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Contributors

Jane Ching, PharmD
Pharmacy Practice Resident

LilyAnn Jeu, PharmD, BCPS
Medication Safety Pharmacist

Nubriel Hernandez
PharmD Candidate

Sheldon Powell
PharmD Candidate

Stanley Moy, PharmD, BCPS
Antimicrobial Stewardship Pharmacist

Yanmen Yang, PharmD
Pharmacy Practice Resident

CONTACT US

Patient Medication Counseling:
Pager 917-219-9855

Main Pharmacy: x 2854/2856

IV Laboratory: x 4889

OR Satellite: x 1622

Parenteral Nutrition: x 3072

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News & Noteworthy:

Topping the Charts of High-Alert Medications

by Sheldon Powell, PharmD Candidate, and Jane Ching, Pharmacy Practice Resident

Medication errors can increase length of hospital stay, inpatient expenses, and rates of disability or death.¹ An error involving a high-alert medication can cause higher risk of patient harm and damaging effects. While these errors do not occur more frequently than other errors with other medications, they bear the risk of causing more harm to patients when errors occur.^{1,2}

During the recent American Society of Health-system Pharmacists Midyear Clinical Meeting in December 2016, medication safety specialist for the Institute of Safe Medication Practices (ISMP) Dr. Darryl Rich unveiled ISMP's list of the top 5 medication classes involved in medication errors in 2016.³ Data compiled from hospital medication error reports, risk assessments, and consumer and FDA reports identified opioids (n = 142 cases), antibiotics (n = 94), antipsychotics (n = 77), antithrombotics (n = 66), and insulins (n = 42) as the most frequent classes. Except antipsychotics, these medication classes mirror the classes most commonly associated with adverse events (i.e., medication errors, near misses, and adverse drug reactions) at University Hospital of Brooklyn.

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Pharmacy & Therapeutics Committee Updates

by Jane Ching, Pharmacy Practice Resident

Meeting Months: October 2016 through January 2017

Policies and Protocols:

- ◆ (New) Initial Immunosuppression and Postoperative Medication Guide for peri- and post-operative medication orders for new adult kidney transplant recipients.
- ◆ (New) Protocol for Dilution of Omnipaque® for CT Studies in a pilot program through the Emergency Department
- ◆ (New) Policy Pharmaceutical Oversight of Drugs Acquired by Non-Pharmacy Departments+
- ◆ (New) Procalcitonin Testing Guidelines
- ◆ (New) Late Onset Neonatal Sepsis Protocol
- ◆ (Updated) Adult Initial Empiric Therapy in Sepsis Patients for Emergency Department patients
- ◆ (Updated) Policy Handling Multi-dose Vials and Medications+

Formulary Changes:

- ◆ Pyrimethamine (Daraprim®) tablets, which now cost \$900 per tablet, will be replaced with pyrimethamine oral suspension at only \$50 for a 30-day supply.
- ◆ A new formulation of dantrolene sodium (Ryanodex®) will replace the older powder formulation Dantrium® for the emergency condition malignant hyperthermia due to greater ease and convenience of storage and preparation. More information on Ryanodex® is provided on page 3.
- ◆ Addition of fosfomycin (Monural®), an oral antibiotic
- ◆ Addition of ciprofloxacin otic (Otiprio®) 6% Suspension
- ◆ Removal of the enteral feeds Osmolyte 1.0® and Osmolyte 1.5® from the Food and Nutrition formulary due to lack of usage

Research Corner: Evaluation of Asymptomatic Bacteriuria Management at SUNY Downstate Medical Center

by Jane Ching, Pharmacy Practice Resident, and Stanley Moy, Antimicrobial Stewardship Pharmacist

Presented at the American Society of Health Pharmacists Midyear 2016 Clinical Meeting, December 2016, Las Vegas, NV

Background: Asymptomatic bacteriuria (ASB) is defined as the presence of bacteria in the urine without signs and symptoms suggestive of a urinary tract infection (UTI).¹ Recommendations from Infectious Diseases Society of America (IDSA) guidelines state that pyuria (presence of white blood cells) in urine is not an indication for antimicrobial treatment.² While antimicrobial therapy for ASB improves short-term microbiologic outcomes, it is also associated with higher rates of resistance, adverse effects, and healthcare costs.³ A retrospective chart review was conducted at SUNY Downstate Medical Center for the purpose of assessing compliance with IDSA guideline recommendations in management of ASB.

Methods: Patients ≥ 18 years old with a positive urine culture (single urine specimen that yielded an organism in quantitative counts $>10^5$ cfu/mL) between January 2016 to August 2016 were included in the study. The primary outcome measured incidence of ASB treatment upon positive urinalysis (UA) and post-urine culture.

Results: Empiric antibiotic therapy was initiated in 54% of ASB patients upon positive UA, with two-thirds of patients prescribed ceftriaxone. After urine culture susceptibility data was available, the incidence of patients being treated increased from 54% to 71%. Approximately 80% of patients on ceftriaxone had antibiotics changed to a different beta-lactam or a fluoroquinolone. Nineteen patients had indwelling catheters and of those, only one-third had their Foley catheter removed. Overall, 11 patients without symptoms and without pyuria in urine still received antimicrobial therapy.

Conclusion: The results of the study showed that despite guideline recommendations, patients are still being initiated on antibiotics for ASB. Limitations of the study include the fact that this is retrospective study with small sample size and there was also reliance on documentation in the medical progress notes for mention of UTI symptoms. However, there is a tendency to respond to positive cultures, which leads to inappropriate antibiotic treatment. Future directions include implementing an in-hospital protocol providing guideline recommendations on treatment of UTIs and ASB including guidance on when to order UA or urine cultures.

References:

1. Trautner BW, Grigoryan L, Petersen NJ, et al. Effectiveness of an antimicrobial stewardship approach for urinary catheter-associated asymptomatic bacteriuria. *JAMA Intern Med.* 2015;175(7):1120-27.
2. Nicolle LE, Bradley S, Colgan R, et al. Infectious diseases society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. *CID* 2005;40:643-54.
3. Dull RB, Friedman SK, Risoldi ZM, et al. Antimicrobial treatment of asymptomatic bacteriuria in noncatheterized adults: a systematic review. *Pharmacotherapy.* 2014;34(9):941-60.

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Topping the Charts of High-Alert Medications

In the ISMP review, the most common reason for errors with opioids, antipsychotics, antithrombotics, and insulins was errors in dosing; while the most common reason for errors with antibiotics was wrong drug.

Preventive strategies to reduce errors should be multi-faceted and tailored to each medication class to help mitigate such errors. Tall-man lettering is one of the techniques used on look-alike sound-alike drugs so they will not get confused for the wrong medication. Restricted access and storage of these drugs can also contribute to the reduction of medication errors.⁴ Discussions among multidisciplinary teams can raise awareness of errors that have occurred and facilitate implementing policies that could aid in reducing these events.⁵

References:

1. ISMP List of High-Alert Medications In Acute Care Settings. Available at: <http://www.ismp.org/Tools/institutionalhighAlert.asp>
2. Institute for Healthcare Improvement (IHI). How-to Guide: Prevent Harm from High-Alert Medications. 2012. Available at: <http://www.ihl.org/resources/Pages/Tools/HowtoGuidePreventHarmfromHighAlertMedications.aspx>
3. Barrett J. ISMP Names Top Medication Safety Issues of 2016. *Pharmacy Times.* <http://www.pharmacytimes.com/conferences/ashp-midyear-2016/ismp-names-top-medication-safety-issues-of-2016>
4. Cohen MR, Smetzer JL, Tuohy NR, et al. (2007). High-Alert Medications: Safeguarding Against Errors. In Cohen MR (Ed.), *Medication Errors* pp. 317-411.
5. ISMP Medication Safety Alert! Your High Alert Medication List- Relatively Useless Without Associated Risk-Reduction Strategies. Available at: <https://www.ismp.org/newsletters/acutecare/showarticle.aspx?id=45>

ISMP Identified Reasons for Adverse Events (2016)

Medication Class	Wrong Drug	Wrong Dose	Wrong Patient	Other*
Narcotics/Opioids	39%	47%	1%	12%
Antibiotics	44%	34%	4%	4%
Antipsychotics	32%	43%	9%	10%
Antithrombotics	17%	54%	17%	4%
Insulins	33%	53%	8%	5%
All Drugs	35%	31%	11%	22%

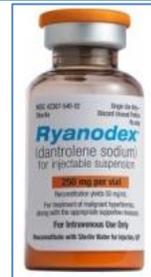
*= Wrong: Route, Quantity, Instructions

New Drug Primer: Dantrolene Sodium (Ryanodex[®])

by Nubriel Hernandez, PharmD Candidate, and Jane Ching, Pharmacy Practice Resident

Dantrolene sodium (Ryanodex[®]) is indicated for treatment of malignant hyperthermia (MH), which is a potentially fatal emergency that may occur after an individual is exposed to the neuromuscular blocker succinylcholine or volatile anesthetics. MH is characterized by uncontrolled release of calcium from skeletal muscle that leads to uncontrolled muscle contractions. Dantrolene prevents release of myoplasmic calcium by inhibiting ryanodine receptors and thereby prevents further muscle contraction and damage.

This new formulation is easier to store and prepare as compared to the traditional powder formulation Dantrium[®]. For the same 70-kg patient, Dantrium[®] requires 9 vials to be reconstituted at 8 minutes per vial, whereas Ryanodex[®] only requires only one vial that can be reconstituted in about 20 seconds. In an emergency, sometimes every second counts.



UHB Indications and Doses:

- ◆ **Treatment of malignant hyperthermia in conjunction with appropriate supportive measures:** IV push at minimum dose of 1 mg/kg. Doses may be repeated up to a maximum cumulative dose of 10 mg/kg.
- ◆ **Prevention of malignant hyperthermia in patients at high risk:** 2.5 mg/kg IV push over 1 minute, 75 min pre-surgery

Contraindications and Precautions:

- ◆ **Contraindications:** None
- ◆ **Precautions:** Muscle weakness . patients should not ambulate without assistance until normal strength and balance are restored

Adverse Reactions:

- ◆ Loss of grip strength and weakness in the legs
- ◆ Drowsiness and dizziness, nausea, thrombophlebitis
- ◆ Tissue necrosis secondary to extravasation, urticaria, erythema, and injection site reactions

Nurses Want To Know

Q: Why are some medications labeled "Hazardous Drugs"? Are they chemotherapy?
A: Unlike high-alert medications, which may result in a greater risk of harm to a patient when errors occur with these medications, hazardous drugs are medications with potential risks to health-care professionals through exposure over time. Depending on the medication, risks may include localized skin reactions, cancers, infertility, or birth defects.

Nurses Want To Know ...

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A: Unlike high-alert medications, which may result in a greater risk of harm to a patient when errors occur with these medications, hazardous drugs are medications with potential risks to health-care professionals through exposure over time. Depending on the medication, risks may include localized skin reactions, cancers, infertility, or birth defects.

The hospital list of hazardous drugs is based on recommendations from the National Institute for Occupational Safety and Health. Antineoplastic agents are labeled in HealthBridge as "Chemotherapy/Hazardous Drug," and these require chemotherapy personal protective equipment (PPE). Non-antineoplastic hazardous drugs are labeled only as "Hazardous Drugs". Examples include immune suppressants, some anti-infectives and some seizure medications. It is also recommended that PPE be worn when preparing or administering these medications. See policy "Reducing Occupational Exposure to Hazardous Drugs" (SAF-24) for more details.

Spotlight on Safety: Showdown of Doses versus Days

by LilyAnn Jeu, Medication Safety/Internal Medicine Clinical Pharmacist

What's wrong with this order?

- ❑ **ceFAZolin IVPB - [Ordered as ANCEF IVPB.]**
1 Gram(s) IV Intermittent Infusion Every 8 Hours
Infuse Over 30 Minute(s)
For 2 Days
Pharm Note x3 doses
Nurse Instructions x 3 doses

Medication orders must clearly indicate an endpoint in terms of number of doses or duration of orders. When schedules do not coincide, patients are placed at risk for extra doses or inadequate therapy.

In this case, the physician ordered one dose every 8 hours for 2 days, which generated 6 tasks on the Worklist Manager (a.k.a., electronic medication administration record). However, in the Pharm Note and Nurse Instructions, the physician also typed notations for only 3 doses. This patient received 4 doses for this order, with the potential for 2 more.

While one extra dose may not seem like a lot, inappropriate overuse of antimicrobials among numerous patients may contribute to antimicrobial resistance for patients in general. In addition, some hospital quality measures (such as the Surgical Care Improvement Project Core Measure Set) require antibiotics to be discontinued within specific time frames. Violations of recommendations may jeopardize hospital payment for care.

