate in the sterile cup. Transfer 5cc of warmed D5W to the other sterile cup containing the acetate. Try not to foam or create bubbles. This impedes filtering. Make sure all (palmitate) is dissolved. Once dissolved, filter with a 0.22 micron filter in the sterile hood into sterile syringe containing 6 cc of 25% albumin. Filter the acetate solution into the syringe last. This is the final infusion preparation. The solution is good for twenty-four hours.

Acetate: 2.88 mmol in 24 cc→ 120 μmol/cc → 3600 μmol in 30 cc
3600μmol (MW of Na-acetate 83.03) = **298.8 mg in the 24 cc D5W**

Palmitate: 57.6 μmol in 24 cc → 2.4 μmol/cc→ 72 μmol in 30 cc
72mol (MW of K-palmitate 290.42) = **20.9 mg in 24 cc acetate soln above**

This provides....

Na: Albumin has 150 mEq/L → 0.15 mEq/ cc in 25% Albumin→
6 cc (0.15 cc) = 0.9 mEq in 30 cc soln→ 0.03 mEq/kg/cc→
24 cc/kg provides 0.72 mEq/kg/24 hours

Acetate infusion provides 2.88 mEql/kg/24 hours

Total Na content is 3.6 mEq/kg/24 hours

K: K-palmitate provides 0.06 mEq/kg/24 hours

Glucose 960 mg/kg/24 hours → GIR of 0.67 mg/kg/min

***Special Note *** Albumin has 3 high-affinity binding sites for palmitate with 9-10 low-affinity binding sites. MW of albumin 67,000. This preparation provides 0.000746 moles or 740 μmole/liter. Palmitate is 2376 μmoles/liter. *This preparation has a ratio of approximately 3.2:1 palmitate to albumin ratio.*

Process Validation

"Validation of aseptic processing procedures provides a mechanism for ensuring that processes consistently result in sterile products of acceptable quality" (p.38 ASHP Technical Assistance Bulletin on Quality Assurance for Pharmacy-Prepared Sterile Products). As part of our process validation each person who will be responsible for preparing infusions will participate in process simulation testing. This means that personnel will participate in the production process and the finished product will then be sent for particulate, sterility testing, pyrogen testing and product assay.