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# Atlas of Ultrasonography in Urology, Andrology, and Nephrology

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Pasquale Martino • Andrea B. Galosi  
Editors

# Atlas of Ultrasonography in Urology, Andrology, and Nephrology

Second Edition

 Springer

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*To my wife Teresa  
and to my son Lucio  
P.M.*

*To my wife Barbara  
and to my sons Matilde  
and Alessandro Ernesto  
A.B.G.*

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## Foreword

The use of ultrasonography in urology goes back more than seven decades when imaging of the kidney and bladder was attempted in the early 1950s of the last century. Initially used by radiologists, it has become clear that interpretation of the results needed clinical input by the treating physician. Progress over the years made the computation of anatomical sections and even 3D depiction possible and allowed a better interpretation of curves and pictures. The ultrasound machines became smaller (and more affordable) and more efficient. Better and more variable probes have been developed and allowed its use not only for diagnostic purposes but also for targeted biopsies and real-time intraoperative support in urological ablation or resection. Its use and thus the need for education shifted more and more to urology and ultrasonography has become an indispensable tool for urologists in their daily practice.

Genitourinary ultrasonography has revolutionized diagnosis and therapeutic pathways in many areas such as urinary stones, tumor detection, obstruction in the urinary tract, vascularization, malformations, just to mention a few examples.

The authors are to be commented for putting together in this book all aspects of ultrasonography from emergency, daily routine use, interventional applications, combining it in a real-time fashion with other imaging modalities as well as recent and future developments. Its use for patients at all ages, and all conditions is outlined. In addition, several chapters deal with recent developments of the interventional application of ultrasound as a real-time, non-radiation-based imaging tool.

With roughly a thousand pictures, complemented with apprehensible graphs and tables and supplemented by several videoclips, this book is an excellent textbook and at the same time work of reference fulfilling its aim to be an essential educational tool for all urologists and others engaging in the imaging of the urinary tract.

This Atlas should therefore be on the shelf of all those needing a reference in their work with ultrasound of the genitourinary tract.

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Arnulf Stenzl

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## Preface

A few years passed (2016) since the first edition of the *Atlas of Urological, Andrological, and Nephrological Ultrasound*. The content of a scientific work infrequently stands current for more than a few years.

In the following years after its first draft, there was a continuous development of ultrasound equipment with a progressive improvement in image quality, as well as the coming of new ultrasound investigation methods, which have completely revolutionized the use of this investigation not only in the diagnostic field, but also as an intraoperative aid and as a guide to minimally invasive surgical techniques.

All this pushed us to create this second edition of the atlas which is made up of 70 chapters, which involves qualified experts in the field of uro-nephro-andrological ultrasound. Alongside completely updated chapters, with new images and video clips, and others totally rewritten, based on recent developments and current guidelines, new chapters have been added on contrast-enhanced ultrasound, fusion biopsy, focal ablation in prostate cancer, microultrasound, multiparametric ultrasound, computerized analysis of ultrasound through artificial neural networks, emergency ultrasound in urology, andrology, and nephrology, and more.

The text includes the role of ultrasound in imaging pathologies of the kidneys, urinary tract, prostate, seminal vesicles, testicles, and penis, including male infertility disorders, and the morphological and functional study of the bladder, ureter, and urethra, including female echodynamic investigation.

Ample and detailed space is provided on the use of ultrasound in the intraoperative and interventional fields and on recently developed ultrasound techniques.

Each chapter defines the purpose and indications of ultrasound, identifies its advantages and limitations, specifies the technological standards for the devices, outlines the performance of the investigation evaluating accuracy while waiting for the differential diagnosis, and indicates the reporting method, making it easy and quick to consult.

The extensive iconography and videos represent the undeniable strong point of the atlas; furthermore, the presence of numerous figures, tables, and diagrams, which enrich many chapters, make it easier to read.

A substantial chapter concerns the practical recommendations for the correct execution of ultrasound investigations.

Most of the recommendations are based on the updated literature review, on previous recommendations, and on the opinions of recognized experts

from the European Section of Urological Imaging (ESUI), the European Association of Urology (EAU), the Italian Society of Integrated Diagnostics in Urology, Andrology, Nephrology (SIEUN), of the Italian Society of Urology (SIU) and of Nephrology (SIN).

We would like to thank the authors who participated in the creation of this atlas, which include not only urologists, andrologists, and nephrologists but also qualified radiologists, general surgeons, engineers, all experts in diagnostic imaging techniques.

We are very grateful to Professor Arnulf Stenzl, Secretary General, European Association of Urology, Director of the Department of Urology, University of Tuebingen Medical School (Germany), for having kindly agreed to present this work.

We also gratefully acknowledge the support of Mr. Karthik Periyasamy, Project Coordinator (Books) at Springer Nature; Dr. Alessandra Born, Senior Editor, clinical medicine books at Springer Nature, in preparing this volume and Dr. Stefania Piccialli, for language assistance.

We hope that the commitment made in the creation of this work can be of support both to those taking their first steps in the field of ultrasound and to experts and sonographers who wish to clarify some aspects in the field of diagnostic and interventional ultrasound urinary system and male genitalia.

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Andrea Benedetto Galosi

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