Top Medication Errors Reported to ISMP in 2020

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Learning Objectives

Following completion of this activity, participants will be able to:

— Identify globally relevant medication errors reported to ISMP in 2020.

— Apply strategies that can be employed to help reduce medication errors.
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Medication Safety Issues with the COVID-19 Vaccines
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Problem

- Dilution errors leading to under- or overdose of vaccine
- Mixing errors with 2-component vaccines (diluent instead of vaccine)
- Storage issues (unsegregated vaccines)
- Not checking/documenting in immunization information system
- Look-alike vials (vaccine-monoclonal antibody mix-up)
- Administration to wrong age group
- Waste of vaccine and not taking advantage of over-fill in vaccine vials
- Errors in scheduling second dose

Recommendations

- Verify competency of vaccinators
- Dispense pharmacy prepared syringes where possible
- Implement independent double check
- Maximize doses withdrawn from vials
- Identify/differentiate monoclonal antibodies from vaccines
- Separate vaccines in storage
- Plan for leftover vaccine
- Be prepared for allergic reactions
- Report vaccine errors and adverse reactions
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Casirivimab and imdevimab monoclonal antibodies

Moderna COVID-19 vaccine

US Food and Drug Administration (FDA) removes syringe administration from vincristine labeling
Problem

— Syringes for IV use have been confused with syringes of drugs administered intraspinally (intrathecally)

— Accidental intrathecal administration of vinCRIStine has killed over 130 patients, many of whom were children with acute leukemia

Problem, cont.

— In 2019, ISMP called on FDA to eliminate vinCRIStine syringe administration in official product labeling

— No cases of accidental intrathecal injection of the drug have been reported with dilution of the drug in a minibag

— In June 2020, FDA asked Pfizer to revise the product labeling. Pfizer complied, removing all references to vincristine administration via syringe from the package insert
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Cancer drugs incorrectly administered to children who died at GPH

-probe finds

Investigations into the deaths of three children who died at the George-town Public Hospital (GPH) in January after being administered pre-chemotherapy drugs have found that the medication was incorrectly administered and standard operating procedures were not followed.

The findings were revealed at a press conference yesterday which included Chairperson of the GPH Board Kessaundra Alex, Deputy Chief Medical Officer Dr Karen Gordon-Boyle, and Director of Medical and Professional Services at the GPH Dr Fawcett Jeffrey.

ISMP strongly recommends against dispensing and administering intravenous Vincristine in a syringe.

ISMP strongly recommends dispensing and administering intravenous Vincristine in a minibag.
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FDA updates vinca alkaloid labeling for preparation in intravenous infusion bags only

[1/15/21] The U.S. Food and Drug Administration is alerting health care professionals to labeling updates for the preparation of vinca alkaloids, a group of chemotherapy agents that includes vincristine sulfate injection, vinblastine sulfate (for) injection, and vincorelbin tartrate injection. To reduce the potential for unintended intrathecal (spinal) administration, which causes death or severe neurological injury, FDA is working with drug application holders to remove instructions for preparation of these drugs by syringe and to recommend preparation in intravenous infusion bags only.

In 2007, the World Health Organization issued an alert (https://www.who.int/patientsafety/highlights/PS_alert_115_vincristine.pdf?ua=1) about medication errors related to accidental intrathecal injection of vinca alkaloids. The Institute for Safe Medication Practices has published multiple reports (https://www.ismp.org/resources/ismp-calls-fda-no-

More mix-ups between vials of ePHEDrine and EPINEPHrine (ADRENALIN)
Problem

— Look-alike vials of ePHEDrine and EPINEPHrine have been frequently mixed up due to name and packaging similarities.

— The latest mix-up occurred between Ameal Pharmaceuticals ePHEDrine and PAR Pharmaceutical EPINEPHrine vials, both of which are similar in size (1 mL) and have purple caps.

Recommendations

— Utilize barcode scanning when stocking, dispensing, and administering these medications.

— Store them apart in the pharmacy and in locked-lidded drawers in automated dispensing cabinets.

— Consider obtaining a different brand of ePHEDrine with a different cap color, using prefilled EPINEPHrine syringes from an outsourcer when possible, or having pharmacy prepare infusions and bolus doses for these drugs except in emergencies.

— ePHEDrine is available in the US in a prediluted form called EMERPHED
Errors associated with oxytocin (PITOCIN) use

Oxytocin

- Intravenous (IV) oxytocin used antepartum is indicated to induce labor in patients with a medical indication, to stimulate or reinforce labor in selected cases of uterine inertia, and as an adjunct in the management of incomplete or inevitable abortion

- Postpartum IV oxytocin is used to produce uterine contractions during expulsion of the placenta and to control postpartum bleeding or hemorrhage

- Improper administration can cause hyperstimulation of the uterus, which in turn can result in fetal distress, the need for an emergency cesarean section, or uterine rupture

- A few maternal, fetal, and neonatal deaths have been reported
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Error Report Analysis

5 Main Themes Identified

1. Prescribing Errors
2. Look Alike Drug Packaging and Names
3. Preparation Challenges
4. Administration-Associated Errors
5. Communication Gaps

Prescribing Errors

— Selecting the wrong drug on computerized prescriber order entry (CPOE) screen when searching using only 3 letters, “PIT,” “OXY,” or “OXY10”

— Example: A physician intended to prescribe oral OXYCONTIN (oxyCODONE) 10 mg every 12 hours as needed for pain for a postpartum patient. He entered “OXY10” into the CPOE search field but accidentally selected “oxytocin 10 units IV” from the menu, resulting in an order for oxytocin 10 units IV every 12 hours as needed for pain. By the time the pharmacist followed up with the prescriber and corrected the error, the patient had received one dose of IV oxytocin
Look Alike Packaging

- 40% of all oxytocin-related reports submitted to ISMP described look-alike vials that had led to, or could have led to, mix-ups between oxytocin and another product

- Look-alike vials (e.g., ondansetron) and names (PITRESSIN, a discontinued brand of vasopressin) stored near PITOCIN or in ADC
  - Often stored alphabetically near each other on pharmacy shelves and used for the same patient population, especially during cesarean sections

Preparation Challenges

- Nurse admixture on patient care units and incomplete or omitted labels for nurse-prepared infusions led to oxytocin given instead of plain IV fluid

- These labeling problems were typically due to interruptions, distractions, or competing priorities on the patient care unit

- Example: An unlabeled bag of what was presumed to be a plain IV solution was administered to a patient. Staff later noted maternal cramping and fetal heart rate deceleration. An investigation revealed that the bag contained oxytocin. The patient required an emergency cesarean section
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Administration Errors

— Mix-ups of IV lines and misconnections to the wrong infusion pump have resulted in drug or dose errors and omissions.
  • Contributing factors: need for multiple IV lines, a fast-paced work environment, heavy workload, failure to trace lines, inexperienced staff, and distractions

— Oxytocin infusion bag was mixed up with either a hydrating fluid or magnesium infusion, leading to significant under- or overdoses
  • Contributing factor: availability of an oxytocin infusion during labor that was intended for use postpartum

— Inconsistent terminology used to express an oxytocin infusion rate in the medication order, administration record, and/or pump library led to several errors

— Flushing IV tubing with unrecognized residual oxytocin can lead to adverse effects (10 mL or more in line and ports)

Communication Gaps

— Lack of clear communication and/or documentation during transitions of care was a key contributor to oxytocin incidents

— Reporters attributed poor communication/documentation to heavy workload, a fast-paced environment, inexperience, and involvement of many individuals in the patient’s care

— Example: Administration of oxytocin was put on hold when staff noted a deceleration in the fetal heart rate. Fifteen minutes later, the physician examined the patient and gave a verbal order to restart the oxytocin infusion, but at a lower rate. A few minutes later, a second physician, who was taking over for the first, gave an order to restart the oxytocin at the original dose. The lack of documentation regarding the decision to lower the rate of infusion was a factor in this incident
Recommendations

- Require at least 5 letters of a drug name when searching electronic systems or keep typing until the drug name appears
- Develop standard order sets and have pharmacy dispense oxytocin in ready-to-administer, labeled bags in standardized concentrations
- Use barcode scanning technology.
- Standardize oxytocin dosing units and infuse through a smart infusion pump with engaged drug library
- Label and trace lines when starting infusions, and immediately discard discontinued infusion bags
- Use communication strategies (e.g., SBAR) during transitions of care
- Once oxytocin infusion completed, change IV line or flush tubing after disconnection

Vials of Neuromuscular Blocking Agents Without Cap Warnings
No Warnings on Caps

- Due to shortages, the US Food and Drug Administration (FDA) allowed temporary manufacturing of paralyzing agents without the vial cap warning, “Paralyzing Agent”
- Affected products include vecuronium (Fresenius Kabi) and rocuronium (Athenex, Alvogen)
- Vials are no longer being manufactured without a cap warning, expiration dates of vials without the warning extend through June 2022 and may be present until then. The vial and carton labels will remain unchanged.
- The absence of the cap warning may lead to potentially fatal drug selection errors with look-alike vials.

Problem

Currently approved cap (left) and temporary cap (right) for vecuronium bromide injection, 10 mg vial and 20 mg vial.

Currently approved cap (left) and temporary cap (right) for rocuronium bromide injection, 50 mg per 5 mL and 100 mg per 10 mL.
Problem, cont.

- When vials are standing upright in storage, staff may select a vial based on cap color and may not notice if they have the wrong vial in hand (Below: tranexamic acid, left, ropivacaine, right)

Recommendations

- Make sure staff are aware of the absence of the warning statement on some paralyzing agents that may still be in stock
- Ensure storage of these products leaves the labels (which still carry a warning statement), not the caps, face up
- Affix auxiliary “Warning: Paralyzing Agent” labels to vial caps of affected products
- Use barcode scanning during preparation and administration
Wrong-Route Tranexamic Acid Errors

Problem

- Three cases of inadvertent spinal tranexamic acid administration instead of a local anesthetic were reported
- Prior mix-ups have occurred between tranexamic acid and bupivacaine or ropivacaine
- Activated the National Alert Network (NAN) in September 2020
Problem, cont.

- All three products are available in vials with blue caps, which are often stored upright making labels difficult to read. These products are typically used in areas where barcode scanning is not utilized (e.g., operating room, labor and delivery).
Recommendations

- Purchase these products from different manufacturers to help differentiate appearance and/or consider alternate preparations (e.g., premixed bag, pharmacy prepared syringes or infusions).

- Store tranexamic acid separately and avoid upright storage to ensure labels are always visible.

- Use an auxiliary label over the cap to indicate vial contents.

- Use barcode scanning prior to dispensing or administering.
Label Updates are Coming

- The US FDA has announced that it will be revising the labeling for tranexamic acid to reduce the risk of potentially fatal wrong route errors.
- The FDA labeling changes will highlight the intravenous (IV) route of administration and strengthen the warnings in the prescribing information to include the risk of medication errors due to incorrect route of administration.

Mix-ups between conventional and liposomal drug products
Problem

- Conventional DOXOrubicin is used to treat a greater variety of cancers and it can be given at higher doses than the liposomal form, which has slower plasma clearance

- A technician accidently used liposomal instead of conventional DOXOrubicin to prepare two infusions

Problem, cont.

- During preparation, the technician received an alert when she scanned the wrong medication, which she overrode
  - At risk behavior which may be common due to alert fatigue

- The pharmacist did not catch the error during verification, and the preparations were dispensed and administered

- One order was compounded with a mixture of liposomal and conventional DOXOrubicin and the other order was compounded with liposomal instead of conventional DOXOrubicin
Potential for other mix ups

- IV amphotericin also has the potential for mix-ups between formulations
  - Either subtherapeutic or fatal dosing mistakes are possible
- Liposomal amphotericin B (AMBISOME) generally dosed 7.5 mg/kg IV daily
- Conventional amphotericin B deoxycholate should not exceed 1.5 mg/kg/day

Recommendations

- Require independent double check of drug and dose
- Prepare in pharmacy where pharmacist can verify the dose before preparation
- Vials of liposomal and conventional DOXOrubicin should be stored separately with a prominent sticker on the liposomal formulation
  - e.g., “DOUBLE CHECK: LIPOSOMAL DOXORUBICIN. DO NOT CONFUSE WITH CONVENTIONAL DOXORUBICIN
- A pharmacist should review all scanning overrides prior to final verification of the preparation
Inappropriate Prescribing of Transdermal FentaNYL Patches for Opioid-Naïve, Elderly Patients

Problem

— FentaNYL patches have been inappropriately prescribed:
  • For opioid-naïve patients to treat acute pain.
  • Due to an “allergy” to codeine that was only a minor drug intolerance.

— FentaNYL patches should only be used in opioid-tolerant patients for the management of pain severe enough to require daily, around-the-clock, long-term opioid treatment.
Case Report

A long-term care patient was inappropriately prescribed fentanyl patch after leaving the Emergency Department (ED)

- Provider thought he was opioid-tolerant since he received 3 small intravenous push doses of fentanyl while in the ED
- Provider thought fentanyl was the only option because the patient had a documented allergy to codeine

Opioid-Tolerant Definition

Patients taking the following for at least one week or longer:

- 60 mg of oral morphine per day
- 60 mg of oral HYDROcodone per day
- 30 mg of oral oxyCODONE per day
- 25 mg of oral oxyMORphone per day
- 8 mg of oral HYDROmorphine per day
- 25 mcg of transdermal fentaNYL per hour
- An equianalgesic dose of another opioid
REMS for Opioid Analgesics

- **Goals:**
  - Educate prescribers and other healthcare providers on the treatment and monitoring of patients with pain
  - Informing patients about risks and how to use and store opioids safely
  - Reduce serious adverse outcomes resulting from inappropriate prescribing, misuse, and abuse of opioid analgesics while maintaining patient access to pain medications

- **Strategies:**
  - Training must be made available to all healthcare providers involved in pain management

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Recommendations

- Follow REMS recommendation to educate healthcare providers and patients.
- Document each patient's opioid status.
  - ISMP Best Practice #15
- Build interactive alerts to confirm opioid tolerance when prescribing fentaNYL patches.
- Distinguish between true allergies and drug intolerances when collecting allergy information.
- Provide patient education sheet for all patients taking fentanyl for the first time.
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Two-Component Vaccine Errors
Problem

Some vaccines come in two components:

1. Active ingredient—lyophilized (freeze dried) powder
2. Vaccine specific diluent (liquid to reconstitute) or liquid antigen or adjuvant

These two components need to be mixed before the vaccine is ready to be administered to the patient.
Examples of Two-Component Vaccines

- Haemophilus influenzae type b
- Measles, mumps, rubella
- Meningococal group A
- Rabies
- Rotavirus oral vaccine
- Tetanus toxoid
- Varicella zoster
- Yellow Fever
- COVID-19

Two-Component Vaccine Error in Samoa

- Medication error: measles, mumps, rubella vaccine reconstituted with atracurium (paralyzing agent)
  - 2 children died
- The public concerned that vaccines were not “safe”, causing low vaccination rates in Samoa
  - Measles outbreak resulting in:
    - 200,000+ infections
    - 85+ deaths
Error with Meningococcal Vaccine (Menveo)

- Menveo: 2 vials must be combined before administration for patient to get full immune response
- 390 reports of administering only one component of Menveo to a total of 407 recipients
  - 269 patients received only the liquid component
  - 138 patients received only the lyophilized component (reconstituted in a different diluent)

Menveo Updated Label
Recommendations


— Circle or highlight critical information, use flag-type reminders.

— Dangerous drugs (paralyzing agents) should not be stored in proximity with vaccines.

— Use barcode scanning systems to ensure correct components are utilized.
  • Scan both components during vaccine preparation.

— Incorporate the patient or family member in the checking process if possible.

Recommendations, cont.

— Manufacturers, technology companies, regulatory organizations work to improve the process
  • Manufacturers should provide both components in a single container or package them in a way that provides fail-safe preparation
  • Labels should provide clear instructions for mixing

— Establish a process to keep both vaccine components together
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Recommendations, cont.

Questions?

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- Deadline: **January 30, 2021**
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This activity is approved for 1.25 contact hours for pharmacists and pharmacy technicians.