VANCOUVER HOSPITAL & Health Sciences Centre

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CHANGES TO FORMULARY

Additions

1. Amlodipine 5mg, 10mg tablets (Norvasc®)
- dihydropyridine class of calcium channel blocker
- cost comparison:
  Amlodipine 2.5mg daily $0.74
  Felodipine 5mg daily $0.74
  Nifedipine 10mg TID $0.66
- see Amlodipine-Felodipine Interchange, page 2

Deletions

1. Felodipine tablets (Plendil®)
Alternative: Amlodipine (Norvasc®)
- see Amlodipine-Felodipine Interchange, page 2

2. Oxtriphylline tablets, liquid (Choledyl®)
Alternatives: Theophylline, Aminophylline
see Oxtriphylline conversion to Theophylline, page 2

Updated Policy and Procedures

1. Felodipine Interchange to Amlodipine

Effective October 10, 1995**,** all orders for felodipine will be automatically switched to amlodipine at the equivalent daily dose (Table 1). Amlodipine is structurally similar to felodipine with a lower incidence of side effects (primarily ankle edema). It is also approved for use in angina.

Table 1. Dosage Equivalence of Felodipine and Amlodipine

Felodipine Dose	Amlodipine Equivalent Dose
5 mg daily	2.5 mg daily
10 mg daily	5 mg daily
15 mg daily	7.5 mg daily
20 mg daily	10 mg daily

2. Oxtriphylline Conversion to Theophylline

Oxtriphylline (Choledyl®) contains 65% theophylline. The following table can be used to convert oxtriphylline to equivalent theophylline (Theodur®) dosage. Physicians will be contacted to obtain a new order when oxtriphylline is prescribed.

Table 2. Conversion of Oxtriphylline to Theodur®

Oxtriphylline Dose	**Theodur® Equivalent Dose**
200 mg q8h	200 mg q12h
200 mg q6h	250 mg q12h
300 mg q8h	300 mg q12h
300 mg q6h	400 mg q12h
400 mg q8h	400 mg q12h
400 mg q6h	500 mg q12h

3. Home IV Antibiotic Program

Home intravenous (IV) antibiotic programs have proven to be safe, effective, and economical for the treatment of various infectious diseases.[1-4] On May 30, 1995 the Vancouver Hospital and Health Sciences Centre launched the Home IV Antibiotic Program in conjunction with the Vancouver Health Department and St. Paul's Hospital.

What is the objective of the Home IV Antibiotic Program?

This program is designed to permit initiation or continuation of parenteral antibiotic therapy in the home setting. This program should help avoid hospital admission or facilitate earlier hospital discharge.

Which patients are considered candidates for the program?

Generally, patients with infections requiring long-term parenteral antibiotic treatment are considered ideal candidates for this program. Such patients include those with endocarditis, osteomyelitis and cellulitis. These patients must be medically stable and require therapy with an approved parenteral antibiotic. The patient, or a support person, must be willing to administer the antibiotic in the home setting. In a few exceptional cases, a home care nurse may be available to administer the medication. Finally, the patient must reside in the City of Vancouver. For patients who live outside of Vancouver, it may be possible to make arrangements for them to be discharged to other

home IV Antibiotic programs.

How does a patient become enrolled into the program?

If a patient is perceived to be a suitable candidate for receiving a parenteral antibiotic at home, the attending physician must page the home IV program pharmacist (pager 871-3221) to request a home IV program assessment. Each patient will then be assessed by a pharmacist and nurse educator and/or home care liaison nurse and an Infectious Disease specialist as required to determine patient eligibility. Assessment includes an evaluation of the current and planned antibiotic regimen, patient competency, home support availability and antibiotic-related administration issues. In general, a minimum of 48 hours notice is required for patient assessment and teaching before hospital discharge is possible.

Who is involved in the care of the patient after enrollment?

Once the patient is enrolled in the program, the nurse and pharmacist will teach the patient how to self-administer their drugs and ensure the patient is familiar with all other aspects of the intended treatment course. The pharmacist will also coordinate with the central pharmacy at St. Paul's Hospital to have the medication dispensed and the necessary IV supplies delivered to the patient's home.

Once discharged, patients will continue to be monitored by the Home IV Team in the Munroe Clinic, (12th and Oak, VHHSC) until completion of therapy. Home care nurses from the Vancouver Health Department will also visit the patient at home to monitor their progress.

Are there any other considerations for patient enrollment?

Patients can be assessed for enrollment into the Home IV Program from Monday to Friday 0800-1600Hrs at both the 12th and Oak and UBC Sites.

If there are any questions or concerns regarding this program, please contact Mavis Friesen at 875-5939. For patient enrollment, please page the on-call home IV program pharmacist at 871-3221 (12th and Oak site) or 871-5196 (UBC site).

References:

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QUESTION AND ANSWER

Question: What is the role of calcium salts as phosphate binders in patients with renal failure?

Answer: Hyperphosphatemia secondary to chronic renal failure plays a major role in the pathogenesis of renal osteodystrophy (bone disease) and soft tissue calcification. Dietary restriction of phosphate and the use of phosphate binders are utilized in order to control serum phosphate concentrations. Intestinal phosphate binders containing aluminum salts (e.g. aluminum hydroxide, Amphojel®) were the mainstay of therapy, however their use is limited today due to their link with causing osteomalacia and dialysis dementia.[1,2] As a result, calcium salts as intestinal phosphate binders are being used to avoid these toxicities. These salts include calcium acetate, calcium carbonate, calcium chloride, calcium citrate and calcium gluconate. Calcium chloride and calcium citrate have several disadvantages compared to the other salts. The chloride salt is very unpalatable and may increase the risk of systemic acidosis. The citrate salt binds phosphate poorly *in vitro*, and when combined with aluminum hydroxide increases the intestinal absorption of aluminum leading to aluminum toxicity.[3] Calcium gluconate may be effective in reducing serum phosphate levels, however data is limited as to its exact role.[4] The two calcium salts primarily used for this disorder are therefore calcium carbonate and calcium acetate. Table 3 compares these two products:

Calcium acetate was recently added to the VHHSC formulary. Several studies have demonstrated superior efficacy of calcium acetate over calcium carbonate in its phosphate binding capacity.[5-8] An equivalent dosage of calcium acetate has been shown to bind at least twice as much phosphate as the carbonate salt.[5,9,10] There are no differences between the products in the control of parathyroid hormone (PTH) or plasma alkaline phosphatase.

While lower doses of calcium acetate can be utilized, hypercalcemia still remains a problem associated with both salts.[5,10] The unchanged incidence of hypercalcemia with calcium acetate despite a reduced dosage may be explained by a possible greater bioavailability of calcium from this salt.[10] Also, with improved control of hyperphosphatemia, phosphate lowering

Table 3: Comparison of calcium acetate and carbonate as phosphate binders

Calcium Salt	Brand Name	Strength	Elemental Calcium	*Dose for phosphate binding	Cost/ tablet
Calcium Acetate	Calcium acetate Stanley®	667mg	169mg	676-1503mg elemental Ca^{++}/day	$0.08
Calcium Carbonate	Tums®, Caltrate®	500mg 1500mg	200mg 600mg	1000-2500mg elemental Ca^{++}/day	$0.03 $0.14

* initiate at 1500mg elemental calcium, adjust according to serum phosphate and calcium

is able to increase plasma calcium via a physicochemical equilibrium mechanism.[5,10] Calcium acetate has also been reported to cause less constipation and gastrointestinal distress compared to calcium carbonate, although it appears to be less palatable.

In conclusion, both calcium carbonate and calcium acetate are effective in reducing serum phosphate in patients with uremia, however a lower dose of calcium acetate may be required. Close monitoring of serum phosphate and calcium is necessary to determine the most effective dose with minimal toxicity.

References

1. Knoll O et al. Gastrointestinal absorption of aluminum in chronic renal failure insufficiency. Contrib Nephrol 1984;38:24-31.
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High Initial INRs with Warfarin Therapy

Hematology at the 12th and Oak Site is currently using a new reagent to determine INRs which is very sensitive to factor VII which has a short half-life (t1/2 = 4 to 6 hours). As a result, unusually high INR results may occur prematurely within 2 to 3 days of warfarin initiation. If this happens, simply hold the warfarin dose until the INR comes down (usually within 1 to 2 days) rather than giving vitamin K which will cause unwanted warfarin resistance. Interventions (vitamin K, FFP) are only necessary if the patient shows signs of bleeding.

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