Contents

List of contributors  page ix
Preface  xiii
Commonly used abbreviations  xiv

1 Clinical perspectives  1
J. S. Gravenstein

Section 1 Ventilation

2 Capnography and respiratory assessment outside of the operating room  11
R. R. Kirby

3 Airway management in the out-of-hospital setting  19
C. C. Zuver, G. A. Ralls, S. Silvestri, and J. L. Falk

4 Airway management in the hospital setting  32
A. G. Vinayak and J. D. Truwit

5 Airway management in the operating room  37
D. G. Bjoraker

6 Capnography during anesthesia  43
Y. G. Peng, D. A. Paulus, and J. S. Gravenstein

7 Monitoring during mechanical ventilation  54
J. Thompson and N. Craig

8 Capnography during transport of patients (inter/intrahospital)  63
M. A. Frakes

9 Capnography as a guide to ventilation in the field  72
D. P. Davis

10 Neonatal monitoring  80
G. Schmalisch

11 Capnography in sleep medicine  96
P. Troy and G. Gilmartin

12 Conscious sedation  102
E. A. Bowe and E. F. Klein, Jr.

13 Capnometry monitoring in high- and low-pressure environments  115
C. W. Peters, G. H. Adkisson, M. S. Ozcan, and T. J. Gallagher

14 Biofeedback  127
A. E. Meuret

15 Capnography in non-invasive positive pressure ventilation  135
J. A. Orr, M. B. Jaffe, and A. Seiver

16 End-tidal carbon dioxide monitoring in postoperative ventilator weaning  145
J. Varon and P. E. Marik

17 Optimizing the use of mechanical ventilation and minimizing its requirement with capnography  148
I. M. Cheifetz and D. Hamel

18 Volumetric capnography for monitoring lung recruitment and PEEP titration  160
G. Tusman, S. H. Böhm, and F. Suarez-Sipmann

19 Capnography and adjuncts of mechanical ventilation  169
U. Lucangelo, F. Bernabè, and L. Blanch
Section 2 Circulation, metabolism, and organ effects

20 Cardiopulmonary resuscitation 185
  D. C. Cone, J. C. Cahill, and M. A. Wayne

21 Capnography and pulmonary embolism 195
  J. T. Anderson

22 Non-invasive cardiac output via pulmonary blood flow 208
  R. Dueck

23 PaCO₂, PrCO₂, and gradient 225
  J. B. Downs

24 The physiologic basis for capnometric monitoring in shock 231
  K. R. Ward

25 Carbon dioxide production, metabolism, and anesthesia 239
  D. Willner and C. Weissman

26 Tissue- and organ-specific effects of carbon dioxide 250
  O. Akça

Section 3 Special environments/populations

27 Atmospheric monitoring outside the healthcare environment and within enclosed environments: a historical perspective 261
  G. H. Adkisson and D. A. Paulus

28 Capnography in veterinary medicine 272
  R. M. Bednarski and W. Muir

Section 4 Physiologic perspectives

29 Carbon dioxide pathophysiology 283
  T. E. Morey

30 Acid–base balance and diagnosis of disorders 295
  P. G. Boysen and A. V. Isenberg

31 Ventilation/perfusion abnormalities and capnography 313
  N. Al Rawas, A. J. Layon, and A. Gabrielli

32 Capnographic measures 329
  U. Lucangelo, A. Gullo, F. Bernabè, and L. Blanch

33 Improving the analysis of volumetric capnograms 340
  G. Tusman, A. G. Scandurra, E. Maldonado, and L. I. Passoni

34 Capnography and the single-path model applied to cardiac output recovery and airway structure and function 347
  P. W. Scherer, J. W. Huang, and K. Zhao

35 Carbon dioxide and the control of breathing: a quantitative approach 360
  M. C. K. Khoo

Section 5 Technical perspectives

36 Technical specifications and standards 373
  D. E. Supkis

37 Carbon dioxide measurement 381
  M. B. Jaffe

38 Gas flow measurement 397
  M. B. Jaffe

39 Combining flow and carbon dioxide 407
  J. A. Orr and M. B. Jaffe

Section 6 Historical perspectives

40 Brief history of time and volumetric capnography 415
  M. B. Jaffe
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>The first years of clinical capnography</td>
<td>430</td>
</tr>
<tr>
<td></td>
<td>B. Smalhout</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>The early days of volumetric capnography</td>
<td>457</td>
</tr>
<tr>
<td></td>
<td>R. Fletcher</td>
<td></td>
</tr>
</tbody>
</table>

Appendix: Patterns of time-based capnograms 461

Index 467