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Safe Medication Use ICU: Guideline Summary on Safe Medication Use in the ICU (2017)

About the Guideline

- These guidelines were created by the American College of Critical Care Medicine who chose a multidisciplinary group of 15 experts in the field of medication safety to review and develop recommendations and suggestions for safe practice.
- An extensive literature search through PubMed, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, CINAHL, Scorpus, ISI Web of Science, and the International Pharmaceutical Abstracts was done from 2010 through 2015.
- The guidelines are evidence-based and were formulated through both concurrent and retrospective reviews utilizing 34 questions, 5 statements, and 1 commentary.
- The elements of the guideline are divided into 3 categories: environment and patient, the medication use process, and the patient safety surveillance system. Medication use was then subdivided into 4 areas: prescription, dispensing, administration, and monitoring.
- The method for grading prompted the experts to make recommendations and suggestions, as well as identify a need for additional research for medication safety in critically-ill patients.
- The authors utilized the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system to rate the quality of the evidence and the strength of the recommendations.

Key Clinical Considerations

Become familiar with the recommendations and best-practice statements provided in this guideline, especially if you work in an acute care setting.

Overview

Many organizations, both governmental and nongovernmental, are focusing on patient safety and preventing medication-related errors by developing tools and providing resources to hospitals that are efficient, effective, and safe, thus improving the quality of care.

- It is estimated that 1 out of every 5 medications administered to patients in a hospital may be considered an error.
- Approximately 44,000 to 98,000 deaths occur annually in U.S. hospitals that are due to preventable medical errors or sentinel events.
- In the intensive care unit (ICU) such events are higher because of the greater use of high-risk medications, the number of medications per patient given within the ICU setting, and the greater morbidity of these patients.
- If the projected cost of adverse drug events from studies done two decades ago is recalculated to today's dollar, the estimated cost to hospitals is in the realm of $4.1 million annually.

Definitions of medication-related event terms

- ***Medical error:*** an error that can occur as a problem in systems, practices, products, or procedur when an action does not go as planned or the wrong action is taken.
- ***ME (medication error):*** when an error occurs during the medication process, with or without untoward results.

- ***Adverse drug reaction:*** when a medication causes a significant reaction leading to the discontinuation of the medication, prevention of future administration of that drug, and/or a dosing change.
- ***ADE (adverse drug event):*** any harm caused by a drug. MEs and ADEs are not always a cause-and-effect result.
- ***Preventable ADE:*** an injury connected to a ME.
- ***Near miss (Potential ADE):*** when harm is not caused by an error, whether the potential ADE is caught either before or after the incident.
- ***Drug-related hazardous condition:*** a physiologic response to a drug that may cause harm; prior to an ADE occurring, abnormal laboratory results are identified.

Environment and patients

- The risk of harm in ICU versus non-ICU patients is greater as it relates to MEs and ADEs. This risk has been shown to be 2 to 3 times higher, and the chance of death for these ICU patients is 2.5 times greater than for non-ICU patients.
- To increase ME reporting, changing the culture of safety is suggested.
    - The philosophy within the environment must be changed to improve ME reporting so an ME is not perceived as an error due to incompetence with a punitive result; this perception is a major barrier to reporting.
    - Staff education regarding accountability, ways of anonymous reporting, using technology, and simplifying the process may assist in this goal.
- Reducing the occurrence of MEs and ADEs through changes in the safety climate and culture is suggested.
    - Methods of improving a safe medication environment may include improved staffing, greater use of care pathways, and an honest, trusting relationship with management.
- Implementing educational interventions to decrease MEs in the ICU is suggested.
    - ADEs were not studied to determine the result that education would provide; however, MEs were shown to decrease with education.
    - Providing an interdisciplinary approach creates a positive educational environment along with implementing activities such as simulations, increasing staff involvement, instituting a standardization of practice, and initiating process improvement efforts.
- General care patients (non-ICU) and ICU patients have different risk factors for ADEs and MEs.
    - There is limited data on the extent of the risk factors for ICU patients to determine if they are greater or different from those of non-ICU patients, and additional comparative studies are warranted.
    - The ICU patient is exposed to more IV medications and high-alert medications and has less reserve due to greater illness; both are factors that make an ICU patient more vulnerable to ADEs.
    - For MEs, one study showed more errors occur during the medication administration phase than during other phases.
- Disclosure of MEs and ADEs to patients and/or family members was discussed in this guideline because of its importance; but it was not graded as there was no evidence, and the committee felt future research is needed.
- Less than 30% of patients are told when an error is made that causes them serious harm.
- A need for policies to provide disclosure is warranted as many hospital personnel do not know how to present the event, are afraid of legal recourse, and are embarrassed.

- Open communication and disclosure can provide increased trust in the medical system and allow an organization to evaluate its processes regarding disclosure.

Prescribing

- Computer provider order entry (CPOE) implementation is suggested as a means to lower MEs and preventable ADEs.
    - CPOE requires thorough preparation along with an evaluation of the system before, during, and after implementation.
    - A benefit of CPOE is a decrease in legibility issues including erroneous abbreviations; however, choosing the wrong drug, wrong dose, wrong formulation, and wrong schedule may become more prevalent.
    - With a CPOE, there is the possibility of choosing the wrong patient's record or the potential inability to customize an order.
    - As with any electronic method, systems go down, which can lead to different prescribing issues, and a secondary/backup system must be in place for these types of events.
- A clinical decision support system (CDSS) is suggested, either paper or electronic, to reduce MEs or ADEs.
    - There are limited studies on CDSSs, but what is available shows a decrease in MEs and ADEs.
    - There is concern with alarm fatigue and how a CDSS may increase this very real issue; however, if the opportunity is available to utilize a CDSS, it may be advantageous for certain medications that are more likely to cause MEs or ADEs.
- Specifically, for orders of insulin, drug-dosing software is suggested to reduce MEs and ADEs. Computerized drug-dosing calculations provide a guideline and eliminate a clinician's individual interpretation, making the process less complicated.
    - Additional studies are needed for other medications.
- Protocols and bundles are suggested to reduce MEs and ADEs.
    - Computerized protocols and guidelines are useful in obtaining specific dosages for individual patients and in helping eliminate inconsistencies; and not following a protocol or guideline increases the risk of MEs and preventable ADEs; therefore the creation of a protocol or guideline is the first step in medication safety; adherence provides benefits in clinical outcomes.
- No recommendation is made on medication reconciliation in ICU patients to reduce MEs or ADEs.
    - Medication reconciliation to reduce MEs and ADEs in the ICU warrants additional research.
    - The Joint Commission (TJC) made medication reconciliation a requirement and a focus in the 2013 National Patient Safety Goals (NPSGs).

Dispensing

- To reduce MEs, automated packaging of medications by robots is suggested for solid dosage forms.
    - In this type of automated system, the proper selection, packaging, and distribution occurs prior to reaching the patient.
    - Efficiency and effectiveness are noted in this costly endeavor.
- Automated dispensing of medications to store, dispense and track medications is also suggested to reduce MEs.

    - Use of such systems (e.g., Pyxis Medstation Rx™), instead of floor stock, or medication cart filling reduces the risk of MEs.
    - Errors may still occur, however, when systems in place are bypassed, such as bar-code scanning to stock or manual override.
- Medication labeling practices, such as tall man lettering, are suggested in sound-alike look-alike drugs (SALAD) to reduce MEs.
    - A list of medications by the Institute for Safe Medication Practice (ISMP) with tall man lettering is an available tool for organizations to use.
- Compliance with safe medication concentration practices (e.g., pharmacy-prepared IV medications, premade IV preparations) is recommended to lower the risk of MEs and potential ADEs.
    - The risk of harm or death by an IV medication error is almost 3 times more likely than other types of errors.
    - In the ICU the use of parenteral products is much greater than in the non-ICU setting.
- No recommendation is made for pharmacist participation in medication passes to reduce MEs or ADEs.
    - Medication administration by the nurse to the patient can be affected by many factors that result in MEs; these include distractions, interruptions, poor communication, inexperience, knowledge deficit, and fatigue.
    - A pharmacist's knowledge and assistance may be useful during medication dispensing, but no studies have been done to review this, and therefore no recommendations or suggestions have been made.
    - Pharmacist involvement in medication passing needs research to evaluate its potential impact on reducing MEs or ADEs.
- For high-risk medications or processes, an independent double-check prior to the drug delivery is suggested.
    - The double-check system for dispensing prior to leaving the pharmacy is common practice; however, within the ICU this practice is subject to error as this is a human effort, and in most cases requires someone other than the primary caregiver to stop what they are doing to perform the activity.
    - Independent double-check remains a recommendation from the ISMP for specific drugs, such as chemotherapy and patient-controlled analgesia.
    - Because high-risk medications can cause a greater chance of harm, the committee suggests that a standardized approach be implemented in the ICU.

Administration

- Bar-code medication administration (BCMA) is suggested in the ICU to reduce MEs and ADEs.
- Use of smart infusion pumps is suggested in the ICU to reduce MEs and ADEs.
- When initial programming of smart infusion pumps occurs, input from an interdisciplinary team is suggested to create the library and to create maximum override limits that may assist with avoiding work-arounds.
- There is no recommendation for mandatory double-checking *during* medication administration of high-risk medications to reduce MEs and ADEs.
    - This statement conflicts with the earlier suggestion of an independent double-check that should occur *prior to* the dispensing of medication in the ICU, and although this makes sense to enact, there is a lack of supporting evidence to make a recommendation.

- Validated tools used to assess medication goals (e.g., sedation or pain relief) during administration and titration is suggested for use in the ICU.
    - In combination with protocols and algorithms, these subjective tools have shown positive outcomes and are recommended to achieve therapeutic goals.

Monitoring

- Automatic dosing of heparin and the ordering of laboratory studies, also known as reflex monitoring, is suggested to reduce the risk of ADEs.
    - The benefit of automatic heparin dosing without laboratory studies is uncertain.
- During the ordering phase, alerts prompting the additional need to order laboratory studies are also suggested to reduce a drug-related hazardous condition (DRHC).
    - Reflex monitoring and automatic prompts should still involve clinician assessment, to avoid false positives (or erroneously generated orders).
    - These methods may also assist with the accuracy of appropriate studies being ordered and timeliness of monitoring.
- There is a lack of supporting evidence to make a recommendation for handoff communication in the ICU to avoid MEs or ADEs.
    - TJC and the NPSGs do recommend improved communication at shift handoff to include medication information.
    - Since there are no studies to review regarding handoff communication and its impact on MEs or ADEs, there is no recommendation made by this committee.
- There is a lack of supporting evidence to make a recommendation for POC testing in the ICU to avoid MEs or ADEs.
- There is a lack of supporting evidence to make a recommendation for patient and family members' knowledge of the patient's medication regimen to avoid MEs or ADEs.
- Research is recommended to help determine if a patient and/or a family member's knowledge of the medication regimen can assist in avoiding MEs or ADEs.

Reference

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