

DRUG AND THERAPEUTICS NEWSLETTER

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All formulary changes and policy/procedure updates have been approved by the Drugs and Therapeutics (D&T) Committee and Medical Advisory Council (MAC).

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Changes to Formulary

Additions

- 1. Zanamivir 5 mg diskhaler (Relenza®)
- Antiviral agent added for the treatment and prophylaxis of oseltamivir (Tamiflu[®]) resistant influenza
- Must be approved by the Medical Health Officer or Infection Control
- 2. Carbamide peroxide 6.5% otic drops (Murine®)
- Ear wax removal drops
- Replaces the discontinued product triethanolamine (Cerumenex[®])
- 3. Metoprolol Slow Release 100 mg, 200 mg tablets
- 4. Esomeprazole (Nexium®) tablets and Rabeprazole tablets (Pariet®)
- Proton pump inhibitors (PPIs)
- See Therapeutic Interchange Policy, pg. 2

5. Sodium Picosulphate sachets (PicoSalex®)

 Bowel cleansing agent as an alternative to other bowel preps (See Table 1 below for comparison of agents)

Table 1. Adult Bowel Cleansing Agents			
Drug	Dosage Form/ Content	Bowel Cleanser Dose	
Sodium Picosulphate (SPS)	Each 16.1 g powder sachet contains: - Magnesium citrate 13.06 g (in solution) - Sodium Picosulfate 10 mg	2 x 150 mL: one in am and pm on day pre- procedure (Dissolve each sachet in 150 mL water)*	
Polyethylene Glycol (PEG, PegLyte®)	Each powder sachet contains: - PEG 70 g	4 L: 240 mL Q10MIN up to max 4 L or until discharge is clear (Dissolve each sachet in 1 L water)	
Oral Phosphates Solution (Phoslax®)	Each 45 mL liquid contains: - Phosphorus 5.625 g	2 x 45 mL: give 24 hours apart (dilute 45 mL in 120 mL water)*	
Magnesium Citrate (Citro-Mag [®])	Each 300 mL liquid contains: - Magnesium citrate 15 g	1 x 300 mL*	

*patients must be adequately hydrated; follow manufacturer's guidelines

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Deletions

- 1. Protirelin injection (TRH, Relefact®)
- Available under the Special Access Program
- 2. Phenazopyridine tablets (Pyridium®)
- Discontinued by manufacturer
- 3. Triethanolamine otic (Cerumenex®)
- Discontinued by manufacturer

Updated Policies

1. PROTON PUMP INHIBITOR (PPI) INTERCHANGE POLICY

Due to new contract pricing for VCH-PHC Pharmacy, esomeprazole 40 mg is the lowest cost PPI. Since esomeprazole 40 mg cannot be split for lower doses, rabeprazole 10 mg is the PPI chosen for lower dose orders. Esomperazole is also the PPI used for NG/G-tube use. As of August 2009, all PPIs are automatically interchanged to one of these 2 agents according to the table below.

Table 2. PPI Equivalent Dose (same interval)				
Ordered Drug	Interchanged to:			
PO orders				
Lansoprazole 15 mg	Rabeprazole 10 mg PO			
Esomeprazole 20 mg				
Omeprazole 10 mg				
Pantoprazole 20 mg				
Lansoprazole 30 mg	Esomeprazole 40 mg PO			
Omeprazole 20 mg				
Pantoprazole 40 mg				
Rabeprazole 20 mg				
NG orders				
Lansoprazole 15 mg	Esomeprazole 20 mg NG			
Omeprazole 10 mg				
Pantoprazole 20 mg				
Rabeprazole 10 mg				
Lansoprazole 30 mg				
Omeprazole 20 mg	Esomeprazole 40 mg NG			
Pantoprazole 40 mg				
Rabeprazole 20 mg				

Physicians will be called for any PPI doses not contained on this table.

2. FILTER REQUIRED FOR DILUTED PHENYTOIN

All diluted phenytoin solutions must be administered with a 0.22 micron in-line filter to remove any phenytoin crystals which may form when diluted. The IV administration sets must be flushed with NS before and after administration. A filter is NOT required for undiluted phenytoin that is administered IV direct.

3. FORMULARY RESTRICTIONS EXPANDED

- Oseltamivir (Tamiflu®) indications have been expanded to include both the treatment and prophylaxis of influenza virus with the following restrictions:
 - ⇒ For treatment of individual cases, there are no restrictions.
 - ⇒ For influenza prophylaxis, approval must be obtained by the Medical Health Officer or Infection Control.
- Lamivudine can now be ordered by GI, SOT, and Leukemia/BMT services and in patients on high dose chemotherapy for Hepatitis B prophylaxis.

4. NARCOTIC EQUIVALENCIES: IM/SC vs. PO

Parenteral and oral narcotic doses are not equivalent. For morphine and hydromorphone, the equivalent narcotic dose for IM/SC is generally at least half that of the PO dose:

Table 3. Equivalent Narcotic Doses				
Drug	IM/SC	РО		
Morphine	10 mg	20-30 mg		
Hydromorphone	2 mg	4 mg		

Thus, orders that combine IM, SC and PO routes are written incorrectly and should be separated into an IM/SC dose and a PO dose.

Incorrect Order

"Hydromorphone 1 to 4 mg SC/IM/PO Q4H PRN"

Correct Order

"Hydromorphone 1 to 2 mg SC/IM Q4H PRN or Hydromorphone 2 to 4 mg PO Q4H PRN"

5. INSULIN GUIDELINES FOR TPN

The majority of diabetic patients require supplemental insulin when a high glucose solution is infused. Guidelines for the addition of insulin regular to TPN are as follows:

A. Initial insulin dose ordered in TPN:

- ⇒ New start TPN in diabetic patient: A common starting point is 0.1 units of insulin per g of dextrose (e.g. 30 units per 300 g dextrose). This ratio of insulin to dextrose is unlikely to cause hypoglycemia. Starting doses may vary based on perceived patient requirements.
- ⇒ Patients on TPN with sliding scale: Add up the insulin sliding scale requirements from the previous 24 hours, then add 1/2 to 2/3 of this dose to the TPN.
- ⇒ Continue to maintain sliding scale insulin with QID glucometer.

B. Increasing the dose of insulin in TPN:

⇒ If over a 24 hour period glucose values consistently exceed the desired goal, the insulin in the TPN can be increased by 0.05 units per g dextrose each day (e.g. 15 units for 300 g dextrose). In general, doses are increased by increments of 5 to 15 units of insulin per 24 hours.

Reference

 Sacks GS et al. Parenteral nutrition implementation and management. In the A.S.P.E.N. Nutrition Support Manual, 2005.

6. PDTM UPDATES

- Vasopressin infusions for treatment of shock may be administered in CCU, ICU and CSICU
- If diltiazem or verapamil are administered IV direct on a general nursing unit, a physician must administer the dose and stay on the unit for 15 minutes. BP and HR should be monitored at baseline, then Q5MIN x 3.

7. BOWEL PROTOCOLS: Medicine and Geriatrics

Some specialty services do not have a servicespecific bowel protocol. When these services order a bowel protocol but do not specify the type of protocol required, pharmacy will default to the Medicine bowel protocol (for patients < 70 years) or Geriatric bowel protocol (for patients ≥ 70 years). Note that suppositories and enemas are contraindicated in Leukemia/BMT patients or those who are pancytopenic or neutropenic. These comments have been added to these protocols.

Pharmacy Awards

Margie Sidsworth was the 2008/09 recipient of the "Resident of the Year" award given by the VCH-PHC Pharmacy Practice Residency Program.

Errata -

FONDAPARINUX: OASIS-5 CLARIFICATION

In the last D&T newsletter (2009;16(2):3-4), we published a review of fondaparinux (Arixtra®), a direct inhibitor of Factor Xa, for the treatment of medically managed NSTEMI. The mortality endpoint in the OASIS-5 trial was not sufficiently reported in that article.

The OASIS- 5 trial was a non-inferiority study that compared fondaparinux to enoxaparin in unstable angina and NSTEMI patients in a randomized, double-blind, double dummy fashion. The primary endpoint was a composite of death, MI or refractory ischemia at 9 days. Fondaparinux met the criteria for non-inferiority to enoxaparin with the primary endpoint occurring in 5.7% of patients in the enoxaparin arm and 5.8% of patients in the fondaparinux arm, HR 1.01 (95% CI 0.9-1.13).

The secondary outcomes, composite of death, MI or refractory ischemia at 30 days and 180 days, were also not significantly different between the groups. However, when examining the individual components of the composite endpoint at 30 days, death occurred in 3.5% of enoxaparin patients vs. 2.9% of fondaparinux patients, HR 0.83 (95% CI 0.71-0.97, p=0.02). Death at 180 days, however, did not reach statistical significance: 6.5% in enoxaparin vs. 5.8% in fondaparinux, HR 0.89 (95% CI 0.8-1.00, p=0.05).

Reference

1. Yusuf S et al. Comparison of fondaparinux and enoxaparin in acute coronary syndromes. NEJM 2006;354:1464-76.

Regional Guideline

CLOSTRIDIUM DIFFICILE - ASSOCIATED DISEASE

Background

Clostridium difficile-associated disease (CDAD) is a healthcare-associated infection that is increasing in significance at VCH-PHC. Most notably, the NAP1 strain has emerged in our patient population and is associated with more severe symptoms. CDAD presents as a spectrum of disease, ranging from profuse diarrhea to pseudomembranous colitis and toxic megacolon, which may result in mortality. As such, it is essential that treatment is initiated promptly and stratified appropriately, as patients can deteriorate rapidly.

In addition to medical treatment, all patients with CDAD or those with high clinical suspicion of CDAD should be isolated on contact precautions. Patients should be monitored closely and examined on a daily basis by nurses, physicians, and other health care staff. In cases of severe or fulminant disease, infectious diseases, gastroenterology, and/or general surgery consultation is indicated.

Guideline

Guideline (Figure 1, page 5):

Regional Clostridium difficile infection guidelines were created to standardize actions that clinicians and health care staff should follow in the treatment and management of CDAD in adult patients. In particular, this guideline aims to identify those patients who need escalation of therapy to vancomycin and/or urgent surgical intervention. It is expected that the guideline should apply to most patients; individual clinical judgment is always required. This document will be updated periodically as new evidence-based data becomes available.

Stakeholders

The CDAD management guideline has been reviewed and endorsed by the following stakeholder groups: Infectious Diseases, Medical Microbiology and Infection Control, Pharmacy, Gastroenterology, General Surgery, Critical Care, and Stem Cell Transplantation.

Monitoring

- Daily vital signs (temperature, blood pressure)
- Daily assessment for number of diarrheal episodes and consistency.
 - ⇒ Diarrhea should resolve within 4-6 days.
 - ⇒ Failure to resolve in 6-7 days is considered treatment failure.
- Daily abdominal examination to determine clinical resolution or progression to more severe disease.
- Bloodwork for CBC and differential, electrolytes and creatinine as clinically indicated. (A recent albumin should be obtained.)
 - ⇒ Increasing WBC or left shift, hypotension, or acute renal failure are indications for switching from metronidazole to vancomycin (where applicable), and for ID, GI, and/or general surgery consultation.
- C. difficile testing should not be used to determine treatment endpoint, as tests may remain positive several months after the episode.

Note:

- ⇒ Metronidazole IV is considered a secondline agent compared to metronidazole PO and vancomycin PO treatment.
- ⇒ Vancomycin IV is <u>not</u> effective for the treatment of CDAD.
- ⇒ Alternative therapies (e.g. cholestyramine, probiotics, or other antimicrobial agents) should not be used routinely.

References

- Providence Health Care. Guidelines for management of suspected/confirmed Clostridium difficile-associated diarrhea (CDAD) Providence Health Care pathway. September 2008.
- Zar FA et al. A comparison of vancomycin and metronidazole for the treatment of *Clostridium difficile*-associated diarrhea, stratified by disease severity. CID 2007;45:302-7.
- Kelly CP et al. Clostridium difficile more difficult than ever. NEJM 2008;359:1932-40.
- Gerding DN et al. Treatment of Clostridium difficile infection. CID 2008;46:S32-42.
- Owens RC. Clostridium difficile-associated disease: an emerging threat to patient safety. Pharmacother 2006;26:299-211
- Henrich TJ et al. Clinical risk factors for severe Clostridium difficile-associated diarrhea. Emerging Infectious Diseases 2009;15:415-422.

Figure 1. Clostridium difficile-Associated Disease (CDAD) Guideline

SUSPECTED OR CONFIRMED CDAD Diarrhea (unformed or watery stools ≥ 3 in 24 h AND 1. Pending C.difficile test with high clinical suspicion OR 2. Positive C. difficile test INFECTION CONTROL Notify Infection Control Isolate on contact precautions Meticulous hand hygiene (preferably with soap & water) **EVALUATE CDAD SEVERITY** Obtain CBC and differential, electrolytes, and serum creatinine MILD OR MODERATE **SEVERE FULMINANT** (Does not meet criteria for (3 or more of the following): (Any of the following): SEVERE or FULMINANT) Age >60 years Toxic megacolon Temp >38.3°C Perforation · Signs of peritonitis WBC >20,000/mm³ Ileus Albumin <25 g/L Severe sepsis/septic shock OR Hemodynamically unstable • Pseudomembranous colitis Acute renal failure (attributable to C. difficile) Clinical judgment FIRST EPISODE ANY EPISODE **ANY EPISODE** Review all antibiotics & Review all antibiotics & Review all antibiotics & discontinue unless clearly discontinue unless clearly discontinue unless clearly indicated indicated indicated Stop all anti-peristaltic & pro-Stop all anti-peristaltic & pro-· Stop all anti-peristaltic & promotility agents motility agents motility agents Metronidazole 500 mg Vancomycin 125 mg PO/NG Vancomycin 125 mg PO/NG PO/NG TID x 10 d* QID x 10 d QID (or may give 500 mg via Obtain ID or GI consult cecal tube or enema QID)^ If not resolving by Day 4-6, Obtain diagnostic imaging (3 If unable to administer Change to views or CT scan of the Vancomycin 125 mg vancomycin or if severe abdomen) ileus/toxic megacolon, PO/NG QID x 10 d Consider General Surgery If symptoms worsen, o Add consult Metronidazole 500 mg IV o Reevaluate for CDAD Q8H o Consider ID or GI consult • Obtain ID or GI, General Surgery and ICU consult immediately RECURRENCE FIRST OR SECOND · Review all antibiotics & discontinue unless clearly indicated · Stop all anti-peristaltic agents & pro-motility agents Metronidazole 500 mg PO/NG TID x 10 d* If not resolving by Day 4-6,

- - o Change to vancomycin 125 mg PO/NG QID x 10 d
- If symptoms worsen,
 - Reevaluate for CDAD severity
 - o Obtain GI or ID consult

THIRD OR MORE

- Vancomycin 125 mg PO/NG QID x 10 d
- Obtain ID or GI consult
- May change to vancomycin if patient intolerant to metronidazole
- In patients who are unable to mount a WBC response >20,000/mm³, an increasing WBC with pronounced left shift may also be considered in these criteria
- Vancomycin IV is <u>not</u> effective for the treatment of CDAD **Note:** Physician assessment for perforation risk is required prior to rectal tube placement