Pharmacy Residency Program Preceptors of the Year

Each year, the outgoing pharmacy residents elect two preceptors who went above-and-beyond in teaching and mentoring, and in the practice of pharmacy.

We are proud to announce the Pharmacy Residency Program Preceptors of the Year for 2019-2020. Thank you to everyone who works with our residents to make the program a success!

PGY1 Community-based Pharmacy Residency Preceptor of the Year

Brianne Traub, PharmD

Specialty Clinical Pharmacist

PGY1 Pharmacy Practice Residency Preceptor of the Year

Maria Fatima T. Iharada, PharmD

Clinical Pharmacy Specialist

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Pharmacy Focus

Overview of Lyme Disease

Rachel Zabriskie, FDU PharmD Candidate 2021

Lyme Disease is the **most common vector-borne disease in the United States** with approximately 300,000 cases per year. Nearly 96% of all **cases occur in fourteen states** located in northeast and upper midwest regions. Lyme Disease is a **bacterial infection caused by *Borrelia burgdorferi*.** On the East Coast, it is typically transmitted through the bites of deer ticks, *Ixodes scapularis*.

Just because a tick bites, doesn't mean the patient will get Lyme Disease! The tick must carry the bacteria AND be attached to the host for 36-48 hours for the bacteria to be transmitted. Tick bites cause irritation around the bite area, similar to a mosquito bite, which lasts 1-2 days. This is normal even if the tick doesn't carry the bacteria. A true hallmark symptom of the bacterial infection is erythema migrans which occurs in both the early and late stages.

EARLY STAGE OF LYME DISEASE

- 3 to 30 days post tick bite
- Erythema migrans 70-80% of the time

This rash typically appears as a **red bullseye** and may be warm and itchy
The bullseye can be twelve inches wide with an average onset of seven days.

LATE STAGE OF LYME DISEASE

- Days to months post tick bite
- More serious symptoms: severe headache and neck stiffness, facial palsy, arthritis or severe arthralgia in large joints, palpitations or irregular heartbeat, and/or central nervous system inflammation.
- May also have additional erythema migrans and numbness or tingling in hands or feet.

Treatment

Adult first line treatment: Doxycycline 100 mg by mouth twice daily for 10-21 days.
Pediatric first line treatment: Amoxicillin 50 mg/kg per day by mouth in three divided doses for 14-21 days. Children daily doses should not exceed 500 mg.
For patients presenting in early stage Lyme disease, duration of treatment can be closer to the shorter end of the duration range.

Adapted from Centers for Disease Control and Prevention. Lyme disease. Available at: https://www.cdc.gov/lyme/index.html. Accessed June 4, 2020.

Drug Info Corner

Lina Loaiza, FDU PharmD Candidate 2021

Question: Can Shingrix® shingles vaccine be administered to a patient who is younger than 50 years old and has had multiple shingles outbreaks?

Answer: Shingles is caused by the varicella-zoster virus, the same virus that causes chicken pox. The chicken pox vaccine is inactive in the nerve tissue and can reactivate as shingles years later. Shingles causes a painful rash that is often a single strip of blisters.[2]

FDA Shingrix® information

Shingrix® is a vaccine ***indicated for preventing herpes zoster (shingles) in adults aged 50 years and older.*** Two doses should be administered intramuscularly at 0 and again at 2 to 6 months.[1]

CDC Shingrix® information

The CDC[3] recommends that healthy adults ≥ 50 years old get vaccinated against shingles with two doses of Shingrix® separated by 2-6 months; regardless of shingles history, previously received Zostavax® or are not sure if ever had chickenpox.[3]

Advisory Committee on Immunization Practices (ACIP) Shingrix® information

The Advisory Committee on Immunization Practices (ACIP) does not recommend shingles vaccination of adults <50 years old due to the low disease risk and concerns about the Shingrix® supply.

Evidence-based use of Shingrix® in ages below 50 years old

A phase I/II, open-label, randomized, parallel-group study, evaluated safety and efficacy of Shingrix® in 10 healthy women and men ages 18 - 30 years and who were not previously vaccinated. Shingrix® was administered in 2 intramuscular doses two months apart. Safety and immunogenicity were assessed up to 12 months post vaccination. Immunogenicity was favorable and the most common reactions were fatigue, myalgia, and headache, and the most common local reaction was injection site pain.[4]

Summary

Based on the CDC recommendations, the results from the clinical trial, and patient's past medical history, patients under 50 years old with a history of shingles can get vaccinated against shingles. These patients should still receive two doses, the second one 2-6 months after the first dose. I believe it would be beneficial in patients who have had recurrent shingles, and no data suggests that Shingrix® is contraindicated in young adults.

References:
1. Shingrix (Zoster vaccine Recombinant). Package insert. Rixensart, Belgium. GlaxoSmithKline Biologicals; 2017
2. Villarroel M. Vahratian A. Center for Disease Control. Shingles vaccine. Available at http://www.CDC.gov. Accessed June 25, 2020.
3. Shingles vaccine.CDC at https://www.cdc.gov/shingles/. Accessed June 25, 2020.
4. Leroux-Roels I, Leroux-Roels G, Clement F, et al. A phase 1/2 clinical trial evaluating safety and immunogenicity of a varicella-zoster glycoprotein e subunit vaccine candidate in young and older adults. The Journal of infectious diseases. 2012;206(8):1280-1290.

New Auto-substitution Policy for Oral Inhalation Devices

Veronica Prisco, PharmD, MHS

Starting the week of August 10, a new auto-substitution policy is in effect. Under the new policy, formulary inhalers available in the inpatient setting include one inhaler type per pharmacologic category.

Please refer to the table below for conversions. In summary:

- ***Admitted ADULT patients on select non-formulary inhalers*** (second column of the table):
  - □ will be ***automatically converted*** to a formulary equivalent by the pharmacist.

- ***Admitted ADULT patients on inhalers NOT on this table***:
  - □ will be required to bring in their own medication from home.
  - □ IF they cannot bring in medications from home, a new order must be written for a formulary equivalent - please contact pharmacy for help in choosing the best option.

- ***For new orders:***
  - □ only formulary agents will be visible on Meditech for ordering.

- At this time, the auto-substitution policy ***applies to adult patients***; pediatric inhaler orders will remain unchanged.

This auto-substitution was approved by Pharmacy & Therapeutics Committee and Medical Board.

Pharmacologic Category	Inhalers	Formulary Equivalent
SABA	Proair (albuterol) 90mcg MDI	**Ventolin** (albuterol) 90mcg
	Proventil (albuterol) 90mcg MDI	
SAMA	**Atrovent** (ipratropium bromide) HFA 17mcg (NO CHANGE)	
SAMA/SABA	**Combivent** (ipratropium bromide/albuterol) Respimat 25mcg/100mcg (NO CHANGE)	
ICS	Flovent (fluticasone propionate) Diskus 50mcg, 100mcg, 250mcg	**Asmanex** (mometasone) Twisthaler 110mcg, 220mcg
	Qvar (beclomethasone) 40mcg, 80mcg	
ICS/LABA	Symbicort (budesonide/formoterol) 80/4.5mcg, 160/4.5mcg	**Dulera** (mometasone/formoterol) 100/5mcg, 200/5mcg
	Advair (fluticasone/salmeterol) 100/50, 250/50, 500/50	
	Breo (fluticasone/vilanterol) Ellipta 100/25, 200/25	
LABA	Serevent (salmeterol) Diskus 50mcg	**Striverdi** (olodaterol) Respimat 2.5mcg
LAMA	Spiriva (tiptropium) Handihaler 18mcg	**Spiriva** (tiotropium) Respimat 2.5mcg
LAMA/LABA	Anoro (umeclidinium/vilanterol) Ellipta 62.5/25mcg	**Stiolto** (tiotropium/olodaterol) Respimat 2.5/2.5mcg

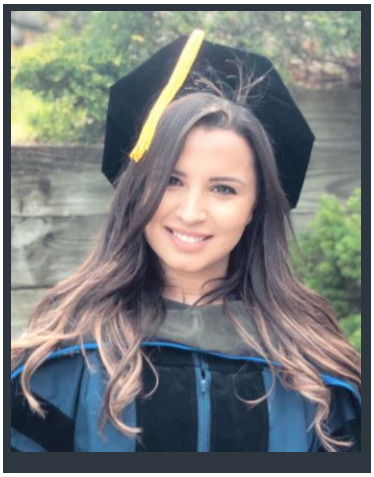
Abbrevaations: SABA = short acting beta agonist
SAMA = short acting muscarinic antagonist
ICS = inhaled corticosteroids
LABA = long acting beta agonist
LAMA = long acting muscarinic antagonist
MDI = metered dose inhaler
HFA = hydrofluoroalkane

References available upon request.

Meet the new Pharmacy Residents

The Valley Hospital Pharmacy Residency Program is nationally accredited by the American Society of Health-System Pharmacists. Upon graduation from schools of pharmacy, pharmacists may choose to further their education through a one-year long post-doctoral residency. This additional training exposes new practitioners to the different aspects of the practice of pharmacy, offers the opportunity to manage special patient populations, and allows application of knowledge and skills in participating as an interprofessional team member. We are proud to announce the three residents for our July 2020 - June 2021 residency class.

Barbara Abboud, Pharm.D., MBA
PGY1 Community-Based Pharmacy Resident



Barbara Abboud grew up in Mahwah, NJ and earned Doctor of Pharmacy and Masters in Business Administration degrees from Fairleigh Dickinson University in 2020. Barbara also earned her Bachelors Degree in Biology with a minor in Psychology at William Paterson University. She is excited to be part of The Valley Hospital healthcare team as the PGY1 Community-based Pharmacy Resident. She is very passionate about the profession and always strives to provide the best outcomes for patients. Her areas of interest include emergency medicine, transitions of care and ambulatory care. Aside for her love for pharmacy, Barbara enjoys working out, cooking, hiking, and spending quality time with her family and friends.

Neha Siddiqui, Pharm.D.
PGY1 Pharmacy Practice Resident

Neha Siddiqui grew up in Farmington, CT and earned a Doctor of Pharmacy degree at The University of Saint Joseph's School of Pharmacy in May 2020. Neha also earned her Bachelors of Science degree in Biology with a minor in Psychology from Nova Southeastern University in Fort Lauderdale, Florida. She is excited to be a part of the The Valley Hospital healthcare team where she can strive for personalized patient care, advance the field of pharmacy, and connect with other healthcare professionals. Neha is looking forward to further exploring her clinical interests in transitions of care, cardiology, and emergency medicine. Aside from pharmacy, Neha enjoys traveling to new countries, baking, and playing basketball.

Joanne Son, Pharm.D.
PGY1 Pharmacy Practice Resident

Joanne Son grew up in Ridgewood, NJ and earned her Doctor of Pharmacy degree at St. John's University in Queens, New York. She is excited to be a part of The Valley Hospital's healthcare team to provide patients with the best service and healthcare. The Valley Hospital is the institution that inspired her to be a pharmacist at a young age, so she is very excited to be back and serving her community. Her areas of interest are ambulatory care and internal medicine. During her free time, Joanne loves to bike, hike, go fruit picking, golf with her family, and travel. Her most recent vacation spot was Switzerland, and she hopes to return one day. Joanne has a love for animals and recently adopted a new shihtzu/poodle mix puppy.

Ketorolac Injection Dosage Adjustments

Briannan Budzak, FDU PharmD Candidate 2021

Ketorolac tromethamine injection is a non-steroidal anti-inflammatory drug (NSAID) for acute pain in adults and should be used for no longer than 5 days. The injection formulation can be administered intravenously (IV) or intramuscularly (IM).

Typical adult dosing is recommended for patients that are:

- under age 65 years old AND
- weigh at least 110 lbs AND
- have normal renal function

IV dosing: 30 mg for one time dose or 30 mg for repeated dosing every 6 hours (maximum of 120 mg/d).
IM dosing: 60 mg for one time dose or 30 mg for repeated dosing every 6 hours (maximum of 120 mg/d).[1]

Ketorolac is contraindicated in patients with advanced renal impairment or kidney disease.[1]

Adjusted dosing must be done for patients that are:

- age 65 years or older OR
- weigh less than 110 lbs OR
- have impaired renal function.

IV dosing: 15 mg for one time dose or 15 mg for repeated dosing every 6 hours (maximum 60 mg/d)
IM dosing: 30 mg for one time dose or 15 mg for repeated dosing every 6 hours (maximum 60 mg/d).

Evidence for dose adjustments in patients ≥65 years old:
Ketorolac is excreted via the kidney and in healthy patients <65 years of age, the half-life of ketorolac is approximately 5 hours. The half-life increases to approximately 7 hours in the elderly population (≥ 65 years of age) due to reduction in plasma drug clearance[2]. A reduced plasma drug clearance may lead to increased toxicities from ketorolac such as increased risk of bleeding, hemorrhage, GI bleed, peptic ulcers, and cardiovascular events including MI and stoke[3]. CNS adverse effects of ketorolac, such as confusion, agitation and hallucination, are more common in the elderly population and may occur even at low doses.[3]

Evidence for dose adjustments in patients with renal impairment:
In patients with reduced kidney function, although the exact CrCl/SCr/eGFR cutoffs are not specified, dose reductions are necessary due to decreased plasma clearance of ketorolac leading to an increased half-life of approximately 10 hours. Increased half-life of ketorolac increases the risk of toxicities such as: bleeding, hemorrhage, GI bleed, peptic ulcers.[3]

Evidence for dose adjustments in patients with low body weight:
Volume of distribution is reduced inpatients with low body weight leading to increased peak plasma concentrations. A reduced volume of distribution requires reduced dosing of drugs to avoid increased plasma concentrations leading to increased risk of toxicities[4] including: bleeding, hemorrhage, GI bleed, peptic ulcers.[3]

Evidence for using reduced dosages:
A randomized, double blind trial of 240 patients published in 2017 compared the efficacy of 10mg, 15mg and 30mg doses of ketorolac in treating acute pain. Pain was assessed before and after ketorolac administration using a numeric pain score from 1-10. The reduction in pain score for the 10mg, 15mg and 30mg groups were 2.5, 2.4, 3.0 respectively. The individual reductions in pain score were all statistically significant, however, the difference between reductions in each dosage group were not statistically significant. This shows that administering ketorolac at a dose of 10mg has similar analgesic effects as administering ketorolac at a dose of 15mg or 30mg with no clinically adverse effects.[5]

Summary of dosing recommendations:

Patient	One-time dose	Multiple doses
<65 years old	30mg IV or 60 mg IM	30mg IM/IV every 6 hours (max 120mg per day)
≥65 years old or <50kg (110 lbs) weight or Renal impairment	15mg IV or 30 mg IM	15mg IM/IV every 6 hours (max 60mg per day)

References: 1. Ketorolac Tromethamine [package insert] Lake Forrest, IL: Hospira Inc. Revised March, 2014. Available at: https://www.accessdata.fda.gov/drugsatfda_docs/label/2014/074802s038lbl.pdf. 2. Gillis JC, Brogden RN. Ketorolac. *Drugs* **53,** 139–188 (1997). DOI: 10.2165/00003495-199753010-00012. 3. Ketorolac (systemic). Lexi-Drugs. Lexicomp. Wolters Kluwer Health, Inc. Hudson, OH. Available at: http://online.lexi.com. Accessed July 2020. 4. Trobec K, Kerec Kos M, von Haehling S, Springer J, Anker SD, Lainscak M. Pharmacokinetics of drugs in cachectic patients: a systematic review. *PLoS One*. 2013;8(11):e79603. Published 2013 Nov 8. doi:10.1371/journal.pone.0079603 5. Motov S, Yasavolian M, Likourezos A, et al. Comparison of Intravenous Ketorolac at Three Single-Dose Regimens for Treating Acute Pain in the Emergency Department: A Randomized Controlled Trial. Annals of Emergency Medicine Vol 70, No 2, pp 177-184. DOI: 10.1016/j.annemergmed.2016.10.014.