



The University of the West Indies Diabetes Outreach Project (UDOP)

Environmental Health Foundation



Pan American Health Organization/ World Health Organization
(PAHO/WHO)

and

The Caribbean Food and Nutrition Institute (CFNI)

present

The 10th Annual International Conference

Theme: New Trends in Diabetes Management

March 4 – 7, 2004

The Renaissance Jamaica Grande Resort
Ocho Rios, Jamaica, West Indies

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Editor-in-Chief

Professor EN Barton

Scientific Editors

Professor The Hon EY St A Morrison, OJ

Professor E Albert Reece

General Information

Registration/Information/General Assistance

Desk Open (The Hotel's Check-In Area)

Wednesday, March 3

3:00 – 6:00 pm

Portland Ballroom Pre-Function Area and Hotel Check-In Area

Thursday, March 4 – Saturday, March 6

7:30 am – 4:30 pm

Exhibits (The Grande Hall)

Thursday, March 4 – Saturday, March 6

9:00 am – 4:00 pm

Poster Viewing (Lobby - Portland Ballroom)

Thursday, March 4 – Saturday, March 6

9:00 am – 4:00 pm

Judging of Posters

Thursday, March 4, 3:30 – 4:30 pm

Audience

The information presented is directed mainly at the members of the healthcare team but is also designed to facilitate understanding amongst the general public.

Conference Objectives

- \$ To update participants on the new oral hypoglycaemics
- \$ To update participants on the more recently introduced insulin preparations
- \$ To review the status of pancreas transplantation
- \$ To introduce the latest technologies used in monitoring diabetes mellitus
- \$ To discuss the role of trace elements in diabetes mellitus and metabolism

Duality of Interest

The participant (denoted by an asterisk next to his/her name in the programme) has indicated that he/she has a relationship which, in the context of his/her participation in this professional education programme, could be perceived to represent a relevant duality of interest. The relationship is between the participant and a pharmaceutical company, biomedical manufacturer, or other corporation whose products or services are directly related to the subject matter of this professional education programme. Relevant dualities include employment by an individual concern, ownership of stock, membership on a committee or the board of directors, receiving honoraria or consulting fees, or receiving grants or funds from such corporation.

Continuing Medical Education Credits

The Caribbean College of Family Practitioners recognizes this programme for 15 credit hours.

FOREWORD

Dear Friends:

This year is special as we celebrate the 10th Anniversary of this international conference. The University Diabetes Outreach Project (UDOP) is in fact 12 years old since it received its enabling grant from the Wolfson Foundation in 1991.

The project has come of age and could better be described as a programme as we continue the annual updating of healthcare givers and receivers on the ever growing pandemic of diabetes mellitus. This education and awareness thrust is possibly UDOP's most successful venture. To date, the envisioned twenty-four hour clinic has not materialized and our services at the headquarters' clinic is still an 8 am - 4 pm operation. However, the outreach grassroots training where we certify diabetes facilitators in the community has achieved international recognition as a solution of the future for chronic non-communicable diseases. The programme was highlighted in Expo 2000, Hannover, Germany, and has continued to receive support from both the Ministry of Health (Government of Jamaica), and International Development Partners, most notably, the technical cooperation programme of Japan.

UDOP's most recent star accomplishment was the establishing of its Renal Dialysis Centre where, within two years, it has acquired seven dialysis machines and serves some 40 regular patients. The goal here is to achieve 12 machines working on a 24/7 basis. Thus, in 12 years UDOP has achieved all of its goals except one, the twenty-four hour outpatient clinic. Its building houses all facets of diabetes mellitus care inclusive of a gym and a pharmacy, and eye laser services.

We are proud of these achievements and this year's conference intends to update participants on the cutting edge of research and healthcare delivery in the field of diabetes mellitus. Our social programmes also will highlight over ten years of premiership as an annual international conference in and of the Caribbean.

Welcome to you all.

*Professor The Hon EY St A Morrison, OJ
Director, The University Diabetes Outreach Project
(UDOP)
The University of the West Indies, Kingston 7, Jamaica,
West Indies*

MESSAGE FROM THE VICE-CHANCELLOR

Once again, it is that time of year when The University Diabetes Outreach Project (UDOP) reaffirms its position as the major Caribbean Centre for diabetes mellitus. This year it celebrates its 10th Anniversary.

The past decade has seen such tremendous growth in educating our people on this subject, and the University takes special pride in knowing that one of our Pro Vice-Chancellors, Professor the Hon Errol Morrison, has been the main mover and shaker in keeping the momentum going, and ensuring that these annual conferences attract the major international figures in the fieldmen and women whose primary concern is to enlighten our communities on the subject, and informing them about lifestyle changes which will help to keep the disease in check.

A University, and particular one in a Third World region, has a responsibility to the governments that provide the financial support to keep us going, by undertaking

relevant research which addresses the challenges of our region as a main priority. The Diabetes Outreach Project makes the University of the West Indies proud. The work that it undertakes, and the facilities that are constantly expanding as a result of the dedication of those with a particular interest in the subject, are a stellar example of recognizing the challenges facing those battling this illness, and identifying ways in which they can cope with the problems it brings.

I send my very best wishes to UDOP on this 10th Anniversary, and am confident that the good work will continue.

*Professor the Hon Rex Nettleford,
Vice-Chancellor,
The University of the West Indies, Kingston 7,
Jamaica, West Indies*

MESSAGE FROM THE PRINCIPAL

The University Diabetes Outreach Project (UDOP), mandated to communicate all information about diabetes mellitus to the nation and to develop a 24-hour clinical service for those in need, has come a long way since its establishment in 1991. This international conference, the 10th since inception of the project, grew out of the early in-service training efforts to improve the skills of medical practitioners to deliver the appropriate healthcare to diabetic patients. The conference, organized as it is around the theme, *New Trends in Diabetes Management*, promises to showcase the latest technologies and therapies available to persons suffering from the disease.

It is with great pleasure that I congratulate the organizers of the conference and their collaborators, the Environmental Health Foundation (EHF), the Pan American Health Organization (PAHO)/World Health Organization (WHO), Caribbean Food and Nutrition

Institute (CFNI) and the American Diabetes Association (ADA), for not only staging this milestone conference, but for also launching, at this conference, the publication of the proceedings of the 8th International Diabetes Conference.

I extend a special word of welcome to the guest speaker, the Rt Hon Dr Denzil Douglas, Prime Minister of St Kitts, and to all foreign participants. I feel certain that the medical fraternity and their associates are sure not only to benefit from the many and varied professional topics, but also from the refreshing cultural activity and stimulating physical exercise that support the scientific sessions.

*Professor Kenneth O Hall
Pro Vice Chancellor and Principal
The University of the West Indies
Kingston 7, Jamaica, West Indies*

MESSAGE FROM THE EDITOR-IN-CHIEF

The West Indian Medical Journal congratulates the University Diabetes Outreach Project (UDOP) and its collaborators on the 10th anniversary of their international conference. The chronic non-communicable diseases are the bane of Caribbean society and the efforts of UDOP and its collaborators to effect lifestyle change and to empower patients with diabetes mellitus and their families to participate in management of this condition must be lauded. The education of healthcare personnel is no less important. The strategies used by UDOP in diabetes mellitus can be applied to other chronic non-communicable diseases. The thrust of UDOP through the diabetes centre, in Kingston, to provide affordable care to patients afflicted by diabetes mellitus and its complications is most welcomed in the healthcare arena where more facilities are needed for care,

especially in areas like long term renal replacement therapy and ophthalmological care. The West Indian Medical Journal is an organ of education and positive change in the ventures of UDOP and its collaborators and the Editorial Board is proud of the long association. The work of UDOP to empower society to deal with diabetes mellitus and to conquer its sting cannot escape the omniscient pen of history.

*Professor Everard N Barton
Editor-in-Chief
West Indian Medical Journal
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The University of the West Indies, Kingston 7
Jamaica, West Indies*

Acknowledgements and Exhibitors

The Conference Organizers wish to thank the following for their support

Comtech Limited

HD Hopwood and Company Limited

Exhibitors

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Air Ambulance Professionals Inc

Astra Zeneca

Aventis Pharma

Bayer Healthcare

CARIMED Limited

Disposables Limited

Environmental Health Foundation (EHF)

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HD Hopwood and Company Limited

Lascelles Laboratories

Medi Grace Limited

Merck Sharp and Dohme

National Health Fund

North Ridge Medical Centre

Novo Nordisk

Roche Diagnostics

Servier Caribbean

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* **Duality of Interest**

Abbreviations Used in Text

CFNI	–	Caribbean Food and Nutrition Institute
DM	–	Diabetes Mellitus
EHF	–	Environmental Health Foundation
IDDM	–	Insulin Dependent Diabetes Mellitus
NIDDM	–	Non-Insulin Dependent Diabetes Mellitus
PAHO	–	Pan American Health Organization
UDOP	–	The University Diabetes Outreach Project
WIMJ	–	West Indian Medical Journal
WHO	–	World Health Organization

Programme

Wednesday, March 3, 2004

3:00 – 6:00 pm

ARRIVALS AND REGISTRATION

Thursday, March 4, 2004

7:00 – 11:00 am

REGISTRATION

11:00 – 11:05 am

OPENING CEREMONY

The Hon EY St A Morrison, OJ

11:05 – 11:15 am

Welcome and Opening Remarks

The Hon Rex Nettleford, OM

11:15 – 11:30

**Keynote Address and Opening
of Conference**

Senator the Hon Linda Baboolal

11:30 – 11:40 am

**Book Launch
8th UDOP/100 years PAHO**

Fitzroy Henry

10th Anniversary Celebration

1ST SCIENTIFIC SESSION

Sponsored by: GlaxoSmithKline

Chair: Owen St C Morgan, CD

12:00 noon – 12:10 pm

**The Sir Alister McIntyre
Distinguished Award
Citation and Presentation of Plaque**

12:10 – 12:50 pm

**The Sir Alister McIntyre
Distinguished Lecture:
Stemming the Tide of the
Global Diabetes Mellitus Epidemic:
The New Public Health Crisis**

James Gavin, III

12:50 – 1:00 pm

Vote of Thanks

Henry Lowe

1:00 – 2:00 pm

LUNCH

2ND SCIENTIFIC SESSION

Sponsored by: GlaxoSmithKline

Chair: Rosemarie Wright-Pascoe

New Advances in Diabetes Mellitus Management

2:15 – 3:00 pm

New Trends in the Use of Combination Therapy in the Management of Type 2 Diabetes Mellitus

***Kathleen L Wyne**

3:00 – 3:30 pm

COFFEE

3RD SCIENTIFIC SESSION

Sponsored by: CFNI/Bayer Healthcare

Chair: Fitzroy Henry

Roundtable Discussion I: Food and Supplements in Diabetes Mellitus

3:30 – 4:00 pm

New Approaches to the Management of Diabetes Mellitus in Energy Medicine

Chabinath Ramnarine

4:00 – 5:00 pm

The Diabetic Epidemic and the Prevention of Cardiovascular Disease – How to Face the Challenge

***Jean-Louis Chiasson**

REPORT ON JUDGING OF POSTERS

4TH SCIENTIFIC SESSION

Sponsored by: Environmental Health Foundation

Chair: Winston Davidson

Micro-environment in Diabetes Mellitus

7:00 – 8:00 pm

Free Radicals and Diabetes Mellitus

James Gavin, III

8:00 – 9:00 pm

WELCOME COCKTAILS

Friday, March 5, 2004

5TH SCIENTIFIC SESSION

Sponsored by: Servier Caribbean

Chair: Michael Boyne

Oral Hypoglycaemics

9:00 – 10:30 am

*Management of Diabetes Mellitus:
The Barbadian Experience*

**Colin Alert*

*Management of Diabetes Mellitus
in Jamaica*

**Knox Hagley*

10:30 – 11:00 am

COFFEE

6TH SCIENTIFIC SESSION

Sponsored by: Novo Nordisk

Chair: Leslie Gabay

New Advances in Insulin Therapy

11:00 – 12:30 pm

*Insulin Treatment of Type 2 Diabetes
Mellitus*

**Arturo Rolla*

12:30 – 2:00 pm

LUNCH

7TH SCIENTIFIC SESSION

Sponsored by: Abbott/Aventis

Chair: Lorenzo Gordon

**New Advances in the Science and
Technology of Diabetes Mellitus**

2:00 – 2:30 pm

Glucose Monitoring

**Arturo Rolla*

2:30 – 3:00 pm

*The Role of Basal Insulin in the
Management of Diabetes Mellitus*

**Michael Boyne*

3:00 – 3:30 pm

*Beta Cell Replacement Therapy for
Type 1 Diabetes Mellitus – Now?*

Robert Northcutt

3:30 – 4:00 pm

COFFEE

8TH SCIENTIFIC SESSION

Sponsored by: Environmental Health Foundation (EHF)

Chair: Henry Lowe

**New Potential of Complementary
Alternative Medicine in Diabetes Mellitus**

4:00 – 5:00 pm

*Phytochemical and Anti-diabetic
Studies of *Cnidocolus aconitifolius*
(*euphorbiaceae*)*

Frederick Oladeinde

SPECIAL LECTURE

6:00 – 7:00 pm	<i>The Next Thrust – Vardenafil, a New Treatment Option for Erectile Dysfunction in Diabetic Males</i>	* Ivan Arago de Montis
7:00 pm – 12:00 am	Relight the Fire	Dolphin Cove Fab 5 Band

Saturday, March 6, 2004

9TH SCIENTIFIC SESSION

**Sponsored by: Diabetes Care and Education Practice
Group of American Dietetic Association/LifeScan**

Chair: Alverston Bailey

Diabetes Education

9:00 – 9:15 am	<i>How Far have we come with Diabetes Mellitus Education?</i>	Suzanne Laws
9:15 – 9:35 am	<i>The Diabetes Mellitus Educator and Insulin Pump Therapy</i>	Fern Vining
9:35 – 9:55 am	<i>Nutrition Education and Counselling</i>	Patti Geil
9:55 – 11:00 am	COFFEE	

10TH SCIENTIFIC SESSION

Sponsored by: Merck Sharp and Dohme

Chair: Michael Banbury

**Roundtable Discussion II:
Wellness Promotion**

11:00 – 11:30 am	<i>Cardiovascular risk management/ reduction in the diabetic</i>	Miguel Garcia
11:30 – 11:45 am	<i>Volunteerism can make a Difference</i>	Beverley Sutherland-Lewis
11:45 – 12:00 noon	<i>Improving Diabetes Care in the Community Setting: The Curaçao Experiment</i>	Wimbert Martina
12:00 noon – 12:30 pm	Discussion	
12:30 – 2:00 pm	LUNCH	

11TH SCIENTIFIC SESSION

**Sponsored by: Florida Medical Centre/North Ridge
Medical Centre**

Chair: Adalinda Gonzalez

**Roundtable Discussion III:
Patient/Provider Interaction**

2:00 – 2:10 pm	Introduction	Adalinda Gonzalez
2:10 – 2:30 pm	The Business of Diabetes Beyond the Medical Team	Darlene Moppert
2:30 – 2:35 pm	Questions and Answers	
2:35 – 2:55 pm	Diabetes Mellitus at 45 000 Feet	Brian Weisz
2:55 – 3:00 pm	Questions and Answers	

12TH SCIENTIFIC SESSION

Sponsored by: PAHO

Chair: Alberto Barceló

Quality of Diabetes Care

3:30 – 4:00 pm	The Pan American Health Organization: Diabetes Mellitus Management in the Americas	Alberto Barceló
4:00 – 4:30 pm	Mastering Your Diabetes: An Educational Intervention For Implementing Basal/Bolus Insulin Therapy	Luigi Meneghini
4:30 – 5:00 pm	Diabetes Management in the USA: A Public Health Perspective	Gloria Beckles
7:00 – 7:30 pm	COCKTAILS	Renaissance Jamaica Grande Resort
7:30 pm	CONFERENCE DINNER	Sir Philip Sherlock Distinguished Awardee: Dr Compton Seaforth Guest Speaker: Dr The Hon Denzil Douglas Prime Minister of St Kitts

MUSIC: Ernie Ranglin and Friends

Presentations: Sir Alister McIntyre

Sunday, March 7, 2004

Sponsors: Beaches Negril, Johnson and Johnson

7:30 am

10K/5K/2K Fun-Run-Walk

Coordinator: Owen Bernard

10:00 am – 2:00 pm

Therapies at Work

Renaissance Jamaica Grande, Grande Hall

- Yoga*
- Chiropody*
- Nutrition Exhibition*
- Supplements*

CITATION

James Gavin, III, the Sir Alister McIntyre Distinguished Awardee for Outstanding Services Internationally in Diabetes Mellitus

This symposium “New Trends in Diabetes Management” marks the 10th international conference of the University of the West Indies Diabetes Outreach Project. We congratulate the organizers for their vision and foresight in recognizing the contributions of those luminaries who, by their work and example, have transformed the care of the diabetic patient. This meant change, and change is always difficult. For as Machiavelli himself suggested: *“There is nothing more difficult to carry out, nor more dubious of success, nor more dangerous to handle, than to initiate a new order of things. For the reformer has enemies in all those who profit by the old order and only lukewarm defenders in all those who would profit by the new”*.

Mr President, colleagues, friends, ladies and gentlemen, I am particularly honoured to present an agent of change, for this society’s highest honour – The Sir Alister McIntyre Award. He is none other than Dr James Raphael Gavin III, Professor of Medicine and President, Morehouse School of Medicine, who, by his research and teaching, has inobtrusively, but capably, made a significant difference to the world of diabetes mellitus.

James Gavin graduated BSc in Chemistry (1966), PhD in Biochemistry (1970) and in medicine, Duke University, five years later. He completed his internship in internal medicine and pathology at Duke University and Barnes Hospital before becoming a clinical fellow in the Division of Metabolism, Washington University, St Louise, Missouri. This was indeed excellent preparation for his next assignments, Directorship of the RIA Core Laboratory, Diabetes Research and Training Centre and Associate Professor of Medicine. He was elevated to the chair in medicine, promoted Chief of the Diabetes Section and the William K Warren Professor for Diabetes Studies, at the University of Oklahoma Health Sciences Centre; appointments which would prove to be of major significance.

The centre rapidly developed an international reputation for excellence in the field of diabetes and metabolism. Its unique teaching methods enabled it to effectively transfer its specialized knowledge and expertise to trainees and international students of whom there were many. He moved to the Howard Hughes Medical Centre as Senior Scientific Officer, before transferring to Morehouse

as Professor of Medicine and President – a just and fitting reward for outstanding administrative capabilities and innovative pioneering research.

In recognition of his scholarship and expertise, Dr Gavin has been the recipient of many honours and awards, too numerous to mention. His most recent being “The Josiah Lilly Award of the American Diabetes Association”. He has received the honorary degree of Doctor of Science from Livingstone College/Hood Seminary, 1999, and Morehouse School of Medicine, 2000. He has been a member of nearly every major organization in his discipline including advisory boards and federal and non-federal committees.

Dr Gavin travels widely in response to the great demand for his teaching and clinical skills. He has held visiting professorships at all the major medical schools in the United States of America and in Japan. He is tireless in his undertaking to disseminate knowledge and is a firm believer in that remarkable principle of *noblesse oblige*.

At the heart of his professional activities lies a belief and a commitment to the scientific method. James has a penchant for expressing his ideas clearly and this is evident in his scientific publications which amount to more than one hundred. These scholarly works have embraced the entire field of diabetes mellitus; his essays on insulin, insulin receptors and membranes are indeed scientific treasures.

James Gavin is a man of enormous energy and talent who has brought his very valued experience to international medicine; today – a Solomon to diabetes mellitus care.

I ask you to receive a great scholar, teacher and administrator and invite you to present him with this our most prestigious award “The Sir Alister McIntyre Award” for excellence in the field of diabetes mellitus.

Previous Awardees

Jean-Philippe Assal	(Switzerland)	1999
Harry Keen	(UK)	2000
Jasbir Bajaj	(India)	2001
Phillip James	(UK)	2002
Richard Kahn	(USA)	2003

Stemming the Tide of the Global Diabetes Mellitus Epidemic: The New Public Health Crisis

James Gavin, III

Chair: Owen St C Morgan, CD

The estimates for the global burden of diabetes mellitus have required constant revision over the past decade because of the explosive epidemic of diabetes mellitus worldwide. This epidemic has been driven by the parallel epidemic of obesity and increasing inactivity due to urbanization, modernization and the growing influence and penetration of processed foods. These trends have their greatest potential impact in populations of colour, who represent both the fastest-growing populations worldwide and have the highest risks for Type 2 diabetes mellitus and its myriad complications. Indeed, the obesity epidemic is accompanied by the risk of not only more Type 2 diabetes mellitus, but also an explosive increase in the prevalence of cardiovascular disease. There is great urgency to stem the

tide of these epidemics because of the potential overwhelming economic burden that will result from increased cardiovascular complications. Fortunately, we now have empirical evidence that in high risk populations, it is possible to prevent development of Type 2 diabetes mellitus by the introduction of lifestyle changes. Increasingly, it will become more important to resort to preventive strategies as we seek to pre-empt the impact of these epidemics on our children and adolescents, and in our ageing citizens. We are indeed possessed of an impressive arsenal of powerful pharmaceuticals for the effective treatment of diabetes mellitus and its clinical sequelae, but this is clearly not the preferred or optimal route for stemming the impact of the global diabetes mellitus epidemic.

New Advances in Diabetes Mellitus Management

Chair: *Rosemarie Wright-Pascoe*

New Trends in the use of Combination Therapy in the Management of Type 2 Diabetes Mellitus

Kathleen Wyne

Type 2 diabetes mellitus is a multi-organ disease that results from the combination of insulin resistance and a β -cell secretory defect. The prevalence of Type 2 diabetes mellitus has increased worldwide during the past decade, and patients with this disease continue to experience a high incidence of morbidity and mortality. Because the complications associated with this disease are so significant, the importance of lowering glycosylated haemoglobin (HbA_{1c}) levels to within the normal range cannot be over-emphasized. Pharmacologic agents are now available that treat the different components of this disease at the level of the muscle, liver, pancreas and fat. Some of these agents also have non-glycaemic effects on the vasculature and

lipid metabolism and may improve many of the risk factors associated with the metabolic syndrome. Data from the United Kingdom Prospective Diabetes Study (UKPDS) group showed that conventional methods of managing Type 2 diabetes mellitus, including the use of traditional monotherapies, do not provide long-term glycaemic control. Consequently, new treatment paradigms, stressing the earlier use of combination therapy, are proposed which can facilitate more durable glycaemic control, thus reducing the complications in patients with Type 2 diabetes mellitus. However, this combination therapy needs to be oriented to the disease process to facilitate lowering the HbA_{1c}. The challenge now is to develop the new “art of diabetes mellitus management” utilizing combination strategies to maximally lower HbA_{1c} and keep it as close to normal as possible.

Roundtable Discussion 1: Food and Supplements in Diabetes Mellitus

Chair: Fitzroy Henry

New Approaches to the Management of Diabetes Mellitus in Energy Medicine

Chabinath Ramnarine

Chronic diseases are generally accepted as incurable and at best, modern medicine, with the use of pharmaceuticals, has only attempted to manage these diseases. 'Lifestyle changes' have become an important addition in the treatment of chronic diseases of our modern era.

The models of the ancient Traditional Chinese Medicine (TCM) and Ayurvedic medicine of India have given many clues and deep insights in curing diseases. Both systems provide a dynamic triad of (1) diet and exercises, (2) herbal remedies and (3) energy medicine – acupuncture in TCM, and energy healing technique in Ayurveda, with the energy medicine being the most profound method of influencing the entire terrain in man.

Man is a multi-dimensional being, similar in makeup to the cosmos. According to physics, we live in an eleven dimensional cosmos. Man's health, well-being and joy, is dependent on the dynamic relationship between the microcosm and the macrocosm. This brings into focus "The New Medicine" and the shift from physical diagnosis and chemical based treatments to energetic diagnosis and treatment with energy based medicine. A new concept of medicine, will be introduced using mathematics and numbers ("the universal language") to cure diseases.

The method involves the precise calculation of mathematical formulae needed to harmonize the microcosm (man) with the macrocosm (universe) and the studying of the emerging energetic patterns for the curing of chronic diseases.

The Diabetic Epidemic and the Prevention of Cardiovascular Disease – How to Face the Challenges?

Jean-Louis Chiasson

The ever-growing burden of Type 2 diabetes mellitus and its complications will be one of the major challenges of the twenty-first century. The worldwide prevalence of diabetes mellitus in the adult population was 4% in 1995 and is predicted to increase to 5.4% by the year 2025. The prevalence is higher in developed than in developing countries. However, the proportional increase will be greater in developing countries: 48%, from 3.3 to 4.9% vs 27%, from 6.0 to 7.6%. Worldwide, the number of people with

diabetes mellitus will double from 150 to 300 million during the same period. Over 60% of diabetic subjects die of cardiovascular complications. Overall, cardiovascular mortality has decreased over the last 20 years except for subjects with diabetes mellitus. For those reasons, the best way to face the challenge will be the prevention of diabetes mellitus and cardiovascular disease. This has now been shown to be feasible.

The concept for the prevention of diabetes mellitus and cardiovascular complications was based on our understanding of the pathophysiology of these pathologies. It is now recognized that insulin resistance and insulin secretion defect are two major factors involved in the development of diabetes mellitus. Insulin resistance is believed to be the first factor to appear in time, but as long as the beta cells can compensate for the insulin resistance, the glucose tolerance will remain normal. It is only when the beta cells fail to fully compensate that glucose intolerance will appear, resulting in post-prandial hyperglycaemia or impaired glucose tolerance (IGT). This moderate post-prandial hyperglycaemia is sufficient to induce glucose toxicity and to further decrease insulin action and secretion, thus contributing to the progression of IGT to diabetes mellitus. The post-prandial hyperglycaemia has also been shown to be an independent predictor of cardiovascular disease. Furthermore, IGT is part of a cluster of cardiovascular risk factors, including central obesity, hypertension and dyslipidaemia known as the metabolic syndrome with insulin resistance as a common denominator. Based on these observations, it was hypothesized that any intervention that would decrease insulin resistance, protect the beta cells and decrease post-prandial hyperglycaemia would also decrease the risk of developing diabetes mellitus and cardiovascular disease.

It has now been shown that in high risk populations with IGT, the risk of developing diabetes mellitus can be significantly reduced by lifestyle modification (diet and exercise) as well as by pharmacological interventions with metformin, acarbose and troglitazone. It has even been suggested that acarbose could reduce the risk of cardiovascular disease both in IGT and diabetic subjects.

Three studies have now shown that diet and exercise could reduce the risk of developing diabetes mellitus in IGT subjects. The Da Qing study ($n = 577$) showed that diet and/or exercise could reduce the risk of diabetes mellitus by 39%. The Finnish DPS ($n = 522$) as well as the

American DPP ($n = 2161$) showed that diet and exercise could reduce the risk of diabetes mellitus by 58%. The DPP ($n = 2151$) also showed that metformin could reduce the risk of diabetes mellitus by 31% while the STOP-NIDDM study ($n = 1429$) showed that acarbose could reduce the risk of diabetes mellitus by 36%. More recently, the TRIPOD study ($n = 236$) done in women with a history of gestational diabetes mellitus showed that troglitazone could reduce the risk of diabetes mellitus by 50%.

The STOP-NIDDM study also observed that acarbose treatment resulted in a risk reduction of 49% for the development of cardiovascular disease ($p = 0.033$). Furthermore, in a subgroup of patients ($n = 132$), acarbose was associated with a significant decrease in the progression of the IMT of the carotid ($p = 0.021$). And finally, a meta-analysis of seven randomized placebo-controlled trials in Type 2 diabetic patients showed that acarbose

treatment was also associated with a significant reduction in cardiovascular disease. These are the first prospective intervention trials supporting the concept that post-prandial hyperglycaemia is an independent risk factor for cardiovascular disease.

Based on these observations, it is clear that we have to develop new strategies for the screening of IGT in high risk population, to initiate as early as possible, an appropriate intervention for the prevention of Type 2 diabetes mellitus. We also need to confirm the effect of acarbose and evaluate the effects of other interventions on cardiovascular disease. It is also clear that screening should be done for other cardiovascular risk factors in high risk populations, and that these should be treated aggressively. Prevention is a key factor in facing the challenge of the diabetic epidemic and its cardiovascular complications.

Micro-environment in Diabetes Mellitus

Chair: *Winston Davidson*

Free Radicals and Diabetes Mellitus

James Gavin, III

The evidence is compelling that we are in the midst of a surging global epidemic of diabetes mellitus. This epidemic has been fueled by the alarming rise in obesity, higher levels of inactivity, aging of industrialized populations, and overall growth of the populations at highest risk for diabetes mellitus. While the numbers of new cases clearly constitute cause for alarm, it is because of the vascular complications of this disease that we have our most growing concerns. The metabolic milieu of uncontrolled diabetes mellitus is one characterized by chemical toxicity. There is the combined burden of glucose toxicity, lipotoxicity, and abundant free radical formation. The

precise mechanisms by which increased free radical formation is catalyzed in diabetes mellitus is not fully known, but it is clear that many of the risks for CVD due to inhibition of NO production can be prevented by the actions of anti-oxidants and inhibitors of free radical formation. The process is complex and not one that is interrupted by the simple introduction of multivitamins or other single classes of antioxidants. Rather, it is clear that metabolic pathways must be affected in ways that normalize glucose and fat metabolism at the cellular and molecular level. Thus, the urgency of comprehensive diabetes mellitus control includes the reduction and elimination of free radical formation in the uncontrolled state, which in turn leads to the reduction of damage to the vasculature and resultant diabetes mellitus complications.

Oral Hypoglycaemics

Chair: *Michael Boyne*

Management of Diabetes Mellitus: The Barbadian Experience

Colin Alert

1. GUIDE study – a head-to-head comparison of the efficacy and safety of two once-daily sulphonylureas.
2. Difficulties in managing diabetes mellitus in Primary Care in Barbados: a 2003 audit at one primary care clinic.

1. The Guide Study

Introduction: The GUIDE study – a head-to-head comparison of the efficacy and safety of two once-daily sulphonylureas.

Design and Methods: GUIDE is a prospective double-blind randomized study that compared diamicron MR and glimepiride as monotherapy or in combination with other anti-diabetic agents over a 27-week period. The study included patients from 12 different European countries.

Results: After 27 weeks of treatment, using a maintenance dose of diamicron MR of 120 mg and a dose of glimepiride of 6mg, improvement of blood glucose control was statistically significant in both groups, based on HBA_{1c} measurements. In this study population, there were 50% fewer hypoglycaemic episodes on diamicron MR than on glimepiride.

Conclusions: Diamicron MR has proven to be a safe and effective anti-diabetic agent, and may be especially useful for patients at risk for hypoglycaemia.

2. Difficulties in managing diabetes mellitus in Primary Care in Barbados: an audit at one private primary care clinic

Introduction: In Barbados, diabetes mellitus is second only to heart disease as the leading cause of death, and the death rate from diabetes mellitus has doubled over the last 25 years, and continues to rise. In 1992 and 1993, an audit of the primary care management of diabetes mellitus was conducted in four Caribbean islands, including Barbados, in government-run (public) and private clinics, and many deficiencies in the quality of service available to patients were identified. There has been no sustained or systematic

attempt to improve the quality of primary care; this study investigates the management of diabetes mellitus in one primary care clinic in Barbados in 2003.

Design and Methods: The clinical course of 73 patients attending one private practice in the three years following the diagnosis of diabetes mellitus was examined.

Results: Many patients could not afford the multiple tests and referrals required for their ongoing monitoring, including glycosylated haemoglobin (HBA_{1c}) and lipid profiles. Although diet and exercise are the cornerstones of management, drug therapy was seen as a convenient and necessary tool to reach specific clinical targets: while the Government of Barbados attempted to provide some drugs free of cost to all diabetic patients, unfortunately other drugs were quite costly. The number of patients that did not attain specific metabolic targets was significant.

Conclusion: Adults must be encouraged to reduce their risk of developing diabetes mellitus by education, and modification of eating and exercise habits. Greater emphasis must be placed on these therapeutic options for controlling the disease in patients already diagnosed with diabetes mellitus. The limited access to specific investigations and drugs makes the task of the primary care physician very difficult in providing optimal care for the diabetic patient in Barbados.

Management of Diabetes Mellitus in Jamaica

Knox Hagley

Diabetes mellitus became a major disease in the Jamaican community during the second half of the 20th Century. In addition to its growing impact on the lives of the nationals, that period witnessed the evolution of a colourful history of the disease in regard to its varied presentations, the identification of different forms, the types of the disorder and the strategies utilized in its management.

The new re-organized conventional management of the disorder with its focus on recommended dietary measures, physical activity practices, body weight reduction when necessary, use of oral anti-diabetic drugs and administration of insulin has been an evolutionary process. However, in Jamaica, peculiarities of that process are worthy of note. Up until the appearance of oral anti-

diabetic agents in the form of sulphonylurea derivatives, management focussed on the administration of insulin with some advice given on dietary measures which all too often proved to be vague and varied and oft times confusing to the patient. There was in fact little or no basic difference in the approach to management of the then juvenile and maturity onset types of diabetes mellitus.

The arrival of the sulphonylurea derivatives in the latter 1950s led to a dramatic change in the approach to management of maturity onset diabetes mellitus and the later recognized non-insulin dependent diabetes mellitus. The effectiveness of these drugs in the management of these patients led to their widespread use and although there was a growing awareness by both clinicians and patients of the importance of dietary measures, the use and oft times, too ready use of the oral drugs which really should be used as adjuvants in the overall process of management, became the dominant therapeutic measure and often proved to be a demotivating factor in relation to dietary measures. Furthermore, increasing body weight so often engendered by this approach to management was, to say the least, unfortunate. The subsequent arrival of the biguanides increased the scope for use of oral agents but, fortunately, not the gain in body weight. Abuse of the oral drugs ensued to the extent that in cases where they were no longer effective in controlling blood sugar levels, patients and clinicians were very reluctant to commence insulin therapy. There was also an inadequate awareness of the important role of physical activity practices.

In the meantime, therapy for the patients with insulin-dependent diabetes mellitus was more straightforward. Insulin therapy was necessary not only for health, but for life. Nevertheless, the well-known difficulties encountered in the management of this disorder were in evidence. The establishment of a diabetic camp for diabetic children has helped to minimize the difficulties for those who have been able to attend. The subsequent further unfolding of the nature of non-insulin dependent diabetes mellitus, later to be labelled Type 2 diabetes mellitus and, in particular, the recognition of the important role of insulin resistance in its pathogenesis, has led to a better and greater recognition of the need for recommended dietary and physical activity

practices and the benefits of weight reduction. A wider array of oral drugs to tackle both insulin resistance and the pancreatic defect in Type 2 diabetes mellitus has also become available. There is, too, a greater awareness by clinicians that insulin therapy is sometimes necessary in this group of patients. Nevertheless, the value of weight reduction, dietary measures and regular sustained physical activity continue to be under-utilized in the management of Type 2 diabetes mellitus.

The monitoring aspect of management has made major strides in recent decades. The previous almost total reliance on estimation of "sugar in the urine" has yielded to increasing use of blood glucose estimation, a process which has been given a filip by the increasing availability of glucometers. In more recent times, estimation of glycosylated haemoglobin has provided a welcome addition to the monitoring process. Periodic physical checks and laboratory tests to provide a fuller assessment of the diabetic patient are still too infrequent and unfortunately, opportunities for early detection and treatment of diabetic complications and/or co-morbid conditions are being missed.

Another form of therapy, probably best described as non-conventional therapy, has also been widely utilized in the management of diabetes mellitus in Jamaica over the past several decades. It has involved widespread use of bush teas. Sometimes supplemented by use of substances deemed to counteract the sweetness of sugar; for instance grapefruit and "bitters". Although adherence to the non-conventional form of therapy was more in evidence among persons in the lower strata of society, diabetics in the higher echelons of society did not neglect it. However, in recent times, the arrival and growing popularity of alternative/complementary medicine has provided the latter groups in the society with an alternative to the traditional bush teas in the form of herbal drugs. The growing awareness of the potential value of anti-oxidants has further helped to entice the diabetic patient into the use of such popular substances as pychnogenal and noni. The more sophisticated chelation therapy practised by some medical practitioners also has been in evidence.

New Advances in Insulin Therapy

Chair: *Leslie Gabay*

Insulin Treatment of Type 2 Diabetes Mellitus

Arturo Rolla

NO ABSTRACT

New Advances in the Science and Technology of Diabetes Mellitus

Chair: *Lorenzo Gordon*

Glucose Monitoring

Arturo Rolla

NO ABSTRACT

accelerates atherosclerosis, worsening cardiovascular risk.

Deterioration of glycaemic control is generally marked by fasting hyperglycaemia because of increased hepatic glucose output (HGO). HGO is also amplified by the effects of growth hormone and cortisol in the early morning (dawn phenomenon). Consequently, the addition of a basal insulin to suppress HGO can effectively improve glycaemic control. In fact, combining basal insulin with oral agents provides for a simple, convenient insulin regimen (i.e. only one injection with no mixing), allows for lower doses of insulin, and limits weight gain. It is not known whether basal insulin should be used in the early stages of diabetes mellitus, even though there are preliminary data that intensive insulin therapy may preserve β -cell function.

Basal insulin requirements can be provided by intermediate or long acting insulin, albeit imperfectly, usually given as two injections a day before breakfast and dinner. These insulin formulations have several limitations. Firstly, there is significant intra-individual variability in their absorption patterns leading to unpredictable fluctuations in blood glucose levels. Secondly, their activity profile shows a peak occurring ~6 hours after injection which increases the risk of nocturnal hypoglycaemia between 12 midnight and 3 am. Nocturnal hypoglycaemia is associated with the "sudden death-in-bed syndrome", hypoglycaemic unawareness, cognitive impairment, poor glycaemic control and weight gain. Thirdly, pre-dinner administration of insulin leads to waning insulin con-

The Role of Basal Insulin in the Management of Diabetes Mellitus

Michael Boyne

Despite the evidence that intensive treatment of hyperglycaemia leads to reduction in diabetic complications, there is still *ennui* among health practitioners to treat aggressively the patient with diabetes mellitus. In Jamaica, 60% of patients are in poor glycaemic control highlighting the urgent need for intensification of care. Many patients and physicians are reluctant to advance to medical therapy, especially insulin therapy. Many do not appreciate that Type 2 diabetes mellitus is a progressive disorder and therefore there is an eventual need for insulinisation to maintain normo-glycaemia. Unfortunately, some physicians mistakenly believe that insulin therapy

centrations in the 4 am to 6 am period, resulting in fasting hyperglycaemia. A practical solution is to give the insulin before bedtime. Hence, the insulin will now tend to peak at a time when the individual is awake. However, this manoeuvre does not totally eliminate the risk of nocturnal hypoglycaemia due to the intra-individual variability in absorption.

Clinical trials have shown that regimens with bedtime insulin and daytime oral agents (sulphonylurea, metformin, thiazolidinediones, acarbose) lead to improved glycaemic control and less major hypoglycaemia compared to twice daily insulin therapy. Insulin/metformin therapy also tends to minimize weight gain. The cost-effectiveness and the long-term consequences of these regimens remain unclear.

Recently, long-acting insulin analogues have been designed. These analogues (glargine and detemir) prolong the absorption of insulin from the subcutaneous space into the blood vessels allowing for a slower, more predictable absorption pattern. Insulin glargine has an onset in ~2 hours, no definable peak and the duration is at least 24 hours. Hence, insulin glargine mimics the physiological profile of basal insulin secretion.

Insulin glargine has been compared to NPH insulin in both Types 1 and 2 diabetes mellitus. Clinical trial data demonstrate that insulin glargine is associated with a reduction in nocturnal hypoglycaemia, with less weight gain and variability in fasting blood glucose, albeit at a higher cost. Consequently, glargine should be specially considered in individuals prone to hypoglycaemia (eg in Type 1 diabetes mellitus patients and the elderly).

In conclusion, the progressive nature of beta cell dysfunction in Type 2 diabetes mellitus necessitates the use of insulin in many patients. Initially, combination therapy of oral agents with a basal insulin offers some unique advantages compared to insulin-alone regimens. The newer basal insulin analogues offer the potential for improved glycaemic control with less hypoglycaemia and weight gain.

Beta Cell Replacement Therapy for Type 1 Diabetes Mellitus – Now?

Robert Northcutt

An overview and summary of the current status of allograft Beta Cell Replacement Therapy (BCR) for complicated Type I diabetes mellitus is presented. Recent international experience with both whole organ pancreas transplant and islet cell transplant is discussed.

In contrast to other organ transplantation such as heart, lung, liver and to some extent kidney, BCR is not the only life sustaining therapeutic alternative. The current state of the art and science of BCR might be summarized as a costly, high-risk alternative to multiple dose insulin therapy for Type 1 diabetes mellitus. There is reasonable data supporting an adjunctive use with kidney transplants to improve renal graft survival and post-transplant quality of life. The only other indication currently accepted is for patients with Type 1 diabetes mellitus who have a high risk of death from severe metabolic instability; recurrent ketoacidosis and hypoglycaemia requiring acute hospital care.

Both whole pancreas and islet cell BCR can result in a rate of full insulin independence as high as 85% one year post-transplant. Long-term outcomes are not yet known; but three and four years of insulin independence have been observed for both whole pancreas and islet cell suspensions. This phenomenal success, after 30 years of 90% failure rates, is a consequence of the introduction in 2000 of the so-called “Edmonton Protocol” for immunosuppression. It is a glucocorticoid-free regimen which is minimally toxic to the transplanted islets. Unfortunately, it is as toxic generally as previous regimens and expensive; being about USD \$60 000 in the first year and about half that in succeeding years. Islet cell BCR requires more donor pancreases for transplanting to achieve the same rates of insulin independence. This is a disadvantage in times of donor pancreas shortages.

Marked improvements of diabetic control have been observed even in transplants not fully insulin independent. The problems of metabolic instability, ketoacidosis and severe hypoglycaemia, can be almost abolished. The effect on long term diabetic complications is still quite uncertain.

At the present time, BCR cannot be viewed as a “cure” for Type 1 diabetes mellitus. Much has to be learnt and improved before it can be rationally applied to the young uncomplicated Type 1 diabetic patients whose life expectancies may be 60 to 80 years.

New Potential of Complementary Alternative Medicine in Diabetes Mellitus

Chair: *Henry Lowe*

Phytochemical and Anti-diabetic Studies of *Cnidoscolus aconitifolius* (euphorbiaceae)

Frederick O Oladeinde, Antony M Kinyua, Adewale Laditan, Ruel Michelin, Modupe Makinde, Arthur L Williams, Maurice O Iwunze, Alvin P Kennedy, Emmanuel A Taylor, Yvonne Bronner

The phytochemical and anti-diabetic studies of the edible, leafy water extract of *Cnidoscolus aconitifolius*, a tree spinach used traditionally for the treatment of diabetes mellitus in southwestern Nigeria are reported. The plant is also found in the USA (southern Texas and Florida), southern Mexico and Costa Rica.

Twenty Balb/CBY male mice, weighing between 30-35g, were treated intraperitoneally with an initial single dose of alloxan monohydrate, 50-mg/kg body weight of mice to induce insulin-dependent diabetes mellitus (IDDM). The dosage was gradually increased to 150mg/kg bodyweight until hyperglycaemia was confirmed. After treatment, the blood glucose levels were measured at zero, one and three hour intervals. Thereafter, the mice were divided into two groups, namely; mild/moderately diabetic (blood sugar of 140-300 mg/dL) and severely diabetic with blood sugar level of over 300 mg/dL. Each group was then administered orally (1g/kg body weight) an aqueous extract of the plant after an overnight fast. The results were compared using chlorpropamide, a standard anti-diabetic agent. Another batch of 5 mice were used as control. There were significant blood lowering effects in both moderately ($p < 0.001$, 0.001) and severely ($p < 0.01$, 0.05) diabetic mice at one and three-hour respectively.

In phytochemical studies, the leaves and stem of the plant contained anthraquinone, saponin and cardiac glycosides; alkaloids, fatty acids, resins and balsams. Tannins were only present in the leaves. The toxic cyanogenic glycosides were absent. The elemental analysis showed zinc, copper and iron. All these components might be responsible for the anti-diabetic activity of these plants.

SPECIAL LECTURE

The Next Thrust – Vardenafil, A New Treatment Option for Erectile Dysfunction in Diabetic Males

Ivàn Arago

The prevalence of erectile dysfunction (ED) in the diabetic population increases with age and chronicity. From 20-29 years of age, ED appears in 4.6 to 9% of diabetic males, after 60 years of age it affects 45.5 to 75% of cases. In individuals of 50 years and more, ED can be the first clinical manifestation of diabetes mellitus. Due to the metabolic alterations in diabetes mellitus, patients with ED may have a mixture of comorbid pathologies that converge in endothelial damage that compromises the physiology of erection and treatment response. Since the appearance of oral treatments based on inhibition of phosphodiesterase 5, the understanding of ED and treatment possibilities has increased considerably. The profiles on treatment response with the three phosphodiesterases inhibitors (sildenafil, vardenafil and tadalafil) also varies according to their different pharmacologic properties. Compared to placebo, 56% of patients treated with sildenafil reported an improvement in erections, 64% and 55% of patients treated with 20mg and 10 mg of tadalafil (respectively) reported an improvement in erections and 72% and 52% of patients treated with 20 mg or 10 mg of vardenafil (respectively) reported an improvement in erections.

Beyond the molecular mechanism of action of the different pharmacologic treatment options, there are psychological mechanisms observed in the patient and in the partner, therefore an integral assessment should consider the best treatment pharmacologic option for the patient combined with the understanding and intervention from the perspective of a couple phenomenon.

Diabetes Mellitus Education

Chair: *Alberto Barcelo*

How Far Have We Come with Diabetes Mellitus Education?

Suzanne Laws

In 1898, Elliott P Joslin founded the Joslin Diabetes Center. Joslin was a pioneer in diabetes mellitus research and care. Even in those early days prior to insulin, there was evidence of diabetes mellitus education being taught to prolong the lives of those suffering from this dreaded disease.

It was Donnell Etwiler who was the true pioneer of diabetes mellitus education promoting the team approach. He recognized the need for education of patients with diabetes mellitus and their families, as well as health professionals who delivered the care and treatment to these patients. In 1966, Etwiler received a grant from the US Public Health Services to establish a Regional Diabetes Education and Detection Center. Etwiler promoted his campaign of the team approach to diabetes mellitus education and founded what is now known as the International Diabetes Center in Minneapolis. He opened the door for diabetes mellitus educators. We cannot afford to forget his message that in the team approach, the patient is at the centre.

In 1973, The American Association of Diabetes Educators (AADE) was founded. For 30 years AADE has provided a forum and avenues for the advancement of multidisciplinary health professional delivering diabetes mellitus education to patients, their families and to other health professionals. It has promoted diabetes mellitus self-management. The AADE has developed its National Diabetes Education Outcomes System (NDEOS) to provide diabetes mellitus educators and diabetes mellitus education programmes with a high level of quality in delivering diabetes mellitus education and care. This has allowed educators and education programmes to be reimbursed for their services.

In this age of technology, the Internet has become a place where people with diabetes mellitus can go to obtain information about the disease and to seek answers for their questions. Are you answering your patients' questions or are they seeking answers on the Internet? Not all information found on the Internet is reliable. Healthcare professionals must recognize the power of the Internet and make sure that their patients are getting information from reliable websites.

Barbara Anderson classifies physicians and health-care professional as "cowboys" or "horse whisperers". The "cowboy" dominates patients with rigid rules where blame and punishment for deviating from the rules leads to a sense of blame and distrust of the healthcare professional. The "horse whisperer" has a major role as a listener. You listen first, and then individualize a diabetes mellitus management plan around what the patient is telling you. One size does not fit all in diabetes mellitus care and management. Are you a "cowboy" or a "horse whisperer"? If you are a "cowboy", then you are setting your patient up for failure. To succeed in today's world of diabetes mellitus care and management, you must learn to become a "horse whisperer".

The Diabetes Mellitus Educator and Insulin Pump Therapy

Fern Vining

Insulin Pump Therapy has been in evidence since the early 1960s, but became an increasingly more familiar mode of blood glucose management. The DCCT research started in the late 1980s. Results were released in the early 1990s making pump therapy more visible to the public. More flexibility in lifestyle, better management of blood glucose levels and clear reductions in HbA_{1c}s have been achieved by people using insulin pumps over conventional therapies. In the beginning, people were hospitalized for four to five days just to teach and initiate insulin therapy by pump. This presented problems in keeping nursing staff competent in teaching a skill that they did not consistently use and eventually, became a reimbursement issue for the hospital. Also, it required people to lose work time unnecessarily and the hospital stay did not truly reflect daily life activities to appropriately adjust insulin rates. Through a gradual evolution from inpatient stays to the outpatient setting, protocols and education components were developed to better meet the needs of the person undertaking pump therapy, the hospital and the physician. The programme at William Beaumont Hospital, Royal Oak, Michigan, is a Nurse Managed programme including pre-pump education, pump initiation and a short follow-up period before turning the patient over to the referring physician.

Nutrition Education and Counselling

Patti Geil

Clinical Goals for Medical Nutrition Therapy in Diabetes Mellitus

- \$ Blood glucose levels in the normal range or as close to normal as is safely possible to prevent or reduce the risk for complications of diabetes mellitus
- \$ Lipid and lipoprotein profile that reduces the risk for macrovascular disease
- \$ Blood pressure levels that reduce the risk for vascular disease

Nutrition Practice Guidelines (NPGs)

- \$ Defined as “systematically developed statements designed to guide practitioner and patient decisions about appropriate healthcare for specific clinical circumstances.”
- \$ NPGs provide a framework for the process of providing MNT for diabetes mellitus
- \$ Three NPGs for diabetes mellitus have been validated: T1, T2 and GDM

Nutrition Practice Guidelines: Research Validation

- \$ Research validation for T1 and T2 NPGs
- \$ Type 1: A1_C at three months improved in 88% of NPG patients compared to 53% of usual care patients
- \$ Type 2: Individuals who received NPG care had significantly lower A1_C values at three-month follow-up than those who received basic nutrition care
- \$ Cost-effectiveness enhanced in Type 2 diabetes mellitus
- \$ Research validation for GDM NPGs
- \$ Lower frequency of insulin use and lower frequency of abnormal A1_C at follow up for women with NPG care

Nutrition Practice Guidelines: The Process

- \$ Nutrition-focussed assessment
- \$ Goal setting and establishing the nutrition care plan
- \$ Intervention
- \$ Documentation and communication
- \$ Evaluation and reassessment

Nutrition-Focussed Assessment

Based on referral data: medical history, medications, laboratory data, anthropometrics, comprehensive nutrition/physical activity history and psychosocial/lifestyle/economic issues.

Goal Setting

These should be reasonable, attainable and measurable. There should be a deferentiation between short-term goals vs long-term goals, client goals vs healthcare team goals and should be mutually agreed upon by client and caregiver.

Establishing the Nutrition Care Plan

ADA Resources: First step, healthy food choices, eating

healthy with diabetes mellitus, exchange lists for meal planning and carbohydrate counting.

Intervention

- \$ The diabetes mellitus educator’s activities that facilitate or support the client’s diabetes mellitus nutrition self-management plan
- \$ Strategies may change as client’s understanding of diabetes mellitus and motivation to self-manage evolve

Documentation and Communication

- \$ Nutrition progress notes in medical record
- \$ Valuable to referral source and other healthcare team members
- \$ Document clinical and behavioural goals, nutrition prescription, meal planning approach, educational topics covered, client acceptance and understanding

Evaluation and Reassessment

- \$ Measurable goals make evaluation a straightforward task
- \$ If goals are not met, change or renegotiate
- \$ If goals are met, set new goals appropriate for current circumstances

Case Study

Using the NPGs to Manage Gestational Diabetes Mellitus Assessment

Caucasian female, twenty-fifth week of second pregnancy

66 inches

Currently 185 lb, pre-pregnancy weight 175 lb

BMI = 28

31 years of age

Family history of Type 2 diabetes mellitus

Results of 50 g glucose challenge test: BG 155 mg/dl

1 hr post glucose load

Results of 100 g OGTT:

Fasting: 90 mg/dl

1 hour: 230 mg/dl

2 hour: 168 mg/dl

3 hour: 136 mg/dl

Additional laboratory values are within normal range for pregnancy

MB is married with a three-year-old son and works full time. She does not smoke cigarettes or drink alcohol. Her only medication is a prenatal vitamin prescribed by her obstetrician. She has no regular programme of physical activity.

Diet recall reveals intake of approximately 3500 calories with 425 grams of CHO. MB is eating frequently to prevent nausea. Breakfast is typically sweetened cereal, skim milk, fruit juice and a sweet roll. Lunch is often a fast food “value meal” with a regular soft drink. MB snacks on chips or popcorn from the office vending machines. Supper is usually late in the evening and often consists of a

casserole-type dish served with a salad, bread and dessert. MB has a bedtime snack every evening of a large bowl of ice cream.

List three goals that would be reasonable for this client.

What should be included in the nutrition care plan for this client?

What nutrition education resources would you use for this client?

How would you document an encounter with this client?

How soon would you set a follow-up appointment for this client? What would you evaluate on the return visit?

Roundtable Discussion II:

Wellness Promotion

Chair: *Michael Banbury*

~~Volunteerism can make a Difference~~

Beverley Sutherland-Lewis

Volunteers are defined as persons who give service for the good of the community without demands of financial rewards. These persons may be professionals and semi-professionals; they may be regarded as youth, retirees or unemployed. They are persons, who, in a spirit of altruism, seek to give help within their community.

Very few governments have been available to meet the full needs of the social service sector through budgetary allocations. However, the deficiency of government funding and short falls in organizations and agencies offering service has been assisted by volunteers who have formed themselves into groups or associations. Not all volunteers have formal organizations. And many persons wanting to "give back" have no idea where to go.

Volunteerism is the core of the development and sustainability of many services whose clientele are persons who are limited in their ability to meet basic social, health, welfare needs. And so the opportunity exists to engage persons who are already organized as well as individuals seeking to give service to become active players in your organization, for the benefit of the organization, the benefit of the client group and of the country as a whole.

Improving Diabetes Care in the Community Setting: The Curacao Experiment

Wimbert V Martina, Marijke Roerhorst-Bors, H Joseph de Bruin, Harold W de Valk

A large population-based study in the last decade on the island of Curaçao (Curaçao Health Study) has shown that Type 2 diabetes mellitus is prevalent with a population-frequency of around 10%. In the same study, it was shown that there were many issues to be improved in the practicalities of the healthcare system. Curaçao is part of the Dutch Antilles which has a semi-autonomous status. The healthcare system is based on the Dutch healthcare system, characterized by free accessibility to basic medical and para-medical care and a mixture of governmental and private insurance agencies and companies. Basic care is given in the community setting by General Practitioners (GP) with referral to specialist care if necessary. In a population of approximately 120 000 inhabitants with around 95 GPs, educated in different countries and speaking Dutch, Papiemento or Spanish; there is one general hospital. Based

on the evaluation of the Curaçao Health Study, a model has been designed to improve the workings of the healthcare system in diabetes mellitus. The elements of the model are:

- \$ Initiating role for a central laboratory facility (Analytic Diagnostic Centre (ADC))
- \$ Protocolized assessment of the patients by the GP: medical history, physical examination
- \$ Protocolized biochemical monitoring of the patients
- \$ Information collection, verification and storage in the ADC
- \$ Protocolized reporting back to the GP from the ADC
- \$ Protocolized referral of every patient to the podiatrist, ophthalmologist, diabetes nurse educator, dietician and invitation to the patient society (Sokudi)
- \$ Exclusion results, meaning that with certain abnormal results from the assessment, patients are automatically discussed with the GP by the consulting specialist and usually referred
- \$ Support of and counselling by a multi-disciplinary group, including healthcare agencies

The programme started on November 1, 2002, and here the results are given of the patients recruited up to September 1, 2003. Eleven GPs started to participate in that period and 404 patients were recruited.

Mean age was 61.1 ± 11.5 years (range: 28-88 years); there was a preponderance of females (70.8%). Median duration of diabetes mellitus was 7.0 years (range: 0-43). Of these patients, 78.2% used oral glucose-lowering medication, 7.4% insulin, the remainder were on diet only. Anti-hypertensives were used by 54%, lipid-lowering drugs by 16%. There were 12.4% smokers and 17.7% used alcohol. Women smoked significantly less and fewer women drank alcohol compared to men. Self-measurement of glucose levels was done by 14.5%.

Physical examination showed a mean systolic pressure of 140 ± 20 mm Hg and a diastolic pressure of 80 ± 11 mm Hg. Mean body mass index was 30.1 ± 5.9 kg/m², with women being heavier than men (30.9 ± 6.0 vs 28.3 ± 5.1 , $p < 0.001$). Laboratory assessment showed a mean non-fasting glucose 219 ± 79 mg/dl and HbA_{1c} $8.45 \pm 2.15\%$. Mean cholesterol was 200 ± 42 mg/dl (higher in women: 206 ± 42 vs 184 ± 37 , $p < 0.001$); HDL-cholesterol 51 ± 15 mg/dl (higher in females: 53 ± 15 vs 45 ± 13 , $p < 0.001$), triglycerides 75 ± 16 (mg/dl). Measurement of the plasma creatinine levels showed a mean of 0.89 ± 0.29 mg/dl; 21% of all patients had micro-albu-minuria. In this patient group

in community care, there was a low prevalence of macro- and micro-vascular complications: myocardial infarction, 3.2%; angina pectoris, 4.0%; CVA, 4.7%; claudication, 2.3%; renal dialysis, 1.5%; amputation below the ankle, 0.7%; amputation above the ankle, 0.2%.

These data show that when evaluating the patient population seen in community care, there is an over-representation of women who are more obese and have higher total and HDL-cholesterol levels. Plasma triglyceride levels are remarkably low. Glycaemic control is inadequate in the whole group. Blood pressure levels are less of a problem. This relatively low prevalence of micro- and macrovascular complications can be explained by the probability that most patients with a history of these complications are seen in specialist care. Although GPs

were instructed to only recruit patients they themselves treated for diabetes mellitus, the patients on renal dialysis demonstrated that some mixture of patient groups occurred.

This first evaluation of the "Curaçao experience" showed that a change in the working practices in community care is possible and will be continued. Next phases include inclusion of other GPs, extending continuing education and certification, extending the participation of medical specialists, paramedical professionals and the patient society, determination of rate of attendance of medical and paramedical service with analysis of reasons for drop-out. Ultimately, this system can be exported to other Antillean islands.

Roundtable Discussion III:

Patient/Provider Interaction

Chair: *Adalinda Gonzalez*

Introduction

Adalinda Gonzalez

NO ABSTRACT

The Business of Diabetes Beyond the Medical Team

Darlene Moppert

Treatment for people with diabetes mellitus has become complex with all facets of the economy involved. Many groups fall into the category of providers. These business opportunities are part of the cost of diabetes mellitus treatment, both direct and indirect.

Physicians, nurses, dietitians and other clinicians provide direct treatment to the person with diabetes mellitus. Insurance providers and the state often are the payers for the services rendered, and therefore have a vested interest in the quality as well as the cost-value of the outcomes.

Disease management specialists and companies are complementing care provided directly by clinicians with positive outcomes for both enhanced quality of life for the patients and improved financial gain. By directly educating the patient and medical providers, those involved with disease management can work to assure quality diabetes mellitus care while enhancing patient compliance. The positive medical outcomes justify the costs paid by the payer, whether public or private.

Companies creating specific products have increased their value because of the heightened marketing of diabetes mellitus products and supplies. Clinical products ranging from glucometers to special shoes, diabetes mellitus support items contribute to the economy as well as serving the

patient. Food suppliers and technologists continue to provide the marketplace with an array of food items useful to people with diabetes mellitus and weight management. Drug manufacturers through their commitment to product development, have changed the face of diabetes mellitus management. Marketing to the populations of people with diabetes mellitus has provided positive financial gain for those companies.

National and international organizations work to increase awareness of diabetes mellitus issues in underserved areas, linking quality healthcare to those most in need. Through their network, resources of information, individuals and supplies reach people all over the globe. Diabetes mellitus lay magazines and books are abundant, helping to teach the general public in a user-friendly way. Working together, everyone achieves more in diabetes mellitus care, provider and patient.

Diabetes at 45 000 Feet

Brian Weisz

It may not seem that an aeromedical evacuation team would deal with diabetes mellitus, but in our present society where the young are more prone to diabetes mellitus and the elderly who are living longer, healthier and travelling more, aeromedical transport teams now face a new and difficult task – the monitoring and treatment of the diabetic patient. Although most emergency aerovacs are due to acute illness or injury, the diabetic patient changes and complicates the treatment regime. The medical flight crew must be able to anticipate exacerbation of any chronic illness and be prepared to treat the whole patient while in transport. Properly trained medical flight crew, along with access to specialized medical equipment ensures proper treatment of the diabetic patient at 45 000 feet.

Quality of Diabetes Mellitus Care

The Pan American Health Organization: Diabetes Mellitus Management in the Americas

Alberto Barceló,

Improvement in diabetes mellitus control is linked to better quality of life and survival. One of the most important challenges for public health in the field of diabetes mellitus is to monitor quality of care with the aim of introducing measures to assure better outcomes. The available published information suggests that diabetes mellitus care in Latin America and the Caribbean is sub-optimal. Previous evaluation of quality of diabetes mellitus care showed that it did not follow international standards and as a consequence, additional reduction in mortality could be obtained through improvement programmes. The Chronic Care Model applied to diabetes mellitus provides a framework to identify gaps in the delivery of care for people with the disease. This presentation combines research carried out in several Caribbean countries. The information comes from the Declaration of the Americas (DOTA) Quality of Diabetes Care Project, the DOTA Health Technology Assessment and the WHO/PAHO National Capacity Survey. As part of the DOTA project, an evaluation of diabetes mellitus care was carried out in outpatient clinics in Jamaica and Bahamas and two hospitals in St Lucia. The DOTA Health Technology assessment exercise was carried out with the participation of officials from Aruba, Bahamas, Barbados, Jamaica, Trinidad and Tobago, St Lucia and Surinam. The WHO National Capacity survey focussed on the availability of national programmes and policies on diabetes mellitus and other chronic diseases. Overall, 17 Caribbean countries participated in the WHO National Capacity Survey. The obtained data showed gaps in diabetes mellitus management at the clinic and public health level. Structure evaluation showed lack of facilities and equipment for testing and examination at some clinics, as well as unavailability of guidelines and public health policies supporting medical care and diabetes mellitus prevention. Process indicators such as low proportion of patient with foot or eye examination, nutrition advice and diabetes mellitus education and short term outcome measures such as poor metabolic or blood pressure control are among the issues detected in some participating sites. A coordinated action plan for diabetes mellitus control and prevention is needed in the Caribbean. The fight against diabetes mellitus should involve governments, the scientific society and community organizations and should focus on improving quality of care and diabetes mellitus education.

Mastering your Diabetes: An Educational Intervention**for Implementing Basal/Bolus Insulin Therapy**

Luigi Meneghini

Despite significant advances in the management of diabetes mellitus, optimal blood glucose control remains a challenging endeavour for many patients and their healthcare professionals. Less than half of patients with diabetes mellitus are achieving target A_{1c} levels and the figures become even more discouraging in insulin-requiring diabetes mellitus. This lack of glycaemic control translates into considerable morbidity and financial burden.

Studies assessing the impact of glycaemic control on insulin-requiring diabetes mellitus clearly support intensification of insulin therapy, through multiple daily insulin (MDI) injections or insulin pump therapy, to achieve glycaemic goals. With the advent of new insulin analogues and devices (monitoring and insulin delivery), some of those glycaemic goals become more attainable. The key strategy in achieving the lowest possible A_{1c} without unacceptable hypoglycaemia is the use of physiologic insulin replacement through basal/bolus insulin therapy.

Basal/bolus insulin therapy utilizes concepts derived from the insulin pump literature to develop algorithms for physiologic insulin replacement. The first step involves the determination of an individual's total daily dose (TDD) of insulin. Algorithms for basal insulin dose and bolus insulin replacement are then calculated from that initial TDD. Bolus insulin makes use of rapid-acting insulin preparations to both cover meal-related carbohydrate ingestion and correction of pre-prandial blood sugars that may be above target.

We present the results of a group education intervention focussed on implementing and reinforcing basal/bolus insulin concepts to patients with insulin-requiring diabetes mellitus not achieving target glycaemic goals on their current regimen. This intervention, called Mastering Your Diabetes (MYD), has resulted in consistent and sustainable improvement in A_{1c} while demonstrating benefits in psychosocial measures collected before and after the programme.

In conclusion, basal/bolus insulin therapy is effective in optimizing blood glucose control in insulin-requiring diabetes mellitus. The key to successful adaptation of a basal/bolus approach by patients is a focussed, interactive and flexible educational intervention that not only presents key concepts to participants, but also encourages them to implement these as part of the educational strategy.

**Diabetes Management in the USA: A Public Health
Perspective**
Gloria Beckles

NO ABSTRACT

Compton Seaforth

**The Sir Philip Sherlock Distinguished
Awardee for Outstanding Contribution to the**

Medical Sciences in the Caribbean Region

Dr Compton Seaforth is a scientist whose greatest interests lie in botanical chemistry, in particular, the systematic characterization of the bio-active constituents of medical plants. He studied at the University (College) of the West Indies

(UCWI), in Jamaica, where he achieved a BSc degree with First Class Honours, before pursuing medicinal researches on the Ackee fruit. This work led him to the completion of his PhD degree in chemistry at the University of Wales in the United Kingdom in 1959.

After some post-doctoral work, he spent over three decades at The University of the West Indies (UWI), St Augustine Campus in Trinidad and Tobago, in teaching and research in organic chemistry, and in Pharmacognosy and Medicinal Chemistry. He served as Dean of the Faculty of Natural Sciences at UWI during the late 1960s. He is also founder member of the Caribbean Academy of Sciences.

Dr Seaforth has held technical consultancies, across the Caribbean region, concerned with poisonous and medicinal plants and with biological diversity conservation, with governmental agencies, and with the Commonwealth Secretariat, the Organization of American States and the United Nations Food and Agricultural Organization.

He has coordinated several conferences and projects, and published numerous research articles on the constituents of significant items such as the Ackee, the Sweet potato and the Mauby bark. His published books include:

- i) Poisonous Plants in Jamaica (with CD Adams and KE Magnus in 1963)
- ii) A Guide to Medicinal Plants of Trinidad and Tobago (with CD Adams and Y Sylvester in 1983)
- iii) Folk Healing Plants used in the Caribbean

(1998).

Dr Seaforth is an Honorary Pharmacist on the Pharmacy Board of Trinidad and Tobago. He was awarded the prize "Innovator of the Year 2002" by the Caribbean Association of Pharmacists. He is also a founding member and the current President of the Caribbean Association of Researchers and Herbal Practitioners (CARAPA). In collaboration with The University of the West Indies, St Augustine, Trinidad and Tobago, in June 2003, this Caribbean association hosted its very successful Sixth International Conference on Herbal Medicine, the theme being – "Advancing Caribbean Herbs in the 21st Century".

Compton Seaforth retired as a Senior Lecturer in Chemistry at the UWI in 1999, but he continues to teach courses in Medicinal Chemistry and Pharmacognosy in the Faculty of Medical Sciences at the UWI, St Augustine in Trinidad and Tobago.

Previous Sir Phillip Sherlock Awardees

Rolf Richards	Trinidad and Tobago	(2000)
David Picou	Trinidad and Tobago	(2001)
Sir George Alleyne	(Barbados)	(2002)
Rene Charles	(Haiti)	(2003)

Poster Presentations

Knowledge and Self-Reported Motivational Factors in Adults with Diabetes Mellitus

YB Wint, EMW Duff, A O'Connor, N McFarlane-Anderson, EY Bailey

Objectives: To determine the extent of knowledge, and self-reported factors that motivate patients with diabetes mellitus (DM) to make lifestyle changes.

Methods: A random sample (n = 133) of men (n = 35) and women (n = 98) with diabetes mellitus were selected from a population of 510 patients attending the Specialist Diabetes Clinic, The University Hospital of the West Indies, Jamaica. A pre-tested in depth interview schedule was administered and anthropometric and biochemical measurements done. Knowledge was scored on basic knowledge of diabetes mellitus, its control and complications. Data were analyzed using Statistical Package for the Social Sciences. Qualitative data were analyzed by sorting texts into related categories and describing the ideas of the subjects.

Results: Median age of respondents: 57.0 years, range 20-90 years. Median time since diagnosis: ten years. Sixty-four per cent completed primary education, 25.5% secondary and 7.5% tertiary, 3.0% had no formal education. Knowledge scores were related to respondents' level of education (p = 0.001) and number of years since diagnosis (p = 0.04). Forty-seven per cent did not know the meaning of the word "diabetes". Only seventy-five per cent knew that diabetes mellitus could not be cured. There was an inverse relationship between age and knowledge scores (p = 0.001). Main sources of information included doctors (62.4%), diabetes mellitus educators (10.5%), books/TV/radio (10.5%), nurses (3.0%), dietitians (1.5%). Main motivational factors for lifestyle changes were: "to keep healthy" (30.8%), "follow doctors' orders" (20.3%), "fear of complications" (15.8%), "desire to live" (12.8%), "feeling compelled" (10.5%). Suggestions to improve control of diabetes mellitus included: "group discussions" (30.8%), "education about diabetes mellitus" (21.0%), "financial assistance (drugs)" (12.8%), "videos/pamphlets" (12.7%), "doctors to describe complications" (9.0%), "more guidance from doctors" (7.7%), "doctors need to be firm and drive fear" (7.5%).

Conclusions: This study indicated the need for structured

educational programmes, particularly in group settings, with specific targeting of older patients with diabetes mellitus. Age, educational level, length of time since diagnosis, gender and reported motivational factors must be considered in planning interventions. Doctors and other healthcare providers need to increase their educational interaction with patients. The patients' reference to doctors as primary sources of information indicates the need for involvement of other members of the health team in planning and implementing effective educational interventions.

02P – 2

Nutritional Status, Self-care Practices and Glycaemic Control in Adults with Diabetes Mellitus

EMW Duff, A O'Connor, N McFarlane-Anderson, YB Wint, EY Bailey, R Wright-Pascoe

Objective: To determine the nutritional status and self-care practices in relation to glycaemic control in adults with diabetes mellitus (DM) attending the Specialist Diabetes Clinic (SDC), University Hospital of the West Indies (UHWI).

Methods: A pre-tested interview schedule was administered to 98 women and 35 men randomly selected from a population (n = 510) of patients with diabetes mellitus attending the SDC, UHWI. Waist circumferences (WC), heights and weights were measured. HbA_{1c} was used as the index of glucose control. Self-care practice scores indicated the extent of compliance with appropriate lifestyle practices. Respondents were asked to recall their usual 24-hour dietary intake and the quantity of sugar in food and beverages estimated. Data were analyzed using Statistical Package for the Social Sciences Version 7.5.

Results: Median age of respondents: 57 years, range: 20-90 years. Median time since diagnosis: ten years. Sixty-nine per cent were being treated with insulin. Median BMI: 29.1, range 16.6 - 47.4 kg/m². Eighty-one per cent were overweight or obese. WC: 40% men > 102cm, 84% women > 88cm, 46% described diet and/or obesity as contributing to their diabetes. Eighty-five per cent had consulted a dietitian but only 56.4% reported being on a "special diet".

Median sugar intake: 105 g/week, range 0-672 g/week. Only 16.5% reported not taking any sugar. Forty-five per cent reported compliance with medications. Seventy-one per cent exercised < 3.5hours/week. They spent a median of 14 hours/day inactive. Exercise scores were inversely related to age ($p = 0.001$) and inactivity ($p = 0.001$) and positively to self-care practice scores ($p = 0.002$). Self-care practice scores were inversely associated with HbA_{1c}% ($p = 0.007$), BMI ($p = 0.005$), and sugar intake ($p = 0.02$). Only 23% had blood glucose controlled to HbA_{1c} ≤ 6.5%.

Conclusions: The majority of respondents were overweight or obese, with central obesity. Fewer than half recognized diet and/or obesity as contributing to their diabetes mellitus. Although the majority had consulted a dietitian, only a few patients were compliant in terms of diet and exercise. The strong inverse association between HbA_{1c} and self-care practice scores suggests that interventions to improve self-care practices, diet and weight control, could improve glycaemic control.

02P – 3

The Hypoglycaemic Effect of *Pilea elizabethae* (Aluminun Plant)

CNA Salmon, RL Lindo, KD Golden

Background and Aims: In spite of the prevalence and high repute of herbal remedies among Caribbean peoples and ethnic groups from other regions, there is still little scientific evidence authenticating or disproving the efficacy of these traditional remedies. *Pilea elizabethae* is among these.

This indigenous Jamaican plant species is found in abundance in the cool, hilly, limestone soil regions of the island. It is believed to be useful in the treatment of diabetes mellitus among other diseases. This study investigates the hypoglycaemic effect of *P. elizabethae* by isolating and characterizing the major chemical component responsible for its reported blood glucose lowering property.

Materials and Methods: Dried, milled portions of the plant were first percolated with organic solvents. The dried crude extracts were initially screened for blood glucose lowering properties in mixed-breed Wistar rats ($n = 6$). Bioassay was conducted using the oral glucose tolerance test (OGTT) as follows. An initial fasting blood glucose value was taken from the rats, after an overnight fast. The crude extracts were administered orally in dimethyl sulphoxide (DMSO) at 0.2 g/kg body weight. A glucose load was administered an hour later and the blood glucose levels were monitored at half hour intervals for a further 2.5 hours. A control group of rats ($n = 6$) were administered pure DMSO orally. The extract that caused lowering of blood glucose was selected for further purification. Isolation of the active component was achieved using a

combination of chromatographic techniques. Following each purification, OGTT was used to assay the blood glucose lowering capacity of each extract. Pure samples were administered intravenously at dosages up to 10 mg/kg body weight. Elucidation of the active component was achieved by nuclear magnetic resonance (NMR) spectroscopy and fourier-transform infra-red (FT-IR) spectroscopy.

Results: Compound CS-100 was obtained by bio-directed purification as the active component of *P. elizabethae*. This compound showed statistically significant hypoglycaemic activity at the 1.0 hour and 1.5 hour post-prandial intervals. The most effective dosage was at 5 mg/kg body weight in comparison to the controls. The mean blood glucose concentrations were 4.52 ± 0.22 mmol/L ($p < 0.011$) vs 5.97 ± 0.33 mmol/L for the control at the one hour post-prandial interval. The 1.5 hour post-prandial values were 4.55 ± 0.31 mmol/L ($p < 0.021$) vs 5.65 ± 0.30 mmol/L for the control. The unpaired students t-test was the statistical tool used.

Conclusion: Compound CS-100 was found to be the primary agent causing the hypoglycaemic effect of *Pilea elizabethae*. This study therefore substantiates the reports of traditional medicine and indicates that Compound CS-100 and other natural product compounds may provide useful alternatives in the management of diabetes mellitus.

02P – 4

Coronary Arteries Lesions in Subjects with Non-Insulin Dependent Diabetes Mellitus

A Olivera Escalona, A Salas Fabre, A Irsel, C Santa Cruz Pacheco, J Lopez Martin, J de la Cruz Fernandez, L Gordon, A Matos Toledo, A Igarza, RA Zambrano Gonzalez, EM Zamora, D Garwood

Introduction: Before coronary angiography was used as a practical diagnostic procedure, many epidemiological studies showed evidence that non-insulin dependent diabetes mellitus (NIDDM) play a significant role in the development of coronary heart diseases and a large proportion of mortality among diabetic subjects has been attributed to cardiovascular diseases. Which coronary arteries are damaged in NIDDM? All the coronary arteries or some of them? We have carried out 951 coronary angiography between January and December 2003, among which 70 NIDDM were studied.

Objectives: To describe the state of the coronary arteries in NIDDM compared to a control group.

Method: The study was done at the Catheterization Laboratory Cardiovascular centre, and/or signs of coronary illness: Sixty-nine NIDDM and 207 non-diabetic subjects (ND) matched (1 NIDDM with 3 ND) by age (± 1 years) and gender. The data were subjected to analysis using

Statistical Package for the Social Sciences (SPSS) Version 10.

Results: The NIDDM showed a more marked damage of the right coronary (RCA), anterior descending (AD) and circumflex (CX) arteries than ND. More than half of the NIDDM (53.6%, 37/69) presented significant lesions (lesion higher than 50%) of the RCA, while this was only present in 29.9% of the ND (62/207). On the other hand, the frequency of NIDDM with significant lesions of the AD artery was 52.2% (36/69), higher than the frequency of 33.3% (69/207) in ND. The frequency of NIDDM with significant lesions in the CX artery was higher (37.7%, 26/69) than in the ND (26.1%, 54/207). However, the frequency of NIDDM with significant lesions in the main left coronary artery (MLC) was smaller (4.3%, 3/69) than that observed in the ND (6.8%, 14/207); nevertheless, the frequency of non-significant lesions (lower than 50%) of MLC was higher in the NIDDM (10.1%, 7/69) than in the ND (5.8%, 12/207).

Conclusion: According to these results in which the significant lesions of the coronary arteries in the NIDDM present with different frequencies according to the anatomical localization of the arteries, the damage of these vascular structures seem to happen in a selective way in subjects with NIDDM.

02P – 5

Insulin-Stimulated Glucose Uptake is Inhibited in Adipocytes

K Barrett, D McGrowder, P Brown, D Ragoobirsingh

Objective: To investigate the role of nitric oxide on insulin-stimulated D-glucose-[1-³H(N)] uptake in adipocytes from streptozotocin-treated diabetic rats.

Method: Sixteen adult Wistar rats weighing between 120-300 g were divided into two groups consisting of eight rats. The drug-treated group was injected with 65 mg/kg body weight streptozotocin (STZ) in conjunction with 180 mg/kg body weight nicotinamide, to induce Type 2 diabetes mellitus. Control rats were injected with saline. After four weeks, an oral glucose tolerance test was performed and control and diabetic rats sacrificed. Blood was collected for insulin determination and D-glucose-[1-³H(N)] uptake into adipocytes in the presence and absence of insulin measured.

Results: There was no significant difference in D-glucose-[1-³H(N)] uptake in the absence of insulin in adipocytes from control and diabetic rats. However, in the presence of 100 nM insulin, D-glucose-[1-³H(N)] uptake was significantly inhibited in adipocytes from STZ-treated rats ($1.26 \pm 0.35 \times 10^{-8} \mu\text{mol/mg/min}$) compared to controls ($4.17 \pm 1.28 \times 10^{-8} \mu\text{mol/mg/min}$), $p < 0.05$. A further increase in

insulin concentration (1000 nM) had no further effect on glucose uptake in adipocytes from control and diabetic rats.

Conclusion: The results of the study indicate that the NO-releasing drug has a direct inhibitory effect on insulin-stimulated glucose uptake in adipocytes and may thereby have a role in the aetiology of Type 2 diabetes mellitus.

02P – 6

Prenatal History Clinical Characteristics and Complications in Newborns of Women with Gestational Diabetes Mellitus

GR Lopez, AH Caimares, LA Regueiferos Prego, LA Bode Marin, AC Matos Toledo, LA Gordon, AS Igarza, RA Zambrano Gonzalez

Introduction: Epidemiological studies have identified an increased risk of complications in newborns of women with gestational diabetes mellitus (WGD) and the development of strategies aimed at reducing that risk is, therefore, not an easy task and would have to involve history of health of the pregnant woman, health services, clearer understanding and more careful assessment of many other factors.

Objectives: To describe the prenatal history, clinical manifestations and complications in newborns of WGD.

Methods: The study was done between 1999 and 2002 at the “Mariana Grajales” South Maternity Hospital in Santiago de Cuba, Cuba. Data was collected from 132 newborns: 66 from WGD and 66 newborns of normal pregnant women (NPW), both groups of women were matched by age (± 2 years), gestational age, and no-hypertension in pregnancy. The data were subjected to analysis using Statistical Package for the Social Sciences (SPSS) Version 10. Information was collected by a questionnaire that included all data of the women and newborn.

Results: Although both groups of newborns did not show great difference with regards to the prenatal history specifically, and the birthweight, the frequency of births by caesarean operation were higher in newborns of WGD (36/66, 56.5%) than the newborns of NPW (52/66, 19.7%) ($p < 0.01$). Also the births before the 37th week of gestational were higher in the group of newborns of WGD (12/66, 18.2%) than the groups of newborns of NPW (3/66, 4.6%) ($p < 0.01$). On the other hand, low values of APGAR (smaller than 4, included APGAR at 1 and 5 minutes) were more frequent among those newborns of WGD (6/66, 9.1%) than the groups of newborns of NPW (1/66, 1.5%) ($p < 0.05$). All the complications were more frequent in the group of newborns of WGD; respiratory complications (13/66, 19.7% vs 3/66, 4.5%; $p < 0.01$); same results for the haematological complications (13/66, 19.7% vs 3/66, 4.5%; $p < 0.01$); trauma (6/66, 9.1% vs 2/66, 3.0%, $p < 0.05$);

metabolic complications (11/66, 16.7% vs 0/66, 0%); infections (6/66, 9.1% vs 0/66, 0%).

Conclusion: These results provide evidence that although the WGD show normal progress of intrauterine growth and birth weight, these newborns present alterations and complications with higher frequency than those of normal pregnant women and for that reason they need a special attention independently of the prenatal history.

02P – 7

Clinical Progress of a Diabetic Group with Intensive Treatment During Five Years

E Cabrera, CA Alonso, L Gordon, E Morrison, Y Terry, D Garwood

Objective: Diabetes mellitus has become a major global public health problem. The patients suffering from this disease are exposed to the risk of very serious complications because of the chronic elevation of the blood glucose concentration and the risks related to the hyperglycaemia. These are, however, avoidable if the patients are given appropriate care.

Method: We designed an integral programme of diet and moderate exercises with weekly attendance to the hospital for guided exercises and glycaemic control, as well as monthly follow-up by the endocrinologist for the first year. Participants also received an educational programme on diabetes mellitus care. Patients exercise every day at home. In the next four years participants attended monthly interchange of exercise and lectures at the hospital and continued to practice regular exercises at home.

Results: From a group of 60 patients at the beginning of the study, 33 remained after five years. The Body Mass Index (BMI) at the beginning was adequate in eight patients, admissible in seven, and inadequate in 18; after the five years, it was adequate 14, admissible seven and inadequate 12. In relation to the clinical treatment, at the beginning only 13 were on diet, nine on tolbutamide, ten glibenclamide and one with insulin treatment. To date, seven stayed on diet, five with tolbutamide, 13 with glibenclamide and five with glibenclamide and insulin, with none on insulin treatment.

Systolic blood pressure at the beginning was adequate for 24 patients, admissible for three and inadequate for seven, to date we have 22 adequate, three admissible and eight inadequate. Diastolic blood pressure was adequate 26, admissible four, and inadequate three; to date 25 were adequate, five admissible and three inadequate.

Conclusion: Intensive treatment of Type 2 diabetic patients

has a beneficial effect on the disease progress. The diabetes educational programmes and the frequent contact with physicians facilitated patients education and control of diabetes mellitus in those patients.

02P – 8

An Integral Intensive Programme for NIDDM

CA Alonso Rodriguez, E Cabrera, EI Cancio, L Gordon, E Morrison, Y Terry, D Garwood

Introduction: Diabetes mellitus, has a lifestyle component which involves diet changes and physical exercise that improves the state of the organism. The treatment of Type 2 diabetes mellitus is not based only on the blood glucose concentration but includes also the active consideration of other vascular risk factors such as dislipidaemias, smoking and sedentary lifestyle.

Objective: To demonstrate the effect of an integral treatment (with lifestyle modifications), in Type 2 diabetic patients. We compare two groups of patients: one with a programme of intensive treatment with diet and moderate intensity exercises (n = 39), and the other control group, with the traditional treatment recommended by the International Diabetes Federation (n = 49).

Subjects and Methods: The patients in the intensive treatment group attended the hospital on a weekly basis for glycaemic and blood pressure control, and for guided exercises training. They also practised their exercises at home. They followed a Diabetes Educational Programme and had monthly consultation with the endocrinologist. We measured carbohydrate metabolism indicators (glycaemia, glycated haemoglobin), lipid metabolism (cholesterol, triglycerides, HDL-Cholesterol, LDL, and VLDL), renal function (creatinine and microalbuminuria) as well as the hormonal control and metabolism (insulin, T3 and T4).

Results and Discussion: The values of glycaemia and glycated haemoglobin were better in the intensive treatment group than in the control group at the end of the period evaluated. Lipid profiles were also much better at the end in the group with intensive treatment, with marked differences in lipoprotein profile ($p < 0.05$). The changes in hormonal parameters improved for both groups with lower insulin values in the group with intensive treatment (lower insulin resistance $p < 0.05$).

Conclusion: The intensive treatment group had a positive effect with marked reduction in lipids. We recommend the extension of this programme of treatment to the primary care level.

02P – 9

Effect of Maternal Pre-gestational Weight and some Maternal and Perinatal Variables in Gestational Diabetics –Preliminary Report

BR Rodriguez Anzardo, L Valdes Amador, J Perez Pinero, J Lang Prieto, BE Herrera Cueva, A Marquez Guillen, LA Gordon

Introduction: The relationship between maternal pre-gestational weight and infant birthweight is known. There exists a close relationship between national health and birthweight and this relationship varies, depending on the weight gain during the course of pregnancy.

Objective: To determine the influence of maternal pre-gestational weight and other maternal and perinatal variable on outcome.

Method: Six hundred and seventy-two gestational diabetics were studied from January 1986 to December 2001 in the Central Service of Diabetes and Pregnancy, National Institute of Endocrinology, Cuba. Statistical analysis determined the association between pre-ques-tioned weight and some obstetric and perinatal events using chi square and Z test with a level of significance $p = 0.05$.

Results: Nulliparous women were the most frequent (47.6%), with a higher significance in the overweight group. Metabolic control (glycaemic profile) was optimal in 77.5% of all women studied but more frequent in the normal weight women (79.2%).

Adequate weight gain during pregnancy (using CLAP criterion) was significant in overweight women (100%). The glycaemic intolerance was significantly higher in the second half of pregnancy and was highest in the overweight women. The most frequent complications during pregnancy were anaemia and pregnancy-induced hypertension and was highest in the obese group.

Caesarian section was the most frequent delivery route in 64.5% and the obese group was highest. Macrosomia was significant in the overweight and obese women. Neonatal hypoglycaemia was more frequent (23.6%) in the normal weight, respiratory distress syndrome (RDS) was 14.1% in overweight and 16.6% in obese groups.

Conclusion: In the obese group, there is a higher risk of anaemia, undergoing Caesarian Section and developing pregnancy-induced hypertension, probably as a result of a higher prevalence of fetal macrosomia.

02P – 10

Oxidative Stress in Adults with Diabetes Mellitus

A O'Connor, N McFarlane-Anderson, EMW Duff, R Wright-Pascoe

Background: Excess oxidative stress has been suggested as a potential mechanism for the increased vascular damage in diabetes mellitus. Possible sources of oxidative stress in diabetes mellitus include altered carbohydrate and lipid metabolism, decreased levels of antioxidant defenses and most importantly, increased generation of reactive oxygen species as a result of the metabolic derangements, lipid peroxidation and glycation. Investigation of oxidative stress as a correlate of glycaemic control is therefore useful in diabetes management. Growing evidence suggests isoprostane as a reliable and sensitive marker of *in vivo* lipid peroxidation that can easily be measured.

Objectives: To determine the levels of isoprostanes in a diabetic population.

Methods: Urine ($n = 124$) and fasting blood samples ($n = 122$) were obtained from patients attending a specialist diabetic clinic at the University Hospital of the West Indies. Levels of F2-isoprostane, 8-iso-PGF2 α were determined in the urine samples using a commercial immunoassay kit obtained from Oxford Biomedical Research. Glycaemic control was determined by measuring HbA_{1c} in the fasting blood samples. The data were analyzed using Statistical Package for the Social Sciences, version 7.5.

Preliminary Results: Mean age was 56.7 ± 14.3 years, with mean time since diagnosis 12.2 years. Seventy-seven per cent had HbA_{1c} $\geq 6.5\%$. Only 12.7% had isoprostane levels ($n = 110$) < 50 ng/mmol creatinine. The mean isoprostane level was 217.92 ± 230 with a range of 5.74 – 1297.78 ng/mmol creatinine. Isoprostane levels were significantly correlated with levels of HbA_{1c} ($r = 0.75$, $p = 0.03$).

Conclusion: The results show high levels of urinary F2-isoprostanes in this diabetic population. A strong correlation was found between HbA_{1c} and the oxidative stress biomarker, confirming previous reports that impaired glycaemic control may increase oxidative stress. The increased oxidative stress may be related to the underlying metabolic abnormalities or could possibly be a result of poor glycaemic control.

02P – 11

Investigation of the Effect of Food Processing on Glycaemic Indices of some Jamaican Foods: A Proactive Approach to Management of Type 2 Diabetes Mellitus

PS Bahado-Singh, AO Wheatley, EY St A Morrison, Ahmad I, HN Asemota

Introduction: Caribbean countries in the past decade have seen a dramatic increase in diabetic cases. In Latin America and the Caribbean it is estimated that the number of people with diabetes mellitus will reach the 35 million mark by 2025. The increased prevalence of the disease among adults is also reflected in figures from Jamaica (17.9% in 1995) and Barbados (16.4% in 1993). This can be attributed to the rapid cultural and social changes as well as increasing urbanization. Studies have also revealed that Type 2 diabetes mellitus has increased in children and adolescents in the Caribbean and has been linked to an increasing sedentary lifestyle giving rising to an obesity epidemic among this age group. Those affected by this disease suffers physiological, epidemiological and neuropathological disorders. However, dietary management and exercise have proven to prevent or delay the onset of Type 2 diabetes mellitus. This directly relates to the carbohydrates and their glycaemic indices.

The Glycaemic Index (GI) of foods is the measure of the power of foods (specifically the carbohydrates) to raise blood glucose concentration immediately after consumption. Studies have shown that equal exchanges of carbohydrates do not elicit similar glycaemic response since the amount of fibre and other nutritional factors affect GI. Collectively these findings suggest that GI influences insulin sensitivity.

Scope of this study: This study is designed to assess the effect of two different food processing methods (boiling and roasting) on post-prandial blood glucose levels.

Method: Fifty grams of available carbohydrate portions of round leaf yellow yam, white yam, lucea yam, breadfruit and banana were fed to non-diabetics in random order on separate occasions after an overnight fast. Capillary finger prick blood samples were taken at 0, 15, 30, 45, 60, 90 and 120 minutes after consumption and GI were determined. Glucose was used as standard.

Results and Discussion: Preliminary results indicate that the process of boiling results in a lower GI of the foods studied as compared to roasting. Green banana had the lowest GI of all the foods for the different processing methods, while white yam had the highest. The difference in GI for the different processing methods can be attributed to the possible leaching of free sugars during boiling. However, the difference in GI between the different foods studied can be attributed to the proximate composition, particle size, degree of gelatinization of the starch granules and digestibility among other factors. It is known that high

fibre foods tend to have a lower GI.

Conclusion: The GI differs according to the different food processing methods used. Boiling results in a lower glycaemic index as compared to foods processed by roasting. This information is of significance to diabetics, as boiling reduces the availability of free sugars and hence may reduce the incidence of post-prandial spikes in blood glucose level.

02P – 12

Effect of Consumption on Sweet Potato (*Ipomea,bataas*) Phytic Acid Extract on Blood Glucose, Liver Function and Faecal Mineral Loss: A Case Study with Rat Model

LL Dilworth, FO Omoruyi, O Simon, EY St A Morrison, HN Asemota

Background: Phytic acid is a major phosphorus compound in plant seeds and is also found in significant quantities in roots and tubers. Phytic acid binds to essential minerals thus rendering them unavailable for intestinal uptake. These minerals may therefore be egested from the body along with the faeces. The presence of phytic acid and other anti-nutrients in the diet may also result in carbohydrates being slowly digested. As a result blood glucose levels are controlled and this is desired in diabetes mellitus.

Apart from binding to minerals, phytic acid is also thought to regulate the process of digestion by binding to some digestion products thereby delaying the onset of diabetes and hyper lipidaemia. Phytic acid may also prove beneficial as it is thought to impair starch digestion hence help in blood glucose control.

Objectives: To assess the effects of phytic acid extract from sweet potato (*Ipomea batatas*) on blood glucose levels in rats. To assess liver transaminases and the weekly faecal output of zinc and iron.

Methods: In this study, phytic acid was extracted from sweet potato and fed to wistar rats for three weeks. At the end of this period the animals were sacrificed and blood glucose determined by the method of Teller (1956). Faecal zinc and iron were assessed weekly using the AOAC (2000) method. The activities of transaminases were determined according to the method of Reitman and Frankel (1957) as reported by Bergmeyer and Erlich (1974). Liver transaminases were evaluated to assess liver function and were done on a weekly basis.

Results and Discussion: All the groups fed phytic acid extract from sweet potato or commercial phytic acid, displayed low blood glucose levels compared to their controls. A further lowering of blood glucose was seen in the groups which also had zinc added to their diets. Faecal zinc was significantly higher in the groups fed phytic acid extract from sweet potato compared to the controls in weeks one

and two. Supplementation of the diets with phytic acid extract from sweet potato or commercial phytic acid resulted in an increase in the faecal output of iron except for the group that was fed commercial phytic acid plus zinc.

Conclusion: Supplementation of the rat diet with phytic acid extract from sweet potato resulted in a general increase in the output of these faecal minerals. The lowering of blood glucose was more pronounced in the groups fed phytic acid extract from sweet potato or commercial phytic acid plus zinc supplement. The results from this study did not show any significant alterations in the liver function of rats that acutely consume these dietary supplements. These results are useful in diet management for diabetics and health conscious individuals.

02P – 13

Implications of Amylose Content and In Vitro Digestibility of Native Jamaican Yam (*Dioscorea sp*) Starches in the Formulation of Tablets and Capsules for Diabetics

CK Riley, AO Wheatley, AS Adebayo, I Ahmad, EY St A Morrison, HN Asemota

Tubers such as yams (*Dioscorea sp*) are widely cultivated in tropical and subtropical regions of the world for their rich carbohydrate and medicinal contents. Over 24 different varieties of yams are found in Jamaica belonging to five cultivated species. Starches extracted from Jamaican yams have shown significant variations in physical and chemical properties among the different varieties and are also of great importance in the formulation of diets and industrial applications. Starch is a multi-purpose excipient in the formulation of tablets and capsules, where it is used as binders, fillers and disintegrants, and it is listed in the top ten excipients. Cornstarch is the most widely used starch in tablet formulation, however previous studies on breadfruit and cocoyam starches have shown promising results. Preliminary data collected on yam starches are encouraging. The degradability of starch when consumed is important especially among diabetics and hyperlipidaemic individuals, as starches that are easily degraded tend to have a higher insulin demand than the slower degrading starches. This can affect the sensitivity to insulin, and influence the development of Type 2 diabetes mellitus, myocardial infarction in women, and reduce HDL cholesterol levels.

Overall Aim: To investigate the possibility of exploiting Jamaican yam (*Dioscorea sp.*) starches as binders and fillers in the formulation of tablets and capsules for diabetics, with the following specific objectives:

- \$ To investigate the effect of amylose content on the tableting properties of yam starches.
- \$ To investigate the effect of *in vitro* digestibility

of yam starches in tablet and capsule formulation for diabetics.

Methods: Starches from round leaf yellow yam, bitter yam and chinese yam were extracted and purified. Amylose content was determined by the method of Farhat *et al*, and the *in vitro* digestibility by the modified method of Hassan and West.

Results and Discussion: Round leaf yellow yam (*Dioscorea cayenensis*) starch had the highest amylose content (265.30 ± 0.09 g/kg) and was the least digestible (13.74 ± 0.03 %) at 37°C while chinese yam and bitter yam with the lowest amylose content (111.44 ± 0.03 and 119.70 ± 0.06 g/kg respectively) displayed significantly higher degrees of enzymatic degradation (21.27 ± 0.01 and 18.11 ± 0.02 % respectively). It has been shown that the degree of starch degradation is greatly affected by the amylose content, as starches with high amylose content tend to have large granules and are more crystalline while those with low amylose content possess smaller granules and higher degrees of amorphousity. The variation in granular size will play a key role in the particles ability to degrade, as smaller granules results in higher glucose release as opposed to the larger granules with lower rates of sugar release.

Conclusion: The differences in the *in vitro* digestibility of the starches from the different yam varieties suggest that these starches are digested and absorbed at different rates when consumed, which could be of importance in the formulation of tablets and capsules for diabetics.

02P – 14

Glycaemic Responses after Ingestion of Three Local Carbohydrate Foods in Trinidad Patients with Type 2 Diabetes Mellitus

CE Ezenwaka, R Kalloo

Background and Aim: Previous studies suggest that inadequate glycaemic control in diabetic patients might be related to the type of carbohydrates the patients consume regularly. Thus, we aimed to assess glucose and insulin responses after diabetic and non-diabetic subjects ingested three commonly consumed carbohydrate foods.

Methods: Thirty-eight Type 2 diabetic and 27 non-diabetic subjects were studied on three different occasions of seven days apart. On each day of the study, anthropometric indices were measured and after collecting fasting blood samples, subjects randomly consumed bread, roti or rice within ten minutes. Subsequently 7ml of venous blood samples were collected at 60, 90, 120 and 150 minutes for determination of glucose and insulin responses.

Results: Although the diabetic patients were older than the

healthy subjects ($p < 0.05$), both subjects had similar weight, body mass index and waist and hip circumferences ($p > 0.05$). The mean fasting and post meal plasma glucose concentrations for the three test foods were higher in diabetic patients than the corresponding values for the healthy subjects (all; $p < 0.001$). Generally roti had the highest incremental glucose levels while rice had the least values for all the test foods irrespective of ethnic group or

diabetic status ($p < 0.05$).

Conclusion: There were variations in glucose and insulin responses to the three test foods. However, roti elicited the highest postprandial hyperglycaemia and should therefore be discouraged in regular dietary plan of diabetic patients.

Congratulations to

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