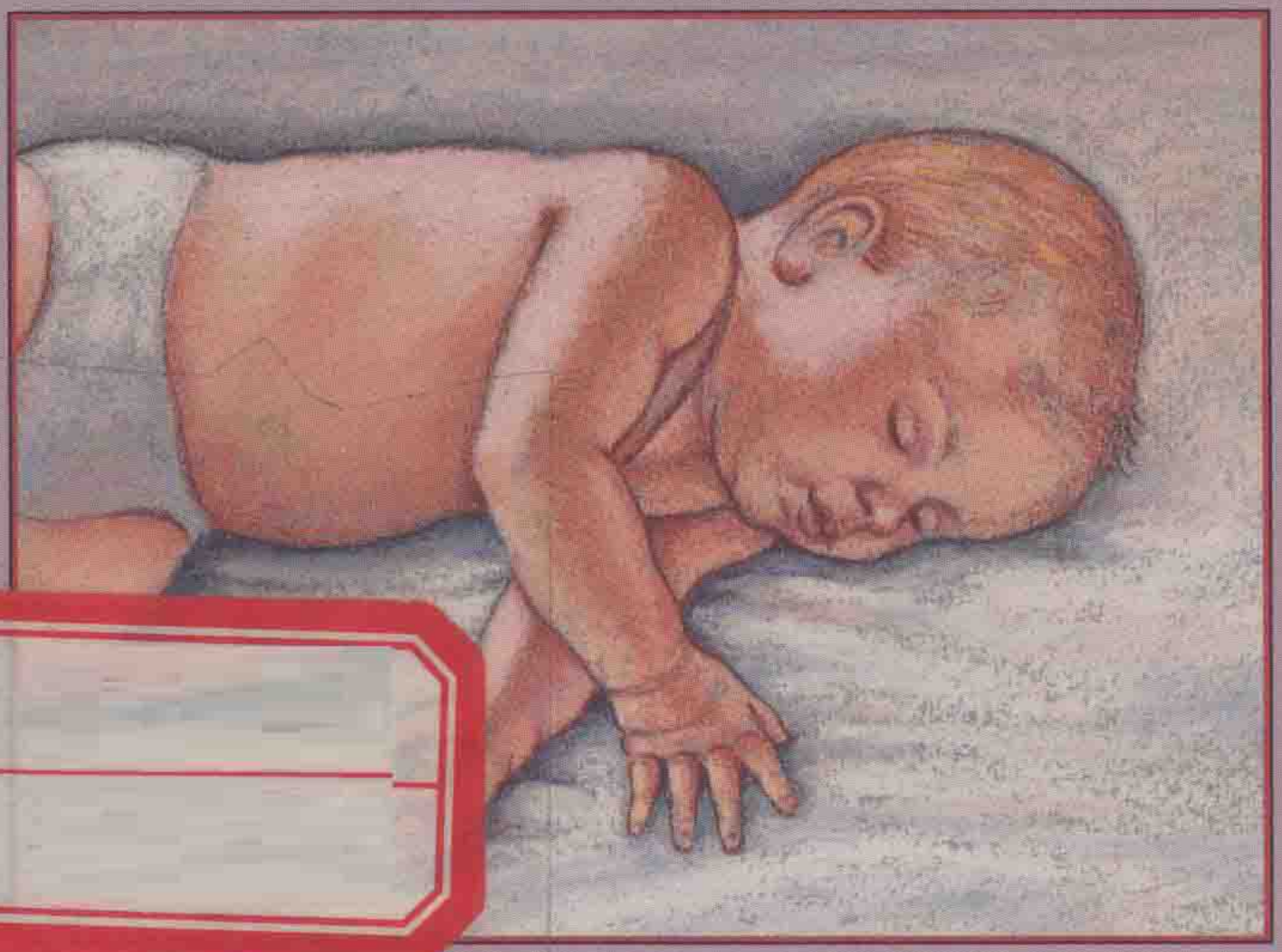
Nurse's Clinical Guide

NEONATAL CARE

SECOND EDITION



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Nurse's Clinical Guide

NEONATAL CARE

Second Edition

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PREFACE

eonatal care has changed dramatically in the past decade. The lvent of single-room labor, delivery, recovery, and postpartal .DRP) care and combined mother-neonate units has necessitated ecialized training for the nurse. To cope with these conditions, a ırse must think critically, assess accurately, and intervene efficiently.

A giant shadow behind all these events is early discharge of the :onate and mother. Stays of 24 to 48 hours for term infants are not ıusual, sick or preterm infants are discharged earlier than ever :fore, and some neonates require technological support at home. For ese reasons, more and more nurses are relying on quick-reference aterials to supplement current nursing knowledge.

Nurse's Clinical Guide to Neonatal Care, Second Edition, includes ore material on home care and assessment tips to assist the nurse readying the neonate and family for discharge and home follow-) care. Providing concise information in an easy-to-use format, the)ok is small enough to be carried in a pocket or stored in a nearby cker.

Chapter 1 surveys the biological and behavioral changes that the :onate experiences during the critical 24 hours after birth, empha- :ing the importance of successful adaptation to the extrauterine ıvironment. It begins by discussing the biological characteristics of laptation, detailing the physiologic adjustments occurring in all)dy systems. It highlights such important changes as the conversion)m fetal to neonatal circulation and onset of independent breath- g. It details thermoregulation in the neonate and illustrates neona- l circulation and lung fluid removal within moments of birth. hapter 1 also discusses the behavioral aspects of neonatal adapta- on and investigates the neonate's interaction with the environment ırough sensory and behavioral capacities, elaborating on visual and earing abilities, tactile perception, taste, and smell. The chapter)ncludes with a description of the periods of neonatal reactivity—a :ries of distinctive behavioral and physiologic characteristics—and a :scussion of neonatal sleep and awake states.

Chapter 2 describes assessment techniques that yield important aseline information about the neonate's physiologic status and adap- ıtion to the extrauterine environment. First, it presents general ssessment guidelines, delineating the proper timing and sequence of

various types of assessment. It points out key health history factors consider and explains how periods of neonatal reactivity may affe physical findings. Next, chapter 2 explains how to conduct a br physical assessment to gather data about the neonate's gene appearance, obtain vital signs, and take anthropometric measu ments. Then it explores gestational-age assessment. After explaini how a neonate's gestational age helps predict perinatal problems, t chapter identifies the physical and neurologic features that he reveal gestational age. It shows how to correlate gestational age w birth weight, body length, and head circumference. The chapter th presents the essentials of a complete physical assessment. It highligl assessment of neonatal reflexes and presents a comprehensive ch detailing normal and abnormal head-to-toe assessment findings a listing possible causes of abnormal findings. The chapter concludes discussing behavioral assessment as a means of exploring t neonate's behavioral state and responses.

Chapter 3 outlines the nurse's role in ensuring successful neor tal adaptation, helping the family adjust to the neonate, and pr moting optimal parent-infant interaction. Using a nursing proc framework, it presents pertinent assessment information and nu ing diagnoses for the normal neonate. The chapter then discus nursing interventions that maintain a stable physiologic status a foster parent-infant bonding. It focuses on measures that ensu neonatal oxygenation, hydration, nutrition, hygiene, safety, a thermoregulation, highlighting interventions that combat cc stress. The chapter presents step-by-step procedures illustrating h to provide routine neonatal care, including bathing, nasal and o suctioning, administering medications, obtaining a urine specime and caring for circumcision and umbilical cord sites.

Chapter 4 assists the nurse in promoting optimal infant nut tion. After delineating nutrient and fluid requirements for neona and infants, it discusses the circumstances that impose special nut tional needs and limitations on neonates and infants, and then reviews nutritional assessment. Next, chapter 4 compares and cc trasts breast-feeding and formula-feeding, and then it explores t factors that influence the parents' choice of infant feeding meth It begins by describing the health benefits of breast-feeding, th

iews the physiology of lactation and the composition of breast lk and examines infant sucking dynamics during breast-feeding. illustrates the lactating breast and offers step-by-step procedures owing how to assess a neonate's sucking reflex and how to train a onate to suck properly. Then the chapter provides basic informa- n about formula feeding, describing commercial formulas and uipment, listing formula intake requirements, and detailing nutri- nal options for the non-breast-feeding infant.

Chapter 4 then presents nursing care for breast-feeding and for- ula-feeding patients and their infants. It explains how to assess a east-feeding patient's knowledge of feeding techniques and scribes how to assess the patient's breasts for consistency and nipple ndition. For the patient using infant formula, the chapter prepares e nurse to assess patient knowledge of formula-feeding techniques d infant formula intake requirements. It follows with a discussion nursing interventions, focusing on general infant-feeding guide- es and patient teaching. This section includes detailed patient- aching aids on such topics as breast-feeding positions, initiating east-feeding, and expressing milk. It touches on drug use during lac- ion and breast-feeding in special situations, and it offers a breast- eding schedule for the working mother. Addressing the patient ng infant formula, the chapter describes interventions that help sure proper formula preparation and effective burping technique, d it explains how the nurse can promote physical contact between e patient and her infant during formula feeding.

Chapter 5 prepares the nurse to care for the high-risk neonate. st, it surveys important concepts in neonatal intensive care, scribing the regionalization of perinatal care and comparing the ree levels of perinatal care provided in perinatal care centers. It amines associated ethical and legal issues, including withholding e support for the critically ill neonate. Then the chapter focuses on rinatal problems that lead to high-risk status, ranging from respira- ry problems, metabolic disorders, and infection to congenital omalies and effects of maternal substance abuse. It describes the thophysiology and etiology of these problems, highlights causes d consequences of birth-weight and gestational-age variations, and scusses child abuse and failure to thrive in the high-risk neonate.

Next, chapter 5 presents nursing care for the high-risk neor and explains how to assess for each perinatal problem described lier. After listing pertinent nursing diagnoses for the high- neonate, the chapter addresses nursing interventions. Highlight emergency measures, the chapter features illustrated procedures neonatal resuscitation and suctioning of an endotracheal tube also presents a chart showing indications and nursing conside tions for resuscitation drugs. Then chapter 5 elaborates on gen nursing interventions for high-risk neonates, including meas that support oxygenation, thermoregulation, and nutrition explains how to prevent or control infection, provide preoperat or postoperative care, and carry out special procedures. The chap concludes with a discussion of specific medical and nursing mana ment of selected perinatal problems.

Chapter 6 guides the nurse in providing practical and psych cial support for the family with a high-risk neonate. To establis theoretical framework for understanding a family's reactions to birth of a high-risk neonate, the chapter begins by discussing th ries of grief and common coping mechanisms. The chapter tl applies these concepts to nursing care. It explains how to assess parents' socioeconomic and cultural backgrounds, their experie with health care facilities, and grieving behavior and coping me anisms. It describes how to evaluate the family's support syste and examines cultural influences on the expression of grief. A offering pertinent nursing diagnoses, chapter 6 identifies nurs interventions that help the family deal with their crisis and att the skills to care for the neonate after discharge. The chapter exa ines the family's teaching needs and explains how the nurse bolster the family's internal and external support systems a enhance their bonding with the neonate. Chapter 6 features examination of nursing measures to support the siblings and gra parents of a high-risk neonate, and it outlines interventions to h families cope with neonatal or fetal death.

Chapter 7 addresses discharge planning and home health c services—the tools that extend neonatal care to the home. A delineating the factors that have increased the demand for hc health care over the past decade, the chapter discusses the nur

le in discharge planning and reviews discharge planning systems ıd resources. It instructs the nurse in assessing the discharge plan-ng needs of the neonate and family, including ways to determine hether the family's circumstances make home health care feasible, ıd presents a sample discharge planning questionnaire. Next, the ıapter explains how to implement the discharge plan by preparing .e parents for the neonate's discharge and helping them select and range payment for health care services.

Chapter 7 then explores home health care in depth, describing 'ailable services, equipment, and supplies and reviewing case man-gement of home care. It identifies the types of home health care a :onate may need—routine and basic care for normal, healthy :onates and specialized care for others. Next, the chapter presents ırsing care for the neonate receiving health care at home. It :scribes the essentials of assessment during the first home visit and ı subsequent visits. It focuses on how to evaluate parental knowl-lge, caregiving skills, and support needs; how to assess whether :alth care can be delivered safely and adequately in the home; and ow to gauge parent-infant interaction. For planning and implemen-tion, chapter 7 discusses the importance of nursing flexibility and novation, then addresses such interventions as ensuring parental ıregiving knowledge and skills, promoting parent-infant interac-on, and helping siblings adjust. Other highlights of chapter 7 .clude discussions of nutritional assessment and home nutrition ıerapy and a chart showing how to assess the neonate requiring ıecial equipment. The chapter includes parent-teaching aids on :aling with an infant who has acquired immunodeficiency syn-'ome and on the use of such equipment as a home apnea monitor ıd nasal cannula for oxygen administration.

Following chapter 7, the book provides additional information a glance. Appendix 1 lists the current NANDA taxonomy of ırsing diagnoses, grouped into nine human response patterns—xchanging, communicating, relating, valuing, choosing, moving, :rceiving, knowing, and feeling. Appendix 2 converts customary eight units to metric units and vice versa. Appendix 3 shows ahrenheit and Celsius conversions. Appendix 4 lists organizations ıat can provide support to families of special-needs neonates.

Appendix 5 is an extensive glossary of need-to-know terms. extensive list of selected references provides avenues for fur exploration of a topic, and a thoughtfully crafted index helps r ers find the information they need in seconds.

Nurse's Clinical Guide to Neonatal Care, Second Edition, foll the nursing process and demonstrates through specific diagn how this process is applied to the neonate and family. It empha family-centered care and considers the role that culture may pla a patient's needs or wishes. Further, it spotlights research find that are applicable in clinical practice and groups useful infor tion in the three domains of learning—cognitive, psychomotor, affective. Finally, its patient-teaching pages support the nurs speaking directly to the patient and to the family. In short, guide will be of major and practical use to any nurse who is pre ing for or delivering level I or level II neonatal care.

CONTENTS

1 NEONATAL ADAPTATION

Immediately after delivery, the neonate must assume the life-support functions performed by the placenta in utero. Birth begins a critical 24-hour phase, called the *transitional period*, that encompasses the neonate's adaptation from intrauterine to extrauterine life.

To survive outside the womb, the neonate must successfully navigate the transitional period. Statistics reflect the difficulty of this task: Mortality is higher during this period than at any other time; 67% of all infant deaths (those occurring during the first year of life) happen during the neonatal period (first 28 days of life).

The transitional period imposes changes in all body systems and exposes the neonate to a wide range of external stimuli. Conditions that prevent successful adaptation to extrauterine life pose a serious threat. By becoming familiar with the normal events of transition, the nurse may recognize signs of poor adaptation and intervene promptly when they occur.

This chapter addresses the full-term infant's adaptation and transition and identifies occasional contrasts with the preterm infant.

BIOLOGICAL CHARACTERISTICS OF ADAPTATION

Crucial physiologic adjustments take place in all body systems after birth. The cardiovascular and pulmonary systems undergo immediate drastic changes as soon as the umbilical cord is clamped and respiration begins. Although cardiovascular and pulmonary changes occur simultaneously, they are discussed separately to facilitate understanding.

Cardiovascular system

To ensure the neonate's survival, fetal circulation must convert to neonatal circulation during the transitional period. Fetal circulation involves four unique anatomic features that shunt most blood away from the liver and lungs. The *placenta* serves as an exchange organ through which the fetus absorbs oxygen, nutrients, and other substances and excretes wastes (such as carbon dioxide). The *ductus venosus* links the inferior vena cava with the umbilical vein, permitting most placental blood to bypass the liver. The *foramen ovale* and *ductus arteriosus* direct most blood away from the pulmonary circuit. Although a small portion of pulmonary arterial blood enters the pulmonary circuit to perfuse the lungs, the ductus arteriosus shunts most to the aorta to supply oxygen and nutrients to the trunk and lower extremities.

Conversion from fetal to neonatal circulation

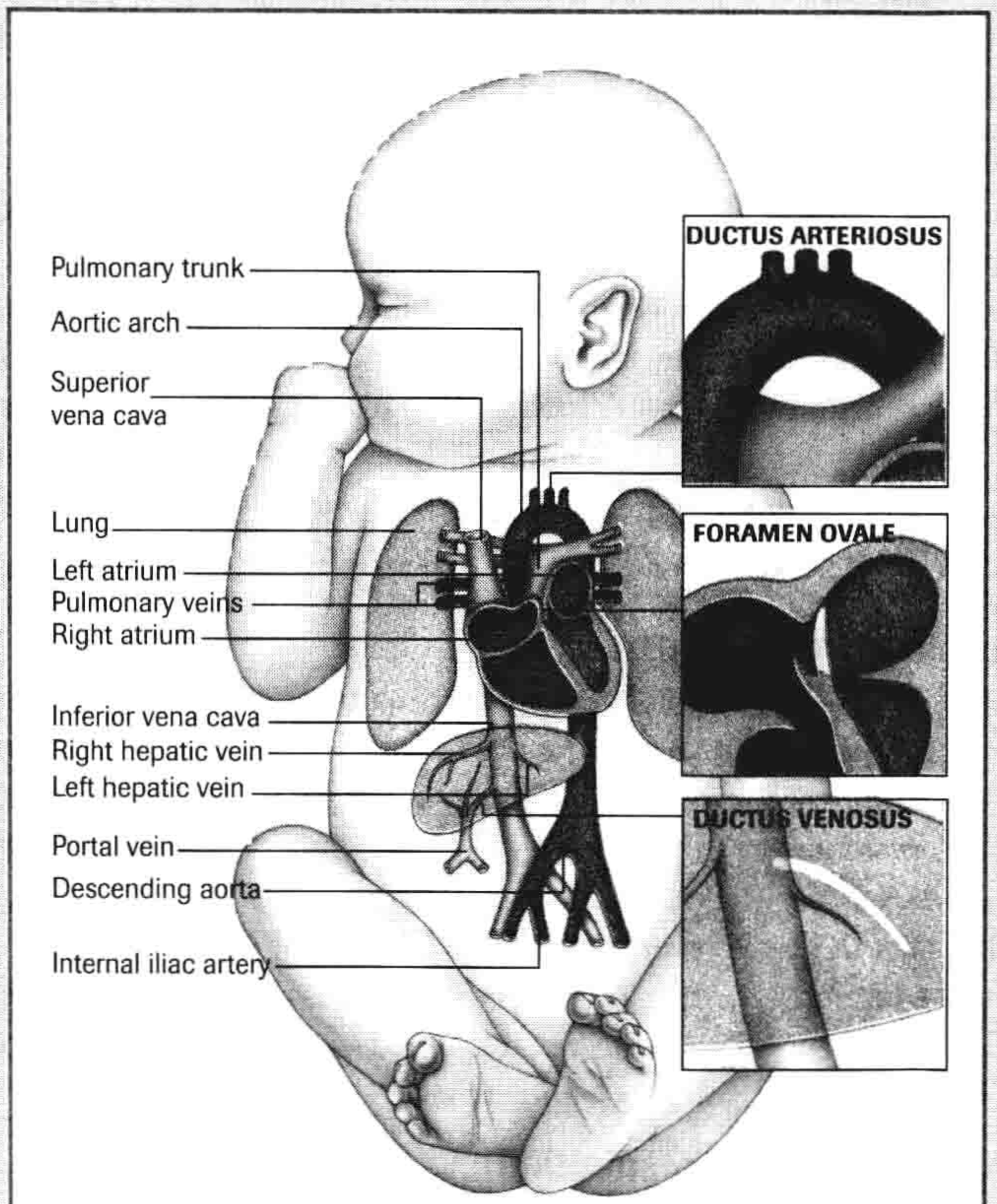
Beginning at birth, fetal shunts undergo changes that establish neonatal circulation. (For an illustration of blood flow in the neonate, see *Tracing circulation*.) As the umbilical cord is clamped and the neonate draws the first breath, systemic vascular resistance increases and blood flow through the ductus arteriosus declines. Most of the right ventricular output flows through the lungs, boosting pulmonary venous return to the left atrium. In response to increased blood volume in the lungs and heart, left atrial pressure rises. Combined with increased systemic resistance, this pressure rise results in functional closure of the foramen ovale. (*Functional closure* refers to cessation of blood flow, resulting from pressure changes, that renders a structure nonfunctional.) Within several months, the foramen ovale undergoes *anatomic closure* (structural obliteration from constriction or tissue growth).

Onset of respiratory effort and the effects of increased partial pressure of arterial oxygen (PaO_2) constrict the ductus arteriosus, which functionally closes 15 to 24 hours after birth. By ages 3 to 4 weeks, this shunt undergoes anatomic closure.

Clamping of the umbilical cord halts blood flow through the ductus venosus, functionally closing this structure. The ductus venosus closes anatomically by the 1st or 2nd week. After birth, the umbilical vein and arteries no longer transport blood and are obliterated.

Tracing circulation

With birth comes functional closure of the fetal shunts (ductus venosus, foramen ovale, and ductus arteriosus) that direct blood flow away from the lungs and liver and separate the systemic and pulmonary circulations. As the shunts close, blood flows from the pulmonary arteries to the lungs and through the portal system to the liver. The large illustration shows circulatory system changes that begin to occur at birth. The boxed illustrations show the shunts as they previously existed.



Because anatomic closure lags behind functional closure, fetal shunts may open intermittently before closing completely. Intermittent shunt opening most commonly stems from conditions causing increased vena caval and right atrial pressure (such as crying); clinically insignificant functional murmurs may result. Also, because shunts allow unoxygenated blood to pass from the right to left side of the heart, bypassing the pulmonary circuit, they may cause transient cyanosis. Both cyanosis and murmurs in the neonate should be carefully monitored and evaluated so that any underlying abnormalities can be detected. (See Chapter 2, Neonatal assessment, for more information about assessing the neonate's cardiovascular system.)

Blood volume

The blood volume of the full-term neonate ranges from 80 to 90 ml/kg of body weight in contrast to the preterm's volume which ranges from 90 to 105 ml/kg of body weight. This volume depends on the amount of blood transferred from the placenta after delivery. Delayed umbilical cord clamping increases blood volume by up to 100 ml (1 dl), possibly increasing heart rate, respiratory rate, and systolic blood pressure. Changes caused by increased blood volume may persist for about 48 hours, possibly leading to crackles and cyanosis.

Respiratory system

Throughout gestation, biochemical and anatomic respiratory features develop progressively, preparing the fetus for the abrupt respiratory changes brought on by birth. Between weeks 24 and 30 of gestation, type II pneumocytes (alveolar cells) begin limited secretion of surfactant. A phospholipid, surfactant decreases the surface tension of pulmonary fluids and prevents alveolar collapse at the end of expiration. Reduction of surface tension facilitates gas exchange, decreases inflation pressures needed to open the airways, improves lung compliance, and decreases work of breathing.

Onset of neonatal respiration

The fetal lungs contain fluid secreted by the lungs, amniotic cavity, and trachea. The fluid volume, which correlates with the neonate's functional residual capacity (FRC), typically reaches 30 to 25 ml/kg of body weight. For the neonate to assume the tasks of ventilation and oxygenation, air must rapidly replace lung fluid. In the healthy neonate, replacement occurs with the first few breaths.