

Accuracy of preparation of i.v. medication syringes for anesthesiology.

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Abstract

Purpose: The results of a study of the accuracy of i.v. medication preparation by anesthesiologists are presented.

Methods: The accuracy of syringe preparation was assessed by analyzing the contents of 500 unused syringes collected after adult and pediatric surgery procedures. The collected syringes contained various i.v. medication formulations representative of different preparation techniques: atracurium 1, 2.5, and 5 µg/mL and fentanyl 10, 20, 25, and 50 µg/mL, which required serial dilution after withdrawal of the drugs from ampuls; thiopental 5, 25, and 50 mg/mL, prepared by diluting reconstituted powdered drug from vials; and lidocaine 10-mg/mL solution, which was withdrawn directly from the ampul into a syringe. Variances between actual and labeled drug concentrations were determined via a validated ultraviolet-visible light spectro-photometry method.

Results: Overall, 29% of the evaluated syringes were found to contain drug concentrations outside the designated range of acceptability ($\pm 10\%$ of the targeted concentration); 18% of preparations deviated from the declared dose by $\pm 20\%$, 8% deviated by $\pm 50\%$, and 4% deviated by $\pm 100\%$. In one instance, the actual drug concentration was at variance with the labeled concentration by $>100\%$. In 4% of cases ($n = 20$), discrepancies exceeded 100%, suggesting not just imprecision but errors in the preparation process, such as incorrect dilution calculations and selection of the wrong medication vial by the syringe preparer.

Conclusion: Analysis of different i.v. formulations of four medications prepared in syringes by anesthesiologists revealed a high rate of discrepancies between ordered and actual drug concentrations, suggesting a need for increased institutional efforts to prevent errors during the preparation process. *Am J Health-Syst Pharm.* 2013; 70:137-42.

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