

Abstract:

Injection ports used to administer medications and draw blood samples have inherent dead-volume. This volume can potentially lead to inadvertent drug administration, contribute to erroneous laboratory values by dilution of blood samples, and increase the risk of vascular air embolism. We sought to characterize provider practice in management of intravenous (IV) and arterial lines and measure dead-volumes of various injection ports. A survey was circulated to anesthesiology physicians and nurses to determine practice habits when administering medications and drawing blood samples. Dead-volume of one and four-way injection ports was determined by injecting methylene blue to simulate medication administration or blood sample aspiration and using absorption spectroscopy to measure sample concentration. Among the 65 survey respondents, most (64.52%) increase mainstream flow rate to flush medication given by a 1-way injection port. When using 4-way stopcocks, 56.45% flush through the same injection site. To obtain a sample from an arterial line, 67.74% draw back blood and collect the sample from the same 4-way stopcock; 32.26% use a different stopcock. Mean (SD) dead-volume in microliters ranged from 0.1 (0.0) to 5.6 (1.0) in 1-way injection ports and from 54.1 (2.8) to 126.5 (8.3) in 4-way injection ports. The practices of our providers when giving medications and drawing blood samples are variable. The dead-volume associated with injection ports used at our institution may be clinically significant, increasing errors in medication delivery and laboratory analysis.

Reference:

Kuntz, M.T., Dudaryk, R. and McNeer, R.R. (2018) Can variable practice habits and injection port dead-volume put patients at risk? *Journal of Clinical Monitoring and Computing*. July 10th. . doi: 10.1007/s10877-018-0179-3.