



Table of contents

SECTION I Differential diagnoses for owner chief concerns and physical examination findings

| | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------|--------------------------------|--------------|----------------------|----|--|--|------------------|----|--|--|-----------------------|----|--|--|-------------|----|--|--|--------------------------------|----|
| Chapter 1 | Growth retardation | 1 | Chapter 5 | Polyphagia | 19 | | | | | | | | | | | | | | | | |
| <i>Federico Fracassi, Dolores Pérez Alenza, Hans S. Kooistra</i> | | | | | | | | | | | | | | | | | | | | | |
| ■ Pathophysiology | 1 | ■ Pathophysiology | 19 | | | | | | | | | | | | | | | | | | |
| ■ Diagnostic approach | 1 | ■ Diagnostic approach | 22 | | | | | | | | | | | | | | | | | | |
| Chapter 2 | Alopecia | 5 | Chapter 6 | Exercise intolerance | 25 | | | | | | | | | | | | | | | | |
| <i>Francesco Albanese</i> | | | | | | | | | | | | | | | | | | | | | |
| ■ Pathophysiology | 5 | ■ Pathophysiology | 25 | | | | | | | | | | | | | | | | | | |
| ■ Classification and clinical signs | 5 | ■ Clinical signs | 26 | | | | | | | | | | | | | | | | | | |
| ■ Diagnostic approach | 5 | ■ Diagnostic approach | 26 | | | | | | | | | | | | | | | | | | |
| Chapter 3 | Weight loss | 9 | Chapter 7 | Obesity | 29 | | | | | | | | | | | | | | | | |
| <i>Sean E. Hulsebosch</i> | | | | | | | | | | | | | | | | | | | | | |
| ■ Pathophysiology | 9 | ■ Etiology and pathophysiology | 29 | | | | | | | | | | | | | | | | | | |
| ■ Clinical signs | 12 | ■ Clinical signs | 29 | | | | | | | | | | | | | | | | | | |
| ■ Diagnostic approach | 12 | ■ Diagnostic approach | 29 | | | | | | | | | | | | | | | | | | |
| Chapter 4 | Polyuria and polydipsia | 15 | ■ Therapy | 32 | | | | | | | | | | | | | | | | | |
| <i>Stijn J.M. Niessen, Federico Fracassi, Sara Galac</i> | | | | | | | | | | | | | | | | | | | | | |
| <i>Edward C. Feldman</i> | | | | | | | | | | | | | | | | | | | | | |
| ■ Physiology and pathophysiology | 15 | ■ Prevention of obesity | 34 | | | | | | | | | | | | | | | | | | |
| ■ Definitions and initial considerations | 15 | Chapter 8 | Hypertension | 35 | | | | | | | | | | | | | | | | | |
| ■ Signalment, history, physical examination | 16 | <i>Rosanne E. Jepson</i> | | | | | | | | | | | | | | | | | | | |
| ■ Diagnostic approach | 16 | ■ Diagnosis | 16 | ■ Pathophysiology | 35 | | | ■ Clinical signs | 35 | | | ■ Diagnostic approach | 37 | | | ■ Diagnosis | 37 | | | ■ Considerations for treatment | 37 |
| ■ Diagnosis | 16 | ■ Pathophysiology | 35 | | | | | | | | | | | | | | | | | | |
| | | ■ Clinical signs | 35 | | | | | | | | | | | | | | | | | | |
| | | ■ Diagnostic approach | 37 | | | | | | | | | | | | | | | | | | |
| | | ■ Diagnosis | 37 | | | | | | | | | | | | | | | | | | |
| | | ■ Considerations for treatment | 37 | | | | | | | | | | | | | | | | | | |

SECTION II Differential diagnoses for clinicopathologic abnormalities

| | | | | | |
|-------------------------------|---------------|-----------------------|------------|----------------|----|
| Chapter 9 | Hyperglycemia | 41 | Chapter 11 | Low thyroxine | 49 |
| <i>Florian Z. Zeugswetter</i> | | | | | |
| ■ Pathophysiology | 41 | ■ Pathophysiology | 49 | | |
| ■ Clinical signs | 41 | ■ Clinical signs | 50 | | |
| ■ Diagnostic approach | 41 | ■ Diagnostic approach | 50 | | |
| Chapter 10 | Hypoglycemia | 45 | Chapter 12 | Hyperlipidemia | 53 |
| <i>Federico Fracassi</i> | | | | | |
| ■ Pathophysiology | 45 | ■ Pathophysiology | 53 | | |
| ■ Clinical signs | 46 | ■ Clinical signs | 53 | | |
| ■ Diagnostic approach | 46 | ■ Diagnostic approach | 53 | | |



| | | | |
|---------------------------------------|-----------|---------------------------------------|-----------|
| ■ Diagnosis | 53 | ■ Clinical signs | 71 |
| ■ Treatment | 54 | ■ Diagnosis | 72 |
| Chapter 13 Hyperkalemia | 59 | Chapter 17 Hypocalcemia | 75 |
| <i>Daniel K. Langlois</i> | | <i>Santiago Teyssandier</i> | |
| ■ Pathophysiology | 59 | ■ Pathophysiology | 75 |
| ■ Clinical signs | 60 | ■ Clinical signs | 75 |
| ■ Diagnostic approach | 60 | ■ Diagnostic approach | 76 |
| Chapter 14 Hypokalemia | 63 | Chapter 18 Hypercalcemia | 79 |
| <i>Ghita Bencheikroun</i> | | <i>Antonio María Tardo</i> | |
| ■ Pathophysiology | 63 | ■ Pathophysiology | 79 |
| ■ Clinical signs | 64 | ■ Clinical signs | 80 |
| ■ Diagnostic approach | 64 | ■ Diagnostic approach | 80 |
| ■ Diagnosis | 81 | ■ Therapy | 81 |
| Chapter 15 Hypernatremia | 67 | Chapter 19 Proteinuria | 85 |
| <i>Chiara Valtolina</i> | | <i>Tim Williams</i> | |
| ■ Pathophysiology | 67 | ■ Pathophysiology | 85 |
| ■ Clinical signs | 67 | ■ Clinical signs | 86 |
| ■ Diagnostic approach | 68 | ■ Diagnostic approach | 86 |
| ■ Treatment | 88 | | |
| Chapter 16 Hyponatremia | 71 | | |
| <i>Chiara Valtolina</i> | | | |
| ■ Pathophysiology | 71 | | |

SECTION III Techniques and procedures

| | | | |
|--|-----------|---|-----------|
| Chapter 20 Blood pressure measurements | 89 | ■ Continuous glucose monitoring systems | 95 |
| <i>Paula García San José, María Dolores Pérez Alenza</i> | | ■ Flash glucose monitoring systems | 96 |
| ■ Blood pressure measurement techniques | 89 | ■ New technologies | 97 |
| ■ Indications for blood pressure measurement | 91 | Chapter 22 Hormone measurements | 99 |
| Chapter 21 Glucose monitoring | 93 | <i>Peter A. Graham</i> | |
| <i>Francesca Del Baldo</i> | | ■ Types of assays | 99 |
| ■ Measurement of blood glucose using automated chemistry analyzers | 93 | ■ Binding proteins and free hormone measurement | 101 |
| ■ Use of portable blood glucose meter devices | 93 | ■ Validation, verification, and quality | 102 |
| | | ■ Transferability of results | 103 |

SECTION IV Endocrinologic diseases

| | | | |
|--|------------|--|------------|
| Chapter 23 Hypothalamus and pituitary gland: anatomy and physiology | 107 | Chapter 25 Vasopressin-related disorders of water homeostasis | 119 |
| <i>Roberto Chiocchetti</i> | | <i>Hans S. Kooistra</i> | |
| ■ Anatomy | 107 | ■ Syndrome of inappropriate ADH release | 120 |
| Chapter 24 Growth hormone disorders | 111 | ■ Diabetes insipidus | 121 |
| <i>Federico Fracassi, Annemarie M.W.Y. Voorbij</i> | | ■ Primary polydipsia | 123 |
| ■ Physiologic effect | 111 | ■ Primary adipsia | 124 |
| ■ Hypersomatotropism (acromegaly) | 112 | Chapter 26 Anatomy and physiology of the thyroid gland | 127 |
| ■ Pituitary dwarfism | 114 | <i>Lisa Stammel</i> | |
| | | ■ Anatomy | 127 |
| | | ■ Physiology | 127 |

| | | | |
|--|-----|--|-----|
| Chapter 27 Canine hypothyroidism | 129 | Chapter 33 Hypoadrenocorticism | 171 |
| <i>Andrea Corsini, Tera Pijnacker</i> | | <i>Nadja S. Sieber-Ruckstuhl, Felicitas S. Boretti</i> | |
| ■ Etiology | 129 | ■ Etiology | 171 |
| ■ Clinical features | 131 | ■ Clinical features | 172 |
| ■ Endocrine testing | 134 | ■ Clinicopathological findings | 172 |
| ■ Diagnostic imaging | 138 | ■ Endocrine testing | 174 |
| ■ Prognosis | 139 | ■ Diagnostic imaging | 176 |
| ■ Prognosis | 139 | ■ Prognosis | 181 |
| Chapter 28 Thyroid tumors and hyperthyroidism | 143 | Chapter 34 Cushing's syndrome | 183 |
| <i>Sylvie Daminet, Miguel Campos</i> | | Pathogenesis and clinical manifestations | 183 |
| ■ Etiology | 143 | <i>Carolina Arenas, Carlos Melián</i> | |
| ■ Clinical features | 144 | ■ Pathogenesis | 183 |
| ■ Diagnostic imaging | 144 | ■ Epidemiology | 184 |
| ■ Diagnosis | 146 | ■ Clinical features | 184 |
| ■ Prognosis | 148 | ■ Clinicopathological findings | 186 |
| Chapter 29 Anatomy and physiology of parathyroid glands and calcium metabolism | 151 | Endocrine testing | 188 |
| <i>Rodolfo Oliveira Leal</i> | | <i>Sara Galac</i> | |
| ■ Anatomy of the canine parathyroid glands | 151 | ■ Low-dose dexamethasone suppression test | 188 |
| ■ Parathyroid physiology and its role in calcium homeostasis | 151 | ■ Urinary cortisol-to-creatinine ratio | 188 |
| Chapter 30 Primary hyperparathyroidism | 155 | ■ ACTH stimulation test | 189 |
| <i>Rodolfo Oliveira Leal</i> | | ■ Endogenous ACTH | 191 |
| ■ Etiology | 155 | ■ High-dose dexamethasone suppression test | 191 |
| ■ Clinical features | 155 | Diagnostic imaging | 192 |
| ■ Clinicopathological findings | 156 | <i>Henk van den Broek and Stefanie Veraa</i> | |
| ■ Endocrine tests | 156 | ■ Abdominal ultrasonography | 192 |
| ■ Diagnostic imaging | 157 | ■ Computed tomography | 193 |
| ■ Diagnosis | 158 | ■ Magnetic resonance imaging | 194 |
| ■ Post-treatment management | 160 | General treatment considerations | 196 |
| ■ Histopathology | 160 | <i>Sara Galac</i> | |
| ■ Prognosis | 160 | Medical treatment | 197 |
| ■ Parathyroids and concurrent endocrine diseases | 160 | <i>Stefania Golinelli</i> | |
| Chapter 31 Hypoparathyroidism: naturally occurring and iatrogenic | 163 | ■ Adrenal-directed drugs (traditional options) | 197 |
| <i>Barbara J Skelly</i> | | ■ Adrenal-directed drugs (future options) | 203 |
| ■ Pathogenesis of PTH deficiency | 163 | ■ Pituitary-directed drugs | 203 |
| ■ Signalment of animals with hypoparathyroidism | 163 | Surgical treatment: trans-sphenoidal hypophysectomy | 207 |
| ■ History and clinical manifestation of hypoparathyroidism | 164 | <i>Björn Meij and Sara Del Magno</i> | |
| ■ Diagnostic procedures and endocrine testing | 165 | ■ Preoperative evaluation | 207 |
| ■ Does hungry bone syndrome exist in dogs? | 167 | ■ Surgical anatomy and diagnostic imaging | 207 |
| ■ Acute management of symptomatic hypocalcemia | 167 | ■ Preoperative management and surgical technique | 208 |
| ■ Concurrent conditions complicating the management of primary idiopathic hypoparathyroidism | 167 | ■ Postoperative care | 209 |
| ■ Long-term treatment and prognosis | 168 | ■ Prognosis | 209 |
| Chapter 32 Anatomy and physiology of the adrenal glands | 169 | Surgical treatment: adrenalectomy | 213 |
| <i>Darja Pavlin</i> | | <i>Sebastiaan A. van Nimwegen</i> | |
| ■ Anatomy | 169 | ■ Surgical anatomy and disease staging | 213 |
| ■ Physiology | 169 | ■ Complications and perioperative measures | 214 |
| | | ■ Surgical approach | 214 |
| | | ■ Outcome and prognosis | 216 |
| Radiation therapy | 217 | <i>Maurice Zandvliet and Jérôme Benoit</i> | |
| ■ Types of radiation therapy | 217 | | |



| | |
|---|------------|
| ■ Treatment considerations | 217 |
| ■ Radiation-associated toxicity | 219 |
| ■ Outcomes of pituitary radiotherapy | 219 |
| ■ Conclusion | 219 |
| Chapter 35 Adrenal tumors (all but cortisol-secreting and pheochromocytoma)..... | 229 |
| <i>Viviani De Marco</i> | |
| ■ Hyperaldosteronism..... | 229 |
| ■ Steroid precursors and sex hormone-secreting adrenal tumors | 229 |
| ■ Adrenal incidentaloma: hormonally silent adrenal tumors | 230 |
| Chapter 36 Pheochromocytoma..... | 233 |
| <i>Marit F. van den Berg</i> | |
| ■ Etiology | 233 |
| ■ Clinical features | 233 |
| ■ Clinicopathological findings | 234 |
| ■ Diagnostic imaging | 234 |
| ■ Diagnosis | 235 |
| ■ Prognosis | 238 |
| Chapter 37 Anatomy and physiology of the canine endocrine pancreas | 241 |
| <i>Thomas A. Lutz</i> | |
| ■ Anatomy of the canine pancreas..... | 241 |
| ■ Endocrine cell types | 241 |
| ■ Function of islet hormones | 241 |
| ■ Secretory control of islet hormones | 242 |
| Chapter 38 Diabetes mellitus | 245 |
| Pathogenesis, clinical manifestations, and diagnosis | 245 |
| <i>Lucy Davidson</i> | |
| ■ Pathogenesis..... | 245 |
| ■ Clinical manifestations..... | 246 |
| ■ Diagnosis | 247 |
| General treatment considerations | 250 |
| <i>Federico Fracassi</i> | |
| ■ The importance of the owner and therapeutic goals | 250 |
| ■ Initiating insulin therapy | 250 |
| ■ Owner education | 250 |
| ■ Dietary recommendations | 250 |
| ■ Exercise | 251 |
| Insulin therapy and other treatment options | 252 |
| <i>Chen Gilor, Linda Fleeman</i> | |
| ■ Goals of therapy for the individual patient | 252 |
| ■ Choosing the best insulin | 253 |
| ■ The ultimate goal of insulin therapy: mimic physiologic insulin delivery | 253 |
| ■ Insulin pharmacology in dogs | 256 |
| ■ Guidelines for starting insulin therapy and adjusting the dose | 258 |
| ■ Compliance, adherence, convenience, and cost | 259 |
| ■ Syringe versus pen administration | 259 |
| ■ Managing inappetence and gastrointestinal signs..... | 260 |
| Dietary management of diabetes | 261 |
| <i>Linda Fleeman, Charlotte Bjørnsvad</i> | |
| ■ Recommendations regarding diet choice | 261 |
| ■ Management of postprandial hyperglycemia in diabetic dogs | 261 |
| Monitoring a diabetic patient | 266 |
| <i>Francesca Del Baldo</i> | |
| ■ Clinical signs | 266 |
| ■ Blood glucose monitoring | 266 |
| ■ Continuous glucose monitoring systems | 270 |
| ■ Urine glucose measurement..... | 271 |
| ■ Glycated proteins | 272 |
| The unstable diabetic | 275 |
| <i>Diego Miceli</i> | |
| ■ Management factors | 275 |
| ■ Causes of insulin resistance | 277 |
| ■ Investigation of diabetic instability | 279 |
| Long-term complications and prognosis | 281 |
| <i>Álán G. Pöppel</i> | |
| ■ Ophthalmic long-term complications | 281 |
| ■ Neurological long-term complications | 282 |
| ■ Systemic hypertension and diabetic cardiomyopathy | 282 |
| ■ Diabetic nephropathy | 282 |
| ■ Gastrointestinal complications | 283 |
| ■ Lipodystrophy | 283 |
| ■ Prognosis | 283 |
| Diabetic ketosis, diabetic ketoacidosis and the hyperosmolar hyperglycemic state | 284 |
| <i>Eleonora Malerba</i> | |
| ■ Etiology | 284 |
| ■ Clinical features | 286 |
| ■ Diagnosis | 286 |
| ■ Therapy | 286 |
| ■ Therapy and prognosis for hyperosmolar hyperglycemic state | 289 |
| Chapter 39 Insulinoma | 297 |
| <i>Johan P. Schoeman</i> | |
| ■ Pathogenesis and clinical manifestations | 297 |
| ■ Signalment | 297 |
| ■ Clinical signs | 298 |
| ■ Diagnostic procedures | 298 |
| ■ Clinicopathological findings | 298 |
| ■ Endocrine testing | 299 |
| ■ Diagnostic imaging | 299 |
| ■ Treatment | 300 |
| ■ Prognosis | 302 |
| Index | 305 |