

Contents

List of Contributors XV

Gestational Diabetes — Survey

1 Gestational Diabetes: A Survey and the Graz Approach to Diagnosis and Therapy 1

By P. A. M. Weiss

Introduction 1

Nomenclature and classification 4

Physiology and pathophysiology 6

Metabolic changes in pregnancy 6

Endocrine effects of pregnancy on carbohydrate metabolism 13

Insulin homeostasis in the fetoplacental unit 13

Insulin homeostasis in the fetoplacental unit of normal pregnancy 13

Insulin homeostasis in the fetoplacental unit of the diabetic woman 14

Screening for disorders of carbohydrate metabolism 20

Target groups 20

Period of screening 21

Methods of glucose tolerance testing 21

Further diagnostic procedures 24

Monitoring blood glucose 24

Amniotic fluid insulin determination 24

Methods of determining amniotic fluid insulin 27

The determination of glucose in the amniotic fluid 29

Treatment 30

Dietary treatment 30

Insulin treatment 34

Metabolic control during insulin treatment 41

Quality of metabolic control 41

Monitoring blood glucose 42

Glycosylated hemoglobin 43

Patient education 43

Monitoring pregnancy, labor and the puerperium 44

Arrest of preterm labor with β -mimetic tocolytic agents 44

Induction of fetal lung maturation 44

Birth weight 45

Sonographic estimation of fetal weight and ultrasound diagnosis of diabetogenic fetopathy 49

Postpartal screening for diabetes 50

Newborns of diabetic mothers 50

Assessment of the quality of metabolic management during pregnancy by the condition of the newborn 52

Selected Topics on Gestational Diabetes

A. The Significance of Gestational Diabetes

2 The World Scope of Gestational Diabetes 59

By J. J. Hoet

Introduction 59

Determinant biological factors of pathologic childbearing 59

Determinants of diabetes 60

Diabetic patterns during pregnancy 61

Diabetes health care in pregnancy in tropical and subtropical zones 62

B. On Physiologic and Pathophysiologic Features of Gestational Diabetes

3 Pathophysiological Background for Gestational Diabetes 67

By C. Kühl and O. Andersen

Introduction 67

Plasma insulin in pregnancy 67

Serum proinsulin in pregnancy 68

Insulin degradation in pregnancy 68

Glucagon secretion in pregnancy 69

Insulin resistance in pregnancy 69

Concluding remarks 70

Summary 70

4 The Human Placenta in Gestational Diabetes 72

By G. Desoye

Introduction 72

Histopathology 72

Histomorphometry 74

Immunopathology 74

Carbohydrate metabolism 76

Lipid metabolism 80

Nucleic acids, amino acids and proteins 82

The placenta as affector of fetal growth 83

Miscellaneous 85

5 Prevention of Placental Insufficiency Syndrom in Diabetic Pregnancies 87

By W. Burkart, U. Cirkel, J. P. Hanker, and H. P. G. Schneider

Introduction 87

Materials and methods 87

Results 88

Discussion 89

C. On Screening and Diagnostics in Gestational Diabetes

6 Gestational Diabetes, Significance of Risk Factors and Results of a Follow-up Study 8 Years After Delivery 93

By K. Fuhrmann

Introduction 93

Methods 93

Result and discussion 93

Screening using random blood glucose values 97

Conclusions 97

7 The Oral 100 g-Glucose-Tolerance Test—Special Criteria for Evaluation in Late Pregnancy 99

By O. Bellmann, N. Lang, H. Schlebusch, M. Niesen, and R. Schönhardt

Introduction 99

Methods 99

Results 101

Discussion 104

Summary 106

8 Glucosylated Proteins in Normal and Diabetic Pregnancy 107

By C. M. Peterson and L. Jovanovic

Introduction 107

Biochemistry of glucosylation and Browning reactions 107

Studies on methods of measurement 108

Studies on the role of glucosylation in the problems of pregnancy complicated by diabetes mellitus 112

Studies on the clinical utility of glucosylated protein 113

Measurements during pregnancy 113

Conclusions 113

9 Glycosylated Haemoglobins and Neonatal Macrosomia 115

By P. Czekelius and J. Rollmann

Glycosylated haemoglobins (GHb) 115

GHb and pregnancy 116

Problem formulation 116

Methods 117

Results 118

Discussion 120

Summary 122

10 *Recurrence of Gestational Diabetes in Subsequent Pregnancies* 123
By Virginia R. Lupo and S. J. Stys 123

Introduction 123
Materials and methods 123
Results 124
Discussion 125
Summary 126

D. On Prophylaxis and Therapy in Gestational Diabetes

11 *Preconceptional Diabetes Counseling in Gestational Diabetes* 129
By J. A. Goldman, D. Dicker, D. Feldberg, A. Yeshaya, and M. Karp

Introduction 129
Material and methods 129
Results 132
Discussion 132

12 *The Use of Prophylactic Insulin in Women with Gestational Diabetes* 134
By D. R. Coustan

Introduction 134
Diagnosis of gestational diabetes 134
Indications for *therapeutic* insulin 134
Theoretical causes of fetal macrosomia despite relative maternal euglycemia 135
Prophylactic insulin—results of randomized trials 137
Retrospective data 138
Clinical strategy 140
Risks 140
Conclusions 141

13 *Insulin Treatment of Gestational Diabetes. The Basal Bolus Concept* 142
By H. M. H. Hofmann, P. A. M. Weiss, and F. Kainer

Introduction 142
Patients and methods 142
Initial planning of the insulin-schedule 143
Results 145

E. On the Fetus and Newborn of Gestational Diabetic Women

14 *Fetal Consequences of Maternal Diabetes* 153
By A. F. van Assche, L. Aerts, and J. Verhaeghe

Introduction 153
The human fetal pancreas 153
 The morphology of the endocrine pancreas 153
 The fetal endocrine pancreas in diabetes 154

Fetal consequences in experimental diabetes induced by streptozotocin 155

The fetal endocrine pancreas in the diabetic BB rat 158

Conclusions 159

Summary 159

15 *Macrosomia and Birth Trauma in Infants of Diet Treated Gestational Diabetic Women* 160

By J. L. Kitzmiller, L. A. Hoedt, E. P. Gunderson, T. S. Theiss, C. L. Ceresa, and A. M. Kitzmiller

Introduction 160

Material and methods 161

Results 162

Discussion 165

16 *Fetal Hemoglobin in the Infant of Gestational Diabetic Mothers (IGDM)* 167

By P. Doménech, X. Pastor, O. Cruz, F. Botet, R. Jiménez, and J. L. Aguilar

Introduction 167

Patients and methods 168

Results 168

Discussion and conclusions 169

17 *Somatometric Study in the Infant of Gestational Diabetic Mother* 171

By X. Pastor, P. Doménech, J. M. Jorba, A. Martínez-Gutierrez, J. Figueras, R. Jiménez, and R. Casamitjana

Introduction 171

Patients and methods 171

Results 172

Discussion and conclusions 174

18 *The Impact of Diet-induced Ketosis During Pregnancy on the Offspring* 176

By R. Steldinger, B. Weber, J. Kneer, and H. Hättig

Introduction 176

Case report 176

Discussion 178

Summary 181

F. *On Oral Contraception in Gestational Diabetes*

19 *Oral Contraceptives in Women with Previous Gestational Diabetes: Influence on Glucose Metabolism* 185

By S. O. Skouby and O. Andersen

Introduction 185

Influence of low dose oral contraceptives on glucose metabolism in normal women and women with previous gestational diabetes mellitus 185

Oral contraceptives in normal women and women with previous GDM: Effect of estrogen/progestogen ratio on glucose tolerance 186
Low dose oral contraceptives and insulin receptor binding in normal women and women with previous GDM 188

G. On the Further Fate of Women Who Had Gestational Diabetes

20 Follow-up Studies in Women with Gestational Diabetes Mellitus. The Experience at Los Angeles Country/University of Southern California Medical Center 191

By J. H. Mestman

Introduction 191

Materials and methods 192

Discussion 195

Conclusions 197

Summary 197

21 The Emergence of Diabetes and Impaired Glucose Tolerance in Women Who Had Gestational Diabetes 199

By J. N. Oats, N. A. Beischer, and P. T. Grant

Introduction 199

Materials and methods 199

Results 201

Incidence according to severity of gestational diabetes 202

Family history 202

Subsequent pregnancies 202

Postnatal tests 203

Age at diagnosis 203

Interval from index pregnancy to diagnosis 204

Body mass index 204

Discussion 205

Summary 206

References 209

Subject Index 233

Acknowledgements and Grants 241