Medication Administration for Patients with Enteral Tubes

Melissa Rock, PharmD, MHS
PGY1 Pharmacy Resident

A number of patients are not able to swallow their tablets or capsules whole, especially those needing enteral nutrition. The common fix to this problem is **crushing the tablets or opening the capsules** and sprinkling them in a drink or food. However, these manipulations cannot be performed on all capsules and tablets. Oral medications may vary in size, shape, weight, hardness, thickness, disintegration, and dissolution characteristics and in other aspects, depending on their intended use and method of manufacture.

Thus, a common question pharmacists get is **"Can the medication be crushed?"** Below are tips you can use to help navigate this challenge:

- General resources that can be used are **package inserts, Lexicomp/Micromedex, and primary literature.** Review drug highlights, administration, and patient counseling sections as this information is most likely to be found here.
- In general, medications that contain "XR," "CR," "XL," or "LA" should not be crushed.
- Some medications are classified as **hazardous** because when they are manipulated, those in contact with the drug are at an increased risk for developing complications. Check the CDC, NIOSH, and DHHS websites to see if a medication is classified as hazardous and how it can be administered.
- To minimize exposure to hazardous drugs, wear protective gloves discard them immediately in an appropriate waste container.
- It is important to see **if tube feedings should be held** before or after medication administration and how long they should be held; if tube feeds are held, **check with your dietitian** to see if any additional changes to the feeding should me made.
- Not all resources will state the same information about administration of medications. If one resource does not provide information about administration, it is a good idea to **refer to another resource.**
- **ALWAYS CHECK WITH YOUR PHARMACIST** if you need help!

www.valleyhealth.com/pharmacy

Journal of The Valley Hospital Pharmacy

Pharmacy Focus

Volume 23
Spring - Summer

Formulary Update (Jan – Feb – March)

Bicalutamide (Casodex®)

Bicalutamide is indicated for use in combination therapy with a luteinizing hormone-releasing hormone (LHRH) analog for the treatment of Stage D2 metastatic carcinoma of the prostate. It is an oral non-steroidal androgen receptor inhibitor that competitively inhibits androgen action by binding cytosol androgen receptors in target tissues, particularly in prostate cancer. Common adverse reactions (≥20%) include pain, hot flashes, gynecomastia, constipation, mastalgia, pelvic pain, back pain, and weakness.

Mosunetuzumab-axbg (Lunsumio ®)

Mosunetuzumab-axbg received FDA accelerated approval for the treatment of relapsed or refractory follicular lymphoma after two or more lines of systemic therapy in adults. It works as a bispecific B-cell maturation agent (BCMA)-directed CD3 T-cell engager and binds to the CD3 receptor on surface of T-cells and CD20 receptor on surface of lymphoma cells and some healthy B-cell lineages. In vitro, activated T-cells cause the release of proinflammatory cytokines and induces lysis of B-cells. Major adverse effects of this therapy include cytokine release syndrome and neurologic toxicity (ICANS).

Teclistamab (Tecvayli ®)

Teclistamab received FDA accelerated approval for the treatment of relapsed or refractory multiple myeloma who have received four prior lines of therapy (including a proteosome inhibitor, an immunomodulatory agent, and an anti-CD38 monoclonal antibody) in adults. It is a humanized immunoglobulin G4-proline, alanine, alanine (IgG4-PAA) antibody that works as a bispecific B-cell maturation agent (BCMA)-directed CD3 T-cell engager and binds to the CD3 receptor on surface of T-cells and CD20 receptor on surface of lymphoma cells and some healthy B-cell lineages. This results in T-cell activation, release of proinflammatory cytokines, and lysis of BCMA-expressing multiply myeloma cells. Major adverse effects of this therapy include cytokine release syndrome and neurologic toxicity (ICANS).

Tenecteplase (TNKase®) for acute ischemic stroke

Tenecteplase is FDA approved for the treatment of myocardial infarction, pulmonary embolism, and catheter occlusion. However, it has recently been used by many in the treatment of acute ischemic stroke. AHA Acute Ischemic Stroke Guidelines state that it may be reasonable to choose tenecteplase over alteplase in patients without contraindications for IV fibrinolysis who are also eligible to undergo mechanical thrombectomy. In the presence of fibrin, tenecteplase conversion of plasminogen to plasmin is increased relative to its conversion in the absence of fibrin. Fibrin specificity decreases systemic activation of plasminogen and degradation of circulating fibrinogen. Benefits over the traditionally used therapy of alteplase include greater fibrin specificity, longer half-life, and bolus administration. Common adverse effects include minor hematoma, minor GI hemorrhage, minor hemorrhage, minor renal artery, and hemorrhage. ……Continued on page 3

Drug Info Corner

Laura Lee, PharmD
PGY1 Pharmacy Resident

***Question**: Why is capsaicin cream used for cannabinoid hyperemesis syndrome and how should it be used for that indication?*

***Response**:* **Cannabinoid hyperemesis syndrome is a condition caused by chronic cannabis use**. Patients will present with cyclic abdominal pain, nausea, or vomiting. This may **improve with hot showers/baths or with cessation of cannabis use**. Acute management in the hospital setting will typically involve hydration with intravenous fluids, administration of antiemetics, and the use of benzodiazepines. The usual antiemetics include ondansetron or metoclopramide. Other interventions may include droperidol, haloperidol, or topical capsaicin.[1]

Capsaicin is responsible for the heat and spice of chili peppers. The sensation of heat is due to the binding of capsaicin to the transient receptor potential vanilloid 1 receptor (TRPV1).[2] Cannabinoids activate both cannabinoid receptor type 1 (CB1) and TRPV1.[3] However, chronic cannabis use can lead to downregulation of TRPV1, which may result in nausea, vomiting, and abdominal pain. Therefore, it is thought that **topical capsaicin may provide relief of symptoms** through its activation of TRPV1.[4]

Capsaicin is currently available over-the-counter in strengths ranging from 0.025% to 0.1%.
Application instructions for this indication include:

- wearing gloves to apply the cream
- washing hands after application
- avoiding contact with eyes
- apply a 1 mm thick layer to patient's abdomen[4]
- apply 3 or 4 times per day as needed.[5,6]

A randomized, double-blinded, and placebo-controlled trial was conducted to evaluate the safety and efficacy of topical capsaicin versus placebo in the management of cannabinoid hyperemesis syndrome. In this trial, 30 patients underwent randomization with 17 patients allocated to the capsaicin group and 13 patients allocated to the placebo group. Patients randomized to the capsaicin group received a single application of 5 grams of 0.1% capsaicin cream while patients randomized to the placebo group received a single application of moisturizing cream. The primary outcome was the patients' reported nausea on a visual analog scale (ranging from 0 to 10 cm with 10 being most severe) 30 minutes after application and the secondary outcome included the patients' reported nausea 60 minutes after application. The results showed that patients who received capsaicin cream had a lower reported nausea score at 30 minutes vs placebo (4.1 vs 6.1; p=0.075). At 60 minutes, there was a statistically significant reduction in reported nausea score with the capsaicin group vs placebo (3.2 vs 6.4; p=0.007). Only 1 patient in the capsaicin group experienced an adverse event due to skin irritation that required removal of the cream.[7]

Continued on page 3……

Comparison of Personal-Use CGM Devices (continued from page 4)

	Dexcom G7[2,4]	Abbott FreeStyle Libre 3[2,3]	Dexcom G6[2,4]	Abbott FreeStyle Libre 2[2,3]
				
Sensor Wear	Sensor up to 10 days (+12 hour grace period to swap sensor)	Sensor up to 14 days	Sensor up to 10 days; replace transmitter every 90 days	Sensor up to 14 days
Device Compatibility	Reader, smartphone, smartwatch	Smartphone, smartwatch **no separate reader device**	Reader, smartphone, smartwatch	Reader or smartphone
Approved Ages	2+	4+	2+	4+
Apps	Dexcom G7 Mobile, Dexcom Clarity, Dexcom Follow	FreeStyle Libre 3, FreeStyle LibreLink, FreeStyle Libre desktop software	Dexcom G6 Mobile, Dexcom Clarity, Dexcom Follow	FreeStyle Libre 2, FreeStyle LibreLink, FreeStyle Libre desktop software
Approved Application Sites	Back of the upper arm for ages 2+ or upper buttocks for ages 2-17	Back of upper arm	Abdomen (for patients age 2+) or the upper buttocks (ages 2-17)	Back of upper arm
MARD*	8.2% (adults)	7.9%	9%	9.2%
Glucose Readings	Real-time glucose readings measured and sent to app or receiver automatically via Bluetooth every 5 minutes. Fingersticks only needed for backup	Real-time glucose reading measured and sent every 1 minute to smart-device – no scanning required. Fingersticks only needed for backup	Real-time glucose readings measured and sent to app or receiver automatically via Bluetooth every 5 minutes. Fingersticks only needed for backup	Real-time glucose reading measured every 1 minute – sensor must be scanned at least every 8 hours to capture all data**. Fingersticks only needed for backup
Insulin Pump Integration?	Pending	No	Yes. Compatible with Tandem t:slim X2, Omnipod 5	No
Range	Must be within 20 (unobstructed) feet of the receiver or mobile device	Transmitter and smart device should be within 2o feet of each other	Must be within 20 (unobstructed) feet of the receiver or mobile device	Transmitter and reader/smart device should be within 2o feet of each other
Warm-up Time	30 minutes	1 hour	Up to 2 hours	1 hour
Interfering Substances	n/a	Vitamin C >500mg/day may falsely raise CGM glucose readings	Hydroxyurea (causes falsely elevated sensor readings); acetaminophen >4g a day may falsely elevate sensor readings	Vitamin C >500mg/day may falsely raise CGM glucose readings

……Continued from page 2

Capsaicin and Cannabinoid Hyperemesis Syndrome

The literature discussed above supports the use of capsaicin cream in managing the symptoms of patients with cannabinoid hyperemesis syndrome. Based on the results of the pilot trial, a single dose of 5 grams of 0.1% capsaicin cream applied to the abdomen may be effective for patients presenting to the emergency department with cannabinoid hyperemesis syndrome. For patients with refractory nausea, it may be reasonable to apply topical capsaicin up to three times a day as needed given that it has been shown to be safe to use for this indication.

References

1. Wang GS. Cannabis (marijuana): Acute intoxication. In: Post TW, ed. UpToDate. UpToDate; 2023. www.uptodate.com. Accessed February 2, 2023.
2. Rollyson WD, Stover CA, Brown KC, et al. Bioavailability of capsaicin and its implications for drug delivery. J Control Release. 2014;196:96-105.
3. Moon AM, Buckley SA, Mark NM. Successful Treatment of Cannabinoid Hyperemesis Syndrome with Topical Capsaicin. ACG Case Rep J. 2018;5:e3. Published 2018 Jan 3.
4. Kum V, Bell A, Fang W, VanWert E. Efficacy of topical capsaicin for cannabinoid hyperemesis syndrome in a pediatric and adult emergency department. Am J Emerg Med. 2021;49:343-351.
5. Senderovich H, Patel P, Jimenez Lopez B, Waicus S. A Systematic Review on Cannabis Hyperemesis Syndrome and Its Management Options. Med Princ Pract. 2022;31(1):29-38.
6. Lapoint J, Meyer S, Yu CK, et al. Cannabinoid Hyperemesis Syndrome: Public Health Implications and a Novel Model Treatment Guideline. West J Emerg Med. 2018;19(2):380-386.
7. Dean DJ, Sabagha N, Rose K, et al. A Pilot Trial of Topical Capsaicin Cream for Treatment of Cannabinoid Hyperemesis Syndrome. Acad Emerg Med. 2020;27(11):1166-1172.

CONTINUED from page 1 – Formulary Update

Abiraterone (Yonsa®, Zytiga®)

Abiraterone is indicated for the treatment of metastatic, castration-resistant prostate cancer (in combination with prednisone [Zytiga] or methylprednisolone [Yonsa]). Abiraterone is an antiandrogen that selectively and irreversibly inhibits CYP17, an enzyme required for androgen biosynthesis which is expressed in testicular, adrenal, and prostatic tumor tissues, and inhibits the formation of testosterone precursors (DHEA and androstenedione). Common adverse reactions (>20%) include: edema, hypertension, hot flashes, hyperglycemia, hypernatremia, hypertriglyceridemia, hypokalemia, hypophosphatemia, constipation, diarrhea, increased AST/ALT, fatigue, arthralgia, myalgia.

Anastrozole (Arimidex®)

Anastrozole is indicated for first-line treatment of locally advanced or metastatic breast cancer (hormone receptor–positive or unknown) in postmenopausal patients; adjuvant treatment of early hormone receptor-positive breast cancer in postmenopausal patients; and treatment of advanced breast cancer in postmenopausal patients with disease progression following tamoxifen therapy. Anastrozole is a selective nonsteroidal aromatase inhibitor that inhibits the conversion of androstenedione to estrone and testosterone to estradiol, which decreases tumor mass or delays progression in patients with tumors responsive to hormones. Common adverse reactions include decreased bone mineral density/increased risk of osteoporosis and fractures, ischemic cardiovascular events (angina pectoris, acute myocardial infarction), musculoskeletal events (arthralgia, ostealgia), vasodilation, hot flashes, GI distress.

Venetoclax (Venclexta®)

Venetoclax is indicated for treatment of newly-diagnosed acute myeloid leukemia (in combination with azacitidine, decitabine, or low-dose cytarabine) in patients ≥75 years of age, or in patients with comorbidities that preclude use of intensive induction chemotherapy; treatment of chronic lymphocytic leukemia or small lymphocytic lymphoma in adults. It is a selectively inhibits anti-apoptotic protein BCL-2, which is overexpressed in CLL and AML cells, thus displacing pro-apoptotic proteins and restoring the apoptotic process. Common adverse reactions (>20%) include edema, hyperglycemia, hyperkalemia, hypoalbuminemia, hypocalcemia, hyponatremia, hypophosphatemia, nausea, diarrhea, anemia, leukopenia, lymphocytopenia, neutropenia, thrombocytopenia, musculoskeletal pain.

Asparaginase erwinia chrysanthemi (Erwinase®)

Asparaginase erwinia chysanthemi is indicated for treatment of acute lymphoblastic leukemia (in combination with other chemotherapy) in patients with hypersensitivity to E. coli-derived asparaginase. Asparaginase catalyzes the deamidation of asparagine to aspartic acid and ammonia, reducing circulating levels of asparagine. Leukemia cells lack asparagine synthetase and are unable to synthesize asparagine. Asparaginase reduces the exogenous asparagine source for the leukemic cells, resulting in cytotoxicity specific to leukemic cells.

Continuous Glucose Monitoring

Gabrielle Sanza, PharmD
PGY1 Community-Based Pharmacy Resident

In the United States, approximately 37 million people (1 in 10) have either Type 1 or Type 2 Diabetes with ~1.4 million new diagnoses each year[1]. While the prevalence of Americans with diabetes continues to rise, the field of diabetes is rapidly evolving as new research, treatment agents, and technologies emerge. One of these evolving technologies are **continuous glucose monitors (CGM).**

Traditional glucose monitoring for people with diabetes has been via fingerstick capillary testing of the blood sugar at varying frequencies daily. While this is an accurate and effective method for people with diabetes to monitor their own blood glucose levels, the fingersticks necessary are often found to be painful and inconvenient for patients especially if the clinician treating their diabetes wants to see many readings throughout the day. The first introduction of continuous glucose monitoring in 1999 (Minimed CGM systems) was the beginning of a revolutionary change to the management of diabetes. CGM systems are **small medical devices used to measure blood glucose continuously over the course of a person's day and through the night**.

How does a CGM work??

CGMs use a **sensor inserted under the skin** which measures the **interstitial glucose** a.k.a. the glucose that is found in the fluid between the cells. Interstitial glucose correlates very well to plasma glucose, however, glucose enters the bloodstream first therefore **sensor glucose readings lag slightly behind blood glucose readings**. This lag is greatest in periods when the blood sugar is rising or falling at a rapid rate[2]. Next, a transmitter sends the information from the sensor to a receiver. This receiver may be a smartphone, smartwatch, tablet, or other device-specific reader.

CGM Definitions:

- **Personal-use CGM:** owned by the individual consumer and data may be used both in real time and retrospectively to visualize and make decisions regarding their diabetes control
- **Professional-use CGM:** refers to devices that are owned and applied by the healthcare center. Data may be blinded (to the wearer) or unblinded for use for a period of time. May be helpful to trial if a given patient is a good candidate for personal CGM use
- **Intermittently-scanned CGM:** requires the wearer to use the receiver/reader/smart device to scan the sensor in order to obtain glucose data
- **Real-time CGM:** automatically transmits glucose data to the receiver/smart device

TOOL FOR PROVIDERS:
https://pro.diabeteswise.org
Prescription assistant tool, up-to-date resources for providers to compare features of CGM devices, see complete order/prescription requirements for each device, gain insight on cost & third-party coverage, and more!

Beneficial Features of Many CGM Devices:

- Visualize both real time data as well as trends in blood sugar control over time
- Anticipate anticipated low blood sugars and alarm patient before occurring
- High and low blood sugar alerts; trend arrows indicating how fast the blood sugar is changing at that moment
- Data can be sent to multiple people/devices (parents, spouses, caretakers, etc.)

When NOT to Use CGM:

- If the patient's symptoms don't match the sensor reading – do a confirmatory fingerstick test
- Dialysis patients
- In patients who are critically ill

Use of CGM has been shown to **decrease hemoglobin A1C, decrease episodes of hypoglycemia, decrease glycemic variability, increase time in range** (% of glucose readings between 70-180mg/dL), and **improve quality of life**[2]. This technology is constantly evolving and improving and today it is the standard of care for individuals treated with intensive insulin regimens[2]. Data from CGMs, when used appropriately and sufficiently, provides better guidance to patients managing their diabetes at home and to treating clinicians who can make appropriate, individualized therapeutic decisions based on a more complete picture of blood glucose fluctuations through the day and overnight.

References:
American Diabetes Association. Economic Costs of Diabetes in the U.S. in 2017. Diabetes Care. 2018;41(5):917-928. doi:10.2337/dci18-0007
ElSayed NA, Aleppo G, Aroda VR, et al. 7. Diabetes Technology: Standards of Care in Diabetes-2023. Diabetes Care. 2023;46(Suppl 1):S111-S127. doi:10.2337/dc23-S007
FreeStyle Libre 3 User's Manual.
Garg SK, Kipnes M, Castorino K, et al. Accuracy and Safety of Dexcom G7 Continuous Glucose Monitoring in Adults with Diabetes. Diabetes Technol Ther. 2022;24(6):373-380. doi:10.1089/dia.2022.0011Medtronic Inc., A Performance Evaluation of the Enlite® 3 Glucose Sensor to Support a Full 168 hours (7 Days) of Use, CER292DOC/F. Oct 2016.
Lorenz C, Sandoval W, Mortellaro M. Interference Assessment of Various Endogenous and Exogenous Substances on the Performance of the Eversense Long-Term Implantable Continuous Glucose Monitoring System. Diabetes Technol Ther. 2018;20(5):344-352. doi:10.1089/dia.2018.0028

CONTINUED ON PAGE 5