pmsi Pharmacy

Morphine Equivalency Dosing (MED): A Tool for Opioid Management

Background

The past few years have seen increased awareness and caution with respect to the prescribing of opioid pain relievers. Initiatives such as the FDA's Risk Evaluation and Mitigation Strategy (REMS) program show that prescribers and regulators are growing increasingly concerned with respect to the appropriate use of narcotic analgesics. While recommendations regarding maximum daily doses have typically revolved around the non-opioid component of combination opioid products (i.e., FDA's mandate to limit the acetaminophen component in products such as Lortab®, Vicodin®and Percocet®), recent clinical data suggests that patients who utilize higher doses of opioid analgesics may be at an increased risk for negative outcomes.

A 2010 study in the *Annals of Internal Medicine* indicated that patients receiving more than 100 mg of morphine equivalent doses per day were at an increased risk for opioid overdose situations. Given this data, organizations such as the Workloss Data Institute, publishers of the Official Disability Guidelines and the State of Washington (Agency Medical Directors' Group) have instituted recommendations not to exceed morphine equivalent doses (MED) greater than 120 mg daily without a demonstrated increase in patient functionality or consultation with a pain management specialist. Clinical research from The Ohio State University College of Public Health and Oregon State University's College of Pharmacy indicates that up to 50% of patients on long-acting opioid therapy are using more than the recommended 120 MED threshold, possibly suggesting the need for more intensive clinical monitoring.

Although certain guidelines, such as those mentioned above, have designated morphine equivalent thresholds above which further patient-specific factors should be considered, it is important to note that MED limits should not be viewed as a "dosage limit" above which opioid use should be universally avoided. Careful understanding of the guidelines, such as that performed by the American Academy of Pain Management, is needed to avoid placing unsubstantiated barriers on the appropriate use of opioids.

Morphine Equivalency Dosing for Common Opioid Analgesics

The following tables illustrate how morphine equivalency calculations are performed. Also included are the maximum daily doses of some common opioids based on 120 mg of morphine equivalent dosing.

Medication	Conversion Ratio (morphine: alternate agent)	Recommended Maximum Daily Dose (based on morphine equivalency)
Morphine	--	120 mg
Hydrocodone	1:1	120 mg
Fentanyl (transdermal)	variable, depending on dose	25 mcg/hr*
Hydromorphone	4:1	30 mg
Methadone	variable, depending on dose	40 mg**
Oxycodone	1.5:1	80 mg
Oxymorphone	3:1	40 mg

Notes:

* 120 mg of morphine is roughly equivalent to 33.3 mcg/hr of transdermal fentanyl; however, due to the unavailability of this dose, the next lowest available dose is presented. Exact equivalency information is not available for this conversion.

** Methadone dosing is extremely variable and is not easily converted to a morphine equivalent dose. Factors such as duration of therapy and patient-specific variables should be taken into consideration.

Definition

Aside from providing a basis for establishing the recommended maximum daily opioid dose above which additional vigilance is needed, the use of morphine equivalency dosing can be used to compare the relative opioid potency when treating a patient with different narcotic pain relievers. Unfortunately, many providers are not well versed in the appropriate prescribing/dosing of this medication class, oftentimes leading to serious drug-related adverse effects due to doses that are too high (i.e., respiratory complications, mental status changes,nausea/vomiting) or too low (i.e., withdrawal symptoms, pain exacerbation) when converting patients from one opioid to another. Given the high degree of variability that can be observed between different narcotic analgesic agents in terms of relative potency, conversion to a morphine equivalent dose allows pain management practitioners to ensure that patients are not over-or under-dosed when transitioning between agents.

Example 1 – Calculation of Morphine Equivalents

Medication	Total Daily Dose	Daily Morphine Equivalent
Hydromorphone 4 mg (3 tablets daily)	3 x 4 mg Hydromorphone = 12 mg Hydromorphone	12 mg Hydromorphone = 48 mg of morphine (based on 1:4 ratio)
Opana ER 40 mg (2 tablets daily)	2 x 40 mg Opana ER = 80 mg Opana ER	80 mg Opana ER = 240 mg of morphine (based on 1:3 ratio)
Total daily morphine equivalent dose	**48 mg** morphine equivalents + **240 mg** of morphine equivalents = **288 mg** total daily morphine equivalents	

Example 2 – Calculation of Morphine Equivalents

Medication	Total Daily Dose	Daily Morphine Equivalent
Hydrocodone-Acetaminophen 10 mg/325 mg (4 tablets daily)	4 x 10 mg Hydrocodone = 40 mg Hydrocodone	40 mg Hydrocodone = 40 mg of morphine (based on 1:1 ratio)
Oxycontin 20 mg (2 tablets daily)	2 x 20 mg Oxycontin = 40 mg Oxycontin	40 mg Oxycontin = 60 mg of morphine (based on 1:1.5 ratio)
Total daily morphine equivalent dose	**40 mg** morphine equivalents + **60 mg** of morphine equivalents = **100 mg** total daily morphine equivalents	

Application

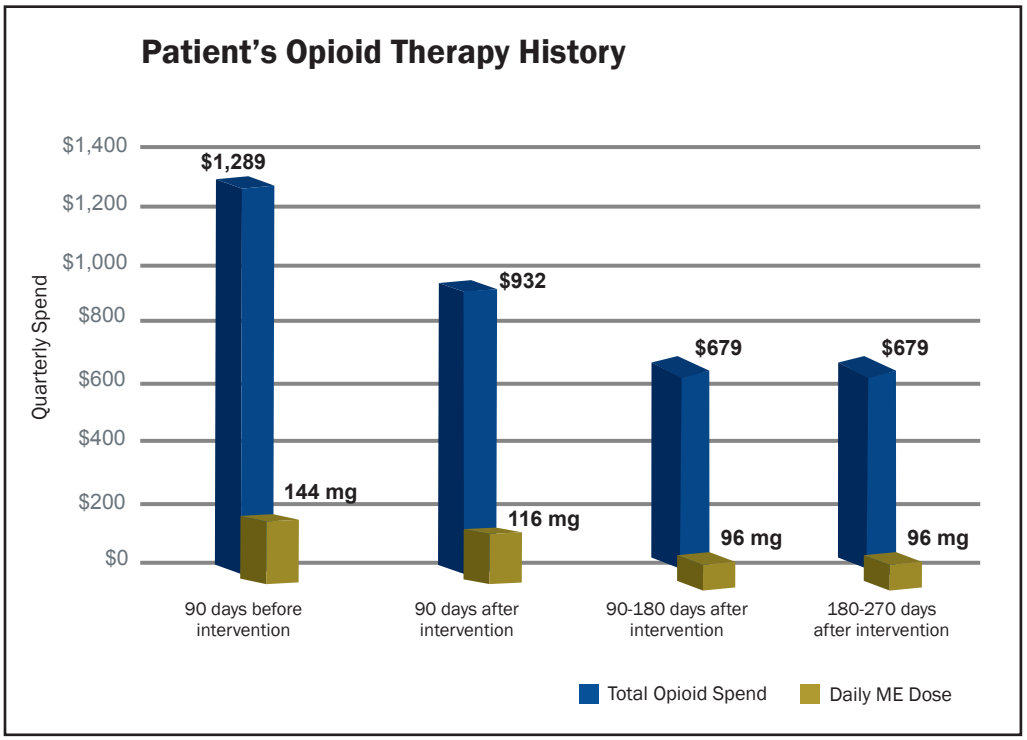
More recently, the calculation of morphine equivalency dosing has been used to aid in the determination of when a patient's care should be transitioned over to a pain management specialist or addictionologist, depending on the patient's individual needs, or when opioid therapy should be considered for discontinuation. Prior to the release of maximum daily dosing recommendations by the State of Washington and the Workloss Data Institute, no clear standards were available to practitioners in need of guidance on the appropriate prescribing of narcotic analgesics.

Although appropriately licensed providers may continueto prescribe narcotic pain relievers to their patients in an unrestricted manner, the use of morphine equivalency guidelines provides practitioners with a clear indicator of when specialty focused patient care may be appropriate. In addition, prescribers can use morphine equivalency dosing as a standardized gauge regarding when the continued use of opioid therapy may not be in the patient's best interest.

Case Study

Review of patient's medication regimen results in reduction in opioid dose and spend

"AP" is an 80-year-old claimant with chronic back injuries who was recommended for a medication review due to high-risk issues of duplicate therapy with muscle relaxants, and the use of multiple opioid pain relievers (two short-acting opioids and one long-acting opioid). Before the review was completed, it was calculated that the patient was utilizing roughly 144 mg of morphine equivalents daily, which represents opioid utilization in excess of the recommended 120 mg daily MED limit. Upon completion of a medication review, a peer-to-peer outreach intervention was completed. As part of the peer-to-peer outreach service, a pain management specialist was utilized to facilitate a collegial discussion of the patient's medication regimen with the treating prescriber, an internal medicine physician. In discussing the case with the prescriber, the peer physician highlighted various therapeutic issues present in this patient's regimen, including the use of muscle relaxants, high-dose opioid use, and the claimant's advanced age representing a risk factor for negative outcomes. The peer physician recommended a referral to pain management because of the patient's high opioid utilization. Although initially, the prescriber stated that he was reluctant to make any changes to the patient's regimen, a pronounced change in the patient's therapy was noted immediately following the peer intervention in the form of the discontinuation of one muscle relaxant (Soma) and the long-acting opioid (Oxycontin). Within six months after the review, the patient's pain regimen was being managed by a pain management specialist. Overall, there was a 47% decrease in opioid spend, and a 33% reduction in the total daily dose of opioids.



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Case Study *Continued*

Clinical Tools

At PMSI, the use of morphine equivalency dosing is an important tool for ensuring that a patient's pain is appropriately treated according to evidence-based clinical guidelines. By leveraging our Risk Intelligence System™ (Risk IS™), PMSI's clinical offerings, such as our High-Risk Profiling Program, help to identify patients who may be exhibiting medication behaviors indicative of potential negative outcomes. As part of this program, the calculation of morphine equivalents plays a pivotal role in identifying patients for whom prescriber contact via an educational letter campaign may be appropriate.

By serving as an indicator of risk in PMSI's Risk IS, the use of morphine equivalents helps to drive PMSI's medication review referral program. Though the assistance of our Clinical Escalation Alert Program, real-time analysis of certain patient prescription activities helps to identify those patients utilizing more than 120 mg of morphine equivalents per day. This aids claim professionals in decision-making processes pertaining to medication appropriateness.

We understand that a determination for continued opioid therapy is a multi-factorial decision involving direct patient observation and objective assessments. However, the use of morphine equivalency dosing helps our clinical team determine which patients may be at an increased risk for negative opioid outcomes and pinpoint those whom alternative pain treatments strategies should be explored.

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