

# INTERNAL MEDICINE ALERT®

*A twice-monthly update of developments in internal and family medicine*

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## Cardiovascular Risk Factors— How Important are They to Control in Diabetic Patients Without Known Coronary Artery Disease?

ABSTRACT & COMMENTARY

**Synopsis:** Cardiovascular risk factors should be modified as aggressively in diabetic patients without coronary artery disease as is recommended for nondiabetic (or diabetic) patients with prior myocardial infarctions.

**Source:** Haffner SM, et al. *N Engl J Med* 1998;339:229-234.

Patients with proven coronary artery disease have 3-7 times greater mortality than do patients without known coronary artery disease.<sup>1,2</sup> Diabetic patients are particularly at significant risk for developing symptomatic coronary artery disease<sup>3,4</sup> as are patients with elevated serum cholesterol levels,<sup>4,5</sup> whether they are afflicted with diabetes. However, it had not been previously clearly determined whether it is necessary to treat diabetic patients who have not previously suffered myocardial infarctions as aggressively with respect to risk factor modification as is recommended for post-myocardial infarction patients whether they are diabetics.

A report recently published in the *New England Journal of Medicine* from the University of Texas Health Science Center at San Antonio, Texas, and from the Turku University in Finland addressed this question by comparing the seven-year incidence of both fatal and nonfatal myocardial infarctions that occurred in 1373 nondiabetic patients with the incidence in 1059 diabetic subjects.<sup>6</sup> Their data suggested that diabetic patients without previous myocardial infarctions had as high a risk of myocardial infarction as nondiabetic patients with previous myocardial infarctions. They conclude that cardiovascular risk factors should be modified as aggressively in diabetic patients without coronary artery disease as is recommended for nondiabetic (or diabetic) patients with prior myocardial infarctions.

### ■ COMMENT BY HAROLD L. KARPMAN, MD

The data in the present study were obtained from a Finnish popula-

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tion-based data base, which is a central registry of all patients with diabetes who receive reimbursement for drugs. Although the data are well collected, one potential limitation of the current study is that the mortality rate from coronary artery disease in Finland is among the highest in the world.<sup>6</sup> The seven-year incidence of myocardial infarctions among nondiabetic patients with and without prior myocardial infarction at baseline was 18.1% and 3.5%, respectively, whereas the incidence of myocardial infarction in diabetic patients with and without prior myocardial infarction at baseline were 45% and 20.2%, respectively. Therefore, the incidence rates in nondiabetic patients with prior myocardial infarctions and in diabetics without prior myocardial infarctions are essentially equivalent. Obviously, a prospective study comparing the effects of different levels of lipid-lowering therapy on coronary heart disease in diabetic subjects, with and without previous history of myocardial infarctions, would be a definitive way to demonstrate that the conclusions derived from this population-based study are accurate. However, in the short-term, it would appear to be prudent to treat all diabetics (whether they have or have not previously suffered a myocardial infarction) with vigorous risk factor modification in order to reduce the incidence of new and/or recurrent myocardial infarctions. ❖

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## Vitamins A, C, and E in Cancer Therapies

ABSTRACT & COMMENTARY

**Synopsis:** *Vitamin E and vitamin C supplements are recommended in modest doses, as they are safe and may help prevent some cancers.*

**Source:** Kaegi E. *Can Med Assoc J* 1998;158:1483.

Because large doses of supplemental vitamin A have serious toxic effects, retinoids like beta carotene (a provitamin—i.e., transformed in vivo into vitamin A) have been touted as treatment for some cancers. There are laboratory and animal data to suggest the increased production and tumoricidal activity of white blood cells and macrophages with retinoids, especially beta carotene and analogues of vitamin A. Clinical data are contradictory, though recent studies suggest an increased incidence of lung cancer with beta carotene supplementation.

Although epidemiologic data suggest a preventive effect of foods rich in vitamin C against stomach and cervical cancer, either through an antioxidant or nitrosamine blocking action, the therapeutic effects of supplemental vitamin C are less clearly documented. Anecdotal reports and uncontrolled case series suggest improved survival, although two randomized controlled trials of vitamin C therapy with advanced cancer were negative. Safety at up to 1000 mg daily has been repeatedly reported. Proponents believe that megadose, intravenous vitamin C earlier rather than later in illness, has a better chance of having a beneficial clinical effect.

Like vitamin A, vitamin E is fat soluble. It is most commonly ingested in food as d-tocopherol, usually gamma, and as a supplement, most of which is synthetic, or dl-alpha tocopherol. Most clinical trials have been done with dl-alpha tocopherol. Vitamin E's lipid antioxidant and immunostimulatory effects are thought to be responsible for its anticancer effects. Toxicity with high doses—over 800 IU—can include nausea, diarrhea, and blurred vision.

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High doses may also interfere with the absorption of anti-coagulants, iron, and vitamin B12. Oral leukoplakia, a cancer precursor, may be successfully treated with vitamin E, and invasive prostate cancer risk may be reduced with 50 mg (approximately 100 IU) daily.

■ **COMMENT BY JOHN La PUMA, MD**

Vitamin E and vitamin C supplements are recommended in modest doses, as they are safe and may help prevent some cancers. Beta carotene supplements may be dangerous and are not recommended. Strong cancer prevention data, especially for gastrointestinal disease, exist for low saturated fat diets that are rich in high fiber, largely unprocessed plant foods. A diet that puts fruits, vegetables, grains, and legumes in the middle of the plate and makes animal foods side dishes is probably the best medicine. Because 250 almonds or hazelnuts are needed for 100 IU of vitamin E daily, however, a supplement is the best way to get this vitamin. (*Dr. La Puma is Director, C.H.E.F. Skills Research, Cooking, Healthy Eating, and Fitness [C.H.E.F.]. Alexian Brothers Medical Center, Elk Grove, IL.*) ❖

## Sensory Neuropathy and Malignancy

ABSTRACT & COMMENTARY

**Synopsis:** Heightened vigilance for occult neoplasms is warranted in patients with undiagnosed sensory neuropathy.

**Source:** Camerlingo M, et al. *Arch Neurol* 1998;55:981-984.

Among 363 patients with peripheral sensory neuropathy prospectively observed over a seven-year period, no cause could be identified in 53. Two patients refused further follow-up, but the remaining 51 patients, 42 men and nine women with a mean age of 64.5 years, were followed at six-month intervals for a mean of 51.4 months. Patients initially underwent extensive evaluations including cerebrospinal fluid examination, sural nerve biopsy, search for humoral markers of neoplasms (carcinoembryonic antigen, alpha-feto-protein, prostatic specific antigen) and circulating antibodies (anti-Hu, anti-Yo, and anti-Ri antibodies), chest radiograph, total body CT, gastroscopy, and rectal examination for occult blood. At six-month intervals, the search for cancer was repeated with routine blood tests, ultrasound examination of the abdomen, pelvis, and thyroid gland, chest radiograph, and stool specimens for occult blood.

Cancer was found in 18 patients (35.3%) within 3-72 months (mean, 27.9 months) of onset of the neuropathy and included non-Hodgkin lymphoma (n = 3), sarcoma (n = 1), and cancer of the liver (n = 4), bladder (n = 3), lung (small cell), prostate (2 each), breast, pancreas, or sublingual gland (1 each). Four patients improved neurologically following treatment of their cancer (1 each with lung, liver, bladder, and sublingual gland cancer), and three did so within weeks—the bladder cancer patient showing a slower improvement. An additional patient developed prostate cancer subsequent to acceptance of the manuscript for publication. Heightened vigilance for occult neoplasms is warranted in patients with undiagnosed sensory neuropathy.

■ **COMMENT BY MICHAEL RUBIN, MD**

Cancer affects the neuromuscular system either directly, by compression or infiltration, or indirectly, by paraneoplastic effect. The latter are rare and present in less than 1% of cancer patients, but they capture clinical attention out of proportion to their incidence due to their unique serologic and often striking clinical phenomenology.

Cancer does not occur more frequently in patients with typical amyotrophic lateral sclerosis, despite the plethora of case reports suggesting otherwise.<sup>1</sup> However, particularly young (< 30 years) or old (older than 70 years) patients should be evaluated for malignancy, and patients with paraproteinemia and elevated cerebrospinal fluid (CSF) protein should be screened for lymphoma.<sup>2</sup> Subacute motor neuronopathy is an accepted paraneoplastic effect of Hodgkin's disease and lymphoma, occurring most often while the patient is in remission, but it is rarely debilitating and tends to stabilize or improve with time.<sup>3</sup>

Leptomeningeal neoplastic polyradiculopathy demonstrates typical radicular symptoms and signs. F-wave electrodiagnostic studies may provide an early clue to compression,<sup>4</sup> and CSF analysis is almost always abnormal.<sup>5</sup>

Subacute sensory neuronopathy is most often seen with small cell lung cancer. Differentiation from idiopathic sensory neuropathy is indicated by finding CSF pleocytosis and elevated protein or associated paraneoplastic encephalomyelitis (in 70%), and anti-Hu antibodies, a complement-binding IgG antibody in serum and CSF that reacts with a tumor antigen and an identical brain nuclear protein. Unfortunately, treatment of the underlying cancer is of no benefit.

Curiously, among patients with idiopathic sensory neuropathy and no evidence of cancer, the incidence of circulating dominant clones of T cells, the T-cell counterpart of monoclonal gammopathy of undetermined significance (MGUS), is strikingly high.<sup>6</sup> Eighty percent of patients with chronic idiopathic axonal neuropathy (12/15) or

chronic idiopathic ataxic neuropathy (4/5) demonstrated these clones, as compared to 20% of normal controls (2/10), elderly patients with degenerative neurologic disease, including Parkinson's disease, Alzheimer's disease, or amyotrophic lateral sclerosis (2/10), or elderly patients with chronic inflammatory demyelinating polyneuropathy (2/10). The relevance of these clones to the underlying neuropathy is unknown but supports the notion that autoimmunity may be causative. The finding suggests the potential for future therapeutic trials using traditional immunosuppressive agents or high-dose intravenous immune globulin. (Dr. Rubin is Associate Professor of Clinical Neurology, New York Hospital—Cornell Medical Center.) ❖

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## Melatonin for Day Sleep or Night Alertness?

ABSTRACT & COMMENTARY

**Synopsis:** *These data do not show real improvement in day sleep or night alertness, and melatonin is not recommended for these uses.*

**Source:** Jorgensen KM, Witting MD. *Ann Emerg Med* 1998;31:699-704.

To determine whether exogenous melatonin improves day sleep or night alertness in emergency physicians working night shifts, Jorgensen and Witting performed a double-blind, placebo-controlled crossover trial. They gave emergency physicians 10 mg sublingual melatonin or placebo each morning during two time-equivalent strings of night shifts. During day-sleep periods, subjective sleep data were recorded, and during night shifts, alertness was assessed using the Stanford Sleepiness Scale. Melatonin did not improve gestalt day sleep ( $P = 0.3$ ) but did suggest a trend toward improved night alertness. Exogenous melatonin may be of modest benefit to night shift workers.

### ■ COMMENT BY JOHN La PUMA, MD

I'll bet that "ER" will feature melatonin, if it hasn't

already. As sure as perception is TV reality, their docs will soon be snoozing. But, if they were real docs, would they have a chance?

These two University of Maryland physicians decided to enroll their emergency medicine residents and attendings to find out. Residents worked two, three, four, or five 12-hour overnight shifts; attendings worked two or five eight-hour overnight shifts. A washout period of five days was created. Most subjects slept the time off through, instead of a few hours after work and a few hours before.

Though the sample size was small, Jorgensen and Witting claim that it had the power to show a dramatic benefit on day sleep or night alertness. There was no benefit. Jorgensen and Witting also claim that this is the largest study of melatonin in night shift workers. They imply that the large dosage would not be used again (0.3 mg is probably adequate to prevent jet lag). Trends toward initial sleep time, premature awakenings, and time to fall asleep favored melatonin, but slightly.

Though virtuous, this study suffers from many unanswered methodologic questions, from the level of activity in the ED on each night, to ways to make sense of subjects' variable time periods worked, to the uncertainties about the constancy of subjects' sleeping places and partners.

With nonstandardized, over-the-counter hormones now available on must-see-TV, go slowly. These data do not show real improvement in day sleep or night alertness, and melatonin is not recommended for these uses. If you recommend melatonin to patients for prevention of jet lag, suggest that it be taken in very low dose—1 mg or 2 mg—for no more than a few days at a time. ❖

## Music Therapy Reduces Anxiety in Mechanically Ventilated Patients

ABSTRACT & COMMENTARY

**Synopsis:** *Music represents a practical, nonpharmacologic alternative that could be used instead of sedative medications.*

**Source:** Chlan L. *Heart Lung* 1998;27:169-176.

To test the effects of music on relaxation and anxiety in patients on mechanical ventilation, Chlan randomized patients to a 30-minute music session or 30-minute rest period. For the music session, subjects using headphones listened to a cassette tape with their choice of program. Options included classical, new age, country-

western, religious, and easy listening. In each category, the tempo of the music was 60-80 beats/min, a rate shown to promote relaxation. For both groups, the immediate environment was set to enhance rest by closing blinds, dimming lights, and posting a “do not disturb” sign. The subjects (n = 54) were recruited from four ICUs in three university-affiliated teaching hospitals. Mean age was 57.1 years, 49% were women, and the mean duration of mechanical ventilation (SIMV) was 7.4 days (median, 3.5 days). Anxiety was measured using the Spielberger State-Trait Inventory. Significant differences between groups were found, with subjects in the music group experiencing less anxiety ( $P < 0.001$ ), a lower respiratory rate ( $P < 0.001$ ), and heart rate ( $P < 0.001$ ), which persisted up to five minutes after the intervention.

■ **COMMENT BY LESLIE A. HOFFMAN, PhD, RN**

Results indicated that a single, 30-minute music session was effective in reducing anxiety and promoting relaxation in patients who had received mechanical ventilation for an average of seven days (range, 1-62 days). The attraction of findings from this study relates to the simplicity of the intervention. Patients in an ICU are exposed to many stressors, especially those who are alert, as patients were in this study, and those who require long-term mechanical ventilation. The intervention included a variety of musical choices, which were considered important by the investigator. Most patients chose classical (56%), followed by country-western (28%), easy-listening (12%), and new-age music (4%).

Commonly, stress and anxiety are managed by administering sedatives. Although they can be effective, these medications have untoward effects. Music represents a practical, nonpharmacologic alternative that could be used instead of sedative medications. Radios can also be used, but the advantage of this intervention is that other noises were blocked by the headphones, potentially promoting greater relaxation. (*Dr. Hoffman is Professor, Medical-Surgical Nursing; Chair, Department of Acute/Tertiary Care, University of Pittsburgh School of Nursing.*) ♦

## Pharmacology Update

### Candesartan

By William T. Elliott, MD  
and James Chan, PharmD, PhD

**A**stra merck has received approval from the FDA to market candesartan (Atacand), the

fourth angiotensin II receptor blocker (ARB) now on the market following losartan, valsartan, and irbesartan. Candesartan has been available for use in several European countries since 1997. The drug is a potent and selective antagonist of the angiotensin II receptor subtype 1 (AT1). It appears the AT1 receptors mediate most of the known effects on angiotensin II. Candesartan is formulated as an inactive prodrug (candesartan cilexetil) to improve oral bioavailability. It is almost completely converted to the active candesartan during gastrointestinal absorption.<sup>1</sup>

#### Indications

Candesartan is indicated for the treatment of hypertension as monotherapy or in combination with other antihypertensive agents.

#### Dosing Information

Candesartan is supplied in 4 mg, 8 mg, 16 mg, and 32 mg strength tablets. The recommended starting dose is 16 mg once daily when used as monotherapy. Total daily dose ranges from 8 mg to 32 mg daily. Candesartan can be administered once or twice daily, although there does not appear to be any advantage for twice daily dosing. Once daily dosing has been shown to maintain blood pressure reduction throughout a 24-hour period with a trough to peak ratio more than 80%.<sup>2,5</sup> Candesartan may be administered regardless of food, and no initial dosage adjustment is necessary for elderly patients or for patients with mildly impaired renal or hepatic function.<sup>2</sup>

If response is inadequate, the addition of hydrochlorothiazide (12.5 mg) may be considered. A response rate of 85% has been reported with a combination of candesartan 16 mg/HCTZ 12.5 mg in patients with mild-to-moderate (stage 1, 2) hypertension.<sup>6</sup>

#### Potential Advantages

Candesartan is not metabolized by the cytochrome P450 system; therefore, interactions with drugs that are metabolized by or are inhibitors or inducers of these isoenzymes are not expected.<sup>2</sup> Candesartan has been reported to have strong affinity for the AT1 receptor. In an in vivo and ex vivo study, candesartan was found to have a higher affinity and/or a slower off-rate from the site of action than losartan.<sup>3</sup>

Even though these two angiotensin II receptor antagonists have similar pharmacokinetics, candesartan (16 mg) was reported to be more effective than

losartan (50 mg) in reducing trough-sitting blood pressure (mean difference of 3.7 mmHg) when both drugs were administered once daily.<sup>4</sup>

### Potential Disadvantages

As with other drugs that affect the renin angiotensin-system, candesartan is somewhat less effective in black patients, as this group of patients tend to have low renin levels.<sup>2</sup> Candesartan should not be used during the second and third trimester of pregnancy.<sup>2</sup> The long-term effects of candesartan and other ARBs on mortality or morbidity remain to be established.

### Comments

Candesartan is the fourth angiotensin receptor blocker to be introduced since 1995. Drugs in this class are generally well tolerated with a side-effect profile not significantly different than placebo, including adverse metabolic effects (e.g., glucose or lipid levels). The efficacy of ARBs are similar to angiotensin-converting enzyme inhibitors (ACEIs), but they are not associated with cough. The lack of cough associated with angiotensin II receptor antagonist appears to be related to its lack of effect on the bradykinin metabolism. The enzyme that converts angiotensin I to angiotensin II is identical to the kinase enzyme that metabolizes bradykinin. Thus, ARBs provide more specific inhibition of angiotensin II as well as more complete inhibition, since angiotensin II can be produced by non-renin related pathways.

Candesartan provides a trough blood pressure reduction of 8-12/4-8 mmHg, with dosing of 8-32 mg compared to placebo. The effect is generally seen within two weeks, and full effects should be seen in four weeks.<sup>2</sup> It is not clear whether candesartan offers any significant advantage over the newer agents, such as valsartan or irbesartan, as results from comparative trials are currently not available. All of these agents offer once daily dosing, are well tolerated, and generally have low potential for drug interactions.

### Clinical Implications

The recent National Health and Nutritional Examination Survey (NHANES III, phase 2) indicated that the control of hypertension among Americans is woefully inadequate. Only 27% of hypertensives surveyed had their blood pressure controlled, (< 140/90 mmHg).<sup>7</sup> This figure actually represented a decline of 1.6% from the previous survey. The control of blood pressure remains a public health priority. A recent study suggests that more aggressive reduction in blood pressure (< 85 mmHg, along with 75 mg of

aspirin daily) may be more beneficial in terms of cardiovascular events.<sup>8</sup>

Diuretics and beta-blockers remain drugs of first choice for uncomplicated hypertension because of their proven efficacy in lowering cardiovascular morbidity and mortality. For patients with certain coexisting conditions, there may be indications for other drug options. For example, ACE inhibitors are the treatment of choice for diabetics with proteinuria.<sup>7</sup> Due to lack of long-term efficacy data, ARBs, such as candesartan, are recommended for patients in whom an ACE inhibitor is indicated but cough becomes problematic.

The cost of candesartan is similar to other ARBs. The wholesale cost for 8 mg or 16 mg is about \$1.10 per tablet and the 32 mg is about \$1.55 per tablet. ❖

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## CME Questions

### 26. Regarding idiopathic peripheral sensory neuropathy:

- a. cancer may be found in up to two-thirds of these patients within 3-72 months.
- b. cancer affects the neuromuscular system by paraneoplastic effect in approximately 10% of cancer cases.
- c. cancer is a serious concern in newly diagnosed cases of amyotrophic lateral sclerosis.
- d. debilitating subacute motor neuropathy is a paraneoplastic effect of Hodgkin's disease and lymphoma.
- e. among patients with idiopathic sensory neuropathy, the incidence of circulating dominant clones of T cells is 80%.

### 27. Effects of a 30-minute music session on anxiety, heart, and respiratory rate included:

- a. greater change with classical music.
- b. no change in any variables.
- c. greater change in women than men.
- d. decreased anxiety, heart, and respiratory rate.

By Louis Kuritzky, MD

Kors JA, et al. *Lancet* 1998;352:601-505.

### T axis as an Indicator of Risk of Cardiac Events in Elderly People

T axis on ekg delineates the orientation of ventricular repolarization. Though findings such as ST-T wave segment changes have been used to predict coronary heart disease, evaluation of T axis in the elderly has not.

Since axis is quite simply assessed, such a marker, if consistent, could be of significant clinical use. The population investigated were participants in the Rotterdam Study, which includes 7129 persons aged 55 and older, whose baseline data accrued during the 1990-1993 period. This population-based cohort study seeks to identify the occurrence of risk factors and their effect on chronic disease in the elderly.

Frontal and horizontal T axes were classified into three groups: normal (15-75 degrees), borderline (-15 to 15 degrees, and 75-105 degrees), and abnormal (-180 to -15 degrees and 105-180 degrees).

During follow-up, 165 persons died from cardiac causes, and 192 had nonfatal cardiac events; additionally, 11 persons had a nonfatal cardiac event followed by a fatal event.

The risk of cardiac death was substantially increased for persons with an abnormal frontal T axis (hazard ratio = 3.9) as was sudden cardiac death (hazard ratio = 4.4). In an analysis that examined hazard ratio for cardiac death, abnormal T axis had as great an increased hazard ratio as a history of angina, myocardial infarction, diabetes mellitus, or hypertension.

Kors and colleagues conclude that their data indicate that the T axis is an important independent predictor for cardiac events. ❖

### Effect of Beta-Blockade on Mortality Among High- and Low-Risk Patients After Myocardial Infarction

Even though large trials have indicated that post-myocardial infarction beta blocker (PMIBB) use reduces mortality, up to two-thirds of eligible candidates do not receive them. Even cardiologists omit up to half of potential recipients. Older-age patients is one of the predictors for physician non-use of PMIBB.

The Cooperative Cardiovascular Project is a data base of hospital claims submitted to Medicare for acute myocardial infarction (n = 200,000). In this group, only 34% received PMIBB. Specific subgroups of patients who were even less likely to receive PMIBB included older, sicker, African American, or diabetic patients. Persons with heart failure, COPD, or elevated serum creatinine were also less likely to receive this therapy.

During 24-month follow-up, recipients of PMIBB enjoyed a 40% reduction in mortality, even when considering patients with COPD. Even though the percent mortality reductions were a bit less among blacks, older patients, and those with an elevated serum creatinine, their overall higher mortality rates produced an absolute reduction in mortality as substantial as that in the lower risk groups.

Gottlieb and associates conclude that their data suggests a substantial underuse of PMIBB, and that groups who may have been perceived as less likely to benefit (blacks, older patients,

patients with renal insufficiency) are instead meritorious groups for consideration of this therapy. ❖

Gottlieb SS, et al. *N Engl J Med* 1998;339:489-497.

### Sunlight Exposure and Risk of Lens Opacities

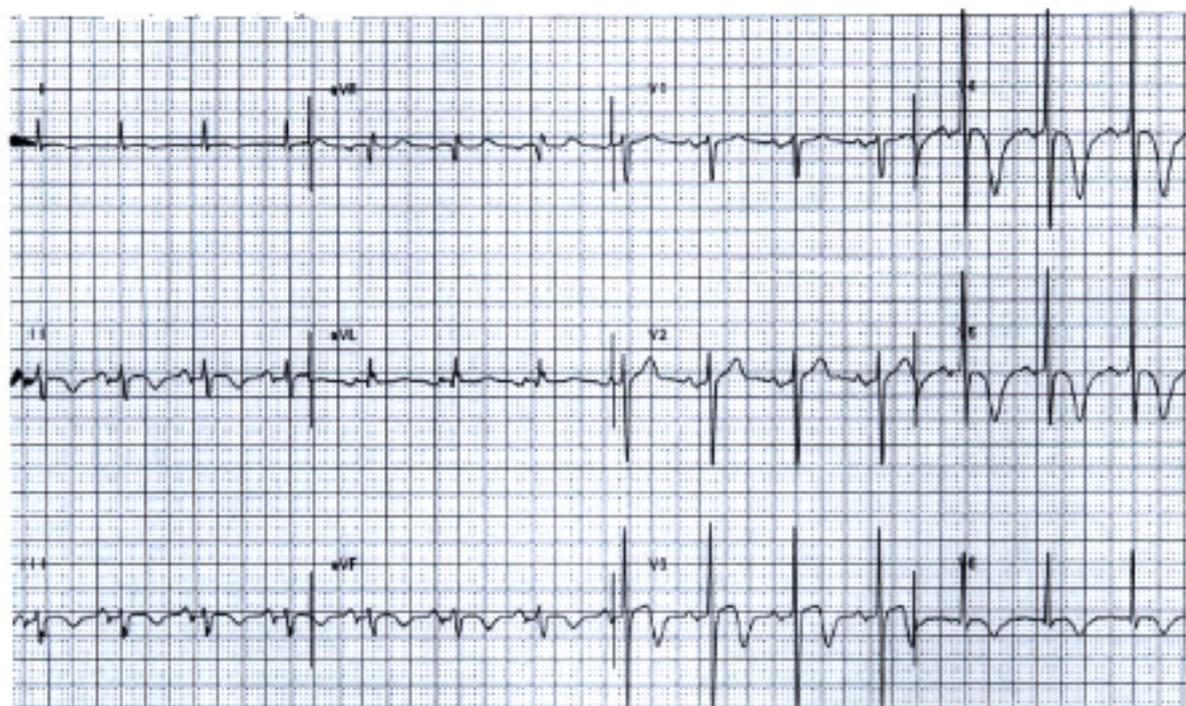
Cataract is the most frequent cause of visual loss. The role of sunlight, in particular UV-B, remains controversial. Some information suggests that sunlight is a provocative factor for cataract and is perhaps limited to men—in particular, non-African American men. The methodology for assessing sun exposure in some previous reports has been suboptimal. This report, the Salisbury Eye Evaluation project, quantified ocular UV-B exposure using a UV-B pyranometer. Measurements of ocular sunlight exposure were made through a series of determinations on residents of this community throughout their daily activities.

Overall, women sustained less UV-B exposure than men. Cataract incidence increased with degree of UV-B sun exposure, from the lowest to the highest quartile, and this relationship remained the same for women and African Americans. Since UV-B sun exposure appears to be a risk factor for cataract development, West and associates suggest that simple protective measures are in order. Plastic glasses provide superior UV-B protection to glass, though of course sunglasses are better still. Even wearing a brimmed hat decreases UV-B exposure 30-50% and should be encouraged. Gender and race do not appear to be protective. Public health measures should include addressing attention to public awareness of the ocular toxicity of sun exposure, specifically cataract. ❖

West SK, et al. *JAMA*. 1998;280:714-718.

## Giant T Waves

By Ken Grauer, MD



**Clinical Scenario:** The ECG shown in the figure was obtained from a 78-year-old woman who was being evaluated for altered mental status. How would you interpret her 12-lead tracing? What is the most likely etiology for the changes you see?

**Interpretation:** The rhythm is sinus at a rate of 85 beats/minute. The PR and QRS intervals are normal, but the QT interval is clearly prolonged. The axis is leftward. There is voltage for left ventricular hypertrophy (LVH). However, the most remarkable finding on this tracing is the presence of very deep and symmetric T wave inversion in multiple leads. This is the

syndrome of "giant T waves." Although ischemia must clearly be considered as the possible etiology, the point to emphasize is that other entities may also produce this picture of diffusely inverted giant T waves. Among these entities are CNS catastrophes (stroke, hemorrhage, Stokes-Adams attacks); non-Q wave infarction, certain types of hypertrophic cardiomyopathy, and intermittent LBBB (left bundle branch block). The etiology for giant T wave inversion in these different conditions is uncertain. The patient in this case had a recent large stroke, but no evidence of infarction. ♦

### In Future Issues:

Hematocrit in Cardiac Patients on Dialysis and Epoetin