“Aluminum contamination from intravenous solutions still represents an unsolved clinical and biochemical problem. Increased aluminum intake constitutes a risk factor for the development to metabolic bone disease, anemia, cholestasis, and neurocognitive alterations.” Lima-Rogel et al (2014).

Reference:

Lima-Rogel, V., Romano-Moreno, S., de Jesús López-López, E., de Jesús Escalante-Padrón, F. and Hurtado-Torres, G.F. (2014) Aluminum Contamination in Parenteral Nutrition Admixtures for Low-Birth-Weight Preterm Infants in Mexico. JPEN. Journal of Parenteral and Enteral Nutrition. September 16th. .

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Abstract:

Background: Aluminum contamination from intravenous solutions still represents an unsolved clinical and biochemical problem. Increased aluminum intake constitutes a risk factor for the development to metabolic bone disease, anemia, cholestasis, and neurocognitive alterations. Low-birth-weight preterm infants (LBWPIs) are one of the most exposed populations for aluminum toxicity.

Methods: To determine the presence of aluminum in components employed in the preparation of parenteral nutrition (PN) admixtures in Mexico and compare with the maximal aluminum recommended intake from the Food and Drug Administration.

Results: Cysteine, trace elements, levocarnitine, phosphate, and calcium salts tested positive for aluminum contamination. All components analyzed were contained in glass vials. Total aluminum intake for 2 sample PN admixtures were calculated in basis to cover nutrition requirements of 2 hypothetical LBWPIs. Aluminum contents, stratified in micrograms per kilogram of weight, exceeded maximal aluminum recommendations, particularly for the very LBWPIs. Substituting sodium phosphate for potassium phosphate salts reduced aluminum intake by 52.7%. Calcium gluconate was the leading aluminum contamination source and

confers the greatest risk for aluminum overdose, even with the salt substitution of potassium phosphate by sodium phosphate salts. Adding cysteine and trace elements might increase aluminum content in PN admixtures.

Conclusion: Cysteine, trace elements, phosphate, and gluconate salts are the main sources of aluminum in PN prepared in Mexico. Substituting sodium phosphate for potassium phosphate salts reduces aluminum intake but does not resolve aluminum contamination risk. Mineral salts contained in plastic vials should be explored as an additional measure to reduce aluminum contamination.

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