Prevalence of Significant Weight Loss and Hypernatremia in Breast Feeding Jaundice Infants Readmitted to Phramongkutklao Hospital Within 1 Month of Age

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***Background**: Neonatal jaundice, especially breast feeding jaundice is the most common cause of neonatal re-admission within the first month of life. Good maternal support and closed follow-up of newborn infants can promote successful breast feeding without causing any complications.*
***Objective**: To determine the rate of significant weight loss and hypernatremia in infants with breast feeding jaundice readmitted to Phramongkutklao Hospital within 1 month of age.*
***Material and Method:** Cross-sectional descriptive study was conducted in infants of gestational age ≥ 35 weeks and birth weight ≥ 2,000 grams who had breast feeding jaundice readmitted between January, 1st and December 31st, 2008. Maternal and neonatal history, laboratory result, complications and treatment were reviewed.*
***Statistical analysis:** Rates of significant weight loss and hypernatremia were calculated. The associations between weight loss and factors, serum sodium, serum bilirubin and weight loss were analyzed using Chi-square and Mann-Whitney U test.*
***Results**: There were 30 infants in the study. 12 (40%) were male. The median gestational age and birth weight were 37 (35-40) weeks and 2,945 (2,100-3,810) grams, respectively. Three infants had significant weight loss more than 10% of birth weights. No infant had hyperbilirubinemia. Severity of weight loss was associated with weight loss at the time before discharge from hospital. Weight loss was not associated with gestational age, sex, parity, cesarean section, exclusive breast feeding, serum sodium level, and serum bilirubin level.*
***Conclusion**: Complications of dehydration such as hypernatremia was not observed in infants with breast feeding jaundice in this study. Maternal education, serial weight measurements and awareness of breast-feeding jaundice problems are helpful strategies to promote successful breast feeding.*

***Keywords**: Breast feeding jaundice, Hypernatremia*

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Hyperbilirubinemia is the most common symptom of readmission of neonates[1]. Several causes of neonatal hyperbilirubinemia have been described such as ABO incompatibility, red cell membrane defect, G-6-PD deficiency, and infection. Nowadays, inadequate breast feeding has increased attention as a cause of neonatal hyperbilirubinemia, especially in the first week of life[2,3] and poor milk intake is likely to be a cause of several complications including weight loss, hypernatremia, dehydration and malnutrition[4-6]. Previous studies indicated that approximately 21-59%[4,7,8] of hyperbilirubinemic infants had weight loss more than 10% of birth weight; 12% of which have hypernatremia[9].

Phramongkutklao Hospital has a campaign of breast feeding promotion. Unfortunately, the increasing of readmission in icteric infants in 2002-2004 to 2005-2006 and 2007 were 5-6, 25-31, and 61 cases respectively. More than 50% of them were diagnosed breast feeding jaundice. Since inadequate breast feeding could be associated with other complications such as significant weight loss and hypernatremia, the authors conducted a study to determine the prevalence of significant weight loss and/or hypernatremia in infants who were

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readmitted due to breast feeding jaundice within 1 month of age.

Material and Method

A descriptive study in icteric infants readmitted between January 1, and December 31 in 2008 was conducted. The infants who were born at gestational age more than 35 weeks; birth weight more than 2000 grams; age at readmission less than 1 month; exclusively or partially breastfed; and had hyperbilirubinemia were recruited. Infants who had hemolytic jaundice or other causes of dehydration were excluded.

After obtaining informed consent from parents. Perinatal and infants' postnatal history including serum bilirubin levels, length of hospital stay before discharge, breast feeding problems and weight changes were reviewed. Serum electrolytes, blood urea nitrogen (BUN) and creatinine (Cr) were collected on the day of admission. Significant weight loss was documented if an infant's weight decreased more than 10% of birth weight. Serum sodium level above 145 mg/dL was defined as hypernatremia. This study was approved for ethic issue by Institutional Review Board Royal Thai Army Medical Department (code R080h/50).

Results

During the study period, 73 infants were readmitted within 1 month of age. 36 (49.3%) of them were diagnosed breast feeding jaundice. Thirty infants were recruited into the study. 12 (40%) of them were male. The median (range) of gestational age and birth weight were 37 (35-40) weeks and 2,945 (2,100-3,810) grams, respectively. 7 (23.3%) infants were delivered by cesarean section. 18 (60%) were the first born child. Twenty-five (83.3%) cases had jaundice before discharge to home with median serum bilirubin level 11.6 (8.0-14.5) mg/dL (Table 1).

The median (range) age at the time of readmission was 7 (3-14) days. 27 (90%) infants were exclusively breastfed. Maternal complaint of inadequate milk production was noted in 10 cases (33.3%). The median (range) serum bilirubin level was 19.1 (14.1-29.2) mg/dL. All infants received phototherapy and two of them were additionally treated with exchange transfusion. Only three (10%) infants had significant weight loss (>10% of birth weight). Nobody had hypernatremia. Intravenous fluid was given in 3 infants (Table 2 and 3).

Infants were categorized into 2 groups based on the degree of weight loss. Gender, gestational age, birth weight, breast feeding, serum bilirubin level and serum sodium were not associated with degree of weight loss (Table 4).

Discussion

The delay of breast feeding jaundice in this study compared to the previous study reported by Yassen, et al[4] may be due to the prolonged hospital stay leading to failure of breast feeding. Inadequate breast milk intake slows down bowel movement and

Table 1. Demographic data of study population (n = 30)

Data	n (%)
Male gender	12 (40)
Gestational age (week)*	37 (35-40)
Birth weight (gram) *	2,945 (2,100-3,810)
Mode of delivery: Cesarean section	7 (23.3)
First parity	18 (60)
5-min Apgar score < 5	0
Length of hospital stay after birth (day) *	4 (2-9)
Hyperbilirubinemia before discharge	25 (83.3)
- Blood group incompatibility	6 (24)
- G6PD deficiency	3 (12)
- Bruises/ecchymoses	1 (4)
- Unspecified	12 (48)
Serum bilirubin before discharge (mg/dL)*	11.6 (8.0-14.5)

* Data presented as median (range)

Table 2. Data at the time of readmission (n = 30)

Data	n (%)
Age at readmission (day)*	7 (3-14)
Type of feeding	
- Exclusively breast milk	27 (90)
- Formula	0
- Mixed	3 (10)
Breast feeding problems	
- Inadequate milk production	10 (33.33)
- Cracked nipple	1 (3.33)
- Poor sucking	5 (16.67)
- Others	1 (3.33)
Weight change from birth weight (gram)*	130 (160-470)
Weight loss > 10% of birth weight	3 (10)
Treatment	
- Phototherapy	30 (100)
- Phototherapy and exchange transfusion	2 (6.67)
- IV fluid	3 (10)
- Antibiotics	3 (10)

* Data presented as median (range)

Table 3. Laboratory investigation at readmission (n = 30)

Laboratory data	Median (range)
Serum bilirubin level (mg/dL)	19.1 (14.1-29.2)
Serum sodium (mEq/L)	136.8 (130.0-142.0)
Serum sodium > 145 mg/dL (n,%)	0, 0%
Serum BUN (mg/dL)	8.3 (4.1-42)

BUN: blood urea nitrogen

Table 4. Factors associated with weight changes more than 10% of birth weight (n = 3) and less than 10% of birth weight (n = 21)

	Weight loss > 10% n (%)	Weight loss < 10% n (%)	p-value
Before discharge to home			
Male gender	1 (33.33)	8 (38.1)	1.000
Gestational age (week)*	37 (35-37)	37 (35-40)	0.371
Birth weight (gram)*	2,810 (2,100-3,190)	2,950 (2,230-3,810)	0.458
First parity	2 (66.67)	11 (52.38)	1.000
Cesarean section	1 (33.33)	4 (19.05)	0.521
Jaundice before discharge	3 (100)	17 (80.95)	1.000
Exclusive breast feeding	2 (66.67)	19 (90.47)	0.343
At the time of readmission			
Serum sodium (mEq/L)*	137 (132-140.3)	136.9 (130-142)	0.964
Serum bilirubin (mg/dL)*	17.0 (16.3-29.2)	19.4 (14.1-24.9)	0.827

* Data presented as median (range)

facilitates the reuptake of bilirubin into circulation. Thus, to reduce the incidence of breast non-feeding jaundice and readmission rate, good support of breast feeding technique should be encouraged. In addition, a follow-up program after discharge is essential to detect breast feeding problems such as severe hyperbilirubinemia, significant weight loss and dehydration.

Although previous studies[5-13] indicated that degree of weight loss, oliguria, less frequent of defecation, cesarean section, prematurity, and short length of hospital stay were associated with high serum sodium and bilirubin levels, but no demonstration of that relationship in this study. The explanation was probably small sample size and late readmission. Thus, degree of weight loss at that time may not represent the nadir of weight changes. In the case of exclusive breast feeding, the authors would recommend monitoring of weight changes and serum bilirubin levels. Moreover, serum electrolytes and BUN should also be monitored if weight loss is more than 10% of birth weight or the infant has signs of severe dehydration such as poor perfusion or oliguria.

Conclusion

Breast feeding jaundice is a common cause of readmission within the first 2 weeks of age. Hypernatremia is quite rare. Breast feeding support and monitoring of serum bilirubin levels are necessary in exclusively breastfed infants.

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ความชุกของภาวะน้ำหนักลดลงมาก และระดับโซเดียมในเลือดสูงในทารกที่มีภาวะตัวเหลืองจากการกินนมมารดาไม่เพียงพอ และกลับมารักษาในโรงพยาบาลพระมงกุฎเกล้าภายในอายุ 1 เดือน

นิธิพันธ์ สุขสุเมฆ, ธานินทร์ พิรุณเนตร, แสงแข ชำนาญวนกิจ, ปรียาพันธ์ แสงอรุณ

บทนำ: *ภาวะตัวเหลืองในทารกแรกเกิดเป็นปัญหาที่พบบ่อยเป็นอันดับแรกของการกลับเข้ามารักษาในโรงพยาบาลในช่วงเดือนแรกของชีวิต โดยเฉพาะภาวะตัวเหลืองจากการกินนมมารดาไม่เพียงพอ การประคับประคองมารดาที่มีปัญหาการให้นมบุตร และการติดตามทารกอย่างใกล้ชิดจะช่วยส่งเสริมให้การเลี้ยงลูกด้วยนมมารดาประสบผลสำเร็จโดยไม่เกิดภาวะแทรกซ้อน*

วัตถุประสงค์: *เพื่อศึกษาอัตราการเกิดภาวะน้ำหนักลดลงมากกว่าร้อยละ 10 ของน้ำหนักแรกเกิด และ/หรือ ระดับโซเดียมในเลือดสูง ในทารกที่กลับเข้ามารักษาในโรงพยาบาลด้วยเรื่องตัวเหลืองจากการได้รับนมมารดาไม่เพียงพอภายในอายุ 1 เดือนหลังคลอด*

วัสดุและวิธีการ: *เป็นการศึกษาเชิงพรรณนาแบบตัดขวาง ในทารกอายุครรภ์ตั้งแต่ 35 สัปดาห์ขึ้นไป และน้ำหนักแรกเกิดมากกว่า 2,000 กรัม ที่มีภาวะตัวเหลืองจากการได้รับนมมารดาไม่เพียงพอ และรับป่วยในโรงพยาบาลพระมงกุฎเกล้า ตั้งแต่ 1 มกราคม ถึง 31 ธันวาคม พ.ศ. 2551 นำมาทบทวนประวัติมารดา และทารก ผลตรวจทางห้องปฏิบัติการ ข้อมูลการรักษาและภาวะแทรกซ้อน*

สถิติ: *การวิเคราะห์ใช้สถิติเชิงพรรณนา Chi-square หรือ Mann-Whitney U-test ตามความเหมาะสม*

ผลการศึกษา: *มีทารกในการศึกษาจำนวน 30 ราย เป็นเพศชาย จำนวน 12 ราย (ร้อยละ 40) มีอายุครรภ์ และน้ำหนักแรกเกิด 37 (35-40) สัปดาห์และ 2,945 (2,100-3,810) กรัมตามลำดับ มีทารกที่น้ำหนักลดลงจากน้ำหนักแรกเกิดมากกว่าร้อยละ 10 จำนวน 3 ราย ไม่พบทารกที่มีระดับโซเดียมในเลือดสูง ไม่พบความสัมพันธ์ระหว่างความรุนแรงของน้ำหนักที่ลดลงกับ เพศ จำนวนครั้งของการตั้งครรภ์ การผ่าตัดคลอด การกินนมมารดาอย่างเดียวระดับโซเดียมในเลือดและระดับบิลิรูบินในเลือด*

สรุป: *การศึกษานี้ไม่พบภาวะแทรกซ้อนจากการมีภาวะขาดน้ำเนื่องจากได้รับนมมารดาไม่เพียงพอ เช่น ภาวะโซเดียมในเลือดสูง การให้คำแนะนำเรื่องการเลี้ยงลูกด้วยนมมารดา การติดตามชั่งน้ำหนักทารกเป็นระยะ และเฝ้าระวังปัญหาตัวเหลืองในทารกที่กินนมมารดา เป็นสิ่งสำคัญที่จะช่วยให้การเลี้ยงลูกด้วยนมมารดาประสบความสำเร็จ*