monitoring performed for safety and efficacy monitoring during the past 12 months of simvastatin therapy. Among these, no significant abnormal CK or liver enzyme values were observed. Conclusions: The drug selections of many healthcare providers who use simvastatin are now in conflict with the changed safety labeling of this agent. Heightened by insufficient safety monitoring, this change represents an important shift in legal liability from industry to the provider community.

11:45 a.m.

### 882-6 Delay in Dose Titration of Lipid-Lowering Therapy Leads to Adverse Cardiovascular Outcomes

Amy S. Friend, Masoor Kamalesh, Ellen M. Schellhase, Tamara S. Evans, Indiana University Medical Center and VAMC, Indianapolis, IN

**Background:** Despite a plethora of data showing benefits of lipid lowering, a majority of the patients are not at their target lipid levels. We investigated titration frequency, time to achievement of target lipid levels, and clinical course of patients during dose titration in a large teaching hospital.
**Methods:** A retrospective chart review was conducted at this institution by reviewing a random sample of 100 patient charts receiving simvastatin 80 mg. Documented cardiovascular events while on statin therapy and timeframe for statin titration and number of titrations to maximal statin dose were collected.
**Results:** Patients were 96% male with mean age 65.3 years (range 44-86). Of these 79% were white. Target low density lipoprotein cholesterol (LDL) level was <100mg/dL for 84% of the group. LDL target level was achieved in 70% of the patients reviewed. The number of titrations to achieve a dose of simvastatin 80 mg ranged from 1 to 6 and occurred over a time period ranging from 3 months to 6.8 years. The average titration period was 2.25 years for the overall population. Average LDL reduction from baseline was 32% (p=0.0001) and high density lipoprotein increased 4.7% (p=0.001). There were 25 cardiovascular events in 17 patients during the titration period. These included 13 anginal episodes requiring hospitalization, 10 revascularizations, and 2 myocardial infarctions. Of these 17 patients, 16 eventually achieved their target LDL level. Average titration period in this group was 3.0 years compared with 2.1 years for those who did not have an event but achieved their target LDL level (p=0.14). **Conclusions:** In clinical practice, there is an excessive delay in titrating lipid-lowering drugs to optimal dose. This exposes patients to a high risk of atherosclerosis related events. Dosage adjustments of statins can be made at intervals of 4 weeks. Thus patients could theoretically be at their optimal dose within 8 - 12 weeks of initiation of lipid-lowering therapy. Clinicians need to be more adherent to published titration guidelines so that patients achieve their desired LDL goal in a more expedient timeframe in order to potentially reduce negative cardiovascular outcomes.

ORAL CONTRIBUTIONS

888

## Hypertension Treatment and Outcome

Wednesday, March 10, 2004, 10:30 a.m.-Noon
Morial Convention Center, Room 207

10:30 a.m.

### 888-1 N-Terminal Pro Brain Natriuretic Peptide Predicts Cardiovascular Events in Patients With Hypertension and Left Ventricular Hypertrophy: A LIFE Study

Michael H. Olsen, Kristian Wachtell, Christian Hall, Hans Ibsen, Jens Rokkedal, Sverre E. Kjeldsen, Richard B. Devereux, Björn Dahlöf, Per Hildebrandt, Glostrup University Hospital, Copenhagen, Denmark, Frederiksberg University Hospital, Copenhagen, Denmark

***Background:*** We have previously suggested that N-terminal pro brain natriuretic peptide (Nt-proBNP) is a cardiovascular risk factor in hypertension. We wanted to test this hypothesis in a new larger group of patients with hypertension and electrocardiographic left ventricular (LV) hypertrophy.
***Methods:*** In 945 hypertensive patients from the LIFE study, we measured traditional cardiovascular (CV) risk factors, urine albumin/creatinine ratio (UACR) and Nt-proBNP by immunoassay after two weeks of placebo treatment. The patients were followed for 55±0.6 months recording the composite endpoint (CEP) of CV death, non-fatal stroke or non-fatal myocardial infarction.
***Results:*** Nt-proBNP above the median value of 20.1 pmol/l was associated with more CV events (Table 1). In Cox regression analyses log(Nt-proBNP) (hazard ratio (HR)=2.40 per 10-fold increase**) predicted CEP independently of total serum cholesterol (HR=1.37 per mmol/l**), serum high density lipoproteins (HR=0.50 per mmol/l*) and logUACR (HR=1.86**). CV death was predicted by log(Nt-proBNP) (HR=3.07 per 10-fold increase**) independently of total serum cholesterol (HR=1.69 per mmol/l***) and of logUACR (HR=2.31**). Framingham Risk Score and LV mass assessed by electrocardiography did not enter the model. *$P$<0.05, **$P$<0.01, ***$P$<0.001
***Conclusion:*** Nt-proBNP is a strong CV risk factor superior to traditional risk factors in hypertensive patients with LV hypertrophy and especially in patients without history of CV disease or diabetes.

Table 1

| | No CV disease or diabetes | No CV disease or diabetes | CV disease or diabetes | CV disease or diabetes |
|---|---|---|---|---|
| **Nt-proBNP** | **Low** | **High** | **Low** | **High** |
| **CEP *(%)*** | 3.2*** | 11.0 | 6.5* | 17.3 |
| **CV death *(%)*** | 0.5*** | 5.0 | 3.3* | 10.9 |
| **Stroke *(%)*** | 1.1** | 5.0 | 2.2* | 9.6 |

10:45 a.m.

### 888-2 Does Left Ventricular Hypertrophy Predict Sudden Cardiac Death Independent of Ischemia? The LIFE Study

Kristian Wachtell, Michael H. Olsen, Richard B. Devereux, Hans Ibsen, Sverre E. Kjeldsen, Stevo Julius, Lars H. Lindholm, Markku S. Nieminen, Björn Dahlöf, Glostrup University Hospital, Glostrup, Denmark, The Weill Medical College of Cornell University, New York, NY

**Background:** Patients with left ventricular hypertrophy (LVH) have been shown to have increased incidence of sudden cardiac death (SCD). This analysis assessed predictors of SCD in a large cohort of hypertensive patients with ECG LVH.
**Methods**: In the LIFE (n=9,193), a double-blind, randomized, parallel-group trial, 190 patients died suddenly within 24 hours of onset of symptoms during the average 4.8 year follow-up period.
**Results:** Patients with SCD were older, more often male and had higher ECG LVH, albuminuria and more frequent history of atrial fibrillation, diabetes, coronary heart and cerebral vascular disease. SCD was not predicted by systolic or diastolic blood pressure, body mass index, cholesterol, potassium or history of peripheral vascular disease. In multivariate Cox analysis Cornell voltage-duration product predicted SCD (Table) and remained predictive in a subgroup (n=3,617) without history of coronary heart disease or albuminuria. The 1-year Cornell voltage-duration product was more predictive than baseline indicating that regression of LVH is more predictive than baseline LVH. Treatment with losartan compared to atenolol was not associated with a lower SCD rate (HR=0.88 [95% CI: 0.66-1.17], p=0.364).
**Conclusion:** Baseline LVH predicts SCD independent of history of coronary heart disease and other cardiovascular risk factors and remains predictive in the subpopulation without signs of atherosclerosis. Furthermore, losartan vs. atenolol treatment appears to benefit SCD equally.

| Cox regression analysis | Hazard Ratio | 95% CI | P |
|---|---|---|---|
| Age (year) | 1.04 | 1.01-1.06 | =0.007 |
| Cornell voltage duration product (100 mV*msec) | 1.02 | 1.01-1.03 | =0.001 |
| Framingham risk score (%) | 1.04 | 1.03-1.06 | <0.001 |
| Urine albumin/creatinine (mg/mmol) | 1.40 | 1.12-1.74 | =0.003 |
| History of coronary heart disease | 2.03 | 1.43-2.88 | <0.001 |
| History of cerebro vascular disease | 1.50 | 0.96-2.35 | =0.077 |
| Heart rate (10 bpm) | 1.29 | 1.14-1.46 | <0.001 |
| History of atrial fibrillation | 2.11 | 1.30-3.40 | =0.002 |

11:00 a.m.

### 888-3 Racial Differences in the Prognostic Value of the Electrocardiographic Strain Pattern in Hypertensive Patients: The LIFE Study

Peter M. Okin, Richard B. Devereux, Markku S. Nieminen, Jackson T. Wright, Sverker Jern, Anne L. Taylor, Robert A. Phillips, Vasilios Papademetriou, Luther T. Clark, Elizabeth O. Ofili, Otelio S. Randall, Lasse Oikarinen, Matti Viitasalo, Lauri Toivonen, Björn Dahlöf, The LIFE Study Investigators, Weill Medical College of Cornell University, New York, NY

Background: The ECG strain pattern of downsloping convex ST segment with inverted asymmetrical T-wave in leads V5 or V6 is associated with increased risk of cardiovascular (CV) morbidity and mortality in the overall LIFE study population. African Americans (AA) have higher rates of ECG strain, CV and all-cause mortality in LIFE, but whether ECG strain is associated with increased risk in AA is unclear.
Methods: Baseline ECGs were examined in 8,854 hypertensive patients (515 [5.8%] AA) enrolled in LIFE. All patients were treated in a blinded manner with atenolol- or losartan-based regimens and followed for a mean of 4.7±1.1 years.
Results: AA patients had a higher prevalence of ECG strain (27.8 vs 9.9%, p<.001), were younger, more likely to be male, current smokers, diabetic, have a history of ischemic heart disease, stroke or congestive heart failure, had higher Sokolow-Lyon voltage but lower Cornell products and greater albuminuria. In non-AA patients, strain was associated with higher 5-year event rates of CV mortality, myocardial infarction (MI), stroke, all-cause mortality, and the LIFE composite endpoint of CV mortality, MI or stroke (Table). In contrast, AA patients with and without strain had similar rates of all endpoints except MI. These findings persisted after controlling for baseline differences and treatment effect in