New Aspects of Clinical Nutrition

espen’82

European Society of Parenteral and Enteral Nutrition

Proceedings of the 4th Congress of the European Society of Parenteral and Enteral Nutrition (ESPEN), Vienna, September 27-29, 1982

New Aspects of Clinical Nutrition

Editors
G. Kleinberger and E. Deutsch, Vienna

203 figures and 113 tables, 1983

©KARGER

Drug Dosage
The author and publisher have exerted every effort to ensure that drug selection and dosage set forth in this text are in accord with current recommendations and practice at the time of publication However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check the package insert for each drug for any change in indications and dosage and for added warnings and precautions This is particularly important when the recommended agent is a new and/or infrequently employed drug

All rights reserved.
No part of this publication may be translated into other languages, reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, microcopying, or by any information storage and retrieval system, without permission in writing from the publisher

© Copyright 1983 by S Karger AG, P. O. Box, CH-4009 Basel (Switzerland)
Printed in Germany by Kieser, Augsburg
Contents

Preface IX
Sir David Cuthbertson Lecture
Jeejeebhoy, K. N.: Micronutrients - State of the Art 1

I. Energy Requirement and its Supply

Chairmen: J. M. Kinney and E. Jequier

James, W. P. T.: Endocrine Control of Energy Balance 31
Young, V. R.; Munro, H. N.; Matthews, D. E., and Bier, D. M.: Relationship of Energy Metabolism to Protein Metabolism 43
Kinney, J. M.: Energy Metabolism in Adult Clinical Conditions 79

II. Nutrition and Patient Outcome

Chairmen: J. Funovics and J. L. Mullen

Dionigi, R.; Nazari, S.; Dominioni, L., and Dionigi, P.: Predictive Value of Nutritional and Immunological Determinations in the Surgical Patient 86
Roth, E.; Funovics, J.; Mühlbacher, F.; Sporn, P., and Mauritz, IP.: Metabolic Parameters as Predictors of Outcome in Critically 111 97
Mullen, J. L. and Buzby, G. P.: Nutritional Assessment, Support and Outcome in Surgical Patients * * 4
Cerra, F. B.: Influence of Nutrition on the Outcome of Septic Patients 136

Arvid Wretlind Lecture

Dietze, G.: / /Inter-Organ Substrate Flow *46

Contents VI

III. Endocrine Aspects of Nutrition in Critically 111 Patients
Chairmen: R. A. DeFronzo and J. Wahren

DeFronzo, R. A.: Regulation of Glucose, Lipid, and Amino Acid Metabolism in Normal Healthy Subjects 169
Gelfand, R. A.; DeFronzo, R. A., and Gusberg, R.: Metabolic Alterations Associated with Major Injury or Infection 211
Foster, D. W. and McGarry, J. D.: Endocrine and Metabolic Adaptation to Starvation 240
Flaider, W. J.: High Dose Insulin Therapy in the Critically Ill Patient 271
Sherwin, R. S.: Effect of Epinephrine on Fuel Metabolism in Man: Role in the Response to Stress 283

IV. Nitrogen Sparing Mechanisms

Chairmen: H. R. Freund and F. B. Cerra

Freund, H. R.: Why Do We Want to Spare Nitrogen? 306
Rodemann, F. P.; Baracos, V. E., and Goldberg, A. L.: The Regulation of Protein Breakdown by Prostaglandins 310
Walser, M.: Nitrogen Sparing Effects of Branched Chain Ketoacids 319
Keller, U.: Regulation of Ketone Body Kinetics in Man, and Relationship to Nitrogen Metabolism 325
Soeters, P. B.; DeBoer, J. E. G.; Oostenbroek, R. J., and Janssen, M. A.: Fate of Branched Chain Amino Acids 337

V. Current Concepts in Amino Acid Therapy

Chairmen: E. Holm and P. Fürst

Fürst, P.: Criteria Underlying the Formulation of Amino Acid Regimens: Established and New Approaches 361
Holm, E.; Leweling, H., and Staedt, U.: Metabolism and Nutritional Supply of Amino Acids in Hepatic Failure 377
Druml, W.; Bürgler, U., and Kleinberger, G.: Renal Failure: Metabolism and Supply of Amino Acids 411
Vinnars, E.: Surgical Trauma: Conventional or Special Amino Acid Solutions for Parenteral Nutrition 422

Contents VII

VI. Amino Acids and Control of Brain Function

Chairmen: B. K. Siesjö and P. Riederer

Pardridge, W. M.: Nutrient Transport through the Blood-Brain Barrier under Normal and Pathological Conditions 440
Pratt, O. E.: Amino Acid Transport across the Blood-Brain Barrier in Conditions in which Amino Acid Metabolism is Disturbed 453
Wurtman, R. J.: Effects of Parenteral Amino Acid Mixtures on the Nervous System 464
Hindfelt, B.: Ammonia Intoxication and Brain Energy Metabolism 474
Ferenci, P.; Schafer, D. F.; Pappas, S. C., and Jones, E. A.: Inhibitory and Excitatory Amino Acid Neurotransmitters in Hepatic Coma 485

VII. Nutrition and Liver Function

Chairmen: H. Joyeux and A. M. J. Woolfson

Joyeux, H.; Astruc, B.; Saint-Aubert, B., and Yakoun, M.: Effects of Different Routes of Nutrition Supply on Liver Metabolism 516
Feldmann, G.: Plasma Protein Synthesis by the Hepatocytes - with Special Reference to Albumin Metabolism 521
Woolfson, A. M.: Liver Dysfunction during Artificial Nutrition 530

Clemens of Pirquet Lecture

Ricour, C. and Duhamel, J.-F.: Childhood Malnutrition: Risk Factors 558
VIII. Nutritional Problems of the Low Birth Weight Infants

Chairmen: R. D. G. Milner and K. Widhalm

Milner, R. D. G.: Nutritional Assessment in the Newborn 570
Lucas, A.: Endocrine Aspects of Enteral Nutrition 581
Mestyán, J. and Rubecz, I.: Energy Expenditure for Maintenance and Growth in Low Birth Weight Infants 595
Pohlandt, F.: Amino Acid Requirement in the Premature 610

Contents VIII

IX. Topics in Childhood Nutrition

Chairmen: H. Wolf and J. Fernandes

Fernandes, J.: Energy Expenditure in Case of Glucose Shortage 623
Bürger, U. and Bürger, D.: Nutrition in Pediatric Patients with Cancer or Leukemia 631
Brodehl, / . The Role of Nutrition in the Treatment of Acute and Chronic Renal Failure in Children 639
Nelson, R. and Eastham, E. J.: Parenteral Nutrition in Inflammatory Bowel Disease in Children 650

Preface

The European Society of Parenteral and Enteral Nutrition (ESPEN) was founded in its first meeting, which took place in Stockholm in 1979. The following congresses - Newcastle upon Tyne (1980) and Maastricht (1981) - revealed a strong interest in this new society and a marked readiness for European cooperation. Subsequently, ESPEN has developed into a group of outstanding scientists interested in experimental and clinical research in human nutrition, covering metabolic, hormonal, and practical aspects.
The main topic of the first (Stockholm, 1979) meeting was the nutritional aspects of carbohydrates; that of the second (Newcastle upon Tyne, 1980) the nutritional aspects of fat; and that of the third (Maastricht, 1981), the nutritional aspects of proteins. The selection of topics for the Vienna ESPEN Congress (1982) was considered by the Scientific Program Committee of the congress. The preliminary program was based upon a careful analysis of the “free papers” that had been presented as “free communications” or “posters” at the first three ESPEN meetings. The result of this study demonstrated that
many specialists in different fields are involved in aspects of experimental and clinical nutrition, and that a great variety of relevant scientific problems are under current investigation. Based upon this knowledge, a proposal of the scientific program was made and - after a great deal of discussion - the final scientific program of the Vienna ESPEN Congress was selected. There are different topics of the congress that have been presented as lectures or symposia. In addition to the Sir David Cuthbertson- and the Arvid Wretlind lectures, a third lecture in honor of Clemens of Pirquet has been presented to the society. This new lecture is oriented toward the enormous contributions of pediatrics in the field of nutritional research.

C. von Pirquet, who is better known for his scientific work in allergic diseases, was chosen to lend his name to the first pediatric lecture in order to honor his milestone work in pediatric nutrition. Pirquet used his skin test (tuberculin test) on malnourished children with tuberculosis: the malnutrition of his patients brought him to anthropometries and the science of nutrition. Pirquet investigated the nutritional status of healthy and sick newborns and children, and correlated the sitting height of infants to their energy requirements. On the basis of precise metabolic balances, he calculated the nutritional requirements of newborns and infants and introduced a nutritional system that is well known as the “Pirquet System of Nutrition”.

The program of the symposia contained seven symposia on nutritional aspects of adults and two symposia on pediatric patients. The program on nutrition in adults included, besides the main topic of the congress, a symposium on “Energy Requirement and its Supply”, and symposia on “Nutrition and Patient Outcome”, and “Endocrine Aspects of Nutrition in Critically Ill Patients”. Furthermore, a cycle of four symposia dealt with nitrogen metabolism, amino acid therapy, and liver function under the titles: “Nitrogen Sparing Mechanisms”, “Current Concepts in Amino Acid Therapy”, “Amino Acids and Control of Brain Function”, and “Nutrition and Liver Function”.

In the pediatric symposia, the “Nutritional Problems of the Low Birth Weight Infants” and “Topics in Childhood Nutrition” were discussed. It is the pleasure of the editors of these proceedings to thank the chairmen of the symposia, who not only offered their experience and support to the local organizing committee of the Vienna ESPEN Congress, but organized and chaired their symposia excellently. Furthermore, the editors would like to extend their thanks to Mrs. Reingard Kleinberger, who ably corrected the proofs of the manuscripts. Finally, the editors wish to acknowledge the excellent work of the staff of Karger, München - particularly Walter Kunz and Siegfried H. Bezold - for its cooperation in achieving rapid publication.
of this document of scientific work.

Vienna, December 16, 1982 Gunter Kleinberger
Erwin Deutsch