

In this study, we developed a novel device, vascular access line air removal device (VALARD), and compared its efficiency of air removal and pause time of forward bulk flow with a commonly used device, the Belmont pump” Xu et al (2018).

Abstract:

Efficient air removal from a vascular access line is a key step to prevent air embolism. Existing devices, especially for rapid infusers, are far from optimum. In this study, we developed a novel device, vascular access line air removal device (VALARD), and compared its efficiency of air removal and pause time of forward bulk flow with a commonly used device, the Belmont pump. Part I experiment, saline was infused at a forward bulk flow rate of 250, 500, and 750 mL/min. Meanwhile, air was introduced into the infusion line at a rate of 5, 10, and 15 mL/min for each bulk flow rate. Air bubbles > 10 μ L downstream from either the VALARD or the Belmont pump and the fraction of pause time of the forward bulk flow were determined. Part II experiment, 120 mL of air was rapidly introduced into the VALARD at a bulk flow rate of about 500 mL/min. Air bubbles > 10 μ L downstream from the VALARD, fraction of pause time of the forward bulk flow, and the transit time of the 120 mL of air at the working chamber were recorded. The VALARD: no air bubbles > 10 μ L were detected during any tested combination of air injection and bulk flow rates without pause of forward flow. The Belmont pump: air bubbles > 10 μ L were detected in 60% of the tests with pause of the forward flow. The VALARD eliminates air efficiently without pause of the forward bulk flow. Further clinical trials are needed to compare the VALARD with other devices and to assess its efficiency, safety, and user friendliness.

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Reference:

Xu, Z., Jin, L., Smith, B., Bai, Y., Luo, H., Strombergsson, L.A., Fei, M. and Jiang, Y. (2018) A novel device for air removal from vascular access line: a bench study. Journal of Clinical Monitoring and Computing. February 17th. .



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