Optimizing the Management of Fertility in Women over 40
Optimizing the Management of Fertility in Women over 40

Edited by
Dimitrios S. Nikolaou
Chelsea & Westminster Hospital
David B. Seifer
Yale School of Medicine
Dedication for Dimitrios S. Nikolaou:
To Egbert te Vede, Masoud Afnan and Nikos Kazantzakis
To my parents, Sotirios and Kyriaki, with infinite gratitude for their sacrifices.
To my wife Dina, my companion and our 2 sons.
To my brother Vassilis.

Dedication for David B. Seifer
“May the love of my art inspire me at all times…” Maimonides

To the memory of my parents and to honor the members of my family who have provided inspiration along my journey: my mother, for her passion, intellectual curiosity and the pursuit of knowledge; my father, for his mindset to challenge the norm while being respectful of others; my brother for his quest of a physical challenge and his embrace of the joy of life; my wife for her commitment to excellence and her moral compass; and our two wonderful sons for inspiring us to be the best versions of ourselves and who are our legacy for the future.
Contents

List of Contributors  ix

Introduction  1
Dimitrios S. Nikolaou and David B. Seifer

Section 1 Demographic Trends
1 Is 40 the New 30? Increasing Reproductive Intentions and Fertility Rates beyond Age 40  3
Éva Beaujouan and Tomáš Sobotka

Section 2 Biological Basis of Female Reproductive Aging: What Happens to the Ovaries and the Uterus as they Age?
2 Biological Basis of Female Reproductive Aging: What Happens to the Ovaries and Uterus as They Age?  19
Jacquelyn Shaw, Jennifer K. Blakemore, and David L. Keefe

Section 3 Lifestyle, Environment, and Optimizing Reproduction in the 40s
3 What Lifestyle Adjustments Can Maximize the Chance of a Natural Conception and Healthy Pregnancy in Women over 40?  27
Alexandra Kermack

Section 4 Rethinking and Redefining “Family Planning” for the Twenty-First Century
4 Diagnostic Testing of Reproductive Aging  39
Tanya L. Glenn and David B. Seifer

Section 5 Optimal Deployment of ART beyond 40
5 Fertility Preservation for “Social” Reasons  56
Timothy Bracewell-Milnes and Dimitrios S. Nikolaou

Section 6 Obstetric Management beyond 40
10 Optimal Management of the First Trimester in Women over 40  119
Beth Cartwright and Aditi Naik

Section 7 Children of Older Parents
12 What Do We Know about the Children of Women over 40 and What Can Older
Contents

Mothers Do to Optimize Their Children's Development? 141
Winifred Mak and Vickie Schafer

Section 8 What Are Realistic Alternatives to Conceiving with Autologous Eggs?

13 Practical Egg Donation in Women over 40 153
James P. Toner and Lauren Rouleau

Section 9 New Technologies

14 Is It Likely That Reproductive Aging Could Be Delayed or Reversed Using Advanced Technologies in the Future? 163

Section 10 Ethics

15 Ethical Issues in the Use of Assisted Reproductive Technology in Women over Age 40 173
Nicole Yoder and Gwendolyn P. Quinn

Epilogue 180
David B. Seifer and Dimitrios S. Nikolaou

Index 181
Contributors

Paula Amato, MD
Division of Reproductive Endocrinology and Infertility, Department of Obstetrics and Gynecology Oregon Health & Science University, Portland, Oregon, USA

David H. Barad, MD, MS
The Center for Human Reproduction, New York, NY, USA The Foundation for Reproductive Medicine, New York, NY, USA

Éva Beaujouan
Wittgenstein Centre for Demography and Global Human Capital (IIASA, OeAW), University of Vienna, Vienna, Austria

Jennifer K. Blakemore, MD, MSc
Langone Fertility Center, New York University, New York, NY, USA

Pietro Bortoletto, MD
The Ronald O. Perelman and Claudia Cohen Center for Reproductive Medicine, Weill Cornell Medical College, New York, NY, USA

Timothy Bracewell-Milnes
Assisted Conception Unit, Chelsea and Westminster NHS Trust, London, UK

Beth Cartwright
Early Pregnancy Unit, Chelsea and Westminster Hospital, London, UK

Pritha Dasmahapatra, MBBS (Calcutta University), MRCOG
Chelsea & Westminster Hospital, London, UK

Shane Duffy, MB BS (Hons), DTM&H, DObst, DMed, MSc, FRCOG
Chelsea & Westminster Hospital, London, UK

Norbert Gleicher, MD
The Center for Human Reproduction, New York, NY, USA The Foundation for Reproductive Medicine, New York, NY, USA Stem Cell Biology and Molecular Embryology Laboratory, The Rockefeller University, New York, NY, USA Department of Obstetrics and Gynecology, Medical University of Vienna, Austria

Tanya L. Glenn, MD
Division of Reproductive Endocrinology and Infertility, Department of Obstetrics, Gynecology, and Reproductive Sciences, Yale School of Medicine, New Haven, CT, USA

David L. Keefe, MD
Langone Fertility Center, New York University, New York, NY, USA

Alexandra Kermack
NIHR Clinical Lecturer/Registrar Obstetrics & Gynaecology School of Human Development and Health University of Southampton, UK

Winifred Mak, MD, PhD
Dell Medical School, University of Texas at Austin, TX, USA

Amir Mor, MD PhD
Division of Reproductive Endocrinology and Infertility, Department of Obstetrics, Gynecology, and Reproductive Sciences, Yale University School of Medicine, New Haven, CT, USA
List of Contributors

Aditi Naik
Early Pregnancy Unit, Chelsea and Westminster Hospital, London, UK

Dimitrios S. Nikolaou, MD
Chelsea & Westminster Hospital, London, UK

Gwendolyn P. Quinn
Department of OB-GYN, Grossman School of Medicine, New York University, New York, NY, USA

Lauren Rouleau, MD, PhD
Department GynOb, Emory University, Atlanta, GA, USA

Vickie Schafer, PhD
Independent licensed psychologist

David B. Seifer, MD
Division of Reproductive Endocrinology and Infertility, Department of Obstetrics, Gynecology, and Reproductive Sciences, Yale School of Medicine, New Haven, CT, USA

Jacquelyn Shaw, MD
Langone Fertility Center, New York University, New York, NY, USA

Tomáš Sobotka
Wittgenstein Centre for Demography and Global Human Capital (IIASA, OeAW), University of Vienna, Vienna, Austria

Steven Spandorfer, MD
The Ronald O. Perelman and Claudia Cohen Center for Reproductive Medicine, Weill Cornell Medical College, New York, NY, USA

James P. Toner, MD, PhD
Emory Reproductive Center, Department GynOb, Emory University, Atlanta, GA, USA

Nicole Yoder, MD
Langone Fertility Center, New York University, New York, NY, USA