

Evaluations of Intravenous Medication Errors with Smart Infusion Pumps in an Academic Medical Center

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Introduction and Background

While some published research indicates a fairly high frequency of Intravenous (IV) medication errors associated with the use of smart infusion pumps, the generalizability of these results are uncertain. Additionally, a lack of a standardized methodology for measuring these errors is still an issue.

Methods

We developed a web-based data collection tool using Redcap software to capture IV medication errors using a participatory design approach with interdisciplinary experts. Using the tool, a prevalence study was then conducted at a 793-bed tertiary care academic medical center, in Boston, Massachusetts. Three inpatient units were recruited for participating in the study. Two trained nurses collected data on the Redcap tool and compared the infusing medication, dose, and infusion rate on the pump with the prescribed medication, dose, and rate in the medical record. All orders were obtained from electronic medical records. Tubing and labeling of the infusing medication according to hospital policies were also assessed. Each error was rated by NCC MERP INDEX by observers. All data was entered on the Redcap data collection tool.

Results

The results showed that the tool was easy to use and effectively captured all IV medication errors. Through the prevalence study, violation errors of hospital policy were found that could potentially place patients at risk, but no critical errors which contribute to patient harm were noted (Table 1).

Table 1: Frequency, type and potential harm rating of errors.

Type of error	# of errors	Frequency per medication NCC MERP observations(n = 181)* severity rating		
		C	B	A
Label complete according to policy	171	94.5	171	
Tubing tagged according to policy	81	44.8	81	13
Unauthorized medication	61	33.7	35	26
Clamp closed	2	1.1	2	
Right meds programmed in correct channel /pump	1	0.6	1	
Rate deviation	1	0.6	1	
Incorrect info on label	1	0.6	1	
Incorrect medication	0	0		
Delay of rate or medication change				
Total	0	0		
Patient identification error	0	0		
Total	318			

*Percentages in this column do not add to 100 because some medications had multiple errors.

Discussion

Although no high-risk medication errors were found, violations of hospital policy for tubing tags and labeling were identified. Information from this study can be used to help to improve safety of administration process, identify areas where improvements in policy and practice are needed. Collecting the same data using the electronic data collection form will allow us to compare these findings across a broad range of hospitals.

References

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