This monograph is based on the authors' extensive experience in the areas of clinical endocrinology and diagnostic imaging, their clinical and research work and insight gained from teaching medical students and doctors in the Czech Republic and abroad. The chapters contain embryological and anatomical notes, clinical characteristics of individual endocrinopathies, laboratory and function tests, including reference values, indications and algorithms of imaging methods and principles of rational modern therapy of individual pathologies, including further clinical monitoring of patients. Texts also give practical advice regarding how to approach patients with endocrine gland diseases, point out some potential misinterpretations of examination results and are supplemented with numerous images of pathological states, which are almost exclusively sourced from the authors' private archives. The chapter on diabetes mellitus centres on the complications of diagnosing diabetes and on the mutual relation between diabetes and other endocrinopathies. Focusing primarily on clinical practice, the work does not elaborate on pathophysiology, but covers only the most recent pertinent literature from the discipline. What makes this comprehensible publication exceptional is the fact that it not only presents the clinical view of the endocrinologist on the various covered subjects, but the reader is also given the opportunity to learn about current diagnostic trends using imaging methods. This interdisciplinary view offers the reader an insight into the field and the necessary knowledge for their clinical practice. This monograph is intended for medical students, junior endocrinologists, diabetologists, radiologists and general practitioners interested in endocrinology, however, it can be useful also for doctors preparing for medical postgraduate certification in endocrinology and imaging methods as it provides valuable information.
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Preface

Over the past few years, endocrinology has belonged among the most dynamically developing clinical disciplines. At the same time, we are witnessing the rapid development of new diagnostic and therapeutic procedures which are increasingly dependent on the results of imaging methods. Currently there are many monographs and textbooks available which generally examine the clinical subjects only from the viewpoint of an expert in the given field. This monograph is unique in that it excludes this one-sidedness; by combining the experience of a diagnostic radiologist with a clinical endocrinologist, this publication achieves an entirely different dimension.

This monograph is the work of leading Czech specialists in the areas of radiology and endocrinology who have extensive clinical experience with the described endocrinopathies. What makes this comprehensible publication exceptional is the fact that it not only presents the clinical view of the endocrinologist on the various covered subjects, but the reader is also given the opportunity to learn about current diagnostic trends using imaging methods. This interdisciplinary view offers the reader a comprehensive insight into the field and the necessary knowledge for their clinical practice.

I am convinced that this book provides valuable information not only for medical students, endocrinologists and radiologists, but also physicians in other medical specialties. It will certainly become a useful aid in the everyday care of patients with endocrine gland diseases.

In Prague, July 20, 2012

Prof. MUDr. Petr Vlček, CSc.
Ukázka knihy z internetové knihkupectví www.kosmas.cz, UID: KOS196184
Introduction

This manuscript, Clinical Endocrinology and Diagnostic Imaging, is based on our extended experience and pedagogical activity in the field of clinical endocrinology and imaging methods, as well as on our clinical research, literature, and published news. We have focused mainly on the information that could be relevant for the management of endocrine patient in day-to-day practice at endocrine and imaging clinics and departments. Diagnostic imaging and intervention methods as well as endocrinology have become multidisciplinary medical specialties with accelerated progress in recent years. About thirty years ago, we took part in introducing some new imaging methods (duplex Doppler ultrasonography, computed tomography, magnetic resonance imaging) in clinical practice in the Czech Republic as well as abroad, and the developments made by new technologies since then are substantial. To our knowledge, this is the first published monograph on the subject of imaging in endocrinology.

The diagnostic and differential diagnostic data of various endocrinopathies, both clinical and imaging methods are summarized in tables to facilitate their evaluation. We present laboratory results and reference values and their ranges in conventional units (weight per volume) used in the USA and also in SI units (mole per liter) widely used in Europe and other parts of the world. Radiation and radioactivity are presented in traditional and SI units as well (rad/gray, rem/sievert; curie/becquerel) and their conversion factors are summarized in chapter Thyroid gland imaging. The ranges of normal reference of hormone and drug values may slightly differ in some working places and laboratories. There may also be individual variations including day-to-day variations and variations over the course of hours of hormone secretion and in relation to the physiology of the subject, including obesity, pregnancy, and exercise.

The chapter on therapy presents proven generic drugs and principles of management strategy for particular endocrine disorders. Therapy requires accurate diagnosis and detailed knowledge of the patient because no drug generates the same therapeutic effects on each person. Readers are encouraged to confirm the information about new drugs contained herein with other sources.

This monograph is intended not only for pre-graduate and post-graduate students but also for all young colleagues interested in clinical endocrinology and diagnostic imaging. We are aware that this manuscript does not and cannot cover all the details of the art of endocrinology, but even so have tried to present a wide variety of endocrine diseases with an emphasis on clinical use.

*Ars longa, vita brevis.*
Acknowledgement

We would like to acknowledge the input of Dr. Radek Pádr, Senior Consultant, Department of Radiology, Charles University in Prague, for most of the presented interventions, Prof. Dr. Petr Vlček, CSc., Head of the Department of Endocrinology and Nuclear Medicine, Charles University in Prague, and Prof. Dr. Karel Benda, DrSc., Professor of Radiology, Masaryk University Brno, for their review of the manuscript and constructive comments.

Prague, December 2011

J. Brunová, J. Bruna
1.1 Embryology remarks

Pituitary gland (hypophysis) is formed from two sources during first eight weeks of fetal life. The epithelial distal part of the pituitary gland (adenohypophysis), which includes the pars anterior, pars intermedia, and pars tuberalis, originates from the primitive stomatodeal ectoderm called Rathke’s pouch. The anterior wall of the proximal portion of Rathke’s pouch grows faster and forms distal part of the pituitary (adenohypophysis). The proximal portion of Rathke’s pouch closes early but a remnant often persists into postnatal life as a cleft or residual basipharyngeal canal that lies between the distal part and neural part. Occasionally Rathke’s pouch gives rise to a cyst, and later in postnatal life to a tumor (Fig. 1.1).

Fig. 1.1 Diagram of pituitary development – midsagittal section of the hypothalamus. 1 – anterior pituitary (adenohypophysis), 2 – pars intermedia of pituitary, 3 – infundibulum (pituitary stalk), 4 – foundation of eminentia medialis, 5 – chiasma opticum, 6 – anterior part of infundibulum, 7 – foundation of the sphenoid bone, 8 – upper pharynx, 9 – residual cranio-pharyngeal (base-pharyngeal) canal, a possible locations of accessory adenohypophysis, 10 – colloid deposits, 11 – posterior pituitary (neurohypophysis)