Abstract:

BACKGROUND: Administering a separator fluid between incompatible solutions can optimize the use of intravenous lumens. Factors affecting the required separator fluid volume to safely separate incompatible solutions are unknown.

METHODS: An intravenous tube (2-m, 2-mL, 6-French) containing methylene blue dye was flushed with separator fluid until a methylene blue concentration ≤2% from initial was reached. Independent variables were administration rate, dye solvent (glucose 5% and NaCl 0.9%), and separator fluid. In the second part of the study, methylene blue, separator fluid, and eosin yellow were administered in various administration profiles using 2- and 4-mL (2 × 2 m, 4-mL, 6-French) intravenous tubes.

RESULTS: Neither administration rate nor solvent affected the separator fluid volume (p = 0.24 and p = 0.12, respectively). Glucose 5% as separator fluid required a marginally smaller mean ± SD separator fluid volume than NaCl 0.9% (3.64 ± 0.13 mL vs 3.82 ± 0.11 mL, p < 0.001). Using 2-mL tubing required less separator fluid volume than 4-mL tubing for methylene blue (3.89 ± 0.57 mL vs 4.91 ± 0.88 mL, p = 0.01) and eosin yellow (4.41 ± 0.56 mL vs 5.63 ± 0.15 mL, p < 0.001). Extended tubing required less separator fluid volume/mL of tubing than smaller tubing for both methylene blue (2 vs 4 mL, 1.54 ± 0.22 vs 1.10 ± 0.19, p < 0.001) and eosin yellow (2 vs 4 mL, 1.75 ± 0.22 vs 1.25 ± 0.03, p < 0.001).

CONCLUSION: The separator fluid volume was neither affected by the administration rate nor by solvent. Glucose 5% required a marginally smaller separator fluid volume than NaCl 0.9%, however its clinical impact is debatable. A larger intravenous tubing volume requires a larger separator fluid volume. However, the ratio of separator fluid volume to the tubing’s volume decreases as the tubing volume increases.

Reference: