Rotation Spotlight:
UGA Veterinary Teaching Hospital

Setting aside my well-known obsession for veterinary medicine, I can say that this is one of the most unique rotations I’ll have. Not only did this rotation give me many once in a lifetime opportunities, but it also gave me the chance to practice my physical assessment skills and apply medication knowledge to a multitude of animals, including dogs, cats, rabbits, and birds.

During my first week, I spent time in the ICU. I was able to assist in taking blood pressures, heart rates, respiratory rates, and temperatures of my patients; hopefully I made Dr. Francisco proud! I also took part in dosing, mixing, and administering medications via IV, PO, and nebulization routes. After completing all of these tasks, I practiced my documenting skills by recording everything in the patient chart.

For my second week, I got to hang out in the exotics department. I spent time watching the veterinarians and students conduct physical exams, saw multiple CT scans and MRIs in action, watched a guinea pig get injected with radioactive technetium to test for hyperthyroidism, aided in a transtracheal wash on a 13-foot python, and witnessed surgeries on a king snake, a hawk, and a pot-bellied pig.

During the third week, I worked with the rehab team. There, I was able to learn about many orthopedic and neurologic disease states and different therapies such as infrared laser and water treadmill. Pictured is one of the degenerative myelopathy patients, Lucky, on the water treadmill a few days before his 13th birthday.

This rotation gave me countless opportunities to be an active member of a collaborative healthcare team and it also gave me tons of direct patient care. It has been such a pleasure being here and I know I’ll be able to take what I have learned into my future career!

Written by: Shannon Schnable (Atlanta Campus)
Reviewed by: Aasna Patel (Augusta Campus)

Measles—They’re Back!

By the year 2000, the United States saw the elimination of measles. Due in part to both the development of an effective vaccine and aggressive vaccination protocols, the severe and potentially deadly complications of measles became distant medical history to many. Recently, however, the disease has reemerged in the United States with over 1,148 cases reported in 2019 alone.¹ This rise in incidence is due to increased international travel, plummeting vaccination rates, and the spread of misinformation about the vaccine’s safety. It is thus integrally important for healthcare professionals to stay up to date on current vaccine recommendations, including the measles, mumps and rubella (MMR) vaccine.

The MMR vaccine is a safe, subcutaneous injection that contains live attenuated measles, mumps, and rubella viruses with a 97% success rate of preventing measles with 2 doses.² The current dosing schedule for children


²(Continued on page 2)
They can improve the public’s knowledge of vaccines, identify the appropriateness of vaccines, and easily dispel myths with scientific facts addressing patients’ concerns. In order to help healthcare professionals stay abreast on current data, the CDC has resources such as “Understanding Thimerosal, Mercury, and Vaccine Safety” and “Talking with Parents about Vaccines for Infants.” These articles are of particular value in preparation for addressing patient concerns and potential questions.

Written by: Aaron Chase (Augusta Campus)
Reviewed by: Casey Rice (Savannah Campus)

References:

Clinica Latina is a free clinic whose vision is to improve access to healthcare within the Central Savannah River Area (CSRA) with an emphasis to serve Augusta’s vast Hispanic population. Physicians and students can see 10-30 patients per clinic, and interpreters round with medical teams to ensure optimal patient care and communication. By striving to provide the best care possible, medical and PA students at Augusta University requested the addition of pharmacy services in 2018.

As third and fourth year pharmacy students, we have the opportunity to provide pharmacotherapy expertise via interventions during patient interviews and promote interdisciplinary learning in an ambulatory care setting. Since the majority of medical and PA students have not undergone pharmacotherapy training yet, they appreciate the opportunity to learn from PharmD students. Anabel Liyen Cartelle, a medical student and member of Asociacion Latina de Servicios del CSRA (ALAS), states, “The addition of pharmacy services to the clinic has vastly improved not only the efficiency, but also the accuracy of our prescription process.”

As a coordinator, my favorite aspect of volunteering at Clinica Latina is assisting our physicians and other students in finding the most cost effective options for patients. I feel like I am making a difference when I can use the knowledge I have gained as an intern to solve barriers to medication access before they ever reach the retail pharmacy. For example, knowing which medications are on back order and knowing about Walmart’s insulin program has a positive impact on medication adherence and, ultimately, outcomes. In addition to solving cost-related problems, I also enjoy solving medication-related problems. In an interesting case, one of our volunteers discovered that a new patient was taking a friend’s Trulicity without a diagnosis of diabetes. The patient’s blood sugar was 80 mg/dL, which was incredibly concerning, since clinic is open in the evening and this was likely a postprandial value. These experiences, patient interactions, and relationships with other healthcare professionals are why I enjoy volunteering at Clinica Latina.

Written by: Behren Ketchum (Augusta Campus)
Reviewed by: Aubrey Slaughter (Augusta Campus)
Atrial fibrillation (AF) is a disease characterized by extremely rapid and disorganized atrial contractions which translate to an irregularly irregular pulse of approximately 120-180 beats per minute. AF is often induced by damage to the heart’s structure and complications from heart disease such as infarction, ischemia, and valvular disorders, or by pulmonary emboli or chronic lung disease. Individuals with AF often present with chest pain or pressure, shortness of breath, palpitations, dizziness, and weakness. Thromboembolic complications are more likely to occur in those with AF and, therefore, are of major concern.

The 2014 AHA/ACC/HRS Guideline for the Management of Patients with Atrial Fibrillation has been updated this year to reflect new evidence as well as new drug approvals. Edoxaban has now been included among the other NOACs (apixaban, dabigatran, and rivaroxaban) as a recommended therapy, and NOACs are recommended over warfarin for all eligible patients except those who have moderate to severe mitral stenosis or mechanical heart valves. Recommended reversal agents include idarucizumab for dabigatran and andexanet alfa for rivaroxaban or apixaban. For more information, the update can be found on the Journal of the American College of Cardiology (JACC) website.

Written by: Brian Voyles and Theo Vaggalis
(Savannah Campus)
Reviewed by: Olivia Nechvatal (Albany Campus)

References:

Clinical Pearls

**Apixaban (Eliquis) dosing for stroke prevention in AF is 5 mg by mouth twice daily, unless at least two of the following are present:**
- Age >80 years
- Body weight <60 kg
- SBP >110 mm Hg

If two or more of the above are present, the dose is decreased to 2.5 mg twice daily

**A CHA2DS2VASc score of >2 in men and >3 in women indicates anticoagulation therapy:**
- Female sex only adds to the score when other risk factors are present
- Patients over 65 years old only need one (non age/sex factor) to be indicated for therapy

**Per the 2019 AF Guideline update, the term “nonvalvular atrial fibrillation” is no longer used**

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**Brexanolone (Zulresso™): New Drug Approval Represents Breakthrough in Fight Against Postpartum Depression**

Postpartum Depression (PPD), the leading cause of maternal suicide in the U.S. and a significant complication in childbirth, has been a rising concern in Women’s Health. PPD affects approximately 600,000 U.S. women annually, with the majority experiencing moderate to severe symptoms. According to the CDC, an estimated 12.8% of women in Georgia self-reported experiencing PPD in 2015. Although the etiology of PPD remains unclear, speculation suggests that hormone level decline may play a roll. Prior to pregnancy, the daily average hormonal levels are approximately 20 mg of progesterone, 15-350 pg/mL of estrogen, and <5nM of allopregnanolone. During pregnancy, these levels increase to 400 mg of progesterone, up to 1000 times higher estrogen levels, and 150 nM of allopregnanolone. In the postnatal stage, hormone levels drop dramatically. These

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hormones are involved with neuroprotective, anxiolytic, and sedative properties that lower depressive symptoms.

According to the DSM-5, PPD is not recognized separately from Major Depressive Disorder. Patients must meet specific criteria for a major depressive episode and have major depressive episodes during pregnancy or within 4 weeks of delivery. The Hamilton Depression Rating Scale (HAM-D) is one of the most common tools used to diagnose PPD and involves 17-28 survey questions with scores representing the disease severity - moderate is 14-18 and severe is ≥19.

Brexanolone (Zulresso™), the first direct treatment for PPD, was approved by the FDA in March 2019 for the treatment of moderate to severe PPD in non-pregnant adult women. Zulresso™ is a gamma-aminobutyric acid A (GABA_A) receptor modulator and is identical to endogenous allopregnanolone. Treatment involves a 60-hour infusion with an extensive administration schedule as outlined in Table 1. The drug is available as a 100 mg/20mL (5 mg/mL) single-dose vial, which requires dilution prior to administration and can be kept refrigerated for up to 96 hours.

**Table 1. Dosing Schedule**

<table>
<thead>
<tr>
<th>Time Interval</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4 hours</td>
<td>30 mcg/kg/hr</td>
</tr>
<tr>
<td>4-24 hours</td>
<td>60 mcg/kg/hr</td>
</tr>
<tr>
<td>24-52 hours</td>
<td>90 mcg/kg/hr</td>
</tr>
<tr>
<td>52-56 hours</td>
<td>60 mcg/kg/hr</td>
</tr>
<tr>
<td>56-60 hours</td>
<td>30 mcg/kg/hr</td>
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</tbody>
</table>

Drug approval was based on two multicenter, randomized, placebo-controlled, phase 3 trials. The primary endpoint was the change from baseline in the HAM-D total scores at 60 hours. Three hundred and seventy-five were screened simultaneously across both studies. In the first study, 138 patients were randomly assigned to receive either Brexanolone 90 mcg/kg/hour (BRX90), Brexanolone 60 mcg/kg/hour (BRX60), or placebo. The average reduction in HAM-D total score from baseline at 60 hours was 17.7 points in the BRX90 group (p=0.0252), 19.5 points in the BRX60 group (p=0.0013), and to 14.0 points in the placebo group, as seen in Figure 1 above. In the second study, 108 patients were randomly assigned to receive BRX90 or placebo. For this study, the average reduction in HAM-D total score from baseline at 60 hours was 14.6 points in the BRX90 group (p=0.0160) compared to 12.1 points in the placebo group.

The most common adverse reactions include sedation/somnolence, dry mouth, loss of consciousness, and flushing/hot flash. This medication is contraindicated in end stage renal disease. It also has a Boxed Warning for risk of excessive sedation or loss of consciousness during administration and, as a result, is only available under a Risk Evaluation and Mitigation Strategy.

Diagnosis and treatment of PPD can be met with many barriers, including the stigma associated with mental health, REMS enrollment requirement for patients and healthcare providers, long drug infusion time, and cost. Zulresso is estimated to cost around $34,000, making it impractical for most.

Because many obstacles exist for appropriate PPD care, regular PPD screenings at OB/GYN and pediatric offices, mental health awareness campaigns, and patient advocacy are all incredibly important for new mothers.

Written by: Diane Ayuninjam (Athens Campus)
Reviewed by: Catherine Rothery (Augusta Campus)

References:
Updated C. Diff Guidelines

Emory University Hospital is a front-runner in new medical and pharmacologic developments. During my Advanced Institutional at EUH, I experienced a wide range of evidence-based practices. In addition to exposure to transplant, oncology, and emergency medicine, I spent a great deal of time working up cystic fibrosis (CF) patients. These are very complex patients that are burdened with a lifetime of intensive medication regimens. Among these patients’ numerous disease states, *Clostridium difficile* colonization is a common chronic comorbidity in this population. *Clostridium difficile* is a spore that causes severe infection in many hospitalized patients and presents a heavy financial burden in healthcare. The IDSA released updated *C. diff* guidelines in early 2018, and the clinical effects are still trickling down into practice.

One large discrepancy that remains, despite the updated *C. diff* guidelines, is the use of *C. diff* infection (CDI) treatment as prophylaxis for those with recurrent infections and continued exposure to antibiotics. This directly affects the CF patients that I saw at Emory. There are no recommendations in the new guidelines to support the use of extended treatment or prophylaxis. The risks associated with prophylaxis are unknown. As an institution that is grounded in evidence-based medicine, the pharmacists at Emory routinely recommended that prophylaxis be discontinued. However, many of the CF patients at Emory that have been maintained on prophylaxis were hesitant about this modification of therapy.

One of the most notable updates is the role of metronidazole in treatment. In the 2010 guidelines, metronidazole was the first line treatment for an initial, non-severe CDI. In the updated 2018 guidelines, metronidazole is now third-line and should only be used when neither oral vancomycin nor fidaxomicin are available. Intravenous metronidazole is still indicated in combination with oral vancomycin in fulminant CDI.

There are also specific recommendations for the pediatric population. Treatment for mild initial episodes and first recurrence of non-severe infections is either oral vancomycin or metronidazole. Treatment for severe initial episodes and recurrent infections is oral vancomycin.

The criteria to test for CDI has also been updated in the new guidelines. A patient should be tested when they produce 3 or more unformed stools in 24 hours. It is no longer recommended to test for infection during the same episode of diarrhea, within 7 days, and it is not recommended to test in asymptomatic patients. The recommendations for detection methods differ based on the institution’s protocol. When there are pre-agreed criteria for patient stool submission for testing, the NAAT alone or a multistep algorithm including GDH + toxin can be used. There were pre-agreed criteria at Emory, as the hospital has been proactively combating CDIs for years.

The recommendations to prevent the spread of *C. diff* are largely the same as in past guidelines, including preference of hand washing with soap and water over alcohol-based cleaners. Likewise, patients who are suspected of having a CDI should be preemptively placed on contact precaution. Gowns and gloves are required for healthcare professional while caring for patients with confirmed or suspected CDI.

### First Line Recommendations

<table>
<thead>
<tr>
<th>Initial CDI Episode</th>
<th>Fulminant CDI</th>
<th>Recurrent CDI</th>
</tr>
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<tbody>
<tr>
<td>Oral vancomycin (125 mg four times daily)</td>
<td>Oral vancomycin (500 mg four times daily)</td>
<td>Oral vancomycin (pulsed regimen as opposed to standard 10 day regimen)</td>
</tr>
<tr>
<td>Fidaxomicin (200 mg twice daily) for a duration of 10 days</td>
<td><em>If ileus is present – add IV metronidazole (500 mg every 8 hours) and vancomycin per rectum</em></td>
<td>Fidaxomicin (if patient was treated with vancomycin first)</td>
</tr>
</tbody>
</table>

Altogether, the new *C. diff* guidelines differ largely from past guidelines in recommendations for prevention, detection, and treatment of CDIs. The clinical impacts of reviewing and implementing these updated recommendations in pharmacy practice are appropriate antibiotic stewardship practices, decreased financial burden, and improved patient outcomes.

Written by: Erin Bendock (Athens Campus)
Reviewed by: Maggie Segovia (Augusta Campus)

References:

Indoor Plants: Whose Got the Thyme?

There’s no doubt about it, with rotations in full swing, our schedules are BUSY. Packed may be the better word. Any time we get to spend outdoors is fought for and treasured. So, if you feel like you’re missing out on what nature has to offer this time of year, it’s time to bring the nature to you.

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Indoor Plants: Whose Got the Thyme?

Thanks to our generation’s new-found botany obsession, there is no shortage of scientific research on the benefits of indoor plants (que the little nerd in us jumping for joy). They help us breathe easier by removing carbon dioxide and adding water to the air. The added humidity can help prevent sore throats, dry coughs, and even dry skin. Additionally, a study by NASA reveals that indoor plants can remove 87% of volatile organic compounds (VOCs) such as formaldehyde, benzene, and trichloroethylene; chemicals found in many household products and dyes. Data has also shown that adding plants to a room can help lower blood pressure, reduce stress, relieve headaches, and improve focus. Kansas State University even conducted a study that showed a decrease in length of hospital stay for patients that had plants in their room!

If your convinced of the benefits but a little less confident in your green thumb, no worries. Thankfully, there are several self-sufficient plant options that won’t mind your dark apartment or transient watering. The following ten indoor plants can’t wait to make your house a home.

10 Indoor Plants for Apartments:

1. Air Plant – yes really, no soil!
2. Spider Plant – loves indirect sunlight, little shady thing
3. Ficus Tree – grandma had one, you can too
4. Zebra Plant – this guy can live in a room without windows!
5. Snake Plant – these can withstand weeks of neglect and are GREAT air purifiers
6. ZZ Plant – only needs to be watered three times a month
7. Cacti – the camels of the plant world
8. Succulents – better yet, sucCUTElent; just mist with water once every two weeks
9. Peace Lily – if you’re after low maintenance but still want a flowering plant, look no further
10. Iron Plant – they brighten up any room they walk into

Written by: Cassidy Sims (Augusta Campus)
Reviewed by: Aubrey Slaughter (Augusta Campus)

References: