Clinical Resource Guide: Opioid Calculations

INTRODUCTION TO OPIOID CALCULATIONS

The American Society for Health System Pharmacists (ASHP) identifies pharmacologic symptom management as a cornerstone of effective symptom management for Hospice and Palliative Care patients. At the end of life, pain is one of the most prevalent and burdensome symptoms experienced by patients with a life-limiting illnesses. Throughout the course of illness, a myriad of factors may result in the need to modify an opioid dose, formulation, or even medication. This Pharmacist Corner is designed help hospice and palliative care clinicians navigate this occasionally daunting clinical scenario.

Pharmacist Corner Objectives

1. Identify reasons for rotating from one opioid to another
2. Review equianalgesic opioid dosing conversion factors
3. Summarize the five-step approach to opioid conversion
4. Describe the concept of incomplete cross tolerance and when to consider applying

RATIONALE FOR OPIOID ROTATION

The decision to change a patient from one opioid to another is often the result of an unintended response or change in patient circumstance requiring a modification of the opioid regimen to achieve the desired outcome. The following are the most common clinical scenarios that result in the need to switch a patient from one opioid to another.

Lack of Therapeutic Response

If a patient is experiencing pain despite being on opioid therapy, and continuation is indicated by follow up assessment, a rational next step would be to institute a dose increase. However, if the patient is unable to tolerate the trialed dose increase secondary to the development of an opioid-related side effect or desired analgesic improvement not achieved, switching to another opioid might improve patient outcomes.

Opioid Adverse Effects

Patients prescribed opioids may experience an array of side effects related to use, ranging from the familiar and expected constipation or drowsiness to the less well-known hypogonadism or urinary retention. It is necessary be knowledgeable of possible opioid-related side effects, and how to address to effectively manage patients with significant pain at the end of life. It is also important to distinguish between a side effect of opioid therapy and an opioid allergy. Many common side effects of opioid therapy are transient, dose-dependent, and a patient can quickly develop a tolerance, resulting in the resolution of symptoms and allowing for continuation of therapy. For patients in which the undesired effect persists and/or is particularly bothersome, consider the following:

APPROACHES TO MANAGEMENT OF OPIOID-RELATED SIDE EFFECTS	
1.	Reduce opioid dose if pain adequately controlled and able to closely monitor response
2.	Aggressively manage opioid-related side effects, but may result in prescribing cascade
3.	Consider addition of non-opioid or adjuvant for opioid-dose sparing benefit
4.	Switch to a different route of administration if formulation available and benefit anticipated
5.	Rotate to a different opioid at equivalent dosing with intent to improve tolerability

Change in Patient Status

As a life-limiting illness progress, patients may lose their ability to tolerate a previously utilized formulation and/or route of administration. This can result from a change in the patient's ability to swallow or a transition of care to a setting where parenteral agents are not a viable option. Additionally, increasing pain requirements may result in the need to rotate to a more potent and/or less burdensome route of administration. Consideration may be given to transitioning from an oral to transdermal route, transdermal to parenteral, parenteral to rectal, or any combination thereof.

Availability

Opioids are also subjected to supply chain issues and manufacturer backorders, which may interfere with availability. Additionally, patients previously prescribed a particular brand of opioid, specific concentration, or compounded product may experience availability issues with transitions in care, changes in insurance coverage, or enrollment in a hospice agency with an established formulary. As a result, a therapeutic alternative should be considered.

Therapy Cost

Private insurance, VA benefits or out-of-pocket payments previously offsetting high-cost opioids (oxycodone SR, buprenorphine formulations, etc) may no longer be applicable following hospice enrollment, leaving the agency to take on the cost therapy. If no history of adverse effect or documented allergy contraindicates use, consider a therapeutic interchange to an agency-approved medication at an equivalent dose. A monitoring plan to ensure efficacy and tolerability should also be implemented at this time.

EQUIANALGESIC OPIOID CONVERSION FACTORS

Centers for Disease Control (CDC) Equianalgesic Dosing Table

Medication	Oral (mg)	Parenteral (mg)
Morphine	30	10
Hydrocodone	30	Not Available
Oxycodone	20	Not Available
Hydromorphone	7.5	1.5
Tramadol	120	Not Available
Tapentadol	100	Not Available
Codeine	200	100

Center for the Advancement of Palliative Care/ McPherson Equianalgesic Dosing Table

Medication	Oral (mg)	Parenteral (mg)
Morphine	25	10
Hydrocodone	25	Not Available
Oxycodone	20	Not Available
Hydromorphone	5	2
Tramadol	120	Not Available
Tapentadol	100	Not Available
Codeine	200	100

While both opioid conversion tables listed above are utilized by a number of professional organizations, health networks and hospice agencies, there is no undisputed, optimal choice. More important is choosing the conversion table that aligns closest to the experiences of agency clinicians, allowing them to be comfortable and confident with the ratios used.

OPIOID CONVERSION

When performing opioid conversion calculations, it is important to establish a process that can be incorporated into the pain/symptom management workflow. Formalizing a process for clinicians ensures a continuity of care for patients within the agency based on a clearly defined protocol aligned with the pain management algorithm. Standardization of this process can minimize variability in opioid dosing strategies and promote optimization of safe and effective prescribing practices.

The Five-Step Approach to Opioid Conversion

Step 1	Complete a comprehensive pain assessment to determine status of pain, and to review proposed pathophysiology of pain to help guide opioid rotation selection
Step 2	Calculate the total daily usage of the current opioid. This should include all long-acting and breakthrough opioid doses.
Step 3	Decide which opioid analgesic to transition to and refer to the opioid conversion table adopted by agency to determine dose of new opioid to initiate
Step 4	Individualize dose based on assessment information gathered in Step 1 and ensure adequate access to breakthrough medication
Step 5	Determine monitoring plan to assess safety, efficacy and tolerability of newly initiated opioid regimen and make adjustments to therapy as appropriate.

INCOMPLETE CROSS-TOLERANCE

When rotating to a new opioid, clinicians must consider the relative potency between opioids. Despite ongoing efforts to review available pharmacokinetic data to improve opioid conversion ratios, it remains difficult to broadly apply these ratios given the varying degrees of response to opioids between individuals. Therefore, experts have long recommend initiating the new opioid at a dose that is 25-50% lower than the calculated equivalent dose of the previous opioid based on the equianalgesic conversion ratio. Patient characteristics are equally important in opioid conversion dose decisions. For example, older age, kidney or liver insufficiency, baseline sedation or delirium, recent ineffective rapid opioid escalation, side effects and/or the need for a change of administration route are all reasons to be more conservative, considering closer to a 50% dose reduction. Conversely, if the patient's pain is not well controlled at the time of opioid transition, a smaller percentage, or possibly no additional dose reduction may be taken.

RECOMMENDATION SUMMARY

Converting a patient from one opioid to another can be a challenging endeavor for even the most experienced hospice clinician due to multiple, patient-specific variables contributing to medication and dose selections. Adopting agency accepted opioid conversion ratios, a process to identify which patients may be candidates for opioid conversion and formalizing a protocol by which this process will be completed will help to minimize variability in opioid prescribing practices, promoting safe and effective dosing strategies.

References

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