

Optimization of the Administration of Intravenous Medication by Reduction of the Residual Volume, Taking User-Friendliness, Cost Efficiency, and Safety into Account

Authors : A. Poukens, I. Sluyts, A. Krings, J. Swartenbroekx, D. Geeroms, J. Poukens

Abstract : Introduction and Objectives: It has been known for many years that with the administration of intravenous medication, a rather significant part of the planned to be administered infusion solution, the residual volume (the volume that remains in the IV line and or infusion bag), does not reach the patient and is wasted. This could possibly result in under dosage and diminished therapeutic effect. Despite the important impact on the patient, the reduction of residual volume lacks attention. An optimized and clearly stated protocol concerning the reduction of residual volume in an IV line is necessary for each hospital. As described in my Master's thesis, acquiring the degree of Master in Hospital Pharmacy, administration of intravenous medication can be optimized by reduction of the residual volume. Herewith effectiveness, user-friendliness, cost efficiency and safety were taken into account. Material and Methods: By usage of a literature study and an online questionnaire sent out to all Flemish hospitals and hospitals in the Netherlands (province Limburg), current flush methods could be mapped out. In laboratory research, possible flush methods aiming to reduce the residual volume were measured. Furthermore, a self-developed experimental method to reduce the residual volume was added to the study. The current flush methods and the self-developed experimental method were compared to each other based on cost efficiency, user-friendliness and safety. Results: There is a major difference between the Flemish and the hospitals in the Netherlands (Province Limburg) concerning the approach and method of flushing IV lines after administration of intravenous medication. The residual volumes were measured and laboratory research showed that if flushing was done minimally 1-time equivalent to the residual volume, 95 percent of glucose would be flushed through. Based on the comparison, it became clear that flushing by use of a pre-filled syringe would be the most cost-efficient, user-friendly and safest method. According to laboratory research, the self-developed experimental method is feasible and has the advantage that the remaining fraction of the medication can be administered to the patient in unchanged concentration without dilution. Furthermore, this technique can be applied regardless of the level of the residual volume. Conclusion and Recommendations: It is recommendable to revise the current infusion systems and flushing methods in most hospitals. Aside from education of the hospital staff and alignment on a uniform substantiated protocol, an optimized and clear policy on the reduction of residual volume is necessary for each hospital. It is recommended to flush all IV lines with rinsing fluid with at least the equivalent volume of the residual volume. Further laboratory and clinical research for the self-developed experimental method are needed before this method can be implemented clinically in a broader setting.

Keywords : intravenous medication, infusion therapy, IV flushing, residual volume

Conference Title : ICINT 2022 : International Conference on Infusion Nursing and Therapy

Conference Location : Bangkok, Thailand

Conference Dates : November 29-30, 2022