PHARMACY & THERAPEUTICS
UPDATE

METHODIST

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Critical Drug Shortages

On-going shortages and strategies to minimize the impact to patient care for drugs with limited availability

Shortage:	***Morphine, Hydromorphone PCA***
Action:	*oral alternatives, intermittent dosing*
Shortage:	***Injectable Opiates***
Action:	*Oral alternatives if possible*
Shortage:	***Diazepam Injection***
Action:	*oral alternatives, lorazepam*
Shortage:	***Lidocaine, Bupivacaine injection with and without epinephrine***
Action:	*alternative concentrations, sizes*

In this Issue

If you have any questions or concerns, please contact the NMH Pharmacy Purchasing Department: 402-354-4337.

Naloxone Dosing & Cerner Powerplan Changes

While the use of naloxone to treat acute opiate over-sedation is common practice, treatment with naloxone is not void of adverse effects, especially when given at higher doses. Larger than necessary doses of naloxone may result in reversal of analgesia with resultant acute pain, increases in blood pressure, or acute withdrawal symptoms. Additionally, abrupt reversal of opiate effects may increase the risk of seizures, ventricular tachycardia and fibrillation, pulmonary edema, cardiac arrest and potentially result in death. Excessive naloxone doses and abrupt reversal in the post-operative period after use of opioids in surgery may also result in nausea, vomiting, sweating, tachycardia, hypertension, seizures, and cardiovascular events.

Previously, naloxone dosing in most Cerner Powerplans was a standard 0.4mg. Recently the Medical Executive Committee approved changes to better reflect the recommended naloxone dosing. Standard dosing except in the Emergency Department or in emergency situation Powerplans (eg RRT), has been modified to **0.2mg every 2 min up to 1mg total dose.**

This change reflects the recommended dosing:

- Acute opioid overdose: 0.4-2mg IV, IM, SQ; may repeat every 2-3 minutes;
- Reversal of respiratory depression with therapeutic opioid use: 0.02-0.2mg IV; may repeat every 2-3 minutes until there is adequate ventilation and alertness without significant pain or discomfort, up to 2mg may be necessary
- Repeat doses may be required within 1- to 2-hour intervals depending upon the amount, type (ie, short or long acting), and time interval since last administration of opioid.

Source: Lexicomp® Drug Information; Accessed March 12 2019

Local Guidelines for NSAID Dosing After Pre-Operative Dosing

The use of non-steroidal anti-inflammatory drugs (NSAID) has increased with the focus on multi-modal pain management as a component of the enhanced recovery after surgery (ERAS) programs. NSAIDs are being used frequently in both the pre-operative and post-operative periods.

There have been several questions regarding the use of a pre-op NSAID and the start time of subsequent post-op NSAID dosing, especially when using two different NSAIDs. The following chart was developed to provide guidance on the initiation timing of post-operative therapy (assuming patient does not have any other reasons to not continue an NSAID) and is based on the pre-op dose administered. Patients with GFR/CrCl ≤ 30ml/min are generally not candidates for NSAIDs.

PreOp Med	Pre-op Dose Given	Standard Timing for next NSAID dose if GFR/CrCl > 50ml/min	Minimum time for next NSAID dose if clinically needed & GFR/CrCl > 50ml/min	Standard Timing for next NSAID dose if GFR/CrCl ≤ 50ml/min
Celecoxib	100mg	12hr	6hr	12hr
	200mg	12hr	6hr	24hr
	400mg	24hr	12hr	24hr
Meloxicam	7.5mg	12hr	6hr	24hr
	15mg	24hr	24hr	24hr

The guidelines take into consideration celecoxib and meloxicam's pharmacokinetic parameters, such as the drug's half-life, as well as the FDA labeled dosing. The recommended dose and the dosing interval may change in patients with specific disease states, such as renal impairment, hepatic impairment, etc. The NMH NSAID safety program also suggests holding NSAID dosing if systolic blood pressure is < 90mm Hg.

The guidelines also take into consideration the following general medication regimen concepts:

- Ensuring that the prior dose has reached its peak effect before considering re-dosing
- Re-dosing typically occurs after two half-lives so drug accumulation and toxicity do not develop
- Assessing whether maximum dosing of a single med has already been given (probably not safe to continue to dose a medication in the same class); may consider additional dosing if max dose not met

Cerner Powerplans with post-operative NSAID dosing should consider these guidelines and the NMH pharmacy department will assess the guidelines to determine if providers need to be notified for regimen modification.

Nitrofurantoin in Renal Dysfunction

Nitrofurantoin is FDA approved for the prevention and treatment of UTIs caused by susceptible gram positive and gram negative bacteria in patients with a CrCl >60 ml/min. It is contraindicated in patients with CrCl<60 ml/min according to package labeling due to reduced elimination and increased risk for drug accumulation and toxicity including elevated liver enzymes, pulmonary infiltrates, and pleural effusions. Nitrofurantoin use in renal impairment may not only increase the risk of adverse effects, but it may also provide inadequate UTI treatment as nitrofurantoin needs to reach adequate urine concentrations in order to be effective. The amount excreted in the urine is directly related to renal function, thus limiting effectiveness.

Data suggest that use of nitrofurantoin may be safe and effective in short-term uncomplicated acute cystitis in patients with an eGFR or CrCl 30 to 60 mL/minute, differing from package labeling. The Beers Criteria recommends avoiding use in geriatric patients ≥65 years with a CrCl <30 mL/minute or for long-term suppression.

The NMH Renal Dosing Adjustment program will be updated to reflect these recommendations (currently using 40ml/min based on prior literature).

Source: J Am Geriatr Soc 00:1– 00:1– 21, 2019.

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