Physico-chemical stability of Plasma-Lyte 148 with common intravenous medications | 1

To investigate the stability of Plasma-Lyte 148 ® and Plasma-Lyte 148 ® + 5% Glucose with eight commonly used therapeutic agents when compared with 5% Glucose and 0.9% Sodium Chloride as diluents” Dawson et al (2018).

Abstract:

BACKGROUND: Plasma-Lyte 148 ® is a balanced, crystalloid intravenous (IV) fluid which is both calcium-free and isotonic. It prevents the hyperchloremic metabolic acidosis and iatrogenic hyponatraemia seen with use of 0.9% sodium chloride and hypotonic solutions respectively. However, data on compatibility with commonly used drugs is lacking.

AIM: To investigate the stability of Plasma-Lyte 148 ® and Plasma-Lyte 148 ® + 5% Glucose with eight commonly used therapeutic agents when compared with 5% Glucose and 0.9% Sodium Chloride as diluents. We aimed to provide vital data which may facilitate the introduction of what appears to be a safer and more economic fluid.

METHOD: Plasma-Lyte 148 ® and Plasma-Lyte 148 ® + 5% Glucose were mixed with morphine, midazolam, fentanyl, ketamine, clonidine, aminophylline, salbutamol and furosemide at set concentrations. Comparisons were made to 0.9% Sodium Chloride and 5% Glucose fluid controls. Six repeats of each IV fluid and drug admixture were analysed through high performance liquid chromatography (HPLC), at three time points: 0, 2 and 24 hours. A concentration change of < 5% was defined as chemically stable. Physical stability was
assessed by observation of precipitate formation or colour change. pH changes were measured using a Fisherbrand Hydrus 300 pH meter. RESULTS: Relative to starting concentration, all drugs except midazolam were stable to +/- 3%. All examined therapeutic agents were chemically stable at 2 and 24 hours relative to control solutions. No precipitate formed in any of the samples. All Plasma-Lyte 148 ® and Plasma-Lyte 148 ® + 5% Glucose drug admixtures remained in a safe, peripheral administration pH range of 5-9 and were closer to the pH of blood than standard fluid-drug admixtures. CONCLUSION: Morphine, fentanyl, ketamine, salbutamol, aminophylline, and clonidine are stable for 24 hours when mixed with Plasma-Lyte 148 ® and Plasma-Lyte 148 ® +5% Glucose for administration at concentrations equivalent to those found at a typical Y site with maintenance fluid. Furosemide is stable at lower concentrations than those seen at a Y-site, but midazolam displayed instability.

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Reference: