
PART

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Factors of High-Risk Pregnancy

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Overview of high-risk pregnancy

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Most pregnancies are low risk and have favorable outcomes. Unpleasant symptoms, physical problems, or minor difficulties with labor and delivery may be a part of such gestations, but the mothers usually recover fully and deliver healthy babies. High-risk pregnancies—the subject of this book—are less common and are potentially serious occurrences.

We classify any pregnancy in which there is a maternal or fetal factor that may adversely affect the outcome as high risk. In these cases, the likelihood of a positive outcome is significantly reduced. In order to improve the outcome of a high-risk pregnancy, we must identify risk factors and attempt to mitigate problems in pregnancy and labor.

Many conditions lend themselves to identification and intervention before or early in the perinatal period. When diagnosed through an appropriate work-up before pregnancy, conditions such as Rh immunization, diabetes, and epilepsy can be managed properly during pregnancy so as to minimize the risks of mortality and morbidity to both mother and baby. It is not possible, however, to diagnose other conditions, such as multiple pregnancies, preeclampsia, and premature rupture of membranes prior to pregnancy. To detect and manage these challenging situations, the obstetrician must maintain constant vigilance once pregnancy is established.

In the management of high-risk pregnancy much progress has been made since the 1950s, yet much remains to be accomplished. Fifty years ago, the delivering physician and the nursing staff were responsible for newborn care. The incidence of perinatal mortality and morbidity was high. Pediatricians began appearing in the newborn nursery in the 1950s, taking responsibility for the infant at the moment of birth. This decade of neonatal awareness ushered in advances that greatly improved neonatal outcome.

Many scientific breakthroughs directed toward evaluation of fetal health and disease marked the 1960s, which is considered the decade of fetal medicine. Early in that decade, the identification of patients with the risk factor of Rh immunization led to the prototype for the high-risk pregnancy clinic. Rh-negative patients were screened for antibodies, and if none

were detected, these women were managed as normal or “low-risk” cases. Those who developed antibodies were enrolled in a high-risk pregnancy clinic, where they could be carefully followed by specialists with expertise in Rh immunization. With the advent of scientific advances such as amniotic fluid analysis, intrauterine transfusion, and, finally, Rh immune prophylaxis, these high risk pregnancies became success stories.

During the 1970s, the decade of perinatal medicine, pediatricians and obstetricians combined forces to continue improving perinatal survival. Some of the most significant perinatal advances are listed in Table 1.1. Also included are the approximate dates of these milestones and (where appropriate) the names of investigators who are associated with the advances.

Among the advances in perinatal medicine that occurred during the 1980s were the development of comprehensive evaluation of fetal condition with the biophysical profile, the introduction of cordocentesis for diagnosis and therapy, the development of neonatal surfactant therapy, antenatal steroids and major advances in genetics and assisted reproduction. These technologic advances foreshadowed the “high tech” developments of the 1990s. Clearly, the specialty has come to realize that “high tech” must be accompanied by “high touch” to ensure the emotional and developmental well-being of the baby and the parents. This decade has been one of adjusting to the challenges of managed care under the control of “for profit” insurance companies. The new millennium brought the decade of evidence-based perinatology. Clinicians became aware of the value of systematic reviews of the Cochrane Database. Major perinatal research projects by the Maternal Fetal Medicine Units Network of the National Institute of Child Health and Human Development answered many clinical questions.

The future will bring better methods of determining fetal jeopardy and health. Continuous readout of fetal conditions will be possible during labor in high-risk pregnancies. Look for the new advances to be made in immunology and genetics. Immunization against group B streptococcus,

Table 1.1 Milestones in perinatology.

<i>Before 1950s</i>					
Neonatal care by obstetricians and nurses					
<i>1950s—Decade of Neonatal Awareness</i>					
Pediatricians entered nursery					
1950	Allen and Diamond	Exchange transfusions	1956	Bevis	Amniocentesis for bilirubin in Rh immunization
1953	du Vigneaud	Oxytocin synthesis			
1954	Patz	Limitation of O ₂ to prevent toxicity	1958	Donald	Obstetric use of ultrasound
			1958	Hon	Electronic fetal heart rate evaluation
1955	Mann	Neonatal hypothermia			
1956	Tjio and Levan	Demonstration of 46 human chromosomes	1959	Burns, Hodgman, and Cass	Gray baby syndrome
<i>1960s—Decade of Fetal Medicine</i>					
Prototype of the high-risk pregnancy clinic					
1960	Eisen and Hellman	Lumbar epidural anesthesia	1967		Neonatal blood gases
1962	Saling	Fetal scalp blood sampling	1967		Neonatal transport
1963	Liley	Intrauterine transfusion for Rh immunization	1967	Jacobsen	Diagnosis of cytogenetic disorders <i>in utero</i>
1964	Wallgren	Neonatal blood pressure	1968	Dudrick	Hyperalimantation
1965	Steele and Breg	Culture of amniotic fluid cells	1968	Nadler	Diagnosis of inborn errors of metabolism <i>in utero</i>
1965	Mizrahi, Blanc, and Silverman	Necrotizing enterocolitis	1968	Stern	NICU effectiveness
1966	Parkman and Myer	Rubella immunization	1968	Freda <i>et al.</i>	Rh prophylaxis
<i>1970s—Decade of Perinatal Medicine</i>					
Refinement of NICU					
Regionalization of high-risk perinatal care					
1971	Gluck	L : S ratio and respiratory distress syndrome	1973	Sadovsky	Fetal movement
			1973		Real-time ultrasound
1972	Brock and Sutcliffe	Alpha-fetoprotein and neural tube defects	1973	Hobbins and Rodeck	Clinical fetoscopy
			1975	ABP	Neonatology Boards
1972	Liggins and Howie	Betamethasone for induction of fetal lung maturity	1976	Schiffrin	Nonstress test
			1977	March of Dimes	Towards Improving the Outcome of Pregnancy I
1972		Neonatal temperature control with radiant heat	1977	Kaback	Heterozygote identification (Tay–Sachs disease)
1972	Quilligan	Fetal heart rate monitoring	1978	Bowman	Antepartum Rh prophylaxis
1972	Dawes	Fetal breathing movements	1978	Steptoe and Edwards	<i>In vitro</i> fertilization
1972	Ray and Freeman	Oxytocin challenge test	1979	Boehm	Maternal transport
1972	ABOG	Maternal–Fetal Medicine Boards			
<i>1980s—Decade of Progress</i>					
Technologic progress					
1980	Bartlett	ECMO	1985	Daffos	Cordocentesis
1980	Manning and Platt	Biophysical profile	1986		DNA analysis
1981	Fujiwara, Morley, and Jobe	Neonatal surfactant therapy	1986	NICHD	MFMU Network established
1982	Harrison and Golbus	Vesicoamniotic shunt for fetal hydronephrosis	1986	Michaels <i>et al.</i>	Cervical ultrasound and preterm delivery
1983	Kazy, Ward, and Brambati	Chorionic villus sampling			
<i>1990s—Decade of Managed Care</i>					
Managed care alters practice patterns					
1991	Lockwood <i>et al.</i>	Fetal fibronectin and preterm delivery	1994	NIH Consensus Conference	Antenatal corticosteroids
1993	March of Dimes	Towards Improving the Outcome of Pregnancy II			
		Fetal therapy			
		Pre-implantation genetics			
		Stem cell research			
<i>2000s—Decade of Evidence-Based Perinatology</i>					
2000	Mari	Middle cerebral artery monitoring for Rh disease	2003	MFMU	Progesterone to prevent recurrent prematurity
2002	CDC MFMU	Group B streptococcus guidelines Antibiotics for PPRM	2006	Merck	Immunization against human papillomavirus

ABOG, American Board of Obstetrics and Gynecology; ABP, American Board of Pediatrics; CDC, Centers for Disease Control; ECMO, extracorporeal membrane oxygenation; L : S, lecithin : sphingomyelin ratio; MFMU, Maternal Fetal Medicine Units; NICU, neonatal intensive care unit; NICHD, National Institute of Child Health and Human Development; NIH, National Institutes of Health; PPRM, preterm premature rupture of membranes.

and eventually human immunodeficiency virus will become available. Preimplantation genetics will continue to provide new ways to prevent disease. Alas, prematurity and preeclampsia with their many multiple etiologies may be the last to be conquered.

New technology will increase the demand for trained workers in the health care industry. The perinatal pro-

fessional team will expand to emphasize the importance of social workers, nutritionists, child development specialists, and psychologists. New developments will create special ethical issues. Finally, education and enlightened attitudes toward reproductive awareness and family planning will help to prevent unwanted pregnancies.