

Pharmacy Department Plays in TVH Relay for Life Fundraiser



The "Pharmacy Family" Team consisted of pharmacists (L-R) Mark Levy, Terri Marxen, Carlo Lupano, and Brianne Traub. They played their hearts out and had a great time supporting our Relay for Life team!

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Pharmacy Focus



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Formulary Update (continued on page 5)

Michelle Budz, FDU PharmD Candidate & Esther Choe, St. John's University PharmD Candidate

Bupivacaine liposomal injection suspension (Exparel®)

This product is an amide *local anesthetic* containing bupivacaine in multivesicular liposomes. It is indicated for postsurgical analgesia and *administered as a single-dose into the surgical site*. Bupivacaine liposomal injection should be injected slowly into soft tissues of the surgical site where bupivacaine will be released from the multivesicular liposomes over a period of time. Concomitant administration with other agents, including bupivacaine HCl, should be used with caution as it may disrupt the liposomal particles or cause an immediate release of bupivacaine from this liposomal suspension. Bupivacaine liposomal injection suspension *is restricted at TVH to hemorrhoidectomy, bunionectomy, breast reconstruction, and hernia repair*.

Acetaminophen intravenous (Ofirmev®)

This medication is a sterile formulation of *acetaminophen for intravenous (IV) infusion*, and is indicated for the management of *pain and reduction of fever*. It is administered as a 15-minute intravenous infusion in single or repeated doses. Dose adjustments are not required when converting between oral acetaminophen and IV acetaminophen in adults and adolescents. It has a black box warning for risk of dosing errors and hepatotoxicity when used in doses exceeding maximum daily limit of 4000mg. Acetaminophen IV use has been expanded at TVH to include anesthesiology and all of surgery. Reevaluation of its use at TVH will be done after 3 months.

Tranexamic acid (TXA; Cyklokapron®)

Additional off-label uses of tranexamic acid have been approved at TVH for *epistaxis* and *acute traumatic injury*. TXA is an *antifibrinolytic agent* that inhibits plasmin and plasminogen *activation to reduce bleeding*. Inserting a cotton pledget, soaked in TXA IV solution, into the nostrils for epistaxis treatment resulted in shorter time to stop bleeding, shorter hospital stay, and fewer rebleeding cases compared to usual nasal packing. Intravenous TXA has also shown to safely reduce mortality in acute traumatic injury with bleeding when administered as early as possible and within three hours of injury.

Pharmacy Residents present at American Society of Health-System Pharmacists Midyear Clinical Meeting in Orlando, Florida

Antibiotic length of therapy for patients with a primary diagnosis of pneumonia: utilization before and after computerized prescriber order entry system modification

Michael Gabriele, PharmD, PGY-1 Community Pharmacy Resident

A recent study published in *Clinical Infectious Diseases* found that, when summing inpatient and discharge lengths of therapy (LOT), over 70% of patients likely receive an excessive overall antibiotic LOT for their community-acquired pneumonia. Previously at The Valley Hospital, discharge antibiotic prescriptions were generated with a 7-day supply by default. In April 2017, the computerized prescriber order entry system was modified to remove these default "days supply" values, thus requiring prescribers to choose a patient-specific length of outpatient antibiotic therapy. This project evaluated the impact of changing the hospital's order entry system on antibiotic LOT in patients with a primary diagnosis of pneumonia.

The data indicated a downward trend in mean outpatient and total LOT (-10.2% and -9.5%, respectively), but the results were not statistically significant ($p = 0.48$ and 0.17 , respectively). A decrease in the proportion of patients receiving 7-day outpatient prescriptions, and increases in patients receiving 3- and 5-day prescriptions was also noted, but this shift was also not statistically significant ($p = 0.30$).

We concluded that removing the computerized default number "days supply" for discharge prescriptions may help reduce overall antibiotic length of therapy, but we may need to consider further interventions such as greater involvement of the Infectious Disease specialists or Antimicrobial Stewardship team at the discharge transition of care.

Evaluation of dosing prophylactic enoxaparin in high risk patients in a large community hospital

Brianne Traub, PharmD, PGY-1 Pharmacy Resident

Subcutaneous enoxaparin is a mainstay in the hospital setting for VTE prophylaxis. Dose adjustments in high risk patients, such as those with obesity or poor renal function, are recommended. The purpose of this study was to evaluate the appropriateness of prophylactic dosing in high risk patients at TVH receiving enoxaparin.

A retrospective chart review evaluated sixty adult inpatients who received enoxaparin on critical care, post-surgical, and geriatric units. Overall, 73% of patients were dosed appropriately. Most of the patients with inappropriate doses received subtherapeutic dosing with enoxaparin 30 mg daily instead of 40 mg daily. A majority of suboptimal doses occurred in the elderly population, where doses may have been adjusted based on age and serum creatinine. The results were presented to P&T, which resulted in Medical Board approval for pharmacist dose adjustment of enoxaparin for renal function.

Dosing adjustment evaluation of oseltamivir in a community hospital

Mark Levy, PharmD, PGY-1 Pharmacy Resident

Oseltamivir is an antiviral agent used for both treatment and prophylaxis against the influenza virus. When given within forty eight hours of symptom onset, oseltamivir is recommended to shorten the duration of the illness and prevent further health complications. Dosing of oseltamivir is based on renal function for adults, and weight for pediatrics.

A retrospective chart review evaluated sixty adult inpatient patients who received oseltamivir during the influenza season. Overall, sixty three percent were dosed appropriately after considering after dose adjustments. Presentation of these findings to the Pharmacy and Therapeutics Committee resulted in Medical Board approval for automatic renal dose adjustment by the pharmacist per protocol. *contd. on p. 3* →

Formulary Update

continued from page 1

Daurorubicin/cytarabine liposomal injection (Vyxeos®)

Daurorubicin/cytarabine is a liposomal combination for *IV injection* with a fixed molar ratio. It is indicated for the treatment of newly diagnosed *therapy-related acute myeloid leukemia (t-AML) or AML with myelodysplasia-related changes (AML-MRC)*.

Daurorubicin, an anthracycline topoisomerase inhibitor, and cytarabine, a nucleoside metabolic inhibitor, have been shown to have synergistic effects in killing leukemia cells. The liposomes are taken up intact by bone marrow cells and undergo degradation, therefore releasing daurorubicin and cytarabine within the cells. Common adverse effects include hemorrhagic events, febrile neutropenia, rash, and edema. *This is restricted to Luckow Pavilion.*

Rituximab hyaluronidase (Rituxan Hycela®)

Rituximab hyaluronidase is indicated for the *treatment of follicular lymphoma, diffuse large B-cell lymphoma, and chronic lymphocytic leukemia*. It is administered *subcutaneously*. Rituximab is a chimeric monoclonal antibody directed against CD20 antigen on the surface of B-lymphocytes. Hyaluronidase, an endoglycosidase, increases the absorption rate of rituximab through permeability of subcutaneous tissue. Rituximab hyaluronidase is *associated with hypersensitivity and other administration reactions*. Patients must have received at least one full dose of rituximab before initiating treatment with rituximab hyaluronidase due to the risk of hypersensitivity reactions during the first infusion. *It is restricted to Luckow Pavilion.*

Rolapitant (Varubi®)

Rolapitant is a substance P/neurokinin 1 receptor antagonist (NK-1 RA) indicated to *prevent delayed phase chemotherapy induced nausea and vomiting (CINV)*. A NK-1 RA in combination with other antiemetic agents is the recommendation and standard of care for the prevention of CINV associated with both highly and moderately emetogenic chemotherapy as per the 2018 NCCN guidelines. Rolapitant *is contraindicated in patients with hypersensitivity to soybean oil and taking CYP2D6 substrates with a narrow therapeutic index*, such as thioridazine and pimozide. The FDA is warning that the IV emulsion formulation has been associated with anaphylaxis, anaphylactic shock, and other serious hypersensitivity in the postmarketing setting. *Rolapitant IV is restricted to Luckow Pavilion.*

Editors in Chief:

Maria Leibfried, PharmD

Carlo Lupano, RPh

Editorial Director:

Ron Krych, RPh

Editorial Advisor:

Tomas Hiciano, RPh

Editor:

Michael Gabriele, PharmD

Contributors:

Michelle Budz

Esther Choe

Michael Gabriele, PharmD

Mark Levy, PharmD

Brianne Traub, PharmD

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pharmacy](http://www.valleyhealth.com/pharmacy)

COPD Inhaler Technique and the Connection to Patient Outcomes

by Michael Gabriele, PharmD, PGY-1 Community Pharmacy Resident

Management of Chronic Obstructive Pulmonary Disease (COPD) using prescription inhalers goes beyond medication selection. Apart from the **right drug** at the **right dose** at the **right time**, a crucial piece of prescription inhaler therapy is the **right technique**. The body of available literature surrounding this topic suggests that **when patients are trained to properly utilize their inhaler devices, they tend to have improved clinical outcomes.**

One such study published in the *International Journal of Chronic Obstructive Pulmonary Disease* in 2017 **compared** clinical outcomes between **patients who used devices requiring similar inhalation techniques** and **patients prescribed devices with different techniques**. Patients were placed in the similar-devices cohort if they used two or more inhalers that were either all aerosols or all dry powder inhalers, and were placed in the mixed-devices cohort if they had at least one inhaler from each category. The results included 8,225 patients in each group and showed that patients in the mixed-devices cohort had a greater overall rate of exacerbations and a higher average daily dose of short acting beta agonists (SABAs). The similar-device cohort had a greater percentage of patients with zero exacerbations per outcome-year (58.5% versus 53.4%) and a greater percentage of patients who had an average daily SABA dose of 0 micrograms (17.5% versus 6.4%). After controlling for likely confounding factors, the authors concluded that their results suggested that **when patients need to learn proper techniques for different types of inhalers** for concurrent use, **it can lead to incorrect inhaler use**, reduced patient adherence, and a reduction in favorable clinical outcomes.¹

Another study published in the *British Journal of Clinical Pharmacology* was conducted on the effectiveness of a community pharmacist **education program for patients receiving inhaled medication** prescriptions for COPD. Patients in the intervention group (n = 371) received two protocol-based pharmacist counseling sessions on their medications, while patients in the control group (n = 363) were given standard, nonprotocol pharmacist care. The results showed that on average, the patients who received the interventional inhaler training scored significantly higher on an inhalation technique scoring checklist at one and three months post-randomization. Additionally, 68.5% of patients in the intervention group scored 100% on their technique checklists, while only 32.9% of the control group did. The clinical consequences of these differences were examined in the secondary endpoints of the study. Thirty-three patients in the control group experienced a combined total of 53 severe exacerbations over the course of the study, compared to a combined total of 24 severe exacerbations across 19 patients in the intervention group. These exacerbations led to 35 hospitalizations totaling 307 hospital days in the control group, and 9 hospitalizations totaling 76 days in the intervention group. The authors concluded that pragmatic **patient education programs**, such as the pharmacist-based one they studied, can improve pharmacotherapeutic regimens and **may reduce hospitalization rates in patients with COPD.**²

Therefore, when patients are prescribed less-complicated inhaler regimens and are provided with extra personalized training, they experience better clinical outcomes. Educating patients on how they can improve their inhaler technique can be a critical intervention to improve patient health at any transition of care.

References: 1. Bosnic-Anticevich S, Chrystyn H, Costello RW, et al. The use of multiple respiratory inhalers requiring different inhalation techniques has an adverse effect on COPD outcomes. *Int J Chron Obstruct Pulmon Dis*. 2017;12:59-71. 2. Tommelein E, Mehuys E, Van hees T, et al. Effectiveness of pharmaceutical care for patients with chronic obstructive pulmonary disease (PHARMACOP): a randomized controlled trial. *Br J Clin Pharmacol*. 2014;77(5):756-66.