



Occlusion alarms during administration of lipid emulsion with vitamins in neonates: *in vitro* evaluation

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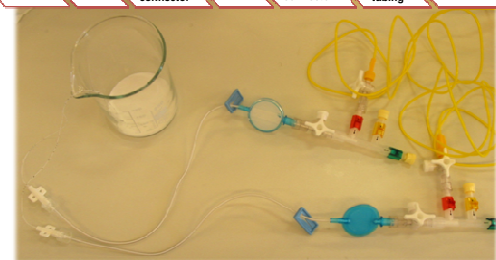
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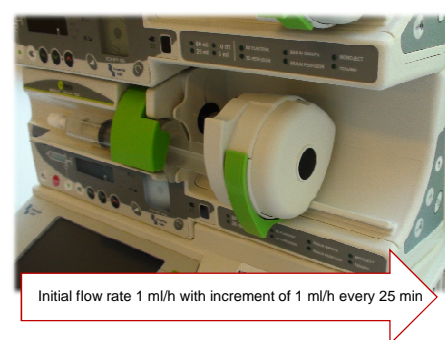
Introduction and objectives

One week-stable lipid emulsion syringes with vitamins are used in the neonatology unit of our hospital¹. An increased incidence of occlusion alarms has been reported by nurses compared to lipid emulsion syringes without vitamins prepared daily. The objective was to compare experimentally the occurrence of occlusion alarms when infusing lipid emulsion with or without vitamins, stored for 2 hours or 1 week at +2-8°C and if differences were observed when stored in syringes or in glass vials.

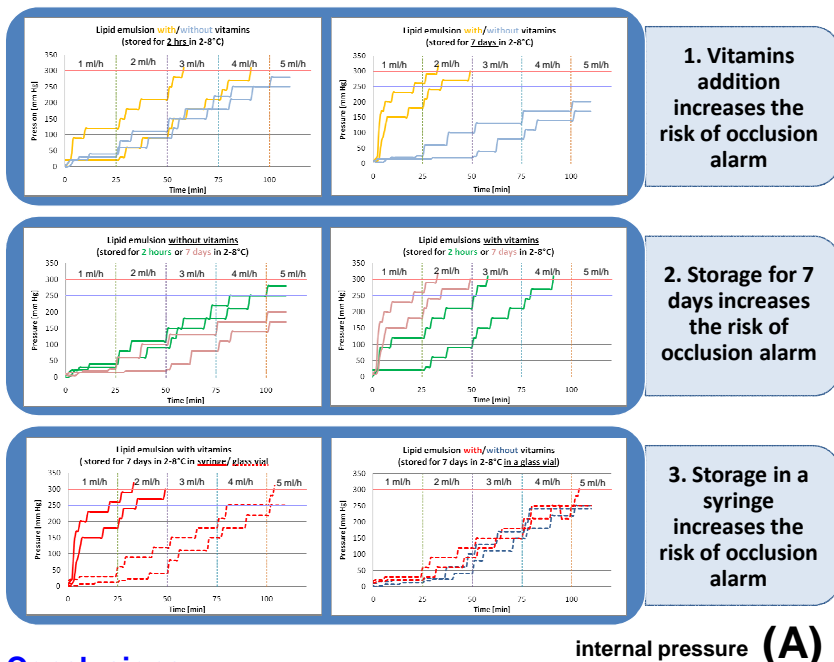
Material and methods



Smart pump (Module DPS, Fresenius Kabi, pressure alarm at 300 mmHg), 10 ml BD-Plastipak syringes, amber type II glass vials, translucent 150 cm double-tubing (BD Extension Tube) and 3-way connectors (BD Connecta Luer-Lok and BD Multiflo), in-line filter (1.2 µm Lipipor NLF, PALL Medical), catheter 27 G (Deltec, Smith Medical). Lipid emulsion (Lipofundin® MCT/LCT) tested with or without vitamins (1 amp. Cernevit®), and stored for 2 hours or 7 days at +2-8°C in syringes or glass vials. Tests were conducted in duplicate. Flow rate started at 1 mL/h with 1 mL/h increments every 25 min, pressure determined on the pump. Kinematic viscosity (Ubbelohde viscometer, Schott-Geräte, capillary 0.63 mm) and apparent pH measured at 25°C.



Results



	Lipids without vitamins	Lipids with vitamins
mm²/s		
stored for 2 hours	2.37	2.58
stored for 7 days	2.33	2.57
4. Vitamins addition slightly increases viscosity		
viscosity in syringes (B)		
	Lipids without vitamins	Lipids with vitamins
stored for 2 hours	7.23	6.15
stored for 7 days	8.01	6.10
5. Vitamins addition decreases apparent pH		
apparent pH in syringes (C)		

Conclusions

Dramatic increase of alarm occlusion risk occurs when lipid emulsion mixed with vitamins is stored for 7 days in syringes at 2-8°C. Modification in emulsion's properties and increased viscosity when adding vitamins to the lipid emulsion could be partially responsible for this observation. However, syringe stiction due to extraction of the silicone oil² by the emulsion mixed with vitamins is probably the main cause, as results are not reproduced when stored in a glass vial. Due to lack of data about silicone oil administration in neonates, production of syringes of lipids mixed with vitamins has been reconsidered.

References 1. Bouchoud L et al. Clin Nutr 2010. 29(6):808-12. - 2. Capes DF et al. PDA J Pharm Sci Technol 1996. 50(1):40-50.

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