VANCOUVER HOSPITAL & Health Sciences Centre

DRUG AND THERAPEUTICS NEWSLETTER

A Publication of the Department of Pharmacy

November 1999 *Volume 6, Number 4*

In This Issue...

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

Updated Policies/Procedures

1. New Warfarin Consultation Service

On January 4, 2000 a new warfarin consultation service will be made available to the Banfield Extended Care (ECU) and Heather Discharge Planning (DPU) units. The program has been named ECU/DPU Warfarin/ INR Consultation Service (EDWICS). Once a DPU patient or Banfield resident is enrolled by way of a signed preprinted order, Banfield Pharmacy staff will assume responsibility for the ordering of warfarin doses and interpretation of INR measurements. Since Banfield Pharmacy is not open on weekends nor Statutory holidays, all INR results reported on the days the Banfield Pharmacy is closed will be referred to the Attending Physician. Banfield Pharmacy staff will not be ordering INR measurements for those days the Banfield Pharmacy is closed. The Nurse Clinicians on the ECU and DPUs are aware of the associated nursing responsibilities. Physicians wishing to enroll their DPU patients or ECU residents into this service are encouraged to complete a preprinted order form to initiate the process.

2. Revised Reserved Antimicrobial Drug Program

The Reserved Antimicrobial Drug (RAD) program was implemented in 1983 to encourage appropriate use of newer and more expensive antimicrobial drugs. Ceftriaxone, ceftazidime, parenteral ciprofloxacin and imipenem are the reserved antimicrobials that currently require prescribing with a preprinted RAD order form. According to the current policy, only a 24-hour drug supply is dispensed unless a RAD order form is completed. A recent program review was conducted by the CSU Pharmaceutical Sciences in collaboration with the Antibiotic Use Subcommittee. The purpose of this review was to identify methods to streamline the program procedures and to enhance the usefulness of the prescribing information provided. The resulting program changes are aimed at continuing to promote the appropriate use of these drugs while minimizing avoidable increases in bacterial resistance.

As of December 15, 1999, physicians will no longer be required to complete a RAD

EDITORIAL STAFF:
Karen Shalansky, Pharm.D.
Peter Loewen, Pharm.D.
Rubina Sunderji, Pharm.D.
Peter Jewesson, Ph.D.
Any comments, questions or concerns with the content of the newsletter should be directed to the editors. Write to CSU Pharmaceutical Sciences Vancouver General Hospital, 855 W12th Ave, Vancouver BC V5Z 1M9, send a FAX to 604-875-5267 or email kshalans@vanhosp.bc.ca
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preprinted order form when prescribing reserved drugs. Instead, these agents can be prescribed using a regular order form. Assuming no prescription-related issues, the reserved drug will be dispensed along with one of the newly generated "Select Antimicrobial Information Notices" (see below). These have been created to provide the health care team with information aimed at improving the appropriate use of these agents. Each drug-specific notice contains information regarding appropriate indications, current susceptibility patterns, dosage regimens, common adverse effects, drug disposition, and IV-IV or IV-PO stepdown alternatives. The notices will be placed at the front of the health record in a similar fashion as is being done for the IV-PO Stepdown Program notices. For ceftriaxone and ciprofloxacin, the previous stepdown notices will be replaced by these new notices. Each RAD treatment course will continue to be reviewed by a clinical pharmacist for appropriateness of use. We welcome any additional recommendations you have to further improve the use of these drugs.

Example of a VHHSC Select Antimicrobial Information Notice

CEFTAZIDIME (Tazidime®)

CEFTAZIDIME

A third generation cephalosporin with gram-negative antibacterial activity

1. When should I use ceftazidime?

- **documented or suspected pseudomonal infections**

2. When should I NOT use ceftazidime?

- **patients with proven allergy to cephalosporins**
- **avoid in patients with proven serious hypersensitivity reactions to penicillins**
- **surgical prophylaxis**

3. What are the 1998 susceptibility patterns for ceftazidime at VHHSC?

Serratia sp.	78%	Enterobacter cloacae	60%
Ps. aeruginosa	85%	Acinetobacter sp.	96%
Citrobacter freundii	78%		

4. What dose should I initially use?

Dosage based on calculated creatinine clearance

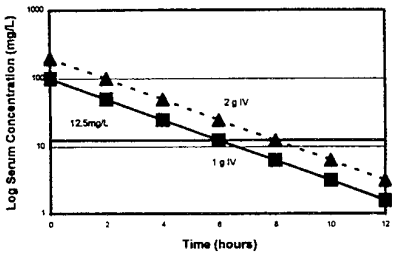
>50mL/min	25–50 mL/min	10-25 mL/min	< 10 mL/min
2g IV q8h	2g IV q12h	2g IV q24h	2g IV q48-72H

5. Can the dose be reduced ?

- **yes, ceftazidime is part of an IV-IV STEPDOWN initiative**
- **consider stepdown to 1g IV if the patient:**
  - **is clinically stable**
  - **is afebrile X 48 hours**
  - **has no positive pseudomonas cultures or a CNS infection**

6. How do the standard dose concentrations of ceftazidime compare with the MICs of typical pathogens?

Ceftazidime Serum Concentrations
1 gram vs. 2 gram IV bolus



MIC(90) for susceptible gram negative organisms is < 12mg/L

ORGANISM	MIC(90)*
Ps aeruginosa*	12.5
Serratia	1.0
E.coli	0.5
Kleb.pneumoniae	0.5
Proteus sp.	0.12

*Resistant strains may have higher MIC(90)

Adapted from: Smith BR. Clin Pharm 1984;3:373-84.

7. What is the daily cost of ceftazidime ?

2g IV q8h ($81/day)* ⇨ **1g IV q8h** ($48/day)*

Consider switching from 2g to 1g when clinically feasible

* includes acquisition, preparation, and delivery costs

8. What are the adverse effects?

- **has a side effect profile similar to most cephalosporins**

9. Are there oral alternatives for ceftazidime?

- **yes, the choice for ceftazidime IV-PO STEPDOWN therapy may vary according to the type and severity of infection**
- **oral therapy should be considered if the patient:**
  - **continues to require the drug**
  - **is clinically stable**
  - **is capable of tolerating the oral dosage**

Produced by CSU Pharmaceutical Sciences and endorsed by the Antibiotic Use Subcommittee, and the Divisions of Medical Microbiology and Infection Control and Infectious Diseases, Vancouver Hospital and Health Sciences Centre

2. Removal Of Immediate-Release Nifedipine From Wardstock

Based on reports of serious cardiac and cerebrovascular events resulting from the use of immediate-release nifedipine when given sublingually or orally for hypertensive urgencies, this dosage form is now being discouraged for use for this indication.[1,2]

As a result of these reports and recognition of the fact that there are acceptable alternatives, immediate-release nifedipine has been removed from wardstock. All prescriptions for immediate-release nifedipine are now being dispensed by a pharmacist as a personal prescription and will be accompanied with a memo alerting the prescriber to this safety information. Nursing units that are exempt from this policy are the Spinal Cord ICU and Stepdown unit (SICU, E9) and rehabilitation medicine (C3).

Alternatives to nifedipine for hypertensive urgencies include oral or sublingual captopril, and oral labetalol, atenolol, clonidine or prazosin. Table 1 lists dosing and potential adverse effects.

Captopril, in particular, has been shown to be an effective alternative to nifedipine[3-5] and has been suggested as a first-line agent for the treatment of hypertensive urgencies.[6] A sublingual 25mg dose of captopril is as efficacious as a 10mg dose of immediate-release nifedipine in lowering blood pressure and is associated with a lower incidence of adverse effects.[3-5] Captopril 12.5 or 25mg scored tablets (for oral or sublingual use) have replaced nifedipine as a wardstock drug. For sublingual administration, patients should be instructed to avoid swallowing until the tablet is completely dissolved (~ 3 minutes).

For further information, please refer to the Drug and Therapeutics Newsletter 1998;5(2):6-8.

References

1 Grossman E et al. Should a moratorium be placed on sublingual nifedipine capsules given for hypertensive emergencies and pseudoemergencies? JAMA 1996;276:1328-31.

2 Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. The sixth report of the Joint National Committee. Arch Intern Med 1997;157:2413-46.

3 Ceyhan B et al. Comparison of sublingual captopril and sublingual nifedipine in hypertensive emergencies. Jpn J Pharmacol 1990;52:189-93.

4 Wu SG et al. Comparison of sublingual captopril, nifedipine, and prazosin in hypertensive emergencies during hemodialysis. Nephron 1993;65:284-7.

5 Angeli P et al. Comparison of sublingual captopril and nifedipine in immediate treatment of hypertensive emergencies: a randomized, single-blind clinical trial. Arch Intern Med 1991;151:678-82.

6 McKindley DS et al. Advances in pharmacotherapy: treatment of hypertensive crisis. J Clin Pharm Ther 1994;19:163-80.

Table 1. Oral Agents for Hypertensive Urgencies

Drug	Captopril (Capoten)	Labetalol (Trandate)	Atenolol (Tenormin)	Clonidine (Catapres)	Prazosin (Minipres)
Dose	12.5-25mg q30min prn SL or PO	200-400mg q3-4h prn PO	100mg q12-24h prn PO	0.1-0.2mg, then 0.05-0.1mg q1h prn PO (max. 0.8mg)	1-2mg q1h prn PO
Onset (minutes)	SL 5-10 PO 15-30	30-120	60	30-60	30-60
Peak Effect (hrs)	SL 0.5-0.8 PO 1-2	3-4	12-16	2-4	2-4
Duration (hrs)	4-6	6-8	24	6-8	< 24
Side Effects	Hypotension, acute renal failure	Orthostasis, bronchospasm, bradycardia	Bronchospasm, bradycardia	Sedation, dry mouth, dizziness, constipation	Syncope (first dose), tachycardia, headache
Comments	Caution if renal failure; avoid in renal artery stenosis	Longer time to peak effect; avoid in asthma, heart failure or heart block	More gradual and prolonged reduction in blood pressure; avoid in asthma, heart failure or block	Avoid in patients with altered mental status	Most effective with increased circulating catecholamines

Infusion Program Updates

The Reduced Needle System: Tips To Improve Use

The reduced needle system was introduced at the VGH and UBCH sites in September 1999. To facilitate this change, the Infusion Program coordinated over 230 inservices over a 24-day period and produced a "Hollywood North!" video for those who were unable to attend. Although the introduction of the reduced needle system has been successful, a few technique-related problems have been brought to our attention. These problems typically subside as experience is gained with the new devices. Some of the questions we have received include:

Question: Why do the upper and lower injection ports leak for some patients?

Response: This tends to be a technique-related problem. Too little pressure when connecting the ports of the primary and secondary tubing together can cause a loose connection and subsequent leakage. Too much pressure can cause connection damage and leakage. The correct method to connect the tubings is to:

1 Firmly insert the secondary tubing into the injection on the primary tubing. Do not twist the secondary tubing when inserting it and do not grasp the tubing collar during this step.

2 Finger tighten the secondary tubing collar once the secondary tubing is firmly seated.

Question: Can I needle through the injection port to administer drugs or flush the line?

Response: No. Needling through the port will damage the port (in particular, the back-check valve) and cause leaking. Luer-lock syringes are connected directly to the port. To administer drug products that are packaged in pre-filled syringes with fixed needles, an injection cap must be attached to the port.

Question: Why and when do I need to use a "dead-ender" cap?

Response: A dead-ender cap needs to be attached:

2 Whenever the original cap on the injection port has been removed. The reduced needle system ports are not self-sealing. Without a cap on the port, you have an open system!

2 To the end of a 7-inch extension on a peripheral IV.

Question: Why does blood sometimes back up into the 7-inch extension when it is used as a saline lock.

Response: This backup can occur when you have not clamped the extension tubing close to the IV site. Clamp as close to the IV site as possible using a positive pressure technique. The 7-inch extension tends to be bulky and we are currently investigating alternatives.

Question: On our unit we are continuing to use the T-piece for incompatible medications and needling through the cap. Is there a needleless T-piece available?

Response: Not yet, but we are also investigating this issue. We anticipate having an alternative by February 2000.

Question: Do we use the reduced needle system procedures for CVCs?

Response: No. Refer to the existing patient care guidelines for CVC procedures. We anticipate modifying the guidelines by February 2000.

Contact one of the Infusion Program educators (Lynn Chase, Carole Leong, Ruth Nicol, Sally Tomlinson) at 54706 if you have any questions regarding the new tubing.