

## CONTENTS

**Preface** xv  
Marcus C. Hermansen

**Iatrogenic Disorders in Modern Neonatology: A Focus on  
Safety and Quality of Care** 1  
Ashwin Ramachandrappa and Lucky Jain

The introduction of new modalities of treatment for the very premature infant and advanced life-support systems have led to a decrease in the neonatal mortality rate, and a consequent increase in the population of the tiniest survivors. Many premature infants that survive their neonatal intensive care unit stay have permanent injury to their vital organs including eyes, lungs, brain, and gastrointestinal tract, causing them to have lifelong disabilities. Whether these injuries are a result of their prematurity, or are caused by the life-support systems and treatments is a subject of much dispute. This article explains the process of iatrogenicity and separates the iatrogenic problems that are preventable from those that are currently unpreventable.

**Anesthesia Complications in the Birthplace: Is the Neuraxial  
Block Always to Blame?** 35  
David J. Birnbach and J. Sudharma Ranasinghe

This article highlights the common and some of the very serious complications that may occur following neuraxial analgesia for labor and delivery, including headache, backache, infection, hypotension, and hematoma. Total spinal and failed block also are discussed, as are complications unique to epidural anesthesia, such as the intravascular injection of large volumes of local anesthetic (causing seizure or cardiac arrest) and accidental dural puncture.

## **Medically Indicated Preterm Birth: Recognizing the Importance of the Problem**

53

Cande V. Ananth and Anthony M. Vintzileos

Preterm birth complicates over 500,000 births annually, affecting 12.5% of pregnancies in the United States. Much of the temporal increase in preterm birth (<37 weeks) over the past decade is largely driven by a concurrent temporal increase in medically indicated preterm birth. Maternal and fetal indications that prompt an intervention at preterm gestational ages include preeclampsia, intrauterine growth restriction, and placental abruption—conditions that constitute “ischemic placental disease.” Ischemic placental disease is implicated in over one of every two indicated preterm births compared with less than one in five births at term. Comprehensive evaluation of risk factors, with careful consideration of heterogeneity in the syndrome of medically indicated preterm birth and ischemic placental disease may provide important clues to predict and consequently prevent preterm birth.

## **Head Trauma After Instrumental Births**

69

Stergios K. Doumouchtsis and Sabaratnam Arulkumaran

Instrumental vaginal delivery involves the use of the vacuum extractor or obstetric forceps to facilitate delivery of the fetus. It is associated with substantial risk of head injury, including hemorrhage, fractures, and, rarely, brain damage or fetal death. This review article describes the different types, etiology, pathophysiology, risk factors, and clinical features of head trauma after instrumental birth, along with their management and prevention strategies.

## **Identifying Risk Factors for Uterine Rupture**

85

Jennifer G. Smith, Heather L. Mertz, and David C. Merrill

Uterine rupture, whether in the setting of a prior uterine incision or in an unscarred uterus, is an obstetric emergency with potentially catastrophic consequences for both mother and child. Numerous studies have been published regarding various risk factors associated with uterine rupture. Despite the mounting data regarding both antepartum and intrapartum factors, it currently is impossible to predict in whom a uterine rupture will occur. This article reviews the data regarding these antepartum and intrapartum predictors for uterine rupture. The author hopes that the information presented in this article will help clinicians assess an individual’s risk for uterine rupture.

## **Medication Errors in Obstetrics**

101

Toni A. Kfuri, Laura Morlock, Rodney W. Hicks,  
and Andrew D. Shore

The findings highlighted in this article suggest that obstetricians and perinatologists face several challenges for safe medication use

during pregnancy. Furthermore, evidence of in-hospital medication errors from obstetric services has been provided by national medication error data voluntarily submitted from many hospitals. The data provide fresh insight into the nature of medication errors in obstetrics, especially regarding the medication use process, the most common types of errors reported, the most commonly reported products overall, as well as those that resulted in patient harm. Providers and staff working within health care organizations should be well aware that a substantial number of patients experience medication errors which can result in serious injuries.

**Computer-Related Medication Errors in Neonatal Intensive Care Units** 119  
John Chuo and Rodney W. Hicks

Iatrogenic medication errors in the neonatal ICU (NICU) are reported to occur up to 2.6 times per 100 NICU days. It has been learned during the last decade that well-intended but faulty implementations of technology can increase the frequency of errors and also can give rise to new types. This article compares and discusses iatrogenic medication errors in the NICU that are related to computer entry and computerized physician order entry systems. The authors also propose a possible approach for evaluating technology that is intended to prevent iatrogenic medication errors in the NICU.

**Medication Errors in Neonates** 141  
Theodora A. Stavroudis, Marlene R. Miller,  
and Christoph U. Lehmann

Prevention of harm from medication errors has become a national priority. Medication errors in the neonatal intensive care unit are common, and most can be avoided. This article reviews the prevalence and types of medication errors affecting the care of the neonate and summarizes approaches that have been used to reduce these errors. Safety initiatives applicable to minimizing medication errors also are discussed.

**Iatrogenic Environmental Hazards in the Neonatal Intensive Care Unit** 163  
Thomas T. Lai and Cynthia F. Bearer

Premature infants in the neonatal intensive care unit (NICU) face many illnesses and complications. Another potential source of iatrogenic disease is the NICU environment. Research in this area, however, is limited.

**Iatrogenic Hyperthermia and Hypothermia in the Neonate** 183  
Stephen Baumgart

This article reviews the physiology of thermoregulation, hypothermia, and hyperthermia. The differential diagnosis of hypothermia and hyperthermia is discussed. The benefits of

hypothermia following hypoxic-ischemic injury are discussed; however, both hypothermia and hyperthermia, in the extreme, are potentially harmful to the newborn. Recommendations for the prevention of these problems are discussed, as well as available treatments.

## **Complications of Vascular Catheters in the Neonatal Intensive Care Unit**

199

Jayashree Ramasethu

Insertion of an intravascular catheter is the most common invasive procedure in the neonatal ICU. With every passing decade, technological innovations in catheter materials and sizes have allowed vascular access in infants who are smaller and sicker for purposes of blood pressure monitoring, blood sampling, and infusion of intravenous fluids and medications. There is, however, growing recognition of potential risks to life and limb associated with the use of intravascular catheters. This article reviews complications of venous and arterial catheters in the neonatal ICU and discusses treatment approaches and methods to prevent such complications, based on current evidence.

## **Hospital-Acquired Infections in the NICU: Epidemiology for the New Millennium**

223

Alison J. Carey, Lisa Saiman, and Richard A. Polin

Nosocomial infections are an important cause of morbidity and mortality in the preterm neonate. Extrinsic and intrinsic risk factors make the preterm neonate particularly susceptible to infection. This review focuses on two major pathogens that cause nosocomial infection, *Candida* and methicillin-resistant *Staphylococcus aureus*. The difficult diagnosis of meningitis in the neonate also is discussed.

## **Necrotizing Enterocolitis**

251

Pinchi S. Srinivasan, Michael D. Brandler, and Antoni D'Souza

In necrotizing enterocolitis (NEC) the small (most often distal) and/or large bowel becomes injured, develops intramural air, and may progress to frank necrosis with perforation. Even with early, aggressive treatment, the progression of necrosis, which is highly characteristic of NEC, can lead to sepsis and death. This article reviews the current scientific knowledge related to the etiology and pathogenesis of NEC and discusses some possible preventive measures.

## **Pulmonary Complications of Mechanical Ventilation in Neonates**

273

J. Davin Miller and Waldemar A. Carlo

Mechanical ventilation is necessary and life saving in many neonates. Most complications are inherent to this intervention

and cannot be confused with iatrogenic errors in judgment or care practices by clinicians. Clinical data suggest that complications such as volutrauma and air leak syndromes can negatively affect long-term pulmonary and non-pulmonary outcomes. Careful attention to many aspects of neonatal care, such as delivery room resuscitation, ventilatory support, and routine care practices, is needed to decrease pulmonary complications of mechanical ventilation. Clinical research is needed to improve mechanical ventilator strategies to reduce pulmonary complications and improve long-term outcomes.

**Index**

**283**