

# Contents

**Preface** **xv**

Michael R. Uhing and Robert Kliegman

**Errata** **xvii**

**Strategies to Prevent Bacterial and Fungal Infection in the Neonatal Intensive Care Unit** **1**

Jeffery S. Garland and Michael R. Uhing

Hospital-acquired infections are one of the leading causes of preventable morbidity and mortality in neonatal intensive care units (NICUs). Device-related infections, such as catheter-associated blood stream infections (CABSIs) and ventilator-associated pneumonia (VAP), are the most common nosocomial infections. This review examines the pathogenesis of CABSIs and methods, widely accepted and novel, that can be used to help prevent them. Strategies to prevent fungal infections, which are often associated with the presence of a central venous catheter, are also reviewed. Finally, the dilemmas in the diagnosis and prevention of VAP in the NICU are discussed.

**Drugs of Choice for Sedation and Analgesia in the Neonatal ICU** **15**

R. Whit Hall and Rolla M. Shbarou

Painful procedures in the neonatal ICU are common, undertreated, and lead to adverse consequences. The drugs most commonly used to treat neonatal pain include the opiates, benzodiazepines, barbiturates, ketamine, propofol, acetaminophen, and local and topical anesthetics. This article discusses the indications for and advantages and disadvantages of the commonly used analgesic drugs. Guidance and references for drugs and dosing for specific neonatal procedures are provided.

**Iron Therapy for Preterm Infants** **27**

Raghavendra Rao and Michael K. Georgieff

Preterm infants are at risk for both iron deficiency and iron overload. The role of iron in multiple organ functions suggests that iron supplementation is essential for the preterm infant. Conversely, the potential for iron overload and the poorly developed antioxidant measures in the preterm infant argue against indiscriminate iron supplementation in this population. This

article reviews the predisposing factors and consequences of iron deficiency and iron overload in the preterm infant, discusses the current recommendation for iron supplementation and its appropriateness, and describes potential management strategies that strike a balance between iron deficiency and iron toxicity.

### **Inhaled Nitric Oxide for Preterm Neonates**

43

Nandini Arul and G. Ganesh Konduri

The evidence for the benefits of inhaled nitric oxide (iNO) on gas exchange, cytokine-induced lung inflammation, and vascular dysfunction has been demonstrated by several animal and human studies. The use of iNO in extremely low birth weight neonates for the prevention of adverse outcomes like chronic lung disease and neurologic injury has been investigated, but the findings remain inconclusive. This review briefly outlines the biologic rationale for the use of iNO in preterm neonates and the results on the outcome measures of bronchopulmonary dysplasia and brain injury from the recent clinical trials. This article focuses on the potential toxicities, persistent controversies, and unanswered questions regarding the use of this treatment modality in this patient population at high risk for adverse outcomes.

### **Racial Disparity in Low Birth Weight and Infant Mortality**

63

James W. Collins, Jr., and Richard J. David

In the United States, African-American infants have significantly worse outcomes than white infants. In this review, the authors look beyond traditional risk factors and explore the social context of race in this country in an effort to understand African-American women's long-standing pregnancy outcome disadvantage. In the process, new insights are highlighted concerning likely causes for the poor birth outcomes of white infants in this country compared with infants in most other industrialized nations.

### **Evaluation and Treatment of Hypotension in the Preterm Infant**

75

E.M. Dempsey and K.J. Barrington

A large proportion of very preterm infants receive treatment for hypotension. The definition of hypotension is unclear, and, currently, there is no evidence that treating it improves outcomes or, indeed, which treatment to choose among the available alternatives. Assessment of circulatory adequacy of the preterm infant requires a careful clinical assessment and may also require ancillary investigations. The most commonly used interventions, fluid boluses and dopamine, are problematic: fluid boluses are statistically associated with worse clinical outcomes and may not even increase blood pressure, whereas dopamine increases blood pressure mostly by causing vasoconstriction and may decrease perfusion. For neither intervention is there any reliable data showing clinical benefit.

Prospective trials of intervention for hypotension and circulatory compromise are urgently required.

**Indications for Home Apnea Monitoring (or Not) 87**

Jean M. Silvestri

Although there is a large body of literature describing infants who experience apnea of prematurity and apparent life-threatening events, there is no consensus regarding the use of home monitoring. This article focuses on issues that affect decision making regarding the use of home monitors in these two groups of infants and reviews existing data to guide a decision to discontinue monitoring at hospital discharge or to prescribe monitoring in the home.

**Short Bowel Syndrome: How Short is Too Short? 101**

Praveen S. Goday

Short bowel syndrome (SBS) is the most common cause of intestinal failure. This article discusses the prognostic factors that predict weaning from parenteral nutrition in SBS. The article also delineates an approach to enteral feeding in SBS.

**Anemia in the Preterm Infant: Erythropoietin Versus Erythrocyte Transfusion—It's not that Simple 111**

Isabelle Von Kohorn and Richard A. Ehrenkranz

Since the late 1980s recombinant human erythropoietin (r-EPO) has been studied as an alternative to packed red blood cell (RBC) transfusion for the treatment of anemia of prematurity in very low birth weight infants. Initial trials and reports focused on r-EPO's ability to prevent or treat anemia of prematurity with the goal of eliminating RBC transfusion but achieved limited success. New concerns about the safety of r-EPO administration have emerged. Past cost-benefit analyses of r-EPO administration versus transfusion for the treatment of anemia of prematurity have been nearly balanced. Autologous transfusion, blood-sparing technologies, changes in RBC transfusion technique and safety, and further elucidation of the risk-benefit ratio of r-EPO therapy may change the cost-benefit analysis.

**Evaluation and Management of Stroke in the Neonate 125**

Alan R. Barnette and Terrie E. Inder

Ischemic perinatal stroke (IPS) occurs in 1 of 2300 to 5000 live births. It is an under-recognized cause of significant long-term disabilities, including hemiplegic cerebral palsy, epilepsy, cognitive delays, and behavioral impairments. The pathophysiology is complex and multifactorial, involving maternal, fetal, placental, and neonatal factors. Knowledge and interventions are emerging to facilitate early diagnosis and treatment of IPS. Early treatment may translate into improved long-term neurodevelopmental outcomes.

- Screening for Maternal Depression in the Neonatal ICU** 137
- Kyle O. Mounts
- Postpartum depression is common in women with infants in the neonatal ICU. Maternal depression can affect infant health and development adversely. A screening program for depression in the neonatal ICU could identify women who have depressive symptoms and facilitate their referral for follow-up services.
- Controversies in the Treatment of Gastroesophageal Reflux Disease in Preterm Infants** 153
- Neelesh A. Tipnis and Sajani M. Tipnis
- Gastroesophageal reflux (GER) is common in preterm infants and usually is a physiologic phenomenon with little clinical consequence. GER resulting in clinical signs and symptoms is considered pathologic gastroesophageal reflux disease (GERD). Correlation of clinical signs and symptoms with GER has been poor in most studies. The efficacy of GERD therapy has not been studied systematically in preterm infants. Furthermore, GERD therapy, particularly with prokinetic agents and surgery, carries potential risks that must be considered before initiation of therapy. Alternative diagnoses, pretreatment diagnostic testing, and desired treatment outcomes should be considered before initiating GERD therapy. Cessation of empiric GERD therapy should be considered, particularly if treatment does not result in the desired clinical outcome.
- Optimizing Growth in the Preterm Infant** 165
- Michael R. Uhing and Utpala (Shonu) G. Das
- Most very low birth weight preterm infants experience postnatal growth failure in the neonatal ICU. In an attempt to minimize this phenomenon, the nutritional support of these infants has tended to become more aggressive in recent years and has become a focus of much study. Despite this attention, many questions remain unresolved. This article examines several of these issues, including the controversies regarding optimal postnatal growth velocity, early aggressive nutritional support, and the transition to enteral nutrition in preterm infants.
- Postnatal Corticosteroids for Bronchopulmonary Dysplasia** 177
- Alan H. Jobe
- Corticosteroids are used to improve lung function in infants who are progressing toward bronchopulmonary dysplasia. Corticosteroids facilitate extubation, but there is conflicting information about adverse effects on the developing brain. An approach to minimizing risk is to use low-dose, short-duration treatments in the highest risk ventilator-dependent patients. Questions remain about which corticosteroid is the safest and how to dose that corticosteroid.

<b>The Role of Genomics in the Neonatal ICU</b>	<b>189</b>
Karen Maresso and Ulrich Broeckel	

Results of both the Human Genome and International HapMap Projects have provided the technology and resources necessary to enable fundamental advances through the study of DNA sequence variation in almost all fields of medicine, including neonatology. Genome-wide association studies are now practical, and the first of these studies are appearing in the literature. This article provides the reader with an overview of the issues in technology and study design relating to genome-wide association studies and summarizes the current state of association studies in neonatal ICU populations with a brief review of the relevant literature. Future recommendations for genomic association studies in neonatal ICU populations are also provided.

<b>Index</b>	<b>205</b>
--------------	------------