American Society of Hypertension

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Current Concepts in Hypertension

Editor's Comments

As the largest professional society with an exclusive interest in the control of the world's most common disease, the American Society of Hypertension is pleased to provide this series of ASH Current Concepts in Hypertension. The latest in ASH's educational programs, each of these 6-page pamphlets will contain short reviews of 3 to 5 newsworthy topics about the diagnosis and treatment of hypertension.

This issue and a subsequent one review the major ongoing clinical studies in hypertension management using both nonpharmacologic and pharmacologic approaches. Each article is written by a principal or primary investigator of the study, and describes the hypothesis, protocol and clinical progress for each investigation. Members of ASH are committed to finding improved and innovative modalities for treatment of their patients, and these studies highlight the need for continued clinical referrals to these various research programs.

The involvement of the experts who are directly responsible for the new information and the rapid time from preparation to publication will ensure that these Updates will be of interest and value to every clinician who manages hypertensive patients.

William H. Frishman, Co-Editor

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Upcoming Issues

Review of Major Ongoing Antihypertensive Studies
Combination Therapies for Hypertension
Endothelial Function—Dyslipidemia

SYST-EUR: A European Therapeutic Trial on Isolated Systolic Hypertension in the Elderly

Objectives

Syst-Eur is a multicenter trial, designed by the European Working Party on High Blood Pressure in the Elderly, to test the hypothesis that antihypertensive treatment of elderly patients with isolated systolic hypertension results is a significant change in stroke morbidity and mortality. Secondary endpoints include cardiovascular events, such as myocardial infarction and congestive heart failure. Additional objectives (side projects) are to investigate (1) whether antihypertensive therapy improves the quality of life in this population; (2) whether antihypertensive therapy decreases the development of vascular dementia; and (3) whether noninvasive 24-hour ambulatory blood pressure measurements add to the prediction of cardiovascular risks, in addition to the conventional blood pressure measurements.

"Syst-Eur [was]. . . designed . . . to test the hypothesis that antihypertensive treatment of elderly patients with isolated systolic hypertension results is a significant change in stroke morbidity and mortality."

Protocol design

Main project

Newly diagnosed and known patients with isolated systolic hypertension are recruited for the study and included in a single-blind run-in phase on placebo (three visits). Patients are eligible in the double-blind part of the study if they are at least 60 years old, if they have a sitting systolic pressure on placebo of 160 through 219 mm Hg with a sitting diastolic pressure lower than 95 mm Hg, and if specified exclusion criteria do not apply. Patients are then stratified and randomized into the double-blind phase of the trial. The stepwise active treatment consists of nitrendipine (first drug), to which enalapril (second drug) and hydrochlorothiazide (third drug) may be added, until systolic pressure is lowered by 20 mm Hg at least, to a level below 150 mm Hg. The control group receives matching placebos. During the double-blind period, the patients are examined at least at 3-month intervals. Blood pressure, heart rate, drug compliance, intercurrent diseases, and endpoints are recorded at each visit, with more elaborate examinations at yearly intervals, including electrocardiography, hematologic and biochemical measurements, and urine analysis.

Patients leave the double-blind period of the study when they (1) reach an endpoint, ie, they experience a fatal or major nonfatal outcome event, (2) are withdrawn, or (3) defect. All patients who leave the double-blind period alive

(Continued on page 2)

Supported by an unrestricted educational grant from **Pfizer, Inc.**

(Continuation from page 1)

are followed to allow an intention-to-treat comparison of mortality and morbidity in the two treatment groups.

In addition to the final analysis, four interim analyses will be performed at intervals related to the number of strokes accumulating during the study, that is after the occurrence of 50, 100, 150, and 200 strokes in the two treatment groups combined. The logrank statistic will be used to compare the survival curves in the two treatment groups.

"Secondary endpoints include cardiovascular events, such as myocardial infarction and congestive heart failure."

Side projects

Three side projects constitute an optional part of the trial. Each participating center decides whether it takes part in one or more of the side projects. If a center takes part in a side project, all its patients must be enrolled.

(l) Side Project on Quality of Life. The assessment of the quality of life is performed by trained interviewers during the placebo run-in period, six months after randomization into the double-blind period and at yearly intervals in this period. The questionnaire covers a variety of aspects of quality of life and includes a short test of psychomotor speed and alertness (Reitan Trail Making); the Sickness Impact Profile dimensions of ambulation, homecare, social interaction, sleep and rest; a measure of depression (BASDEC); and a checklist of symptoms.

(2) Side Project on Vascular Dementia. The diagnosis of vascular dementia is a two-step procedure: first the diagnosis of dementia should be established, then the underlying condition should be identified. The protocol is based on the administration of the mini-mental score (MMS) once a year to the patients. If the MMS score is 23 or less, a set of criteria are used to establish the diagnosis of vascular dementia.

(3) Side Projects on 24-hour Blood Pressure Monitoring. In addition to the clinic blood pressure, noninvasive ambulatory blood pressure is recorded during the placebo run-in phase six months after randomization and at yearly intervals in the double-blind phase of the trial. Ambulatory blood pressure recorders must have been validated according to specific guidelines. Blood pressure must be recorded over an entire period of 24 hours at intervals of no longer than 30 minutes. The recordings will be analyzed by calculating overall, day- and night-time averages, and the diurnal profile using cumulative sums and Fourier analysis.

Sample sizes

Syst-Eur requires 3,000 randomized patients followed for five years (15,000 patient years) to test the two-sided hypothesis that the projected rate of 17 fatal and nonfatal strokes per 1,000 patient years will be altered by 40% on active treatment, with a significance of 1% and a power of 90%. The sample size correlations of the main project also apply to the Vascular Dementia side project, assuming an incidence rate of 16 per 1,000 patient years. Approximately 400 patients in each group will be required to test a 10% difference in quality of life between the active and placebo groups. It is estimated that 5,000 patient years are necessary to test the main hypothesis of the side project on ambulatory blood pressure.

Observations to date

The number of 3,000 randomized patients was reached on l/9/1995. Recruitment continues, however, according to a decision made by the General Assembly of Investigators in January 1995. The General Assembly convenes annually.

Figure 1 gives the blood pressures at randomization and at various followup visits on double-blind treatment from an interim analysis performed in October 1994.

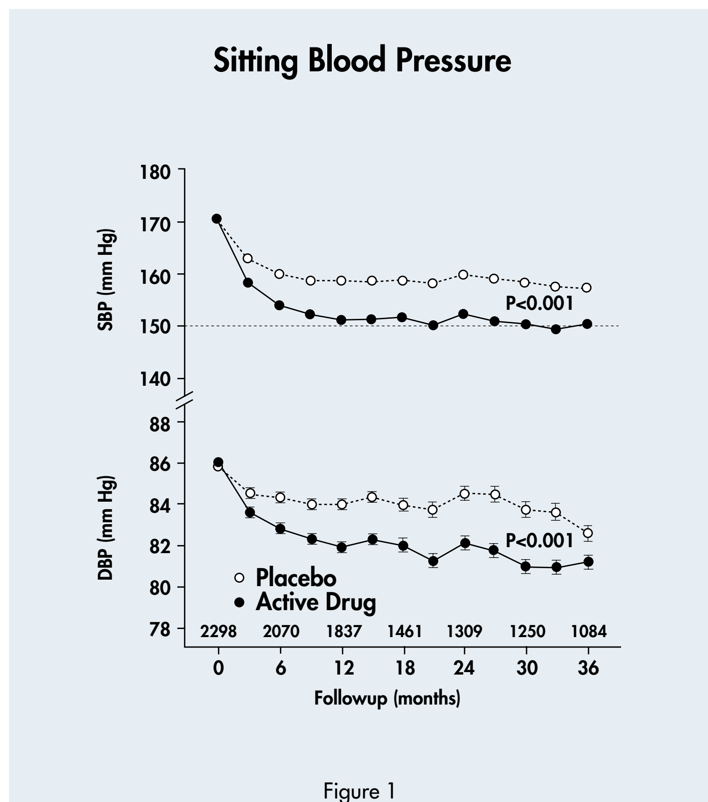

Figure 1

Legend to Figure

Sitting systolic and diastolic blood pressures at randomization and at various followup visits on double-blind treatment (per protocol analysis). The number of patients with BP readings at a particular followup visit is given at the bottom of the figure for the two treatment groups combined. Values are means ± SE.

Trial coordinators R. Fagard, MD and J. Staessen, MD
Hypertension and Cardiovascular Rehabilitation Unit
University of Leuven
U.Z. Gasthuisberg
Leuven, Belgium

Antihypertensive and Lipid-lowering Treatment to Prevent Heart Attack Trial (ALLHAT)

Background and Hypotheses

Hypertension affects 50 million Americans. Strong clinical trial evidence unequivocally supports the ability of antihypertensive therapy to prevent stroke to the extent predicted by epidemiologic observational studies. Thus, a 5- to 6-mm Hg drug-induced fall in diastolic pressure has repeatedly been found to produce a 40% to 45% decline in strokes. By contrast, prevention of myocardial infarction has been less satisfactory. In fact, in most clinical trials, the treatment-induced reduction (about 11%) in heart attacks has been about half of that predicted by epidemiologic studies.

"Strong clinical trial evidence unequivocally supports the ability of antihypertensive therapy to prevent stroke . . . ."

It has been suggested that the shortfall in coronary heart disease (CHD) protection may reflect adverse affects of diuretics and beta blockers employed in the trials. It is possible that the adverse effects of these drugs on electrolyte, glucose, and lipid metabolism may have partially offset the ability of hypotensive therapy to prevent coronary disease events.

The driving force behind the ALLHAT Study was, therefore, to design a study of sufficient size and scientific rigor to determine whether and which of the newly available classes of antihypertensive drugs were superior, in terms of cardioprotection, to diuretics, the current standard of care. Other issues such as cost, impact on African Americans, and quality of life, are also being evaluated.

". . . Treatment-induced reduction (about 11%) in heart attacks has been about half of that predicted by epidemiologic studies."

A second objective of the study is to extend knowledge about the cardioprotective power of lipid-lowering agents. Existing data derives largely from the study of middle-aged Caucasian subjects. In ALLHAT the focus will be broadened to include older and more African American subjects. The primary hypothesis to be tested is that all-cause mortality will be lower in hypertensive patients with LDL cholesterol between 120 and 189 mg/dL (or 100 to 159 mg/dL for those with CHD) receiving HMG CoA reductase inhibitor and a lipid-lowering diet, compared to patients receiving regular care and a lipid-lowering diet.

"It has been suggested that the shortfall in coronary heart disease protection may reflect adverse affects of diuretics and beta blockers employed in the trials."

Design and Methods

ALLHAT is sponsored by the National Heart, Lung, and Blood Institute (NHLBI) in conjunction with the Department of Veterans Affairs. It is a randomized, blinded, clinical trial with 40,000 relatively high-risk hypertensive subjects. Study sites include Veterans Administration hospitals and nearly 400 practice sites throughout the country. The latter approach represents a substantial departure from the usual pattern of reliance on academic medical centers as settings in which to conduct clinical trials. The reasons for this approach include the practical need to broaden the net to achieve the recruitment goal as well as the desire to carry out the study in settings akin to those where most antihypertensive therapy can be expected to take place and, finally, to limit the total cost of the study. Partial funding for the study is being provided by several drug companies.

Participants will be males older than 55 and females, older than 60 who have, in addition to hypertension, at least one additional risk factor such as evidence of cardiac ischemia or cardiomegaly, type II diabetes, a low HDL cholesterol, or history of a cardiovascular event. It is anticipated that about half of the study group will enter the lipid lowering component of the study.

Participants are then blindly randomized to chlorthalidone, amlodipine, lisinopril, or doxazosin. Step 2 and 3 agents may be added if necessary to attain adequate blood pressure control. These will be open label and may include reserpine, clonidine, atenolol, and hydralizine. The lipid-lowering agent is pravastatin. The primary endpoints will be fatal CHD and nonfatal myocardial infarction. In addition, stroke, angina, congestive failure, peripheral arterial disease, and renal function, as well as medical-care utilization and quality of life will be assessed.

Significance

Coronary artery disease is the leading cause of death and disability for Americans. The inability of traditional antihypertensive drugs to realize the full potential for heart attack prevention, coupled with the availability of newer, potentially better agents, makes the issue of identifying the best agent(s) a matter of major public health and clinical practice importance. Recent concerns about the use of calcium channel blockers (the short-acting variety and not the long-acting variety used in ALLHAT) only reinforce the need to have morbidity and mortality data for all antihypertensive drugs.

"Recent concerns about the use of calcium channel blockers . . . only reinforce the need to have morbidity and mortality data for all antihypertensive drugs."

Michael H. Alderman, MD
Chairman of Epidemiology and Social Medicine
Albert Einstein College of Medicine
Bronx, NY

Prevention and Treatment of Hypertension Study (PATHS)

Alcohol consumption has been recognized as an important correlate of blood pressure in many epidemiologic studies but few interventional studies have been conducted to examine the effect of a reduction in alcohol intake on blood pressure. Because these studies have usually included few subjects and been of short duration (table 1), the National Heart, Lung and Blood Institute (NHLBI), the National Institute on Alcohol Abuse and Alcoholism (NIAAA), and the Veterans Affairs (VA) Cooperative Studies Program have conducted a randomized, controlled, multicenter trial. Its purpose is to determine whether blood pressure is reduced following six months of alcohol moderation in moderate to heavy drinkers who are not alcohol dependent. Moderate to heavy drinking is defined as three or more drinks per day average but not alcohol dependent. Additional criteria include above-average, normal, or mildly hypertensive levels of diastolic blood pressure (DBP) after withdrawal of any antihypertensive medication. Above-average normal DBP was defined as 80 to 89 mm Hg and mild hypertension as DBP of 90 to 99 mm Hg or 80 to 99 mm Hg if withdrawn from antihypertensive medications. The other primary objective of the trial was to determine whether a reduction in alcohol intake could be achieved at six months and maintained for two years.

"Alcohol consumption has been recognized as an important correlate of blood pressure in many epidemiologic studies . . . ."

The secondary objectives were to determine whether: 1) a dose–response relationship exists between blood pressure change and changes in self–reported alcohol intake and/or biochemical markers of alcohol intake, controlling for weight, heart rate, exercise, urinary sodium and potassium, and dietary intake of calcium and other nutrients in each treatment group and in both groups combined; 2) there is a difference between the treatment and control groups in terms of echocardiographic left ventricular mass changes at six months compared to baseline and to determine whether the degree of change in left ventricular mass correlates with the amount of change in blood pressure, self–reported alcohol intake, and/or biochemical markers of alcohol intake; 3) drug treatment for hypertension is required at a lower rate in the intervention group compared to the control group over two years; and 4) there is a relationship between changes in self–reported alcohol intake (by retrospective diary) and changes in the following biochemical markers: apolipoprotein A_1 and A_2, HDL (and HDL_2 and HDL_3) cholesterol, gamma glutamyltransferase (GGT), and carbohydrate-deficient transferrin (CDT).

We randomized 641 veterans to either an alcohol reduction intervention or a control observation group at seven VA clinical sites. The goal of the intervention was the lower of ≤2 drinks daily or a 50% reduction in intake. Alcohol intake was assessed by self–report using a retrospective diary (Chronological Drinking Record) and by various biochemical markers, including apolipoproteins, HDL cholesterol (and subfractions), and CDT analyzed at a central laboratory. The alcohol intervention technique was a cognitive-behavioral program and the intensive phase consisted of six counseling sessions over three months. Echocardiograms were obtained at baseline and six months after randomization. Participants averaged 57.3 years of age; 75% were white, 19% were African-American, and 5% were Hispanic. Although both men and women were actively recruited, only five of the participants were women. Blood pressure averaged 140/86 mm Hg for all participants and 147/90 mm Hg for upper stratum (hypertensive) participants; mean weight was 193 lbs and heart rate averaged 76 beats/min. Alcohol intake averaged 6.0 drinks/day in the six months prior to randomization, although mean alcohol intake the week prior to randomization was 4.5 drinks/day (439 g/week). Participants in PATHS have completed followup and data analyses are ongoing. This trial should provide information that will contribute to recommendations for alcohol intake changes in moderate to heavy drinkers for the prevention or treatment of hypertension.

"This trial should provide information . . . for alcohol intake changes in moderate to heavy drinkers for the prevention or treatment of hypertension."

William C. Cushman, MD
Professor of Medicine & Preventive Medicine
University of Tennessee Center for Health Sciences
Memphis, Tennessee

Randomized Controlled Trials of the Effect of Alcohol Reduction on Blood Pressure

	Study Population		Study Results				
Study, Year	n	Age, Years (Mean ± SD or Range)	Duration (weeks)	Baseline BP (mm Hg)	Alcohol Intake Difference (Drinks*/Day)	BP Reduction (mm Hg)	*P* Value
Puddey, 1985	46	35 ± 8	6	133/76	3.7	3.8/1.4	<.001/<.05
Howes, 1985	10	25 – 41	0.6	120/66	5.7	8/6	<.025/<.001
Puddey, 1987	44	53 ± 16	6	142/84	4.0	5/3	<.001/<.001
Ueshima, 1987	50	46 ± 7	2	148/93	2.6	5.2/2.2	<.005/NS
Wallace, 1988	641	42 ± 20	52	136/82	1.0	2.1/?	<.05/NS
Parker, 1990	59	52 ± 11	4	138/85	3.8	5.4/3.2	<.01/<.01
Cox, 1990	72	20 – 45	4	132/73	3.4	4.1/1.6	<.05/<.05
Maheswaran, 1992	41	40s	8	144/90	3.1	Not Reported	NS
Puddey, 1992	86	44	18	137/85	3.0	4.8/33	<.01/<.01
Ueshima, 1993	54	44 ± 8	3	144/96	1.7	3.6/1.9	<.05/NS

Table 1

* *A standard drink is defined as 14 g of ethanol and is contained in a 12-oz glass of beer, a 5-oz glass of table wine, or a 1.5 oz of distilled spirits.*

From: Am J Hypertens. 1994; 7:814-823.

Theme I • The Basic Science of Hypertension: Molecules to Man

Theme II • Clinical Hypertension: Pathophysiology and Pharmacology

Theme III • Hypertension and Public Health: Population Studies and Large Trials

Thursday, May 16 • 8:30 AM to 10:30 AM

President's Symposium: Genetic Basis of Cardiovascular Disease and Implications for Hypertension

Chairmen: *Lawrence R. Krakoff, M.D. and Thomas G. Pickering, M.D., Ph.D.*

Familial Hypertrophic Cardiomyopathy: From Man to Mouse
–Christine E. Seidman, M.D., Boston, MA

Liddle's Syndrome
–Richard P. Lifton, M.D., Ph.D., New Haven, CT

Marfan's Syndrome
–Harry Dietz, M.D., Baltimore, MD

Polycystic Kidney Disease
–Jared J. Grantham, M.D., Kansas City, KS

10:50 AM to 12:30 PM
Theme I • The Vessel Wall and Hypertension

Growth and Remodeling in the Vessel Wall
–Stephen M. Schwartz, M.D., Ph.D., Seattle, WA

Original Communications

Theme II • Sleep Apnea

Sleep Apnea: Pathophysiology and Cardiovascular Consequences
–Barbara J. Morgan, Ph.D., Madison, WI

Sympathetic Neural Mechanisms in Obstructive Apnea
–Virend K. Somers, M.D., Ph.D., Iowa City, IA

Original Communications

Theme III • Women and Estrogen

Overview
–Suzanne Oparil, M.D., Birmingham, AL

Original Communications

1:30 PM to 3:30 PM
Theme I • Hypertensive Heart Disease: Molecular Mechanisms

Gene Transfer into the Myocardium
–Leslie A. Leinwand, Ph.D., Boulder, CO

Original Communications

Theme II • Hypertension: The Mother and the Child

Clinical and Pathophysiological Characteristics of Pregnancy Induced Hypertension: Pre-eclampsia vs. Chronic Hypertension
–Phyllis August, M.D., New York, NY

How to Treat Hypertension in Pregnancy: Pharmacologic and Non Pharmacologic
–William M. Barron , M.D., Maywood, IL

Fetal Effects of Antihypertensive Drug Therapy
–Aileen Sedman, M.D., Ann Arbor, MI

Theme III • Comprehensive Risk Assessment: A Strategy Whose Time Has Come?

Risk Stratification in the General Population
–William B. Kannel, M.D., M.P.H., Framingham, MA

Gambling with Hyperlipidemia and Coronary Risk: Ricking the Winners and Losers
–Steven A. Grover, M.D., Montreal, Canada

Absolute Risk in Hypertensive Patients
–Rodney Jackson, M.D., Ph.D., Auckland, New Zealand

Original Communications

Thursday, May 16 • 5:00 PM to 7:00 PM
Theme I • Endothelial Factors in Hypertension

Role of Endothelin in Hypertension
–Joey P. Granger, Ph.D., Jackson, MS

Update on Endothelin Antagonism and Inhibition
–Thomas F. Lüscher , M.D., Bern, Switzerland

Nitric Oxide Regulation in Hypertension and Heart Disease
–Joseph Loscalzo, M.D., Ph.D., Boston, MA

Nitric Oxide and Atherosclerosis
–Philip S. Tsao, Ph.D., Stanford, CA

Theme II • Debates
Are Placebos Obsolete?

PRO: *Karin B. Michels, Sc.D, M.P.H., Boston, MA*

CON: *Richard H. Grimm, Jr., M.D., Ph.D., Minneapolis, MN*

Hypertension in Blacks: Is This a Black and White Issue?

PRO: *Clarence Grim, M.D., Milwaukee, WI*

CON: *Kenneth A. Jamerson, M.D., Ann Arbor, MI*

Theme III • Target Organ Protection

Renal Aspects
–Paul K. Whelton, M.D., M.Sc., Baltimore, MD

Cardiac Aspects
–Richard B. Devereux, M.D., New York, NY

Carotid Aspects
–William A. Applegate, M.D., Memphis, TN

Friday, May 17 • 8:00 AM to 10:00 AM
Awards Session

Robert Tigerstedt Award
–Myron H. Weinberger, MD

ASH/HMR Young Scholars Award Lectures
–To Be Announced

10:30 AM to 12:30 PM
Theme I • The Kidney/Endothelial Factors in Hypertension

Overview
–Luis M. Ruilope, M.D., Madrid, Spain

Original Communications

Theme II • Homocysteine and Nutritional Factors

The Homocysteine Story
–Ian M. Graham, M.D., Dublin, Ireland

Homocysteine and Renal Disease
–Killian Robinson, M.D., Cleveland, OH

Original Communications

Theme III • Geography, Migration and Cardiovascular Disease

Overview
–George J. Miller, M.D., London, England

Migration and Cardiovascular Disease in Great Britain
–John K. Cruickshank , M.D., Manchester, England

Regional Variation in Cardiovascular Disease Mortality in the U.S. *–To Be Announced*

Original Communications

1:30 PM to 3:30 PM
Theme I • Mechanisms of Mechanical Injury of the Vessel

Response of Endothelial Cells to Shear
–Peter F. Davies , Ph.D., Chicago, IL

Mechanisms of Pressure Induced Renal Injury
–Helmut G. Rennke, M.D., Boston, MA

Response of the Heart and Cardiocytes to Stretch
–Seigo Izumo, M.D., Ann Arbor, MI

Theme II • Preadult Influences on the Development of Hypertension

Natural History of Blood Pressure in Children: Task Force *–Bonita Falkner, M.D., Philadelphia, PA*

Prenatal Influences: Birth Weight Pathophysiologic Determinants of Essential Hypertension
–David J. P. Barker, M.D., Southampton, England

Childhood and Adolescent Predictors of Cardiovascular Disease
–Alan R. Sinaiko, M.D., Minneapolis, MN

Evaluation of Hypertension in Children and Adolescents *–Julie R. Ingelfinger, M.D., Boston, MA*

Friday, May 17 • 1:30 PM to 3:30 PM
Theme III • Hypertension and Special Populations

Hypertension in Thirteen American Indian Communities: The Strong Heart Study
–Barbara V. Howard, Ph.D., Washington, DC

African Americans
–Richard S. Cooper, M.D., Maywood, IL

Latinos/Mexicans
–*To Be Announced*

Original Communications

5:00 PM to 7:00 PM
Obesity, Metabolic Abnormalities and Hypertension

Pathophysiology of Obesity
–*Jules Hirsch, M.D., New York, NY*

Role of Sympathetic Nervous System in Obesity
–*Lewis Landsberg, M.D., Chicago, IL*

Renal Mechanisms of Obesity Hypertension
–*Bertram Kasiske, M.D., Minneapolis, MN*

New Approaches to the Treatment of Insulin Resistance, Dyslipidemia, and Hypertension
–*Theodore A. Kotchen, M.D., Milwaukee, WI*

Current Status and Prospects for Pharmacologic Treatment of Obesity
–*Michael Weintraub, M.D., Rockville, MD*

Saturday, May 18 • 9:00 AM to 10:40 AM
Theme I • Adrenergic Mechanisms and Metabolic Control of Hypertension

The Genetics and Physiology of the -3 Receptor in Glucose Control
–*Jeremy Walston, M.D.*

Original Communications

Theme II • Hypertensive Heart Disease: Clinical Aspects

Hypertensive Heart Disease in Blacks
–*Ivor J. Benjamin, M.D., Dallas, TX*

Original Communications

Theme III • Clinical Trials: What Will We Know and When?

Overview of Trials Completed or in Progress: What's Resolved and What's Not?
–*Stephen MacMahon, M.D., Auckland, New Zealand*

Original Communications

11:00 AM to 1:00 PM
Theme I • The Renin Angiotensin System

Role of Angiotensin in Fetal Kidney Development
–*R. Ariel Gómez, M.D., Charlottesville, VA*

New Directions in Angiotensin II Signaling
–*Bradford C. Berk, M.D., Ph.D., Seattle, WA*

Role of Renin Uptake in Vascular Function
–*Duncan J. Campbell, M.D., Victoria, Australia*

Role of Angiotensin II in Vascular Hypertrophy/ Hyperplasia
–*John J. Mullins, M.D., Edinburgh, Scotland*

Theme II • White Coat Hypertension

The White Coat Effect: Definitions and Determinants
–*Thomas G. Pickering, M.D., Ph.D., New York, NY*

Assessment of the Degree of Hypertensive Disease in White Coat Hypertensives
–*William B. White, M.D., Farmington, CT*

Effects of Antihypertensive Therapy in the White Coat Hypertensive Patient
–*Richard A. Reeves, M.D., Princeton, NJ*

Theme III • Managing Hypertension in Managed Care

Overview
–*Sheldon G. Sheps, M.D., Rochester, MN*

Three Successful Models

Diabetes Model From the Group Health Cooperative of Puget Sound
–*Edward H. Wagner, M.D., M.P.H., Seattle, WA*

Indian Health Service Model
–*Thomas K. Welty, M.D., M.P.H., Rapid City, SD*

John Deere Experience
–*Daniel J. Wilson, M.D., Rochester, MN*

Panel Discussion

2:00 PM to 4:00 PM
Is Any Drug Safe?

Late Breaking Developments

The Most Up-to-date Information on the Effectiveness and Safety of Antihypertensive Therapy

Friday, May 17, 12:00–2:00 PM
ASH Special Workshop
Teaching About Hypertension in Medical Schools: Innovative Strategies and Techniques.

Interested parties should contact Andrew Zweifler, MD by March 15, 1996. 3918 Taubman Center, Ann Arbor, MI 48109-0356. Phone: 313-936-4795 Fax: 313-936-8898. e-mail: azweifler@umich.edu

Saturday, May 18, 2:00–5:00 PM
ASH Special Symposium
Nurse Case Management and Advanced Nursing Practice Models for Hypertension Care

Co-chairmen: *Martha N. Hill, RN, PhD, Baltimore, MD*
Nancy Houston Miller, RN, BS, Palo Alto, CA

Objective: To provide a multidisciplinary audience with practical, "how-to" strategies for implementing and maintaining several approaches to care of patients with hypertension.
–*3 nursing CEU's pending*

The American Society of Hypertension designates this continuing medical education activity for up to 35 credit hours in Category 1 of the Physician's Recognition Award of the American Medical Association. This program is approved for pharmacists for up to 35 hours of continuing medical education credit ACPEI.D. No. 073-000-96-036-L01.

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