

Evaluation and Management of Newborn Jaundice by Midwest Family Physicians

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BACKGROUND. Recognition and management of newborn jaundice is controversial and even more challenging with the early discharge of newborns. The purpose of this study was to describe the jaundice management patterns of family physicians in Minnesota and Wisconsin and compare them with American Academy of Pediatrics recommendations.

METHODS. Forty-two members of the Practice-Based Research Group of the Wisconsin Research Network and of the Minnesota Academy of Family Physicians Research Network recorded information on study cards about the care they provided to healthy full-term newborns for 6 months.

RESULTS. Data was collected on 335 infants, 30% of whom were jaundiced. Physicians ordered limited laboratory testing on selected jaundiced infants. Infants with jaundice were more frequently breast-fed, and had longer hospital stays. Jaundice was commonly managed by phototherapy (17%), home sunlight (28%), and increased breast-feeding (44%). Twenty-six percent of the physicians used a formal phototherapy guideline. The timing of the first follow-up visit did not differ for infants discharged before or after 48 hours of age.

CONCLUSIONS. Family physicians identified and managed newborn jaundice relatively infrequently in our study. Their practice patterns were consistent with most aspects of the American Academy of Pediatrics jaundice guideline, although few of them used it to guide phototherapy use. The study physicians did not generally follow recommendations for follow-up of infants discharged early. Until a large-scale clinical trial of newborn jaundice management is performed, a variety of practices should continue to be acceptable.

KEY WORDS. Jaundice, neonatal; hyperbilirubinemia; practice patterns; physicians, family. (*J Fam Pract* 1998; 47:461-464)

Approximately 60% of newborns in the United States become clinically jaundiced.¹ The appropriate evaluation and treatment of neonatal jaundice, particularly in the healthy full-term newborn, has been the subject of long-standing controversy. In recent years, jaundice management has become even more challenging with the early discharge of newborns, typically before their jaundice has peaked. Moreover, there have been disturbing reports of increasing severity of jaundice and a reemergence of kernicterus in association with decreasing hospital stays.² Not surprisingly, a 1992 survey of American Academy of Pediatrics (AAP) fellows demonstrated a wide range of practice in the treatment of a hypothetical case of a healthy full-term newborn with hyperbilirubinemia.³

In October 1994, the AAP published a practice guideline, "Management of Hyperbilirubinemia in the Healthy Term Newborn."¹ The guideline was also published in

the American Academy of Family Physicians' journal 3 months later. Some critics have questioned the evidence cited in defense of this guideline.⁴ Because no large-scale clinical trial of treatment of full-term newborns with jaundice has ever been undertaken, the evidence cited to support the guideline was primarily retrospective epidemiologic data.¹ In addition, the guideline has been criticized because no formal pilot studies were done to measure its impact.⁴ The AAP plans another survey of its fellows' practice patterns in neonatal hyperbilirubinemia in the future.³

No studies have been reported to date on physicians' practice patterns regarding neonatal jaundice since the publication of the AAP guideline, and, although 65% of family physicians perform newborn care in the hospital, no studies of their management of jaundice have ever been reported.⁵ The purpose of our study was to describe jaundice management patterns of family physicians in Minnesota and Wisconsin when they were providing care for healthy full-term newborns.

METHODS

Members of the Minnesota Academy of Family Physicians Research Network and members of the Practice Based Research group of the Wisconsin Research Network were invited to participate in the

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study. Participants first completed a brief demographic survey. They then collected data about the healthy full-term newborns they cared for in the nursery and for whom follow-up information was available for the infants' first 2 weeks of life. Participants documented study data by checkmarks on pocket-sized cards that were mailed and returned on a monthly basis for 6 months in 1997. The following data were collected for all study infants: feeding method, age at discharge, age at and location of first follow-up visit, and whether the infant was ever jaundiced. For jaundiced infants, the following data was collected: method of determining jaundice severity, laboratory tests performed, jaundice management, and mother's blood type. Statistical analysis was performed by chi-square tests and analysis of variance.

RESULTS

Forty-two family physicians participated in the study; 32 practiced in Minnesota, 10 in Wisconsin. Sixty-two percent of the physicians were men; the mean age of the entire group was 39 years. Eighty-six percent were residency trained and board certified. Their practice locations were: 42% rural, 26% large city, 19% suburban, and 12% small city. Most participants practiced in a family practice group (36%), multispecialty clinic (31%), or residency clinic (24%). Eleven (26%) physicians reported using a written guideline when deciding whether to start phototherapy. Only 4 (10%) used the AAP phototherapy guideline.¹

During the 6-month study period, information was collected on 335 infants. The number of study infants reported by each physician ranged from 1 to 40, with a mean of 8. Sixty-six percent of the infants were breast-fed while in the hospital, and 98 infants (30%) were jaundiced during the first 2 weeks of life. Jaundiced infants were significantly more likely to be breast-fed than bottle-fed (82%, $P < .0001$).

The physicians determined the severity of jaundice by the intensity of the yellow color (60%) and by the level on the infant's body reached by the yellow color (42%). No physicians used a jaundice meter, such as an icterometer or bilirubinometer.

A total bilirubin test was performed on 66% of the jaundiced infants. Forty-eight percent had a direct bilirubin test. Other laboratory testing of jaundiced infants included: blood type (33%), Coombs test (29%), and other unspecified tests (11%).

Seventeen (28%) jaundiced infants received phototherapy (9 in the hospital, 4 at home, and 4 in both locations). Physicians instructed the parents of 28% of the jaundiced infants to place the infants in sunlight to decrease the jaundice. Jaundice management recom-

TABLE

Age at Follow-up of Infants Discharged at Less than 48 Hours of Age

Practice Characteristics	Age of Infant		P
	Age ≤ 5 days No. (%)	Age > 5 days No. (%)	
Type of practice			<.005
Solo	2 (33)	4 (67)	
Family practice	7 (13)	47 (87)	
Multispecialty	28 (35)	51 (65)	
Community clinic	1 (17)	5 (83)	
Residency clinic	15 (52)	14 (48)	
Practice location			<.05
Large city	18 (25)	55 (75)	
Small city	9 (41)	13 (59)	
Suburb	7 (18)	31 (82)	
Rural	19 (43)	22 (54)	
Total	53 (30)	121 (70)	

Note: P value results from chi-square tests of two practice characteristics and two age groups.

mendations for the 78 breast-fed infants included: increased breast-feeding (55%), formula supplementation (15%), water supplementation (13%), and interrupted breast-feeding (5%).

One hundred ninety-seven (61%) of the study infants were discharged at less than 48 hours of age. Only 53 (30%) of the infants discharged early had their first follow-up visits within 2 to 3 days of discharge, as recommended by AAP guidelines.¹ The timing of the first follow-up visit for infants discharged early varied with the practice type and location, as shown in the Table. The age at follow-up for infants discharged early ranged from 2 to 33 days. The mean age at follow-up was not significantly different for infants discharged before or after 48 hours of age (9.6 vs 10.8 days, $P = .1$). The location of the first follow-up visit also did not differ significantly by infants' discharge age. Eighteen percent of infants discharged early had an initial follow-up visit in the home, compared with 23% of infants discharged later ($P = .3$).

DISCUSSION

The family physicians in this study cared for a small number of jaundiced infants, on average, over a 6-month period. The incidence of jaundice reported by these physicians is half of the generally reported incidence.¹ Because jaundice typically peaks at 3 to 5 days of life, it was probably present but not identified in many infants discharged early without follow-up within the next few days.

The AAP guideline suggests obtaining total bilirubin tests on infants with "jaundice 'clinically significant' by

medical judgment." The study physicians' selective testing of jaundiced infants is consistent with these recommendations. They most frequently used the intensity of the jaundice to decide whether to test bilirubin. The physicians used the level of jaundice on the body as a guide for testing, as suggested by the AAP guideline, for 42% of the jaundiced infants.¹ None of the physicians used an icterometer or transcutaneous jaundice meter, which are also suggested by the guideline.¹ With the exception of the total bilirubin testing that was done on 66% of the jaundiced infants, relatively few laboratory tests were performed. Although direct bilirubin testing is discouraged by the guideline, it was obtained in 48% of jaundiced infants in the study.

The study physicians were not asked to document the bilirubin levels of their jaundiced infants. Therefore, comparisons cannot be made with the AAP guideline regarding the appropriate bilirubin levels at which to begin phototherapy. However, only 10% of the study physicians reported using the AAP guideline for the use of phototherapy. Home phototherapy was used in 47% of the infants that received phototherapy. This rate is similar to that reported in the 1992 national AAP survey, in which 48% of office-based pediatricians used home phototherapy.³ In a 1993 survey of community pediatricians in Philadelphia, 32% of the respondents had used home phototherapy.⁶

Home sunlight was recommended by the study physicians for 28% of the jaundiced infants. The effectiveness of sunlight in lowering bilirubin levels was first reported in 1958.⁷ This observation ultimately led to the development of phototherapy. However, a review of the literature revealed no further studies in the English language about the use of sunlight for the treatment of jaundice.

Most jaundiced infants in our study were breast-fed (82%). The AAP guideline discourages the interruption of breast-feeding in healthy full-term infants and encourages continued and frequent breast-feeding. Supplementation with water or dextrose water is not recommended because it has been shown to be ineffective. However, other treatment options presented include supplementing breast-feeding with formula, or temporarily interrupting breast-feeding and substituting formula. The management recommendations of the physicians to increase breast-feeding (55%) and supplement with formula (15%) were consistent with the AAP guideline. Water supplementation was recommended for 13% of infants and interruption of breast-feeding for only 5%. In the 1992 AAP survey, 16% of office-based pediatricians would not interrupt breast-feeding regardless of bilirubin level.³

FOLLOW-UP

The AAP recommendation that all neonates discharged less than 48 hours after birth have follow-up by a health care professional within 2 to 3 days of discharge was modified slightly in the AAP's 1995 Hospital Stay for

Healthy Term Newborns guideline.⁸ The new guideline specified that follow-up be within 48 hours of discharge. In a 1995 report, early discharge had no effect on the follow-up interval recommended by pediatricians in a large community hospital in Michigan.⁹ A second study demonstrated that oral and written communication to pediatricians emphasizing the importance of quick follow-up for infants discharged early significantly improved compliance with the guideline.¹⁰ Even after the educational intervention, however, 33% of infants discharged early were scheduled to be seen 14 days after discharge.

The physicians in our study also generally did not follow the recommendations for follow-up of infants discharged early. Family physicians working in residency-training programs were most compliant with the recommendation. The Newborns' and Mothers' Health Protection Act, which went into effect on January 1, 1998, should result in fewer infants being discharged early. The act requires all group health insurance plans to provide coverage for hospital stays for new mothers and their babies for a minimum of 48 hours after a normal vaginal delivery. Maternity lengths of stay have already increased in New Jersey, which enacted a similar law in 1995.¹¹ Minnesota had a maternity length-of-stay law in effect during the time of this study; Wisconsin did not have such a law. Significantly more infants from Wisconsin were discharged early than infants from Minnesota (72% vs 57%, $P < .05$).

CONCLUSIONS

Because our study involved family physicians from two midwestern states, the results may have limited generalizability. However, this study is the first to examine management practices of family physicians rather than pediatricians, and the first to examine the care of actual rather than hypothetical patients with neonatal jaundice. The practice patterns of family physicians in this study were consistent with most aspects of the AAP jaundice guideline. Until a large-scale clinical trial of newborn jaundice management is performed, a wide variety of practices should continue to be acceptable.

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