EDITORIAL

Trigger Tools for Adverse Drug Events: Useful Addition to the Quality Tool Box

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"Primum Non Nocere" (First, Do no harm) has been the founding principle of medical practice since the days of Hippocrates. The "Quality and Safety" movement started with a seminal report by the Institute of Health Management, United States, in 2006, "To err is Human," which stated that more than 50,000 deaths occurred annually in hospitalized patients due to preventable medical errors.[1] This took the entire medical community by surprise and accreditation programs started benchmarking the quality of care by measuring error rates in hospitals.

Medication errors (MEs), many of which are preventable can happen at many stages like prescribing, transcribing, and dispensing of medicines. These errors have a potential of inflicting patient harm. Adverse drug events (ADE), on the other hand, are actual injury including physical, mental, or loss of function occurring to the patients due to MEs. Adverse drug events are one of the major reasons of preventable harm in hospitalized patients. About 1 out of 100 MEs results in actual ADE while 7 out of 100 have the potential to do so.[2] About one-fourth of all ADEs are preventable. Identifying potential ADEs due to MEs gives an opportunity to rectify them and avoid future harm.

Majority of ADEs occur due to system errors. In order to conduct a root cause analysis and to estimate the effect of policies adopted by an organization to decrease the incidence of ADEs, an estimate of their occurrence in a particular unit needs to be ascertained first. The estimates of ADEs vary based on the clinical context, with more critically ill more prone and will also be more vulnerable to the side effects. Off-hour (weekends and nights) medications are also prone to ADEs.[3]

Intensive care units (ICUs) are more prone to ADEs for various reasons, polypharmacy is common leading to more drug interactions, calculation errors in intravenous drug dosing, use of sedation makes ADE reporting by patients difficult, and associated organ dysfunction leads to more errors in drug dosing calculation. Moreover, discontinuation of chronic medications at home also makes ICU patients at risk of ADEs and the predominant patient population in ICU of the geriatric age group makes them more vulnerable to ADEs.[4]

Adverse drug events are notorious for being underreported as they are dependent on voluntary reporting. In an environment of punitive measures adopted for errors, ADEs will be even more underreported. Only 10–20% of ADEs are ever reported out of which 80–90% do not cause any harm. On the other hand, systemic surveillance of ADEs through the chart review and direct observation by a trained observer are labor-intensive and costly. Moreover, due to lack of proper documentation ADEs may not be properly charted.[5]

In order to have a more effective way of detecting ADEs that can cause potential harm, Institute for Healthcare Improvement (IHI) has developed an ADE trigger tool to facilitate chart review and detect more ADEs. This method has been successfully adopted in many hospital settings. A set of triggers has been identified by IHI, which when present are more commonly associated with ADEs. These triggers usually consist of high-risk medications, high-risk procedures, and out-of-the-range laboratory reports. These triggers are usually routinely documented in clinical notes and can be easily identified by the quality team through a retrospective review of clinical notes. Patients with presence of one or more of these triggers should have their chart reviewed for any ADEs. This method decreases the number of charts to be reviewed, increases the yield of ADEs, and reliance on voluntary reporting is reduced. High-risk medications usually consist of hypoglycemics, anticoagulants, sedatives, narcotics, chemotherapeutic agents, antipsychotics, intravenous potassium, etc. Individual units can identify and customize these triggers depending on their case mix and previous records of ADEs. High-risk procedures are the ones carried out in the emergent situation.[6–8]

In this issue of the journal, a trigger tool-initiated survey of ADEs was conducted in a busy emergency department of a tertiary care hospital. This pilot project confirms the applicability of this methodology in other situations like ICUs. The authors randomly analyzed case records, prospectively, to identify preset trigger tools. Once identified, they tried to collect data by chart review and interrogating health-care personnel to note whether these trigger tools have led to probable or definite ADEs. More robust methodology needs to be adopted at this step of the survey to ensure that ADEs are not missed. Moreover, a prespecified criteria of specifying ADEs that have resulted in harm like in terms of increasing length of stay, additional investigations, medications, or procedures need to be identified. These outcomes may become a quality benchmark for quality control and audit purposes.

We should be cognizant of the fact that identifying trigger tools that lead to a harmful ADEs is a monitoring tool only and should be linked with policies to minimize ADEs and reanalyze

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the incidence of ADEs after a certain period of time after the policies have been implemented using the same set of trigger tools. Emphasis should be placed to adopt protocols customized to local resources to prevent ADEs that are identified by the trigger tools, which might be unique to the case mix and the practice pattern of an organization.

The methodologies that can be adopted to prevent ADE once identified by the trigger tools could be a provider-based or system-based approach. The provider-based approach consists of medication review in the bedside checklist during daily ICU rounds. High-risk medications need to be discontinued if possible, and polypharmacy needs to be avoided. Drugs should be considered as a cause of any new symptoms appearing in the patients. Hypotension after intravenous paracetamol is an example of such ADE. Drug–drug interaction and drug dosing modification based on age and the renal function should be considered daily.[9] In a system-based approach of mitigating ADE, the electronic health record and the computerized physician order entry system are getting increasingly essential to avoid human errors. Barcoding of the medicines and matching it with patients' wrist bands and smart infusion pumps are some of the new technologies to decrease system error.[10]

Above all, presence of a dedicated clinical pharmacist well versed with ICU medication, during the rounds and medicine reconciliation, is of the utmost importance.[11]

References

1. Committee on Identifying and Preventing Medication Errors, Board on Health Care Services, Cronenwett LR, Aspden P, Wolcott JA, Bootman JL. Preventing Medication Errors: Quality Chasm Series. Washington, DC: Inst. Med., Natl. Acad. Press; 2006.
2. Bates DW, Boyle DL, Vander Vliet MB, Schneider J, Leape L. Relationship between medication errors and adverse drug events. J Gen Intern Med 1995;10(4):199–205. DOI: 10.1007/bf02600255.
3. Miller AD, Piro CC, Rudisill CN, Bookstaver PB, Bair JD, Bennett CL. Nighttime and weekend medication error rates in an inpatient pediatric population. Ann Pharmacother 2010;44(11):1739–1746. DOI: 10.1345/aph.1P252.
4. Wilmer A, Louie K, Dodek P, Wong H, Ayas N. Incidence of medication errors and adverse drug events in the ICU: a systematic review. Qual Saf Health Care 2010;19(5):e7. DOI: 10.1136/qshc.2008.030783.
5. Jha AK, Kuperman GJ, Teich JM, Leape L, Shea B, Rittenberg E, et al. Identifying adverse drug events: development of a computer-based monitor and comparison with chart review and stimulated voluntary report. J Am Med Inform Assoc 1998;5(3):305–314. DOI: 10.1136/jamia.1998.0050305.
6. Carnevali L, Krug B, Amant F, Van Pee D, Gérard V, de Béthune X, et al. Performance of the adverse drug event trigger tool and the global trigger tool for identifying adverse drug events: experience in a Belgian hospital. Ann Pharmacother 2013;47(11):1414–1419. DOI: 10.1177/1060028013500939.
7. Rozich JD, Haraden CR, Resar RK. Adverse drug event trigger tool: a practical methodology for measuring medication related harm. Qual Saf Health Care 2003;12(3):194–200. DOI: 10.1136/qhc.12.3.194.
8. Pandya AD, Patel K, Rana D, Gupta SD, Malhotra SD, Patel P. Global Trigger Tool: Proficient Adverse Drug Reaction Autodetection Method in Critical Care Patient Units. Indian J Crit Care Med 2020;24(3):172–178.
9. Schiff GD, Seoane-Vazquez E, Wright A. Incorporating indications into medication ordering–time to enter the age of reason. N Engl J Med 2016;375(4):306–309. DOI: 10.1056/NEJMp1603964.
10. Forni A, Chu HT, Fanikos J. Technology utilization to prevent medication errors. Curr Drug Saf 2010;5(1):13–18. DOI: 10.2174/157488610789869193.
11. Greenwald JL, Halasyamani L, Greene J, LaCivita C, Stucky E, Benjamin B, et al. Making inpatient medication reconciliation patient centered, clinically relevant and implementable: a consensus statement on key principles and necessary first steps. J Hosp Med 2010;5(8):477–485. DOI: 10.1002/jhm.849.