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DRUG AND THERAPEUTICS NEWSLETTER

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Vancouver General Hospital, UBC Hospital, GF Strong

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In This Issue...

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

This and other Drug and Therapeutics Newsletters are on the Web at **www.vhpharmsci.com**

Changes to Formulary

Deletions

1. Ovral® (d-norgestrel 250 mcg/ethinyl estradiol 50 mcg)

- Discontinued by manufacturer
- Formulary alternatives: Postcoital Contraception: Plan B® (levonorgestrel); Bleeding/Menorrhagia: Brevicon® 1/35 (norethindrone 1 mg/ethinyl estradiol 35 mcg), Premarin® (conjugated estrogens injection)

2. Aminophylline SR tablets (Phyllocontin®)

- Discontinued by manufacturer
- Alternative: Theophylline SR tablets

Updated Policies

1. FONDAPARINUX FOR HIT PATIENTS

Fondaparinux was previously restricted to use in unstable angina and Non-ST Elevation Myocardial Infarction (NSTEMI). Fondaparinux formulary indications have been expanded to include the treatment or prophylaxis of venous thromboembolism (VTE) in patients who have heparin-induced thrombocytopenia (HIT). Its use for HIT is restricted to prescribing by or consultation with a hematologist.

2. PARENTERAL DRUG THERAPY MANUAL (PDTM) 2010 UPDATE

All hard copy PDTMs at Vancouver Acute have been replaced with the 2010 update. If there are any questions, please contact Karen Shalansky at 604-875-4839 or Lisa James (regional PDTM editor) at 604-875-4111, local 61857.

3. ON-LINE PDTM & FORMULARY ACCESS

The on-line PDTM and Drug Formulary can be accessed several ways:

- **On the VCH homepage (http://vhnet)** - The PDTM can be accessed directly on the VCH homepage. For the Drug Formulary, click on "Programs and Services", then under Vancouver Acute click on "Pharmaceutical Sciences - VA", then under External Links on the right hand side, click on "Formulary".
- **On PCIS** - Click on "Start Here" or "Show VTB" at the top of page, then on the left hand side, click on "Pharmacy Links", then "PDTM". For the Formulary, click on "VA-VC Pharmacy" under "Pharmacy Links", then "Formulary".
- **On www.vhpharmsci.com webpage** - the formulary is located under "Quick Link". The PDTM is no longer found on this website.

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Find us on the Web at **www.vhpharmsci.com**

4. PHARMACIST AUTHORITY

The College of Pharmacists of BC Professional Practice Policy (PPP) 58 – Medication Management (Adapting a Prescription) became effective April 1, 2009. The intent of this policy is to improve the timeliness, safety and efficiency of meeting patients' drug-related needs by enabling pharmacists to perform select activities independently, within their scope of competence and experience.

At VA, implementation of various portions of the Policy will be gradually incorporated into the responsibilities of the clinical pharmacists, under the direction and supervision of the Clinical Coordinator. Effective Jan 24, 2011, unit-based clinical pharmacists will be permitted to perform the following PPP activities. For more details, please refer to the on-line VA Formulary Policy 4.7.

The Pharmacists' Policy for Adaptation of a Prescription and Authorities was approved by HAMAC and the VA Drug and Therapeutics Committee earlier this year.

In all cases, the pharmacist must ensure that:

- They are practicing within their scope of competence and experience
- They have adequate information to make appropriate therapeutic decisions
- The health needs of the patient are being met
- The effectiveness of drug therapy is maintained or improved
- The patient is not placed at increased risk
- The appropriate documentation and communication is completed
- They continue to manage and monitor the drug regimen, and to ensure there is transfer of care before leaving the service.

Exceptions: Pharmacists cannot adapt prescriptions for Narcotic or Controlled drugs.

PPP1: Continuation of a medication to ensure continuity of care

A. Continue or initiate non-prescription medications, except NSAID and ASA.[1]
B. Continue a prescription medication taken prior to admission when confirmed by PharmaNet and verified with the patient or caregiver.[2]
C. Re-order an in-patient medication with an automatic stop date .[1]

PPP2: Adaptation of ambiguous orders or non-essential orders for non-formulary complementary medicines or vitamins.

A. Adapt an ambiguous prescription[3,4]
B. Discontinue non-formulary complementary medicines or vitamins.[1]

PPP3: Adaptation of unsafe orders

A. Modify an unsafe order.[3,4]
B. Hold an interacting drug if it is involved in a significant drug-drug interaction and the prescriber cannot be contacted and the drug is considered non-essential to immediate patient care.[1]

PPP4: Adaptation of dose, regimen, or formulation

A. Modify the dose of an anti-infective drug based on renal function.[1,3]
B. Modify an aminoglycoside or vancomycin dose based on drug levels.[3]
C. Modify all other medication dosages based on drug levels.[2]
D. Modify medication dosages based on a target level (e.g. INR).[2]
E. Intravenous to oral conversion program for antimicrobials, proton pump inhibitors and H2 blockers.[3]
F. Order serum drug levels and other tests to guide drug therapy monitoring.[3]

PPP Clinical Governance

The appropriate application of all PPPs will be evaluated with each audit of the Pharmacist Clinical services. For those where chart notes are required, copies of each chart note must be given to the resource pharmacist as a quality assurance measure.

Delivery of Care

The pharmacist will attempt to provide the above care to any patient without the need for a specific request from a physician or care team member. However, the provision of this care will be governed by the availability of appropriate staffing levels and in the context of patient priorities.

[1] Unit-based clinical pharmacists who have been in clinical practice at VA for at least 1 year
[2] Unit-based clinical pharmacists who have been in clinical practice at VA for at least 1 year AND have obtained approval by Clinical Coordinator
[3] Unit-based clinical pharmacist had previous authority for this PPP
[4] Dispensary pharmacists authorized for this PPP as well as unit-based clinical pharmacists.

4. VANCOMYCIN EMPIRIC DOSING GUIDELINES - UPDATE

Tiffany Luey, B.Sc.(Pharm)., Mike Legal, Pharm.D., Mary HH Ensom, Pharm.D., Rosanne Thalakada, B.Sc(.Pharm), Tim Lau, Pharm.D.

Vancomycin is a glycopeptide antibiotic that is used to treat staphylococcal (including methicillin-resistant *Staphylococcus aureus* (MRSA)), streptococcal, and enterococcal infections. The most recent consensus review published by the American Society of Health-System Pharmacists, the Infectious Diseases Society of America, and the Society of Infectious Diseases Pharmacists recommend target vancomycin pre-dose concentrations of 15-20 mg/L for the treatment of complicated infections, such as abscesses, bacteremia, endocarditis, meningitis, and osteomyelitis.

A High-Target Vancomycin Dosing Nomogram has been developed locally at VGH and SPH, as a tool to assist clinicians in empirically dosing vancomycin to achieve these higher target levels (see Tables 1-4, page 4). The Vancouver Acute Vancomycin Empiric Dosing Guidelines have been updated to include this high-target nomogram. The updated guideline will be available as a pocket card and in the on-line Formulary under Therapeutic Tools.

For therapeutic monitoring, vancomycin serum levels should be ordered in the following situations:

1) Pre-vancomycin level on 3rd or 4th dose (within 48 hours) if:
   - a higher level of 15-20 mg/L is desired
   - patient is at risk for accumulation (e.g. Q8H interval)
   - patient is receiving other nephrotoxic agents
   - serum creatinine is above normal, renal function is changing or uncertain
   - patient is obese (>125% IBW), pregnant, pediatric or hypermetabolic (e.g. burn patient, cystic fibrosis)

   Repeat level at least weekly to ensure pre-level is within desired therapeutic range
2) Pre-vancomycin level after 7 days of therapy (for prolonged course) if aiming for levels < 15 mg/L **AND** no other risk factors as per above
3) Pre-vancomycin level if patient is not responding to therapy
4) Pre- and 3 hour post-vancomycin level (target 20-40 mg/L) if calculation of precise kinetic parameters are necessary (e.g. in a case when a target pre-level of 15-20 mg/L cannot be achieved while on prolonged therapy, or in an obese, pregnant or pediatric patient, especially when aggressive dosing is required)

A quality assurance study will be performed in early 2011 to validate the predictability of the high target nomogram. For any questions, please contact Tim Lau, at 604-875-4111, local 63361.

Pharmacy Awards

The National Canadian Society of Hospital Pharmacists (CSHP) has honoured several members of the VA Pharmacy Staff with the following research awards:

- **Rosanne Thalakada B.Sc. (Pharm)**, Michael Legal Pharm.D. , **Tim TY Lau Pharm.D.**, Josh Batterink B.Sc.(Pharm), Mary HH Ensom Pharm.D.
  Specialites in Pharmacy Practice Award for their research paper entitiled *"A Novel Vancomycin Dosing Nomograpm for Achieving High-Target Levels at Two Major Canadian Teaching Hospitals."*

- Eric Poulin B.Sc.(Pharm), **Erica Greanya Pharm.D.**, **Nilu Partovi Pharm.D.**, RJ Shapiro MD, Mary HH Ensom Pharm.D.
  Specialties in Pharmacy Practice Award for their research paper entitled "*Development and Validation of Limited Sampling Strategies for Tacrolimus and Myocophenolate in Steroid-Free Renal Transplant Regimens*."

Vancomycin Empiric Dosing Guidelines

Table 1. Initial Dose per Interval

Total Body Weight	LOADING DOSE (maximum 2500 mg/dose)		MAINTENANCE DOSE
kg	Target pre-level 10-15 mg/L (20 mg/kg)	Target pre-level 15-20 mg/L (25 mg/kg)	(15 mg/kg)
40-50	1000 mg	1250 mg	750 mg
51-60	1250 mg	1500 mg	1000 mg
61-70	1250 mg	1750 mg	1000 mg
71-80	1500 mg	2000 mg	1250 mg
81-90	1750 mg	2250 mg	1250 mg
91-100	2000 mg	2500 mg	1500 mg

Table 2. Suggested Target Pre-Vancomycin Levels Based on Indication

Pre-vancomycin Level 10-15 mg/L	Pre-vancomycin Level 15-20 mg/L
Skin and soft tissue infection not due to MRSA Urinary tract infection (catheter-associated; rule out bacteremia)	Catheter-associated bacteremia CNS infection Deep-seated or sequestered infection (e.g. abscess) Endocarditis Osteomyelitis MRSA bacteremia, pneumonia, or skin and soft tissue infection MSSA bacteremia (penicillin allergic patient)

Table 3. Low Target 10-15 mg/L Initial Dosing Interval (hours)

SCr (µmol/L)	Age Group (years)					
	20-29	30-39	40-49	50-59	60-69	70-79
40-60	8	8	12	12	12	18
61-80	8	12	12	12	18	18
81-100	12	12	12	18	18	18
101-120	12	12	18	18	18	24
121-140	12	18	18	18	24	
141-160	18	24	24	24		
161-180	24	24				
181-200	24					

Table 4. High Target 15-20 mg/L Initial Dosing Interval (hours)

SCr (µmol/L)	Age Group (years)						
	20-29	30-39	40-49	50-59	60-69	70-79	80-89
40-60	8	8	8	8	8-12*	12	12
61-80	8	8	8-12*	12	12	12	12-18*
81-100	12	12	12	12	12-18*	18	18
101-120	12	12	12-18*	18	18	18	18
121-140	12	18	18	18	18	18-24*	
141-160	18	18	18	18-24*	24		
161-180	18-24*	24	24	24			

*If more aggressive therapy is desired, select more frequent dosing interval

Shaded boxes: These patients have unstable and/or reduced renal function, and the nomogram may not be as predictive.

- For those with an interval stated, patients should receive a loading dose followed by 3 hour and pre-2nd dose serum levels to determine appropriate dosing.
- For those with no dosing interval stated, patients should receive a loading dose followed by 3 hour and 24 hour post-dose serum levels to determine subsequent dosing.
- A clinical pharmacist should be contacted for assistance with dosing and interpretation of levels.

KEY

1. Establish patient age, weight, and serum creatinine
2. Using Table 1, identify initial loading dose and maintenance dose per interval according to patient weight and target pre-vancomycin level
3. Using table 2, determine the target pre-vancomycin level based on clinical indication
4. Using Tables 3 or 4, identify initial dosing interval according to target pre-vancomycin level, age, and serum creatinine