Feature Article

Pharmacy Learners

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Student pharmacists complete clinical practicums as part of their training to gain experience in various pharmacy settings and leadership skills. As practice educators or preceptors, we are in a unique position to make a meaningful impact in their development as future colleagues. Students are encouraged to take a collaborative approach to their learning as they are able to provide current clinical practice information to their practice sites.

At the Pharmacists Clinic (the clinic), we welcome 12-16 pharmacy learners per year on practicum. A standard approach to planning the learning activities was developed to ensure students are able to get the most out of their experience. We embrace the approach of teaching while learning from our students.

Onboarding process
Students start their practicum with an orientation about the clinic, staff and resources. They meet with the director to gain perspective on the mandate of the clinic. Training is provided on how to use the electronic medical record (EMR) system as it may be their first time documenting in an EMR. As primary care practice is a new environment for most learners, mock patient cases were developed as part of the onboarding process to gauge their clinical thought process and abilities.

Tiered learning
When the Clinic has multiple pharmacy learners simultaneously, it presents the opportunity for a tiered learning approach. Senior learners can provide therapeutic teaching sessions to junior learners, which helps develop their teaching and communication skills. This approach can also reduce the teaching duties of the practice educator.

Journal clubs
Journal club exercises done in a group setting is a way to strengthen critical appraisal skills through discussing potential issues and interpretations of primary literature. Disseminating that information to the pharmacy team is one way for the team to gain knowledge and remain up to date on current evidence.

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Case Study

Opioid Conversion: More than just math

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A 55-year old woman is referred to the UBC Pharmacists Clinic with a chief complaint of chronic pain. Her current medical conditions and medications are detailed below. In addition, she reports 1–2 cups of coffee daily and minimal physical activity. She has no known drug allergies. Her main goal was to improve functional status as she is the primary caregiver for her elderly parents.

Chronic pain
- Codeine controlled release 50mg one tablet PO BID PRN
- Hydromorphone 1mg one tablet PO q4h PRN
- Acetaminophen/caffeine/codeine 30mg one to two tablets PO QD PRN

Migraines
- Topiramate 75mg one tablet PO HS
- Sumatriptan 100mg one tablet PO at onset
- Vitamin B2 400mcg one tablet PO QD
- CoQ10 100mg one tablet PO QD

Hypertension
- Ramipril/hydrochlorothiazide 5mg/25mg one tablet PO QD

Osteoarthritis (jaw, hands, back, knees) and Sleep apnea

The patient’s chronic pain is localized to her face with auriculotemporal nerve and temporomandibular joint involvement and radiates to her neck and shoulders. Quality of pain is described as throbbing, stabbing, aching with pins and needles sensation along the jawline. Severity at best is 6/10 and as bad as 10/10 during migraines. Current pain management consists of long-term opioid therapy as prior alternatives for neuropathic pain were ineffective. Past medications include gabapentin, pregabalin, amitriptyline, NSAIDs (ibuprofen,
naproxen, celecoxib), acetaminophen, and tramadol. The patient's current medication regimen is complex and may increase risk of confusion. Due to uncontrolled pain, the patient may benefit from an opioid switch (also known as opioid rotation) as patients with waning efficacy or tolerability concerns often see improvement upon switching.\(^1\)\(^2\)\(^3\) Recommendations in this case are based on the 2017 Canadian Guideline for Opioids for Chronic Non-Cancer Pain and a review on current opioid rotation practices conducted by Smith and Peppin (2014).\(^2\)\(^3\)

Opioid rotation is indicated for uncontrolled pain, intolerable adverse effects, onset of hepatic or renal impairment, change in route of administration or cost considerations.\(^1\)\(^2\)\(^3\) Daily opioid use for this patient consisted of 50–100mg of codeine controlled release, 4mg of hydromorphone IR, and 1–2 tablets of acetaminophen with caffeine and codeine (30–60mg of codeine). The breakthrough doses were self-limited by the patient.

**Opioid Potency Ratios in Equianalgesic Tables**

For opioid rotation, the total daily dose of the current opioid is converted to a reference, usually morphine, which is then converted to the opioid of choice.\(^1\)\(^2\)\(^3\) Equianalgesic tables provide a rough approximation of equivalent opioid potency.\(^1\)\(^4\) Final calculations may differ based on differences in potency ratios as listed in **Table 1**. Ratios may be based on studies, other equianalgesic tables and clinical experience.\(^4\)

**Cross-Tolerance**

A large limitation of equianalgesic tables is a lack of patient specific factors. The final opioid dose must be adjusted to account for individual patient characteristics, comorbidities, concurrent medications, and incomplete cross-tolerance.\(^1\)\(^2\)\(^3\) Derived analgesic effects may differ based on genetics, age and gender.\(^2\)\(^4\) Upon conversion to the opioid of choice, a dose reduction of 25–50% is required to account for incomplete cross-tolerance to reduce the risk of inadvertent overdose.\(^2\)\(^3\) A larger reduction (50%) is indicated in elderly or frail patients or if the original opioid dose was high.\(^2\) In this case, our non-elderly patient was experiencing uncontrolled pain with the original regimen and therefore a smaller reduction may be appropriate.

**Variability in Response to Codeine**

Response to codeine depends on the activity of the hepatic CYP2D6 enzyme which converts codeine to its active metabolite, morphine.\(^5\) Patients fall into four categories of metabolizers (ultrarapid, normal, intermediate and poor) with associated differences in analgesic effects.\(^5\) Patient variability in codeine metabolism is not represented in equianalgesic tables, highlighting the importance of tailoring the opioid dose to the patient. In these cases, a more conservative initial dose with frequent monitoring and titration can avoid the potential of toxicity.

Another variability is how codeine doses are reported. For example, codeine controlled release tablets are reported in codeine base (e.g. 100mg of base codeine), but immediate release codeine (e.g. 30mg in a combination preparation) is reported as codeine phosphate (contains approximately 75% codeine base). This can be an important consideration when switching between different codeine formulations.

**Table 1 - Equianalgesic oral opioid dosing (mg) based on three sources**

<table>
<thead>
<tr>
<th>Opioid</th>
<th>Vancouver Coastal Health(^4)</th>
<th>eCPS Opioid monograph(^7)</th>
<th>Opioid guidelines for CNCP(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>10 to 15</td>
<td>15(^*)</td>
<td>15</td>
</tr>
<tr>
<td>Codeine</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>7.5–10</td>
<td>7.5–10</td>
<td>10</td>
</tr>
</tbody>
</table>

\(^*\)Around-the-clock dosing

For chronic pain, controlled release opioids increase ease of administration.\(^3\) Use of immediate-acting opioids for breakthrough pain help gauge effectiveness of the long-acting regimen. As a general rule, breakthrough doses should be 5–15% of the total daily dose of the long-acting opioid.\(^2\)

The patient received a prescription from her physician for morphine SR 20mg PO BID plus morphine IR 5mg PO q6h PRN for breakthrough pain. The prescribed morphine dose was higher than our calculated dose as listed in **Table 2**, increasing the risk of toxicity if taken as prescribed. The patient had received the controlled-release morphine in 10mg capsules therefore it was recommended that she start at...
a lower dose and titrate as needed based on daily use of breakthrough doses. Diligent monitoring during opioid rotation is required to reduce the risk of withdrawal or toxicity. Dose titrations can be done aggressively to ensure pain is managed appropriately. A naloxone kit was recommended in case of toxicity during the switch. We followed up with the patient every week and eventually titrated up to the prescribed dose.

As seen in this case, there is great variation in opioid conversion. Equianalgesic tables are helpful but carry their own limitations. Trial and error is required to find an appropriate patient-specific dose to provide pain management and ultimately improve functional status. The experience and knowledge of the pharmacist is critical to address the intricacies of opioid rotations for the best possible patient outcomes.

### Table 2 - Opioid conversion based on different equianalgesic tables

<table>
<thead>
<tr>
<th>Systematic approach to opioid conversion</th>
<th>Vancouver Coastal Health</th>
<th>eCPS Opioid monograph/Opioid guidelines for CNCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Calculate total daily dose (TDD) of current opioid.</td>
<td>TDD codeine: 80-160mg and TDD hydromorphone: 4mg</td>
<td></td>
</tr>
<tr>
<td>2. Convert opioid to morphine equivalent (MEQ).</td>
<td>28 to 54mg MEQ (calculated using the lower end of the equianalgesic range)</td>
<td>32 to 44mg MEQ</td>
</tr>
<tr>
<td>3. Convert to opioid of choice.</td>
<td>(morphine = opioid of choice for this case)</td>
<td></td>
</tr>
<tr>
<td>4. Reduce TDD by 25% to account for incomplete cross-tolerance.</td>
<td>21-40.5mg MEQ</td>
<td>24-33mg MEQ</td>
</tr>
<tr>
<td>5. Long-acting plus breakthrough regimen, to be monitored and titrated as needed</td>
<td>Morphine SR 15mg BID + morphine IR 2.5mg q6h PRN</td>
<td>Morphine SR 10mg BID + morphine IR 2.5mg q6h PRN (breakthrough doses limited by tablet availability)</td>
</tr>
</tbody>
</table>

### References

Note – Each case study has been peer reviewed and qualifies as a non-accredited learning activity (CE-Plus) within the annual professional development requirement for licensure by the College of Pharmacists of British Columbia.

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Your Responsibility

The recommendations in this case are based on the views of our clinicians after careful consideration of the best available evidence and needs of a specific patient. As a health care professional, you will assess each of your cases based on the patient’s unique circumstances and in consultation with the patient and their care team. If you would like to discuss one of your patients with us please contact the Clinic team.