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978-0-521-70143-3 - Neonatal Emergencies: A Practical Guide for Resuscitation, Transport and
Critical Care of Newborn Infants

Edited by Georg Hansmann

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CAMBRIDGE UNIVERSITY PRESS

Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore,
 São Paulo, Delhi

Cambridge University Press
 The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by
 Cambridge University Press, New York

www.cambridge.org

Information on this title: www.cambridge.org/9780521701433

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First published by Georg Thieme Verlag (2004)
 This edition published 2009

Printed in the United Kingdom at the University Press, Cambridge

A catalog record for this publication is available from the British Library

Library of Congress Cataloging-in-Publication Data

Neonatal emergencies : a practical guide for resuscitation, transport,
 and critical care of newborn infants / edited by Georg Hansmann.

p. : cm.

Includes bibliographical references and index.

ISBN 978-0-521-70143-3 (pbk.)

1. Neonatal emergencies. 2. Neonatal intensive care. I. Hansmann,
 Georg, 1972–

[DNLN: 1. Infant, Newborn, Diseases. 2. Intensive Care, Neonatal–
 methods. 3. Infant, Newborn. 4. Intensive Care Units, Neonatal.

5. Resuscitation. 6. Transportation of Patients. WS 421 N4373 2009]
 RJ253.5.N457 2009

618.92'01–dc22

2009013052

ISBN 978-0-521-70143-3 Paperback

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This book is dedicated to my family.

Wherever you go, go with all your heart.

Confucius, 551–479 BC, China

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Foreword (1)

In many ways neonatology is synonymous with emergency. Many of us in the field chose neonatology because of the potential for complex, medically and ethically challenging scenarios to arise anytime we are called to the delivery room and the opportunity to care for critically ill newborns while working under intense time pressure in the neonatal intensive care unit. *Neonatal Emergencies*, edited by Georg Hansmann, MD, PhD, is a welcome addition to our field of medicine. One of the most unique and valuable aspects of this text is its focus on emergency and critical care of the newborn. Unlike other textbooks of neonatology that attempt to cover all aspects of neonatal care, and because of this tend to become too unwieldy to serve as a source of rapidly accessible information, *Neonatal Emergencies* presents pertinent information in a concise, easy-to-read manner. Figures, tables, and algorithms convey information clearly and succinctly. There are many examples of practical advice for the health care professional at the bedside including topics such as what questions to ask when on the phone with a colleague who wishes to refer a patient to you for transport, and lists of appropriate procedures to perform, equipment to use, and medications to deliver when caring for a sick neonate. Key points are emphasized by positioning in a box where the text is preceded by an exclamation mark or is shaded. Pertinent questions are also included so that the reader may perform a self-assessment after reviewing the material in a particular section or chapter.

The practical nature of the content of this text is also plainly evident in its emphasis on physical examination skills and what can be learned about the neonatal patient using one's eyes, ears, and hands. Other important topics covered in the following pages but rarely found in other references include decision-making, training issues, and the importance of effective communication with fellow health care professionals (between and among the obstetric and neonatology team members) and with parents. Although not a comprehensive resource on the ethical challenges inherent in neonatal care, this text does touch upon them in a sensitive and compassionate manner.

Simulation-based training is finding its way into the formal preparation and assessment of multidisciplinary teams of health care professionals charged with caring for newborns. Indeed the Neonatal Resuscitation Program (NRP) of the American Academy of Pediatrics will be evolving into a career-long learning program with simulation-based training at its core. In a way *Neonatal Emergencies* serves as a primer for those looking to develop realistic immersive scenarios for their training programs; thus its publication is timely, indeed.

Neonatal Emergencies presents an evidence-based approach to care of the critically ill newborn with contributions from an international panel of experts and supported by multiple contemporary references. It will serve as a readily accessible resource to a broad group of users including established pediatric/neonatal and obstetric physicians, anesthesiologists, nurses, nurse practitioners, midwives, and transport specialists as well as trainees in these domains. Mastery of the content knowledge written in this book as well as the

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Foreword (1)

technical skills described in its pages will prepare one well for the emergencies that are sure to arise when caring for newborns in the delivery room and intensive care unit.

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Foreword (2)

Emergencies constitute a fundamental part of newborn medicine. I learned this the hard way shortly after I had finished medical school 35 years ago. As a research fellow in perinatal medicine I was offered to work for a week now and then in the neonatal intensive care unit, in spite of no formal training. After one or two days I had my first call and had to run to the obstetrical department, where a severely asphyxiated boy had been delivered. I have to admit that I did not know what to do. The insufficiency I felt and the incompetence of my handlings made me decide that this would not happen again. The fascination of dealing with and handling acute events in a satisfactory way has been an important part of my life ever since. However, I have never forgotten this boy at my first call, in spite of the fact that I, during the past 35 years, have dealt with thousands of severely ill newborn infants.

Today we talk about the first “golden minutes” of life: these precious minutes when it is so important to do everything as correctly as possible. We know today that newborn babies should not be ventilated with too high or too low tidal volumes and we know that we should avoid excessive oxygen even briefly. And so many acute events may occur in the nursery in the time following these first “golden minutes” after birth. For many of the most immature and vulnerable infants even small deviations from normality for a brief period may be catastrophic. It is a huge burden for health personnel to carry the future of the whole life of a human being during these important minutes – and not only the life of the newborn but also implications for their family.

There is a need for evidence-based guidelines for everyone involved in emergencies in the neonatal period. Georg Hansmann and his colleagues have written an impressive comprehensive volume in *Neonatal Emergencies*. Here we find the most recent and modern views on a wide specter of emergencies in neonatal medicine summarized in a clear and didactic manner. This is simply a book for the future. Every pediatric resident and fellow and every neonatologist would benefit from reading this book. Experienced or not, *Neonatal Emergencies* will be a great help in the daily and often stressful life of everyone dealing with sick and fragile newborn infants.

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Preface

Over the past decades, evidence-based medicine has become an international endeavor. In neonatal intensive care, however, well-designed randomized controlled trials (RCTs) are quite rare, and clinical decision-making – especially in time-sensitive emergency situations (delivery room, NICU) – may be challenging and mainly based on the providers' expertise and experience. Since the approaches to key issues in neonatal intensive care often differ significantly between countries, I found it was now time to bring together the best and most current clinical evidence available, and the broadest experience possible. The challenge of this new handbook *Neonatal Emergencies* therefore was to find a group of internationally distinguished experts, not only among different institutions but also across countries, continents, and disciplines. I am pleased to have gathered a group of accomplished neonatologists, pediatric cardiologists, anesthesiologists, and critical care physicians from all over the world. We learned a lot from each other while writing the chapters that will follow this Preface.

The book is written for an interdisciplinary readership, i.e., pediatric residents, fellows and junior faculty, NICU nurses and nurse practitioners, obstetricians, midwives, anesthesiologists, physicians in emergency medicine, and specialized paramedics. It can be used for emergency situations as well as a guide for mock codes or clinical workshops. Our goals were straightforward: this handbook should be comprehensive but practical and easy to use so that the information provided may actually help health care providers with different levels of experience to save newborn lives and prevent disability. Thus, we added multiple illustrations and tables, and developed several flow sheets (algorithms), many of which are based on the ILCOR/AAP/AHA/ERC guidelines 2005 (neonatal and pediatric life support), RCTs, and meta-analyses such as Cochrane systematic reviews. More than 2000 original and review articles were screened, and about 600 of those are now cited in the final text. Where evidence-based data are not available, sparse or ambiguous, the authors pass on their clinical experience in several neonatal, pediatric, and cardiac intensive care units, and neonatal emergency transport to the reader.

Briefly, this handbook is divided in five major sections: Section 1 covers history and reality of neonatal transport services. Section 2 describes the essential “basics” in neonatal resuscitation and critical care, including two separate chapters on mechanical ventilation and ethics. In Section 3, about 30 clinical scenarios are subdivided in etiology/pathophysiology, epidemiology, clinical presentation, differential diagnosis, diagnostics and treatment in multiple (often subsequent) clinical settings. Both our patients and pediatric cardiology are close to our hearts so cardiovascular diseases are more extensively described than in most other handbooks on neonatal intensive care. The book covers, for the first time to our knowledge, the management of critically ill newborns from the first minute of life (i.e., the delivery room), during transport and in the first days on the intensive care unit. By focusing on the first 72 hours of life, the text goes beyond the National Resuscitation Program (NRP) and its excellent handbook, published in 2006 by the American Academy of Pediatrics (AAP) and the American Heart Association (AHA). Section 4 outlines the fundamentals and challenges of neonatal transport. Section 5 gives recommendations for

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the clinical training of transport and delivery room staff, and offers several normograms (laboratory, etc.).

Neonatal emergency and critical care medicine is constantly developing towards new or modified treatments that should be based on the principle “do no harm.” Good examples of ongoing controversies are the current discussions about oxygen toxicity, therapeutic hypothermia, and the perinatal management of babies born out of meconium-stained amniotic fluid. The authors and Cambridge University Press have done their best to provide the reader with the most current, accurate, evidence-based diagnostic, and therapeutic recommendations. However, when data from well-designed RCTs were not available, our recommendations are based on “expert opinion” only. Therefore, we highly encourage the readers to use additional standard textbooks as well as online resources, and to utilize their own experience and updated knowledge when caring for critically ill newborn infants. Particularly for drug dosing, drug–drug interactions, drug adverse effects, and non-pharmacological interventions, the reader needs to follow the instructions and warnings provided by the manufacturers (i.e., package insert) and the Food and Drug Administration (FDA, and its equivalents in countries outside the United States of America) before administering these medications or performing the procedures described. Realizing that more than one approach to the clinical problem may be right, we nevertheless aimed to give precise and detailed treatment recommendations. However, in the individual emergency situation, certain treatment options may need to be added, changed or omitted by the critical care provider.

Although we might have achieved our goal of internationality to some extent already, we hope to broaden our range. Hence, the authors would very much appreciate your comments and suggestions on this first English edition of *Neonatal Emergencies* (neonatal.emergencies@gmail.com).

Georg Hansmann
Boston
July 2009

Cambridge University Press

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Acknowledgments

I am indebted to my dedicated co-authors and many of my colleagues for being an invaluable resource while writing this book:

Proofreading, suggestions, and comments by:

Agnes Bartha (UCSF; seizures)

Carlos Botas (UCSF; several scenario chapters)

Ronald Clyman (UCSF; PDA)

Robert Lustig (UCSF; hypoglycemia)

Douglas Miniati (UCSF Pediatric Surgery; GI malformations, birth trauma)

Colin Partridge (UCSF; ethics, TTTS, hydrops fetalis, GI malformations, PPHN)

Rod Phibbs (UCSF; history of neonatal transport services)

Ted Ruel (UCSF; HIV)

Sarah Scarpace (UCSF Pharmacy; drug dosing)

Thomas Shimotake (UCSF; basics, PPHN)

Yao Sun (UCSF; basics)

H. William Taeusch (UCSF; ethics)

Jay Tureen (UCSF; sepsis)

I appreciate the support I have received from ICU and transport staff, faculty, and trainees with whom I have had the pleasure of working over the years.

Moreover, I would like to thank Dr Michelle Lazaro and the editorial staff at Cambridge University Press for their tremendous help and patience with the translation, editing, and layout of this new handbook.

The authors would very much appreciate your comments and suggestions on this first English edition of *Neonatal Emergencies*. Please send an email with your comments and suggestions to neonatal.emergencies@gmail.com.

Georg Hansmann

Boston

July 2009