

The aim of the study was to assess the concentration of plasticizers in red blood cell units according to storage time and after mechanical rinsing using a cell salvage device” Münch et al (2019).

Abstract:

INTRODUCTION: Plastic can be toxic and hazardous to an organism’s health, but it is being widely used in our daily lives. Di-2-ethylhexyl-phthalate is the most common plasticizer in medical devices made of polyvinylchloride and is commonly found in soft bags storing red blood cell units. Di-2-ethylhexyl-phthalate and its degradation product mono-2-ethylhexyl-phthalate can migrate into human body fluids, for example, blood and tissues. The aim of the study was to assess the concentration of plasticizers in red blood cell units according to storage time and after mechanical rinsing using a cell salvage device.

METHODS: Levels of di-2-ethylhexyl-phthalate and mono-2-ethylhexyl-phthalate were analysed in 50 unwashed red blood cell units using liquid chromatography coupled with tandem mass spectrometry. In addition, phthalate concentrations were measured before and after mechanical rinsing in six more washed red blood cell units with storage times ranging between 36 and 56 days. A linear regression model was determined by the daily increase of di-2-ethylhexyl-phthalate and mono-2-ethylhexyl-phthalate in the stored red blood cell units subject to their storage time (range = 4-38 days), and the effect of mechanical rinsing on their phthalate concentration was calculated.

RESULTS: A linear correlation was found between storage time of unwashed red blood cell units and the concentration of di-2-ethylhexyl-phthalate ($p < 0.001$) or mono-2-ethylhexyl-phthalate ($p < 0.001$). Stored red blood cell units older than 14 days had significantly higher concentrations of both contaminants than red blood cell units of shorter storage time ($p < 0.001$). Mechanical rinsing in washed red blood cell units attained a reduction in the di-2-ethylhexyl-phthalate and mono-2-ethylhexyl-phthalate concentration by a median of 53% (range = 18-68%; $p = 0.031$) and 87% (range = 68-96%; $p = 0.031$), respectively.

CONCLUSION: Leaching of di-2-ethylhexyl-phthalate and mono-2-ethylhexyl-phthalate into red blood cell units depends on the duration of storage time. Plasticizers can be significantly reduced by mechanical rinsing using cell salvage devices, and thus, red blood cell units can be regenerated with respect to chemical contamination.

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Münch, F., Göen, T., Zimmermann, R., Adler, W., Purbojo, A., Höllerer, C., Cesnjevar, R.A. and Ruffer, A. (2019) Reduction of exposure to plasticizers in stored red blood cell units. *Perfusion*. May 31st. doi: 10.1177/0267659119851403. .