Coating for aluminium within medical devices in direct contact with infusion fluids should be recommended” Perl et al (2019).

Abstract:

The use of fluid-warming systems is recommended for infusion rates > 500 ml.h-1 to avoid peri-operative hypothermia. Some fluid-warming devices use disposable aluminium-heated plates for heat transfer, but there is no protective coating to separate the fluid from the heated aluminium surface. It is unknown if this could promote release of aluminium into infusion fluids. We investigated a coated (Fluido compact) and an uncoated (enFlow) fluid-warming device using normal saline or balanced electrolyte solution as infusion fluids, pumped through the heated disposables at flow rates of 2, 4 and 8 ml.min-1 for 60 min each. Aluminium concentrations in the fluid samples were analysed using graphite furnace atomic absorption spectrometry. With saline the coated and uncoated devices yielded aluminium concentrations below the level of quantification (< 128 μg.l-1 ). Similarly, balanced electrolyte solution in the coated device yielded aluminium concentrations < 128 μg.l-1 . However, balanced electrolyte solution in the uncoated device yielded aluminium concentrations of up to 6794 (3465-8002 [1868-7421]) μg.l-1 . Repeating this last study at a flow rate of 2 ml.min-1 resulted in quite high aluminium concentrations when the uncoated device was not heated (~1000 μg.l-1 ) and higher concentrations after the device was heated. We conclude that using uncoated aluminium plates in fluid-warming systems can lead to a risk of administering potentially harmful concentrations of aluminium when balanced crystalloid solutions are used. The mechanism is unclear, but heat is in part involved. Coating for aluminium within medical devices in direct contact with infusion fluids should be recommended.

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Reference:

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