Contents

Foreword ......................................................... v
Teresa K. Woodruff and Karrie Ann Snyder

Foreword ......................................................... vii
Lindsay Beck and Joyce Reinecke

Contributors ................................................... xvii

Part I  Introduction

1. The Emergence of a New Interdiscipline: Oncofertility ............ 3
   Teresa K. Woodruff
   Oncofertility: The New Offensive in the War on Cancer .......... 3
   Secondary Effects of Treatment on the Health and Quality
   of Life of Young Survivors of Cancer .............................. 4
   Fertility Threats Due to Cancer Treatment ........................ 5
   An Emerging Urgent Unmet Need for Young Cancer Patients:
   Balancing Life-Preserving but Fertility-Threatening
   Cancer Treatments ............................................... 6
   Information GAP ............................................... 9
   Data GAP ..................................................... 10
   Option GAP ................................................... 10
   Conclusion .................................................... 11

Part II  Fertility Risk and Treatment Options

2. Fertility Management for Women With Cancer .................. 15
   Sanjay K. Agarwal and R. Jeffrey Chang
   Ovarian Physiology .......................................... 15
   Impact of Cancer Therapies on Ovarian Function ............... 18
   Current Techniques of Fertility Preservation .................. 20
   Embryo Freezing ............................................. 20
   Ovarian Tissue Freezing ................................... 22
3. Fertility Preservation in Adult Male Cancer Patients. 28
   Robert E. Brannigan
   The Impact of Cancer on Male Reproductive Health. 28
   Endocrine Effects of Tumors. 29
   Cytotoxic Autoimmune Response. 30
   Systemic Physiological Changes. 31
   Psychological Changes Associated with Cancer. 31
   The Impact of Cancer Treatment on Male Reproductive Health. 32
   Effects of Radiation Therapy. 32
   Effects of Chemotherapy. 36
   Effects of Surgery. 38
   Effects of Opiods. 39
   Fertility Preservation in Male Cancer Patients. 39
   American Society of Clinical Oncology Guidelines. 40
   Sperm Cryopreservation. 41
   Overview of Sperm Collection Techniques. 42
   Testicular Tissue Cryopreservation (ONCO-TESE). 42
   Future Directions in Fertility Preservation in Male Cancer Patients. 45
   Conclusion. 45
   References. 46

4. Managing Fertility in Childhood Cancer Patients. 50
   Kimberley J. Dilley
   Follow-up Guidelines Related to Male Fertility. 51
   Risk Factors. 51
   Surveillance and Screening. 51
   Additional Management Issues. 52
   Follow-up Guidelines Related to Female Fertility. 52
   Risk Factors. 52
   Surveillance and Screening. 53
   Additional Management Issues. 54
   Optimal Care for Pediatric Cancer Patients. 54
   References. 55

5. Fertility Risk in Pediatric and Adolescent Cancers. 57
   Clarisa R. Gracia and Jill P. Ginsberg
   Scope of the Problem. 57
   The Importance of Fertility to Cancer Patients. 57
Common Cancers in Children and their Treatment ........................................ 58
Fertility Risks for Young Females ................................................................. 58
Gonadotoxicity of Cancer Treatments ............................................................ 58
Chemotherapy ................................ ................................................................. 59
Radiation ........................................................................................................... 59
Effects on the Hypothalamic-Pituitary-Ovarian Axis ........................................... 61
Pregnancy Outcomes in Cancer Survivors .......................................................... 63
Options for Preserving Fertility in Girls and Young Women ............................... 63
Fertility Risks for Young Men ........................................................................... 64
Chemotherapy ................................ ................................................................. 65
Radiotherapy .................................................................................................... 65
Options for Preserving Fertility in Boys and Young Men ........................................ 66
Ethical Issues in Pediatric Patients .................................................................... 67
Conclusion ......................................................................................................... 67
References ................................ ............................................................................ 68

Part III Oncofertility Techniques and Research

6. Bioengineering and the Ovarian Follicle ....................................................... 75
   Min Xu, Teresa K. Woodruff, and Lonnie D. Shea

   Follicle Growth In Vivo .................................................................................. 76
   Culture Systems for Follicle Growth ............................................................... 77
   Hydrogels for Three-Dimensional Culture In Vitro ........................................... 78
   Ovarian Transplantation Using Biomaterials ...................................................... 79
   Conclusion ....................................................................................................... 80
   References ................................ ......................................................................... 80

7. The Science of Cryobiology ............................................................................ 83
   Steven F. Mullen and John K. Critser

   Introduction ...................................................................................................... 83
   Anatomy of Cryopreservation ......................................................................... 83
   The Effects of Water Precipitation (as Ice) During Cooling ............................... 84
   Ice Nucleation, Crystallization, Vitrification, and Devitrification .................... 84
   Solute Concentration as a Result of Ice Crystallization, The
   Associated Osmotic Effects, and Cell Death at Supra-Optimal
   Cooling Rates .................................................................................................. 86
   Cell Death at Sub-Optimal Cooling Rates and the
   Role of Cryoprotectants in Mitigating Cell Damage ........................................ 90
   Cryoprotectants: Beneficial Effects .................................................................. 91
   Cryoprotectants: Detrimental Effects ............................................................... 94
   Cell Death at Sub-Optimal Cooling Rates ....................................................... 98
   Cooling and Cooling Injury/Cold Shock .......................................................... 99
   Vitrification as an Alternate to Equilibrium cryopreservation ........................... 102
   References ................................ ......................................................................... 103
8. **Ovarian Tissue Cryopreservation and Transplantation: Banking Reproductive Potential for the Future**

   *David Lee*

   - Indications for Ovarian Tissue Banking ........................................ 110
   - Scope of the Clinical Problem and Incidence of Ovarian Failure ............. 110
   - Gonadotoxicity of Chemotherapy .................................................. 111
   - Gonadotoxicity of Radiation Therapy .............................................. 112
   - Limitations of Fertility: Preserving Techniques .................................. 113
   - The Promise of Ovarian Tissue Banking ........................................... 115
   - Cryopreservation of Ovarian Tissue has been Successful ......................... 116
   - Autotransplantation of Ovarian Tissue has been Successful ...................... 117
   - Problems with Ovarian Transplantation: Re-Introduction of Cancer ............. 123
   - Xenografting as a Potential Solution ............................................. 124
   - Conclusion ....................................................................................... 126
   - References ....................................................................................... 126

9. **Progress, History and Promise of Ovarian Cryopreservation and Transplantation for Pediatric Cancer Patients**

   *Yasmin Gosiengfiao*

   - References ....................................................................................... 132

**Part IV Health Care Decision-Making**

10. **Oncofertility and the Social Sciences** ............................................. 137

    *Karrie Ann Snyder*

    - Studying Cancer Within the Social Sciences ...................................... 138
    - Gender and Oncofertility ................................................................. 139
    - Gender and Patient-Physician Interactions ......................................... 140
    - Gender and the Experience of Infertility ........................................... 141
    - Race/Ethnicity and Oncofertility ...................................................... 142
    - Race/Ethnicity and Patient–Physician Interactions ............................... 143
    - Race/Ethnicity and Family and Community Involvement ......................... 144
    - The Digital Divide and Race/Ethnicity .............................................. 145
    - Conclusion ....................................................................................... 146
    - References ....................................................................................... 147

11. **Shared Decision Making: Fertility and Pediatric Cancers** .................. 149

    *Marla L. Clayman, Kathleen M. Galvin, and Paul Arntson*

    - The Current State of Pediatric Oncofertility ...................................... 150
    - Family Communication in Context .................................................... 151
    - Shared Decision Making in Theory and in Practice .............................. 152
Part V  Ethical and Psychosocial Impact of Cancer-Related Infertility

12.  Today’s Research, Tomorrow’s Cures: The Ethical Implications of Oncofertility
Leilah E. Backhus and Laurie Zoloth

Expanding Options for Women – Follicle Preservation and Maturation
A Prairie Horizon: The Long View of Research on Fertility
The Role of Oncologists and Infertility Specialists
Ethical Issues in the Case of Childhood Cancers
The Special Case of Young Girls
Research in Children
Assessing the Intervention: A Community Consent Process in Action
The Ethical Implications for a New Terrain: Therapy or Enhancement?
Recalling a Complex History
Conclusion
References

13.  The Psychosocial Context of Cancer-Related Infertility
Matthew J. Loscalzo and Karen L. Clark

The Social Context
Psychosocial Screening for Infertility Concerns
Biopsychosocial Screening Instrument: How Can We Help You and Your Family?
Discussion and Implications

References

14.  Childhood Cancer: Fertility and Psychosocial Implications
Karen E. Kinahan, Aarati Didwania, and Carrie L. Nieman

Recent Research on Late Effects and Infertility
Addressing the Threat of Infertility
Childhood Cancer Survivors and Fertility Preservation
Male Infertility
Access to Care
Conclusion
References
15. Fertility Preservation and Adolescent Cancer Patients: Lessons from Adult Survivors of Childhood Cancer and Their Parents .................................................. 201

   Methods .......................................................... 203
   Study Design and Sample Recruitment ........................................... 203
   Data Collection and Analysis .................................................. 203
   Results .......................................................... 204
   Sample Characteristics .................................................... 204
   Content Analysis ..................................................... 204
   Discussion ......................................................... 211
   Conclusion ......................................................... 215
   References ......................................................... 216

Part VI Training in a New Medical Discipline and Medical Guidelines

16. Oncofertility: A New Medical Discipline and the Emerging Scholar ........................................... 221
    Laxmi A. Kondapalli

    Infertility: An Unmet Clinical Need for Young Cancer Patients ........ 222
    Oncofertility and the Oncofertility Scholar ................................... 226
    Reproductive Endocrinology and Infertility as the Springboard to a New Oncofertility Scholar .................................................. 226
    Research Directions ................................................... 229
    Future Directions .................................................... 230
    Conclusion ......................................................... 231
    References ......................................................... 233

17. Oncofertility Consortium Consensus Statement: Guidelines for Ovarian Tissue Cryopreservation .................................................. 235
    Leilah E. Backhus, Laxmi A. Kondapalli, R. Jeffrey Chang, Christos Coutifaris, Ralph Kazer, and Teresa K. Woodruff

    References ......................................................... 239

Part VII Patient Stories and Oncofertility

18. Personal Accounts of Cancer and Infertility .......................... 243
    Provided by Fertile Hope

    A New Generation of Hope: Antoinette’s Story ...................... 243
    Starting a Family One Day: Adriane’s Story .......................... 244
<table>
<thead>
<tr>
<th>Contents</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>An Improvised Script: Beverley’s Story</td>
<td>245</td>
</tr>
<tr>
<td>Life is Worth Living: Brian’s Story</td>
<td>246</td>
</tr>
<tr>
<td>Young and Hopeful for the Future: Dorothy’s Story</td>
<td>246</td>
</tr>
<tr>
<td>Hope, from Texas to Panama: Elia’s Story</td>
<td>247</td>
</tr>
<tr>
<td><strong>Appendix A: Oncofertility Options</strong></td>
<td>249</td>
</tr>
<tr>
<td><em>Provided by Fertile Hope</em></td>
<td></td>
</tr>
<tr>
<td><strong>Index</strong></td>
<td>257</td>
</tr>
</tbody>
</table>
Oncofertility
Fertility Preservation for Cancer Survivors
Woodruff, T.; Snyder, K.A. (Eds.)
2007, XVIII, 263 p., Hardcover
ISBN: 978-0-387-72292-4