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Boston University
Goals and Objectives for the Coming Year for The University Hospital Pharmacy Dept.

The University Hospital Department of Pharmacy has accomplished much in the past year, including:
1) Publication of a Hospital Formulary & Newsletter
2) Implementation of a Unit Dose Drug Distribution System, considered the safest and best systems available. The last nursing unit (B7) will be up on this system by the time this newsletter is out.
3) Establishment of pharmacy substations on the patient floors to improve pharmacist monitoring of patient drug therapy and optimize the response time to medication orders, including the recent relocation of cancer chemotherapy preparation to a pharmacy substation on F4.
4) Computerization of pharmacy profiles last October and the recent conversion to an improved system with inventory capabilities to improve pharmacy handling of drug orders, better track drug utilization (improving pharmacy management capabilities), and more accurate billing/charging of drugs.
5) Pharmacy preparation of cardioplegia solutions.
6) Development of a Pharmacy Residency Program and a Staff Development Coordinator to improve the capabilities and training of our staff.
7) Development of a Pharmacy Library and Drug Information Center to better answer drug information questions.
8) Movement into a state-of-the-art pharmacy facility in the Atrium Pavillion.

Many of the fruits of these accomplishments, through improved pharmacy services, will only begin to show in the coming months.

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Drug Review: Encainide (Enkaid)
By David P. Nicolau, R. Ph., Pharmacy Resident, Department of Pharmacy, The University Hospital

Encainide (Enkaid) is a Type 1C antidysrhythmic agent that was recently added to The University Hospital Formulary. This agent is structurally unrelated to other antiarrhythmic agents currently available for the treatment of arrhythmias. The usefulness of this agent is due to its ability to manage arrhythmias refractory to conventional antiarrhythmic therapy. This agent possesses potent local anesthetic activity and markedly decreases the rate of rise of Phase 0 of the action potential. Although this product is currently on the Formulary, its use is restricted to the Cardiology Service approval.

Pharmacology

Encainide is a potent sodium channel blocker, thus reducing the rate of rise of Phase 0 of the action potential. The most prominent effects after oral administration are prolongation of AV nodal conduction time and impulse conduction within the His-Purkinje system. In addition it increases refractoriness in the atrium, ventricle and accessory pathway. The electrocardiogram of patients receiving oral encainide exhibit a dose-dependent widening of the QRS complex and HV (His ventricular) interval. Encainide prolongs PR and QT interval to a lesser extent. It increases the effective refractory period (ERP), decreases the action potential duration (APD), thus increasing the ratio of ERP to APD. Generally, agents that maintain or prolong the ERP/APD ratio are effective, because they prevent the formation of arrhythmias arising from slowed conduction. Encainide has been shown to have minimal hemodynamic effects. It does not significantly affect left ventricular contractility, blood pressure, heart rate, stroke volume, ejection fraction or end diastolic volume.

Pharmacokinetics

Encainide is well absorbed following oral administration with peak plasma concentrations attained in one to three hours. The drug undergoes oxidative metabolism in the liver, which promotes two phenotypes, classified as either extensive or poor metabolizers. This hepatic biotransformation produces two active metabolites, o-desmethyl encainide (ODE) and 3-methoxy o-desmethyl encainide (MODE), which are more potent than the parent compound. Encainide and its metabolites are primarily excreted by the kidney.

The majority of the population are extensive metabolizers. In these patients, the systemic bioavailability of encainide is low, (25 - 30%) due to extensive first pass metabolism. As a result, the parent drug has a relatively short elimination half-life (2.5 hours) and low plasma concentrations. The elimination half-life of the active metabolites is three to eight times longer than the parent compound, thus producing plasma concentrations five to ten times higher than the parent compound.

Only seven to ten percent of the population are poor metabolizers. Recently, they were found to be lacking the specific cytochrome P450 isoenzyme which is responsible for drug oxidation. In these patients, encainide has a greater oral bioavailability and a significantly longer half-life. Plasma concentrations of encainide are greater than 20 times the concentration achieved in extensive metabolizers. The half-life of encainide is extended in poor metabolizers to eight to eleven hours.

Adverse Effects

One of the greatest concerns with the use of encainide, as with each of the Type 1C agents, (i.e. flecainide) is the aggravation of ventricular arrhythmias. Studies have reported a 10 to 20% incidence of malignant ventricular tachycardia in patients receiving encainide therapy. These events may be marked by hypotension and a progression to ventricular fibrillation. The majority of malignant cardiac events have been observed in patients with a history of sustained ventricular tachycardia or fibrillation. This effect is more commonly observed in patients whose daily dose of encainide exceeds 200 mg.

Noncardiac side effects associated with encainide therapy include blurred vision, headache, nausea and dizziness. Although the incidence of these side effects may be as high as 60%, they are transient and usually improve with dosage reduction. Other less commonly observed side effects may include abnormal liver function tests, a metallic taste and tremors.

Drug Interactions

There are no reported drug interactions between encainide and other antiarrhythmic agents, beta blockers, diuretics or calcium channel blockers. However, caution should be exercised when these
agents are used concurrently due the possibility of pharmacologic synergy which may affect cardiac conduction.

The coadministration of cimetidine with encainide may increase the plasma concentration of both the parent compound and its metabolites. The significance of this drug interaction is unknown, however, it may be advisable to monitor the patient's electrocardiogram and clinical status.

**Dosage and Administration**

The initial dosing regimen is 25 mg orally every eight hours. If the desired therapeutic response is not achieved after four to seven days (allowing for steady-state plasma concentrations of encainide and its metabolites to be reached) the dose may be increased to 35 mg. After another four to seven days, the dose may be increased further to 50 mg. If the patient is not controlled, the regimen may be changed to 50 mg every six hours, but should never exceed 75 mg every six hours. Daily doses greater than 200 mg are not recommended because of a higher incidence of proarrhythmic effects. However, doses of 300 mg per day have been administered safely.

Encainide dosing should be determined by the patient's clinical response to therapy and electrocardiographic changes. In patients with renal disease, the dose should be reduced to one third of the standard dose. Despite a decrease in the elimination of encainide in patients with liver dysfunction, no major dosage adjustments appear necessary.

**Conclusion**

Encainide is an effective antiarrhythmic which may be an alternative for managing ventricular arrhythmias refractory to other agents. Due to its potential for arrhythmia induction and its relatively high incidence of side effects, specific dosing guidelines for therapy should be followed. Since encainide exhibits minimal hemodynamic effects, it may be preferable over other currently available antiarrhythmic agents. This agent is restricted to the Cardiology Service and their approval must be given to the Pharmacy before it is dispensed.

References Available Upon Request
Pharmacy Goals and Objectives for the Coming Year
(continued from page 1)

In the coming year, the Pharmacy will turn its eyes inwards to concentrate on quality assurance and the development of methods to assess, monitor and improve the level of basic pharmacy services already in place. Efforts to streamline tasks, improve response time and productivity will be a priority. Development of a more courteous attitude, increased staff training/development, improved communications and more visibility of the pharmacists in patient care areas will be key objectives for the year. "Taking Pride in Excellence" will be the Pharmacy's motto.

Secondary objectives will increased involvement in antibiotic utilization, provision of sophisticated drug information services and clinical pharmacy services.

A formal drug information services, drug therapy educational programs, pharmacokinetic dosing service and narcotic/pain management service are planned in this area.

The one new pharmacy service that will be implemented this year will be an OR substation to assist in the paperwork and control of narcotics in the OR. Improved narcotic control and accountability will be addressed throughout the hospital as well.

The main goal of the pharmacy at The University Hospital is the safe and effective use of drugs within the institution in a cost effective manner. Any ideas, suggestions or input on how the pharmacy can improve the level of services it offers is not only welcome but encouraged.

P&T Committee Actions
September 1987
No actions this month.

Pharmacy News Tibbits
(continued from page 1)

New NU Pharmacy Faculty Member

Kimberley Adler, Pharm.D., a graduate of the University of Southern California School of Pharmacy, was recently hired as an Assistant Professor of Clinical Pharmacy for the Northeastern University School of Pharmacy assigned to The University Hospital. NU has for many years had pharmacy students in the bachelor's and Doctor of Pharmacy programs participating with medical rounding teams as part of their clinical clerkships. Kimberley replaces Kim Mu-Chow, who was hired by UH as the Pharmacy Clinical Coordinator one year ago.

Pharmacist Appointments

Anthony Riccardione M.S. is welcomed as a new pharmacist at UH. Tony has over 17 years of hospital pharmacy experience including clinical and supervisory roles.

Ming Laopornsvan M.S. was recently assigned as the Pharmacy Antibiotic Specialist for UH. Daniel Dobson M.S. was assigned as a Pharmacy Specialist, with responsibilities initially in coordinating the Dept’s Quality Assurance Program and later in Oncology. Both previously worked as staff pharmacists at UH.