Medication Reconciliation Errors on Discharge for Epilepsy Monitoring Unit Patients

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Background and Purpose: Medication errors are common in the inpatient setting. Epilepsy patients who miss doses of their antiseizure medications are at risk for breakthrough seizures and subsequent complications. The purpose of this study was to quantify and characterize anti-seizure medications reconciliation errors on discharge from the epilepsy monitoring unit (EMU).

Methods: Consecutive admissions to an academic medical center EMU were retrospectively reviewed. Medication reconciliation errors on discharge, including drug errors, dosing errors, and dose timing errors, were recorded. Associations between medication errors and clinical and demographic variables were analyzed using binary logistic regression for continuous variables and Fisher exact tests for categorical variables.

Results: One hundred and eleven admissions between January 1, 2021 and December 31, 2021 were identified. Fourteen anti-seizure medication reconciliation errors were recorded during 11 unique admissions (9.9% of admissions). The most common error type was dosing error (10/14 errors; 71.4%). Number of antiseizure medications on admission ($p=0.004$), total number of medications on admission ($p=0.013$), number of medication changes during admission ($p=0.0007$), and length of stay ($p=0.0001$) were associated with increased likelihood of errors.

Conclusions: Medication reconciliation errors upon discharge from the EMU occur during approximately 10% of admissions. A higher number of preadmission antiseizure medications, higher total number of preadmission medications, higher number of medication changes during admission, and longer length of stay are associated with increased risk of discharge medication reconciliation errors. Careful attention should be paid to patients with these risk factors. **(2024;14:17-20)**

Key words: Medication reconciliation, Patient discharge, Epilepsy, Patients

Introduction

Medication errors are common in the inpatient setting. Medications are often erroneously started, changed, or discontinued when a patient is admitted to the hospital, transferred to another service, or discharged. Medication reconciliation is the act of reviewing a patient's medications and confirming the correct medication, dose, and rout are all consistent with the final recommendations before discharge. Discharge medication errors are particularly common: 41% to 75% of drugs prescribed on discharge are discordant with a patient's preadmission therapy, and most discrepancies are unintentional and clinically significant.[1,2] Discharge medication errors include incomplete, inaccurate, or illegible discharge medication instructions as well as unintentional omissions of necessary medications.[3] One study showed that 23% of patients discharged from an academic hospital had an adverse event, of which 72% were medication-related.[4] Medication errors increase with increasing patient age and number of preadmission medications.[1,5]

Epilepsy patients who miss doses of their antiseizure medications (ASMs) are at risk for breakthrough seizures, which can lead to injuries, reduced quality of life, and even death.[6-9] Therefore, it is essential to identify and prevent medication errors that could result in missed or incorrect ASM dosing and subsequent breakthrough seizures. The purpose of this study was to quantify and characterize ASMs errors among patients with epilepsy upon discharge following elective admission to an academic medical center epilepsy monitoring unit (EMU).

Methods

Data collection and evaluation

This was a retrospective study. All patients electively admitted to the EMU at Lenox Hill Hospital from January 1, 2021 to December 31, 2021 were included. Each patient's electronic medical record was reviewed and demographic information including age, sex, race, and preferred language was collected. Hospitalization-related variables including the reason for admission and length of stay were also collected. Preadmission medication regimen was obtained from the last epilepsy clinic note in the outpatient medical record. All changes made to the medication regimen during hospitalization were reviewed in the inpatient medical record. Discharge medication regimen was obtained from the discharge medication reconciliation in the electronic medical record. Discharge medication errors were documented and classified as drug errors (wrong medication prescribed), dose errors (wrong dose prescribed), or dosing schedule errors (incorrect dosing schedule). A medication listed in the discharge medication reconciliation was considered an error if 1) it was not present or did not have the same dose or dosing schedule prior to admission, and it was not intentionally started or changed during the admission; 2) it was intentionally started or changed during the admission, but the drug, dose, or dosing schedule did not match the inpatient progress note on the day of discharge; or 3) it was prescribed prior to or during admission but was unintentionally not included in the discharge medication reconciliation.

Data handling and statistical analysis

All data was entered into a password-protected Excel file on the Department of Neurology server for statistical analysis. Demographic and hospitalization data were analyzed descriptively. Total numbers were used for categorical variables. Means, standard deviations, medians, and interquartile ranges were used for continuous variables. The total number of patients with each type of discharge medication reconciliation error was documented. Binary logistic regression tests were performed to determine whether there was an association between the continuous variables and medication errors. Fisher exact tests were performed to determine whether there was an association between the categorical variables and medication errors.

Results

Patient demographics

One hundred eleven admissions to the EMU between January 1, 2021 and December 31, 2021 were identified. Patient demographics are shown in Table 1.

Table 1. Demographics of patients admitted to the epilepsy monitoring unit

	Value
Age (years)	38 (27.0-48.5)
Sex	
Female	58 (52.0)
Male	53 (48.0)
Race	
White	60 (54.0)
Black	12 (10.8)
Asian	4 (3.6)
Other/multiracial	35 (31.5)

Values are presented as number (%) or median (interquartile range).

Table 2. Predictors of antiseizure medication errors on discharge from the epilepsy monitoring unit

	Patients without errors	Patients with errors	Significance
Length of stay (days)	4 (1-14)	6 (3-25)	0.0001
Number of changes	1 (0-5)	2 (1-5)	0.0007
Number of medications on admission	4 (1-15)	6 (3-15)	0.013
Number of ASMs on admission	1 (0-8)	3 (2-5)	0.004
Age (years)	38 (1-92)	34 (17-66)	0.62
Sex			0.877
Female	55	3	
Male	45	8	

Values are presented as median (interquartile range) or number.
ASMs, antiseizure medications.

Medication reconciliation errors

Fourteen medication reconciliation errors were recorded during eleven unique admissions (9.9% of admissions). The most common error type was dosing error (10/14 errors; 71.4%). Number of ASMs on admission (p=0.004), total number of medications on admission (p=0.013), number of medication changes during admission (p=0.0007), and length of stay (p=0.0001) were associated with increased likelihood of errors (Table 2). There was no significant difference between patients with and without medication reconciliation errors regarding patient age (p=0.62), sex (p=0.877), or weekday vs. weekend discharge (p=0.443).

Discussion

Medication reconciliation errors on discharge from the EMU were found in approximately 10% of admissions. While this is on the lower end compared to error rates from prior studies, which range from 11% to 53%,[4,10,11] avoidance of ASM errors is critical due to the risk of breakthrough seizures.[7-9] The most common error in this sample was dose error, in contrast to prior studies, and where drug omission errors were more common.[2,12,13] Number of ASMs on admission, total number of medications on admission, number of medication changes during admission, and length of stay were associated with increased likelihood of errors. This is concordant with the results of prior studies.[13-15]

Medication errors are more common in patients with long admissions, patients taking many medications, patients with more medication changes during admission, and which suggests that extra attention should be paid to accurate discharge medication reconciliation for these patients. Programming the electronic medical record system to alert the provider when length of stay exceeds a certain number of days, or medication list exceeds a certain number of medications or medication changes, and may help to reduce errors. A follow up study with a larger sample could identify cutoff points for both length of stay and number of medications or medication changes above which errors start to increase. Other interventions that have been shown to reduce discharge medication errors include adding a pharmacist to the team and using post-discharge follow up calls for early recognition of medication-related errors.[16,17] These strategies may help to improve the care of patients in the EMU.[17,18] Limitations of this study include the single-center design and small study sample.

In this retrospective study of patients electively admitted to an academic medical center EMU, discharge medication reconciliation errors occurred in approximately 10% of hospitalizations. Predictors of medication errors included a higher number of antiseizure medications on admission, a higher total number of medications on admission, and longer length of stay.

Conflicts of Interest

The authors declare no conflict of interest.

Acknowledgments

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