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Pediatric Urogenital Radiology

Third Edition

 Springer

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Preface to the Third Revised Edition

It is an honor for me having been entrusted with editing this new third edition of the standard textbook *Pediatric Uroradiology*; however, it took quite some time and effort get everything done.

Looking back over time to the first edition of this textbook more than a decade ago, one realizes that not that much has changed for many queries in spite of ongoing discussions on varying concepts, experts' opinions and recommendations, new insights into pathophysiology, and new imaging options as well as new applications of existing modalities or refinement of existing techniques. And still, there is restricted high-level evidence for deciding on how to best image our pediatric patients for many pediatric urogenital conditions.

Nevertheless, some basic trends can be observed and are also reflected in this new edition. There is a general tendency towards reducing invasiveness and radiation burden to our pediatric patients, and it is widely recommended to more strictly adhere to a "therapeutic thinking efficacy," i.e., imaging must have an impact on patient treatment and management. Thus, the numbers of voiding cystourethrograms have in most centers significantly decreased, antibiotic treatment for uncomplicated vesicoureteric reflux is less often prescribed, or intravenous urography has been mostly outdated and replaced by modern ultrasound or MRI for the common pediatric queries.

Additionally, the growing economic pressure (in the USA with the aim of making money from health care, in Europe for saving money by restricting medical services) has led to a new thinking and concept in pediatric medicine and also pediatric radiology, i.e., only treatment and related diagnostic measures that impact further outcome, prognosis, and development are administered. Thus, imaging modalities that probably do not necessarily effect patient morbidity and mortality are questioned, particularly if they imply invasiveness or burden such as radiation, sedation, or contrast agent application.

Finally, considering the new development towards "personalized medicine" and the growing demand for interdisciplinary diagnostic and therapeutic approaches, additional in-depth knowledge on clinical basics, diagnostic needs, embryology, and pathogenesis, as well as therapeutic options and consequences, is becoming indispensable for the radiologist to enable an understanding of what imaging must provide in terms of diagnosis and management decision information. In the recent years, fetal imaging has become an established part of pediatric uroradiology, too: not only that it detects conditions

that have to be addressed after birth by pediatric radiology but increasingly pediatric radiologists are performing fetal body MR imaging themselves.

Taking all these aspects into consideration, this new edition has been restructured into four main sections: the methods, the anatomy and embryology, the clinical information, and the imaging section. As such, it contains some new chapters – e.g., a completely new chapter on fetal imaging has been introduced, and dedicated clinical chapters are provided that shall offer a comprehensive insight into the various conditions and diseases. Furthermore, all old chapters have been revised or updated and some were completely rewritten. New illustrations have been added and recent new knowledge, insights, and changes in imaging approaches (e.g., contrast-enhanced ultrasonography; modern MRI applications and techniques) have been integrated. Hence, this third edition aims to address all these aspects, but without disregarding the valuable and necessary established “old” imaging procedures that may still be indicated for well-defined diseases and conditions.

As with this diversity of approaches and persisting restricted evidence in many of the pediatric urology conditions, a somewhat varying and partially overlapping presentation of the individual contributors to this third edition is intended – in order to allow for an informed reflection of the continuous re-orientation process in pediatric urogenital imaging. To achieve this objective, a broad context and knowledge of all possible options and conditions that are mandatory for understanding are provided clearly to satisfy the needs of practicing pediatric radiologists, pediatricians, pediatric surgeons, urologists, and nephrologists. Furthermore, up-to-date information and reference are provided for researchers.

Only with the help of the distinguished and renowned faculty of international experts in the field of diagnostic and interventional pediatric urology as well as neighboring fields (e.g., pediatric surgeons/urologists/nephrologists and pediatricians) who contributed to this revised new edition, this new edition hopefully has become a comprehensive volume containing all the latest advances thus fulfilling the demands of a textbook covering all aspects at the most modern and newest of the art.

Last but not least, I want to acknowledge the dedication and expertise of each contributor and I thank all authors sincerely for their hard efforts and their excellent contributions as well as their patience. I do hope that – as the first two editions – this new edition will again become a standard working and reference text for pediatric urogenital radiology that helps in improving our service to the pediatric patients, the future generation.

Preface to the Second Edition

Never before in the history of pediatric uroradiology have concepts, expert opinions and recommendations changed as significantly and as quickly as over the last 5–7 years. Even established scientific concepts which we thought would never be debated again, are now back on the discussion table. This even applies to the treatment and imaging management of very common but serious nephrourological disorders such as urinary tract infection and vesico-ureteric reflux, where the benefit of antibiotic prophylaxis and therefore the role of imaging are called in to question. These changes are not only triggered by the latest scientific findings, some of which contradict formerly established scientific concepts, but by the growing awareness of evidence-based medicine and, last but not least, also by new imaging techniques and technologies.

However, many old concepts still remain and many facts established in the last millennium are still true and pertinent today. This leads to some confusion even among experts, who are still searching for consensus-based imaging management recommendations.

Therefore, the invitation to compile a second revised and extended edition of the book *Pediatric Uroradiology* came at the right moment. In many aspects, the first edition could be used as a reliable basis for the development of the second edition. Thus this new book embraces both the new, taking recent advances in knowledge and technology into account, and the old. It is a complete rewrite where necessary, containing new contents with regard to latest developments such as genetics, and it provides the newest recommendations and discussions on clinical and imaging management of common nephrourologic disorders.

Thanks to the contributions of the distinguished and renowned international experts in the field of diagnostic and interventional pediatric uroradiology and of neighbouring fields such as genetics and pediatric nephrourology, a comprehensive volume containing all the latest advances could again be prepared, fulfilling the demands of a textbook covering all aspects of pediatric uroradiology in its broadest context. This book should satisfy the needs of the practising (pediatric) radiologist, pediatrician, pediatric surgeon and urologist; it should also offer up-to-date information and references to the researcher.

In view of the ongoing, rapid and significant changes, it was the intention of the editor to include a number of somewhat varying and overlapping views of the individual contributors for this second edition. Precisely this approach

guarantees the requisite comprehensiveness and allows a degree of diversity reflecting the continuous reorientation process in pediatric uro radiology.

Again, it was a great honour and pleasure to work as an editor for this book project. I would like to acknowledge the dedication and expertise of each contributor, and I thank all of them sincerely.

Mrs. Irene Stradner, my secretary, was an indispensable member of our team; she did a marvelous job for this book project and I would like to express my warmest gratitude to her.

I hope that this second revised edition will again become a standard working and reference text for pediatric uro radiology.

Graz, Austria

Richard Fötter

Preface to the First Edition

A substantial change in the diagnostic and therapeutic management of urogenital disorders in children has taken place in recent years. There are two main reasons for this phenomenon: first, the growing integration of (new) imaging modalities such as magnetic resonance imaging and helical computed tomography and of advanced ultrasound techniques into pediatric uro-radiologic imaging protocols; second, dramatic advances in our knowledge on the natural history of important urogenital pathologies of childhood as a consequence of maternal–fetal screening ultrasound.

Changing indications and limitations and comprehensive multimodality interpretation should be in the field of the (pediatric) radiologist's expertise. To enhance the role of the radiologist, she/he should have a profound knowledge of urinary symptoms as well as the principles of medical and surgical treatment in children and should also be able to interpret laboratory data.

This growing challenge for the (pediatric) radiologist seems to justify the idea of a book specifically devoted to pediatric uro-radiology. Therefore, we were delighted to be invited by the series editor, Prof. Baert, to write such a book. Thanks to the contributions of the well-known international experts in the field of diagnostic and interventional pediatric genitourinary radiology who wrote the different chapters, a comprehensive volume could be prepared fulfilling the demands on a textbook covering all aspects of pediatric uro-radiology in its broadest context. The book is written to satisfy the needs of the practicing radiologist and pediatrician but also to offer up-to-date information and references to the researcher.

In view of the above-mentioned changes in the field, one central goal was to discuss the reorientation of diagnostic and interventional radiological approaches to problems of the pediatric genitourinary tract and to elucidate the contributions made by different diagnostic and interventional uro-radiologic techniques.

The focus of this book is primarily the point of view of the (pediatric) radiologist, but it offers all the necessary information for the pediatrician, pediatric surgeon and urologist as well putting decisions on imaging management on a reasonable basis. To meet the demands on a (pediatric) radiologist today, pertinent clinical observations, important pathophysiologic concepts, operative options, postoperative complications and clinical as well as radiological normal values have been included.

Dedicated chapters are devoted to specific problems of the newborn and infant, such as imaging and interpretation of upper urinary tract dilatation,

postnatal imaging of fetal uropathies, associated urinary problems with imperforate anus, epispadias–exstrophy complex and lower urinary tract anomalies of urogenital sinus and female genital anomalies.

Detailed discussions focus on the management of common problems in pediatric urology such as urinary tract infection, vesicoureteric reflux and functional disorders of the lower urinary tract including enuresis and incontinence.

In dedicated contributions, embryology and the changing anatomy and physiology and pathophysiology of the growing organism are discussed to facilitate understanding of the disease processes and anticipated complications and form the rationale for interventions.

Specific chapters deal with agenesis, dysplasia, parenchymal diseases, neoplastic diseases, stone disease, vascular hypertension, renal failure and renal transplantation and genitourinary trauma in children. Specific problems of childhood neurogenic bladder are discussed.

Interventional urologic procedures in children are discussed in full detail not only to show their value in treatment and diagnosis of a given problem, but also to serve as a source guiding the performance of these interventions.

It was the intention of the editor to respect the views of the individual contributors as far as possible. This is reflected in a diverse writing style and some degree of overlap and repetition. In the opinion of the editor, just this approach guarantees the necessary comprehensiveness.

After an always enjoyable time as editor I would like to acknowledge the dedication and expertise of each contributor; I thank all of them sincerely. Mrs. Renate Pammer, my secretary, was an important member of our team and I would like to express my warmest gratitude to her for the excellent job she did for this book project.

We all hope that this book will be accepted as the standard working and reference text for pediatric urology. Moreover, we hope that it will prove useful to physicians in training and specialists alike as a reference source during preparation for examinations and conferences. The bibliography should readily satisfy the needs of all kinds of readers.

Graz, Austria

Richard Fötter

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