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The Year Book of PEDIATRICS®

Editors
Frank A. Oski, M.D.

James A. Stockman, III, M.D.

1986 YEAR BOOK OF PEDIATRICS®

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Frank A. Oski, M.D.

Given Professor and Chairman, Department of Pediatrics, Johns Hopkins University School of Medicine

James A. Stockman, III, M.D.

Professor and Chairman, Department of Pediatrics, Northwestern University School of Medicine; Physician in Chief, The Children's Memorial Hospital, Chicago

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1 The Newborn

Do You Shake Hands With Mothers of Floppy Babies?
T. H. H. G. Koh (Hope Hosp , Salford England)
Br. Med. J. 289:485, Aug. 25, 1984 1–1

There are very few clinical situations where the birth of a child can lead to the new diagnosis of a serious condition in the mother and her family. In the past year, 2 admissions resulted in the diagnosis of myotonic dystrophy (MD) in both babies and 12 members of their families. One of these 2 babies in whom routine handshaking with the mother led to an early diagnosis is described.

Baby girl was delivered vaginally at 38 weeks' gestation after spontaneous labor. Polyhydramnios had been noted at 33 weeks. No drugs were given during labor, but meconium-stained liquor and type 2 decelerations were noted before delivery. At birth, the baby was covered in fresh meconium and had mild birth asphyxia; she was resuscitated appropriately. At 5 minutes she was breathing spontaneously and was pink breathing air. Initial electrolyte and blood sugar levels were normal. On examination she was extremely hypotonic and areflexic and had a feeble cry. There was a large cephalhematoma, bilateral pes cavus, and mild talipes equinovarus. A differential diagnosis of per natal asphyxia or neuromuscular disease was made. Feeding proved slow and difficult, and nasogastric feeding was initially needed.

When the mother, aged 28 years, visited the baby, routine handshaking revealed an obvious myotonic grip. She was unaware of her muscle disease but had noticed difficulties for some years. She could not easily remove pegs from the clothesline or unscrew caps from containers. She admitted to feeling "more stiff" during this and her two previous pregnancies. She thought that fetal movements had been normal during the recent pregnancy. On examination, she had bilateral ptosis, percussion myotonia, mild dysarthria inability to bury her eyelashes, and a myopathic smile. Her 2 daughters, aged 4 and 8 years, respectively, had never had symptoms or signs of muscular disease. There had been 2 spontaneous abortions at 5 and 7 weeks, respectively. Examination of other members of the mother's family confirmed the presence of myotonia in her mother, twin sister, and 2 brothers. A niece, aged 8 months, born to the twin sister had been hypotonic since birth although no diagnosis had been made. Examination of this baby disclosed the tent-shaped mouth and considerable hypotonia. No members of this family were aware of their condition.

The detection of neonatal MD may be difficult and is based on clinical suspicion. The condition is not as rare as is generally thought. Since the affected babies often have respiratory problems, it is common to attribute the hypotonia to perinatal asphyxia. The clinical picture consists of extreme hypotonia, neonatal respiratory problems, joint deformities, facial diplegia with a tent-shaped mouth, unexplained hematomas, and polyhydramnios.

Most mothers and their families are not known to have MD. Thus in two series, 38 of 59 families were not known to have MD at the time of delivery. In most cases, the mother had noticed the myotonia but, as other members of the family have the symptoms, she has never thought of the disability as abnormal and therefore never reported them. Early diagnosis avoids unnecessary extensive investigations for the numerous causes of hypotonia in a baby.

▶ A handshake and a greeting is a good way to start off any relationship, and an article dealing with a diagnostic handshake is a good way to start off the YEAR BOOK. Shaking hands with the mother or father of your patient is just common courtesy—kissing them, however, is really unnecessary. By the way, always suspect myotonic dystrophy in an infant with respiratory distress in whom the chest x-ray film reveals the presence of thin ribs.—F.A.O.

Maternal Fluid Overload During Labor: Transplacental Hyponatremia and Risk of Transient Neonatal Tachypnea in Term Infants

S. C. Singhi and E. Chookang (Univ. of the West Indies, Kingston, Jamaica)

Arch. Dis. Child. 59:1155–1158, December 1984 1–2

Women in labor frequently receive an infusion of aqueous glucose solution for hydration or for oxytocin treatment, and this can cause transplacental hyponatremia and resultant seizures or neonatal jaundice. An increased risk of transient neonatal tachypnea, or wet lung syndrome, apparently also exists in newborns with transplacental hyponatremia.

Comparison was made between 180 infants born to mothers who received aqueous glucose solution by infusion for hydration or as a vehicle for oxytocin and 103 control infants whose mothers received no intravenous fluid. All were singleton infants delivered vaginally at term. The two groups were similar in maternal age, gestation, duration of labor, birth weight, and Apgar score.

Hyponatremia, defined as a level of serum sodium of 130 mmol/L or lower, occurred in 39% of the study infants and in 6% of control infants, a significant difference. Transient neonatal tachypnea was diagnosed in 15% of study infants who were hyponatremic, which was significantly more often than in normonatremic infants in this group and in control infants. Tachypnea was associated with administration of a higher volume of glucose solution and a lower level of cord sodium. The volume of glucose solution that was given correlated negatively with the values of sodium in both the maternal and cord serum. Lowered values of serum osmolality showed the dilution nature of the hyponatremia.

These findings suggest an increased risk of transient neonatal tachypnea in term infants with transplacental hyponatremia that is related to the intrapartum maternal infusion of aqueous glucose solution. They also offer an explanation of the increased incidence of transient neonatal tachypnea in infants delivered by cesarean section. These infants have lower plasma

oncotic pressure at birth, and their mothers usually have received large volumes of fluid in the intrapartum period.

▶ Transplacental hyponatremia and hyposmolarity have also been implicated in the pathogenesis of neonatal jaundice following the infusion of oxytocin during labor (Singhi, S., et al.: *Arch. Dis. Child.* 54:400, 1979; Buchan, P., *Br. Med. J.* 2:1255, 1979). Singhi and co-workers have examined cord serum sodium values in three groups of 278 term infants and correlated these values with the incidence of jaundice (bilirubin > 5 mg/100 ml) during the first 3 days of life (*Br. J. Obstet. Gynecol.* 91:1014, 1984). Of the 278 infants, 87 were born to mothers who were given infusions of 5% or 10% glucose in water during labor, 90 were born to mothers who received glucose solution as a vehicle for oxytocin, and 101 were born to mothers who did not receive any intravenous fluid therapy. Jaundice occurred in 32% and 33% of the first two groups but in only 12% of the controls. The prevalence of jaundice in the infants with a serum sodium value in excess of 131 mEq/L was the same in all three groups, but jaundice occurred 3½ times more frequently in hyponatremic infants. One may conclude that hyponatremia produces transient tachypnea as well as hyperbilirubinemia. The jaundice is probably a result of increased red blood cell destruction produced by osmotic lysis of erythrocytes.

Obstetricians should not be allowed to "drown" babies by proxy. It appears unwise for mothers to receive more than 500 ml of electrolyte-free water in any 24-hour period during the conduct of labor.—F.A.O.

Incidence of Hyperbilirubinemia in Breast-Versus Formula-Fed Infants
Joyce A. Adams, Dennis J. Hey, and Robert T. Hall
Clin. Pediatr. (Phila.) 24:69–73, February 1985 1–3

An increase in hyperbilirubinemia has been noted in breast-fed infants in the first week of life. The effects of various factors on the occurrence of hyperbilirubinemia were examined in a retrospective study of 233 full-term infants born consecutively at the University of Health Sciences Hospital, Kansas City, Missouri, in a 6-month period in 1980. The breast-fed and formula-fed groups were similar in mean birth weight, maternal age, and Apgar scores (Table 1). More of the white mothers chose to breast-feed their infants.

Breast-feeding was the factor most predictive of development of hyperbilirubinemia that exceeded 12 mg/dl. Weight loss after 3 days is related to hyperbilirubinemia in Table 2. Significantly more breast-fed than formula-fed infants had peak levels of bilirubin that were higher than 15 mg/dl when neonates with bruising and cephalhematoma were excluded (Table 3). Hyperbilirubinemia is related to the length of hospital stay in Table 4. Hyperbilirubinemia resolved within 10 days except for 1 case, which was presumed to be a case of "true breast milk jaundice." Formula-fed infants had peak levels of bilirubin on days 3–5, and their hyperbilirubinemia resolved by day 7 in all cases.

Breast-fed infants have hyperbilirubinemia more often than formula-fed

TABLE 1.—Comparison of Breast-Fed and Formula-Fed Groups

Variable	Breast-fed Mean (SD)	Range	Number (%)	Formula-fed Mean (SD)	Range	Number (%)
Birth weight (g)	3447 (482)	2240–4730		3328 (483)	2290–4990	
Mothers age (yrs)	24.2 (3.8)	18–40		23.1 (4.8)	15–36	
1-minute Apgar	7.6 (1.0)	4–9		7.3 (1.4)	–39	
5-minute Apgar	8.8 (0.6)	7–10		8.7 (1.4)	5–10	
Hematocrit (%)	60.5 (6.6)	43–79		61.1 (7.5)	40–77	
Total number			115			118
Male			63 (55)			53 (45)
White			103 (90)			92 (78)
Non-white			12 (10)			26 (22)*
One-Day Program			70 (61)			53 (45)
Three-Day Program			45 (39)			65 (55)*
Narcotic pain medication			18 (16)			11 (9)
C-section			3 (3)			5 (4)
Induction of labor			6 (5)			6 (5)
Forceps used			20 (17)			14 (12)
Bruising or cephalohematoma			14 (12)			1 (1)*
ABO set-up with negative Commbs			17 (15)			17 (14)

*$P<.05$ by using Pearson chi-square analysis.
(Courtesy of Adams, J.A., et al.: Clin. Pediatr. (Phila.) 24:69–73, February 1985.)

infants in the first week of life. It is not known whether this form of hyperbilirubinemia is harmful. Delayed motor development has been described in the Collaborative Perinatal Project, but attempts to document long-term cognitive impairment have failed. Breast-feeding remains a pre-

TABLE 2.—WEIGHT LOSS AND HYPERBILIRUBINEMIA FOR INFANTS ON THREE-DAY PROGRAM

	Breast-fed	Formula-fed	p*
Number	43	62	
Mean weight loss as:			
% of birth weight	5.3	3.9	<.03
Standard deviation (%)	3.9	3.1	
Minimum (%)	0	0	
Maximum (%)	19.6	19.3	
Correlation between weight loss and hyperbilirubinemia†	R = 0.098 p > 0.1‡	R = 0.244 p > 0.05‡	

*Comparison of means by using analysis of variance.
†Each case coded as follows: *1*, bilirubin not measured or <10 mg/dl; *2*, bilirubin 10.0 to 11.9 mg/dl; *3*, bilirubin 12 to 14.9 mg/dl; and *4*, bilirubin >15 mg/dl.
‡Probability that R values will be greater than zero.
(Courtesy of Adams, J.A., et al.: Clin. Pediatr. (Phila.) 24:69–73, February 1985.)

TABLE 3.—INCIDENCE OF HYPERBILIRUBINEMIA IN BREAST-FED AND FORMULA-FED INFANTS

Classification According to Peak Bilirubin Level	Breast-fed	Formula-fed	p†
Group 1 (not measured or <12 mg/dl)	78 (77%)	108 (92)	NS‡
Group 2 (12.0–14.9 mg/dl)	11 (11%)	7 (6%)	NS‡
Group 3 (above 15 mg/dl)	12 (12%)	2 (2%)	<0.002
Groups 2 and 3 (above 12 mg/dl)	23 (23%)	9 (8%)	<0.003
Total (Groups 1, 2, and 3)	101	117	

*After excluding infants with bruising or cephalohematoma.
†Pearson chi-square analysis.
‡NS, not significant.
(Courtesy of Adams, J.A., et al.: Clin. Pediatr. (Phila.) 24:69–73, February, 1985.)

ferred method of feeding healthy infants. Further study is needed to determine whether hyperbilirubinemia in breast-fed infants is related to hospital management.

▶ The findings in this study are in substantial agreement with last year's report by L. M. Osborn and associates (see the 1985 YEAR BOOK, pp. 24–26).

What is a normal bilirubin level? M. J. Maisels and K. Gifford provide us with an answer in a presentation at the 1985 meetings of the Society for Pediatric Research-American Pediatric Society (*Pediatr. Res.* 19:240A, 1985). Maximum serum bilirubin concentrations and feeding methods were analyzed in 2,388 infants, of whom 99% were white. The results are given in the table.

The authors conclude that a bilirubin level greater than 13 mg/dl in a term infant who is not breast-feeding requires evaluation, whereas a bilirubin level

TABLE 4.—Incidence of Hyperbilirubinemia According to Length of Hospital Stay

Classification According to Peak Bilirubin Level	One-Day Program			3-Day Program		
	Breast-fed	Formula-fed	p*	Breast-fed	Formula-fed	p*
Group 1 (peak bilirubin < 12 mg/dl)	49 (82%)	51 (96%)		29 (69%)	56 (89%)	
Group 2 (peak bilirubin 12–14.9 mg/dl)	4 (5.5%)	2 (4%)	NS	7 (17%)	5 (7%)	NS†
Group 3 (peak bilirubin > 15 mg/dl)	7 (12.5%)	0	<.01	5 (12%)	2 (3%)	<0.05
Groups 2 and 3 (peak bilirubin > 12 mg/dl)	11 (18%)	2 (4%)	<.02	12 (29%)	7 (11%)	<0.02
Total (Groups 1, 2, and 3)	60	53		41	63	

*Pearson chi-square analysis.
†NS, not significant.
(Courtesy of Adams, J.A., et al.: Clin. Pediatr. (Phila.) 24:69–73, February 1985.)

Maximum Serum Bilirubin mg/dl		
Percentile	Breast-fed	Bottle Fed
10	2.1	1.6
25	4.3	3.1
50	7.3	5.6
75	9.7	8.0
90	12.5	10.1
95	14.5	11.6
97	15.5	13.0
99	17.0	15.5
MEAN + SD	7.1 + 3.9	5.8 + 3.4

greater than 15.5 mg/dl should be necessary to arouse concern in a breast-fed infant. Hurray for Maisels and Gifford—change the definition and the problem goes away. This reminds me of the plan of Senator George Aiken of Vermont for dealing with the Vietnam war. Aiken suggested that we declare that we won the war and bring the troops home. That would save face and save lives.

For more on neonatal jaundice, read on.—F.A.O.

Natural History of Neonatal Jaundice

Coleen Kivlahan and Elizabeth J. P. James (Univ. of Missouri, Columbia)
Pediatrics 74:364–370, September 1984 1–4

A study was made of the relationship between infant feeding type and the occurrence and natural history of neonatal jaundice in term newborn infants. A retrospective chart review of 124 records confirmed earlier findings indicating that jaundice is recognized more often in breast-fed infants than formula-fed infants. A prospective cohort study of 140 term newborn

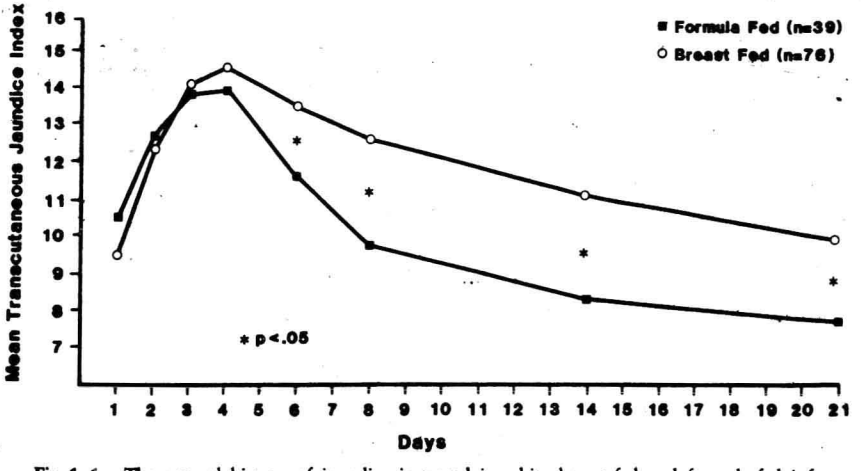

Fig 1–1.—The natural history of jaundice is traced in white breast-fed and formula-fed infants. (Courtesy of Kivlahan, C., and James, E.J.P.: Pediatrics 74:364–370, September 1984. Copyright American Academy of Pediatrics 1984.)

infants was conducted using the Minolta Air-Shields transcutaneous jaundice meter. For 3 weeks, 115 white infants and 25 black infants were followed at predetermined intervals.

The peak jaundice meter readings were higher and the elevated levels lasted longer in breast-fed infants than in formula-fed infants. Readings in the latter group returned to baseline levels within 8 days, whereas the readings were still elevated in breast-fed infants when the study ended at 21 days. Black infants had higher transcutaneous readings than white infants had because of their deeper skin pigmentation, but otherwise their course was identical to that of the white infants. The natural history of jaundice in white infants is shown in Figure 1–1. The distribution of jaundice in the white infants was bimodal; in about 25% of the breast-fed infants, the jaundice meter readings reached levels corresponding to bilirubin values of more than 13 mg/dl, whereas in the remaining infants the pattern was similar to that in the formula-fed infants.

Human milk feeding appears to be associated with more prolonged hyperbilirubinemia than formula-feeding is in normal term infants. This finding is important in light of the renewed interest in breast-feeding among the medical profession and society as a whole.

▶ Jerry Lucey, Professor of Pediatrics, University of Vermont, Editor of *Pediatrics,* and an internationally acknowledged bilirbuin maven, writes as follows:

"It's time to accept the observations and experience of many physicians that breast-feeding is associated with a 'high level' of serum bilirubin. Does anybody think it makes any real difference whether the serum bilirubin level is 7 or 13 mg/dl? I don't. Maisels and Gifford are right to suggest that we should declare a 'new normal' classification for breast-fed infants that accepts levels of 15 mg/dl as 'normal' (*Pediatr. Res.* 19:240A, 1985). Let's declare it's normal and announce that this problem is solved!"

Phototherapy in Full-Term Infants With Hemolytic Disease Secondary to ABO Incompatibility

Lucy M. Osborn, Carl Lenarsky, Raymond C Oakes, and Michael I. Reiff
Pediatrics 74:371–374, September 1984 1–5

Current guidelines for the management of neonatal hyperbilirubinemia indicate that phototherapy should be instituted early in all infants with hemolytic disease. However, many infants with ABO incompatibility and positive Coombs' test results meet these treatment criteria during the first 24 hours of life without the subsequent development of physiologic jaundice. Evaluation was made of the efficacy of a protocol designed to decrease the number of infants receiving phototherapy by extending the pretreatment observation period. The protocol called for phototherapy to be instituted if serum bilirubin levels increased to 10 mg/100 ml before 12 hours of age, to 12 mg/100 ml before 18 hours of age, to 14 mg/100 ml before