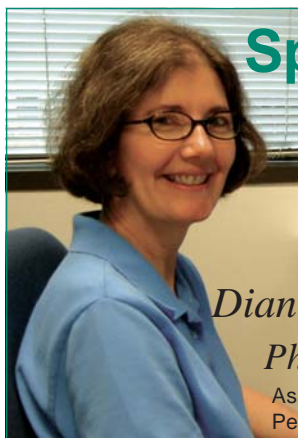




NeonatalNews.Netsm

From the Section of Neonatology, Department of Pediatrics, Baylor College of Medicine, Houston, Texas

Vol. 5 No. 2, November 2004



Spotlight

Diane Anderson,
PhD, RD, CSP
Associate Professor of
Pediatrics-Neonatology

In the year 2000, Diane Anderson, PhD, RD, joined the staff at Baylor College of Medicine as Associate Professor of Pediatrics. In the past four years, drawing on her strong background in neonatal nutrition, Dr. Anderson has grown the Baylor neonatal nutrition team and strengthened its role overall in the multidisciplinary care approach to patient care.

Dr. Anderson's early training started with her Bachelor of Science degree in nutrition from Bowling Green State University and her graduate nutrition degrees from Case Western Reserve University. Her professional career in neonatal nutrition began at Case Western where she worked with William B. Pittard, III, MD, MPH, Project Director of the Neonatal Nutrition Training Program, which consisted of

- an annual conference for physicians and health care providers of high-risk infants,
- a graduate neonatal nutrition course, and
- a newly developed one-week practicum for nutritionists working in the NICU.

In 1988, Drs. Pittard and Anderson established the Neonatal Nutrition Training Center at the Medical University of South Carolina in Charleston. At that time, a three-month Neonatal Nutrition Fellowship was added. A strong public health component evolved with input and teaching opportunities provided from South Carolina public health nutritionists.

That experience was applied to her position at Baylor where she presently is Director of the Neo-

see Spotlight, page 4

The Front Line

Neonatal nutrition program

by Diane Anderson, PhD, RD, CSP

Over a 14-year period, the Neonatal Nutrition Service for the Section of Neonatology at Baylor College of Medicine has grown exponentially as the size of the nurseries at Texas Children's Hospital and Ben Taub General Hospital has expanded and the patient population has become more complex. The Nutrition Service began with one nutritionist at Texas Children's and now four nutritionists provide education services at Texas Children's and at Ben Taub. As active members of the multidisciplinary neonatal teams, nutritional support is optimized during nursery rounds.

Our nutritionists play a strong educational role for physicians, nurses, and other medical professionals that complete the clinical teams. The Nutrition Service is further enhanced through collaborative relationships with the Bureau of Nutrition Services of the Texas Department of Health and the Children's Nutrition Research Center—the largest federally funded children's nutrition research center in the country, which is operated by Baylor College of Medicine in cooperation with the USDA's Agricultural Research Service and Texas Children's Hospital.

Before joining the Baylor Neonatal Nutrition Service, all members had prior work experience in a NICU. Three completed the three-month Neonatal Nutrition Fellowship Program (funded by Federal Maternal and Child Health) either at Baylor or at The

see Nutrition service, page 2

Breaking News

Oral feeding premature infants: Research update

by Chantal Lau, PhD
Assistant Professor of Pediatrics-Neonatology

Many premature infants have difficulty feeding by mouth. Knowledge gained in this area over the last 10 years through our research has helped increase understanding of the physiologic mechanisms underlying a premature infant's inability to feed orally. By using an apparatus that simultaneously monitors sucking, swallowing, and respiration during bottle-feeding, we are able to study the development of sucking.

A mature sucking pattern consists of the rhythmic alternation of suction (negative intra-oral pressure) and expression (compression/stripping of the nipple). However, a



see Feeding, page 2

Editor's Corner

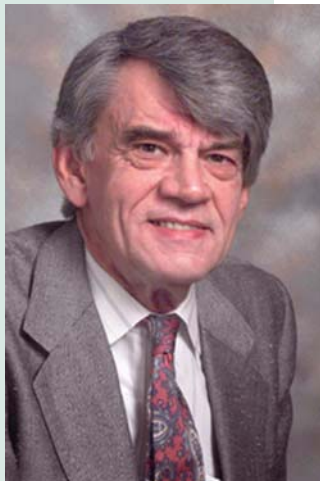
Advances in neonatal nutrition

William C. Heird, MD,
Professor, Pediatrics-Nutrition
Guest Editor

Given the current emphasis on and interest in neonatal nutrition, it is hard to believe that as recently as 50 years ago, most small neonates were intentionally starved for the first few days of life. The eventual demonstration that infusion of a 5% glucose solution improved survival changed this practice but early nutritional management didn't improve dramatically until well after introduction of total parenteral nutrition (TPN) about 30 years ago. This, of course, was due to the difficulties of overcoming the poorly coordinated suck-swallow mechanisms, immature intestinal motility, and immature metabolic processes of these infants as well as their usual severe lung disease that necessitated mechanical ventilation, further interfering with nutrient delivery.

Though it showed early theoretical promise, TPN was not the panacea envisioned, largely because of its many unanticipated complications in the neonatal population. At the time, it was often called one of the world's largest uncontrolled clinical trials. Over the years, understanding of the basis of both the metabolic and mechanical complications of TPN has improved and these problems, for the most part, are now manageable. Accurate infusion pumps, safer methods of venous access and more optimal infusate components also are available. Concurrently, the importance of enteral nutrition has become apparent and novel routes of enteral delivery of nutrients are available. Knowledge of the nutrient needs of these infants also has improved dramatically as has knowledge of the consequences of not meeting these needs. Human milk fortifiers are available, allowing the preterm infant access to the many non-nutritional benefits of human milk while providing the additional protein, calcium, and phosphorus needed by preterm infants fed human milk.

Despite the many advances in nutritional management of preterm infants over the past 50 years, even over the past 10 years—many of them at Texas Children's Hospital and the Baylor College of Medicine's USDA/ARS Children's Nutritional Research Center—we still have a long way to go. Few of our infants weigh the same at discharge as a fetus of the same post-conceptual age and these growth deficits often persist, even into adulthood. The contribution of these deficits to the documented developmental problems of these infants is currently an active area of research. In the past two decades, the dramatic increase in survival of very immature infants has presented additional challenges, ranging from determining if nutrient needs of the tiny infants are different from those of larger infants to delivering these needs. Current research at Texas Children's is addressing those and many other questions. It is important that this continue even as we apply our still incomplete knowledge to improve the nutritional management of this exceedingly vulnerable population.



The Baylor College of Medicine Neonatal Nutrition Service comprises (l-r) Cathy E. Montgomery, RD, LD, CSP, graduate of University of Texas at Austin; Amy C. Hansen, RD, graduate of University of Chicago; Megan Russek, MS, RD, LD, graduate of Massachusetts General Hospital Institute of Health Professions; and Dr. Diane Anderson, graduate of Case Western Reserve University. The team is supported by Deena Victor, MS, Neonatal Nutrition Technician, Dr. Steven A. Abrams, MD, Medical Director, and Myrthala Miranda-Guzman, Administrative Assistant.

Nutrition service (continued from page 1)

Medical University of South Carolina headed by Dr. Diane Anderson, PhD, RD, LD. This program is unique in the U.S.—it provides three solid months of focused training in the very specialized area of neonatal nutrition. And today's complex neonatal treatment demands that the critical aspect of neonatal nutrition be at the forefront of care. Our nutrition specialists are an integral part of that care for the patient populations we serve.

Feeding (continued from page 1)

mature sucking pattern alone is not necessary for a premature infant to feed by mouth successfully or safely. Also essential for safe oral feeding is proper coordination of suck-swallow-breathe. Although studies suggest that this is attained when a 1:1:1 or 2:2:1 suck:swallow:breathe ratio is observed, it is unclear what such a ratio implies. In a recent study, we observed that the 1:1 suck:swallow ratio is already attained by the time healthy premature infants begin to bottle feed. However, the swallow:respiration ratio seems less important than exactly *when* swallowing occurs during the respiratory cycle. A five-point sucking scale has been developed to assist us in identifying the maturation level of infants' sucking. Further examination of the role of suck-swallow-breathe coordination and the timing of swallowing during the respiratory cycle is ongoing.

Two additional practical points should be noted.

- The natural vacuum build-up inside a bottle during a feeding can hinder milk flow for the preterm infant whose suction component is weak.
- Incoordination of swallow-breathe mechanism means that attention must be given to the pace of oral feeding in a preterm neonate.

The Baylor College of Medicine neonatal feeding team coaches mothers to help their babies through this crucial developmental phase to become successful feeders. For more information, see our booklet for parents about oral feeding (*Oral Feeding The Premature Infant*), which is available from our web site at

www.neonate.net/parents/parents.htm



Case Report

Neonatal nutrition

by Megan Russek, MS, RD, LD

An 807-gram infant was born at 27⁴/₇-weeks' gestation by emergency cesarean section to a 32-year-old G₂P₁Ab₀ mother. Birth weight was 10th percentile for dates, and length was the 50th percentile; head circumference was less than 3rd percentile. The initial Apgar scores were 1, 5, and 4 at 1, 5, and 10 minutes of life. Umbilical vascular lines were placed and the infant was intubated; the infant developed bilateral pneumothoraces requiring placement of tube thoracostomies. The baby was then transferred to the Texas Children's Hospital NICU for mechanical ventilation.

Initial intravenous fluids (IVF) consisted of 10% dextrose at 80 mL/kg per day. Prior to 24 hours of life, TPN starter solution (TPN SS) was begun with a mixture of amino acids, dextrose, calcium, magnesium, trace elements, and vitamins. Twenty-four hours later, standard TPN, at 80 mL/kg per day and 5 mL/kg per day of Intralipid® (IL), were started. Standard TPN volume and IL were advanced as fluid and lipid tolerance allowed. The chest tube was removed on day of life (DOL) 5. On DOL 6, 130 mL/kg per day of standard TPN and 20 mL/kg per day of IL were attained.

Following successful extubation to NCPAP, trophic feedings of expressed breast milk (EBM) were initiated at 10 mL/kg per day, advanced to 20 mL/kg per day the following day, and maintained at this volume for 5 days. Feedings were then advanced, as tolerated, by 20 mL/kg per day increments. By DOL 21 the baby was receiving 150 mL/kg per day of EBM + human milk fortifier without TPN or IL. Birth weight was regained by 2 weeks of age.

Discussion

Emphasizing several issues will highlight a baby's nutritional course. Initiating a source of protein on the first day of life (TPN SS) prevents negative nitrogen balance and may improve serum glucose control. After 1 to 2 days of the TPN SS, standard TPN solution is initiated. Our TPN solution provides appropriate amounts of all nutrients based on a volume of 130 mL/kg per day with the addition of IL. IL provides a high-calorie energy source and, with at least 2.5 mL/kg per day of IL, adequate essential fatty acid intake.

Trophic feedings are small-volume feedings (10 to 20 mL/kg per day) that are maintained at this low volume for 5 to 10 days. These feedings are meant to up-regulate intestinal tract growth factors and generally are not considered a source of calories and nutrients. Benefits include achievement of full enteral feedings sooner, increased gastrin and other enteric hormone levels, and a more mature intestinal motor pattern.

(Intralipid is a registered trademark of Riker Laboratories, Inc., Northridge CA.)

Contact Us

The Baylor College of Medicine Section of Neonatology has staff at hospitals in Houston's Texas Medical Center and in the local community.

To request a neonatal consultation at any of our locations, call
1-877-NEONATE
(1-877-636-6283)

Texas Medical Center locations

Texas Children's Hospital
6221 Fannin Street, Houston TX 77030
Director of Nurseries: James M. Adams, MD

For neonatal transport, call the Kangaroo Crew:
In Houston: 832-824-5550
Toll-free: 1-877-770-5550

St. Luke's Episcopal Hospital
6720 Bertner Avenue, Houston TX 77030
Director of Nurseries: Michael E. Speer, MD

The Methodist Hospital
6565 Fannin Street, Houston TX 77030
Director of Nurseries: Michael E. Speer, MD

Ben Taub General Hospital
1504 Taub Loop, Houston TX 77030
Director of Nurseries: Joe Garcia-Prats, MD

Community locations

East Houston Regional Medical Center
13111 East Freeway, Houston TX 77015
Director of Nurseries: Dilcia A. McLenan, MD

St. Luke's Community Medical Center - The Woodlands
17200 St. Luke's Way,
The Woodlands TX 77384
Director of Nurseries: Charles T. Hankins, MD

Twelve Oaks Medical Center - Sharpstown
6700 Bellaire Blvd, Houston TX 77074
Director of Nurseries: Tommy Leonard, MD

© Baylor College of Medicine, Section of Neonatology 2004. All rights reserved.

Material provided within these pages is for informational purposes only and is not intended as medical advice or instruction. For medical advice or treatment, individuals must consult their own physician or other health care provider. The views and opinions expressed on these pages are not necessarily those of Baylor College of Medicine, its departments, or any of its affiliated hospitals, or other health care providers.

Neonatal Nutrition Symposium

Addressing nutritional management issues of low birth weight and/or premature infants.

March 6-9, 2005

Sheraton Suites Houston

2400 West Loop South • Houston, Texas

For information, contact: Myrthala Guzman or Diane Anderson, PhD, RD
telephone 832.826.1360 • facsimile 832.825.2799 • email dianea@bcm.tmc.edu
www.neonate.net/education/nutrition/

Application for continuing education credits is pending for physicians, dietitians, nurses, and lactation consultants.

Presented by

Baylor College of Medicine and Texas Children's Hospital

Sponsored in part by the Federal Maternal and Child Health Bureau (MCHB), Health Resources and Services Administration (HRSA)

Leonard E. Weisman, MD
Professor of Pediatrics
Head, Section of Neonatology

Editorial Staff

Michael E. Speer, MD
Professor of Pediatrics
Editor

Marlane J. Kayfes
Managing Editor

Chad Smalley
Editorial Assistant

Editorial Board

Lisa M. Adcock, MD
Gerardo Cabrera-Meza, MD
Dawn Dorsey
Kenneth Due
Joseph A. Garcia-Prats, MD
Karen E. Johnson, MD
Heidi E. Karpen, MD

**Baylor College of Medicine
Neonatal Fellowships**

**Neonatal-Perinatal Medicine
Fellowship Program**

accepts applications year-round

For information

- visit our Web site: www.neonate.net
- send email to:
fellowship-program@neo.bcm.tmc.edu
- mail: write to the address at the top of this page

**Neonatal Nutrition
Fellowship Program**

for Registered Dietitians with clinical experience; accepts applications year-round for two training periods (January–March and April–June).

For information

- visit our Web site: www.neonate.net

Or contact Diane Anderson, PhD, RD

- email: diane@bcm.tmc.edu
- telephone: 832.826.1346
- mail: write to the address at the top of this page

Supported in part by the Federal Maternal and Child Health Bureau (MCHB), Health Resources and Services Administration (HRSA).

Spotlight (continued from page 1)

natal Nutrition Service and the Project Director of the Leadership Excellence in Maternal and Child Health (MCH) Nutrition Training Grant. Graduates of the Baylor neonatal nutrition training program have taken positions in NICUs, academic settings, and other positions related to maternal child health around the world.

Dr. Anderson has been an invited author for reviews on neonatal nutrition management and continues to be active in the American Dietetic Association (ADA) and the Commission of Dietetic Registration in various elected and appointed positions. The ADA recognized her in 2002 with the Excellence in Practice–Dietetic Education Award.

Calendar of Events

*28th Annual Perinatal Nursing Symposium
at the Hilton University of Houston*

- October 28. Five Preconference Workshops and Welcome Reception
- October 29. Symposium

More information at www.neonate.net/education/perinatal/ or contact Rosa Lopez, telephone 713.873.3515, email rlopez1@bcm.tmc.edu

5th Annual Reba Michels Hill Lectureship

- November 12. M. Jeffrey Maisels, MD, Chairman, Department of Pediatrics, William Beaumont Hospital, Royal Oak MI, and Clinical Professor of Pediatrics, Wayne State University Medical center, University of Michigan Medical School, Detroit MI.

8:30 AM Texas Children's Hospital (Auditorium), 6621 Fannin St., Houston TX
12 NOON, Texas Children's Hospital, West Tower, Neonatology Office, 6th floor Conference Room.

Topics to be announced. More information at www.neonate.net/education/hill.htm/

Neonatology Update:

New Directions in Nitric Oxide Therapy

January 14, 2005

More information at www.neonate.net/education/no-update/ or contact the Conference Coordinator, telephone 832.826.1359, email nocc@texaschildrenshospital.org

Neonatology Nutrition Symposium

March 6–9, 2005

More information at www.neonate.net/education/nutrition/ or contact Myrthala Guzman or Diane Anderson, PhD, RD telephone: 832.826.1360, email: diane@bcm.tmc.edu

Supported in part by the Federal Maternal and Child Health Bureau (MCHB), Health Resources and Services Administration (HRSA).