original article

The use of breastfeeding assessment tools to predict the excess weight loss risk in newborns

Emzirme değerlendirme araçlarının yenidoğanlarda aşırı kilo kaybını tahmin etmede kullanımı

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Abstract

Aim: Postnatal weight loss is a major issue of concern to pediatricians. We aimed to determine whether the LATCH tool, Infant Breastfeeding Assessment Tool (IBFAT) and the Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF) are useful in predicting postnatal excess weight loss.

Material and Method: One hundred fifty one mother infant dyads' breastfeeding sessions were monitored and scored simultaneously by using the LATCH and IBFAT assessment tools during the postnatal first feeding and at 12, 24 and 48 hours. Maternal confidence in breastfeeding was assessed using BSES-SF at the same breastfeeding sessions. Infants were followed until they reached their birth weights after discharge. Comparisons were made between infants with ≥10% weight loss and infants with <10% weight loss during following.

Results: IBFAT, LATCH and BSES-SF scores were significantly higher in infants with <10% weight loss than those with ≥10% weight loss ($p<0.05$). According to ROC analysis including all tools' scores, AUC values were close to 0.70. These results indicate that these assessment tools can be used to predict the risk of excessive weight loss of the newborns.

Conclusions: Mother/infant dyads that achieve higher scores in these tests can be discharged earlier, avoiding unnecessary hospitalization.

Keywords: Breastfeeding assessment, LATCH, IBFAT, BSES-SF, excess weight loss

Öz

Amaç: Yenidoğan bebeklerde postnatal ilk günlerde aşırı kilo kaybı önemli bir sorundur. Biz bu çalışmada emzirmeyi değerlendirme araçlarından LATCH, IBFAT ve BSES-SF'in postnatal erken dönemde aşırı kilo kaybının tahmininde kullanışlı olup olmayacağını araştırmak istedik.

Gereç ve Yöntem: Doğumdan sonra 150 anne ve bebek çifti emzirme sırasında izlendi ve emzirme başarıları doğumda, 12, 24 ve 48.saatlerde LATCH, IBFAT emzirme araçları ile değerlendirildi. Eş zamanlı olarak annelerin emzirme özgüven skorları belirlendi. Postnatal dönemde bebeklerin kiloları doğum ağırlığına ulaşana kadar izlendi ve %10'dan fazla ve %10'dan az kilo kaybeden bebeklerin emzirme skorları karşılaştırıldı.

Bulgular: IBFAT, LATCH ve BSES-SF skorları %10'dan fazla kilo kaybeden bebeklerde %10'dan az kilo kaybeden bebeklere göre anlamlı derecede düşüktü($p<0,05$). ROC analizine gore AUC değerleri 0,7'ye yakındı. Bu sonuçlar bu emzirmeyi değerlendirme araçlarının aşırı kilo kaybının tahmininde kullanılabileceğini göstermektedir.

Sonuç: Yüksek skorlara sahip anne bebek çiftleri daha erken taburcu edilebilir. Böylece gereksiz hastanede yatıştan kaçınılabilir.

Anahtar Kelimeler: Emzirme değerlendirilmesi, LATCH, IBFAT, BSES-SF, aşırı kilo kaybı

Introduction

Neonates lose 5-7% of their birth weights over the first week of life and regain it by the tenth day of life [1,2]. Excessive weight loss is defined as a weight lose of more than 10% of the birth weight [3-5]. The incidance of severe dehydration is very variable in the literature [3-7]. Severe dehydration, especially with hypernatremia, is associated with serious complications such as cerebral edema, seizures, disseminated intravascular coagulation and intracranial hemorrhage [4,8]. Inadequate breast milk intake appears to be the most important factor in the development of neonatal hypernatremic dehydration [9,10]. In a study, excessive weight lose were found 8% in exclusively breastfed newborns and 26% of these cases were attributable to inadequate maternal milk volume and 74% were attributable to poor breastfeeding technique by either the mother or infant [5]. In order to prevent dehydration, pairs of mother and baby should be closely monitored after birth, and pairs at risk for breastfeeding failure should be further supported. However, healthcare professionals have limited time to assess breastfeeding and identify babies who are at risk for dehydration due to short hospital stays. Therefore, hospitals without the possibility of long-hospital follow-up with high birth capacity, should take other measures to foresee infants at risk for dehydration.

Several tools have been developed to assess breastfeeding, enabling prediction of breastfeeding problems and early weaning. Two of the most commonly tools are the Infant Breastfeeding Assessment Tool (IBFAT) and the LATCH scoring system [11-14]. These tools quantify the behavior of both mother and infant during breastfeeding as well as measure the efficacy of the feeding. However, controversy exists about the validity and reliability of the tools [15-17]. We have presented the realibility and validity of these tools in our previous study [18]. Mother's confidence in breastfeeding is important and assessed using the Breastfeeding Self Efficacy Scale (BSES). This scale was developed by Dennis CL first, afterwards it was shortened and translated into different languages [19-21].

In our present study, we aimed to determine whether the LATCH and IBFAT breastfeeding assessment tools and the BSES-SF are useful in predicting postnatal excess weight loss.

Material and Method

All mothers, who delivered healthy, term singleton infants in the obstetrics & gynecology clinic of a tertiary care hospital between December 2011 and February 2012, and their infants were included in the study. The study was approved by Gazi University Medical School ethics committee. Written informed consent was obtained from each mother following a detailed explanation of the study. Mothers and their infants were excluded from the study for the following reasons: multiple pregnancy; the presence of congenital abnormalities; infants requiring intensive

care. Before birth, mothers were informed verbally and in written by the physician and nurse about appropriate breastfeeding positions, effective breastfeeding techniques, hand expression, breastfeeding frequency and breastfeeding duration. Post delivery infants were placed and remained in direct skin-to-skin contact with their mothers within the first 5-10 minutes after birth in the delivery room and breastfed.

Mothers were recommended that the frequency and duration of breastfeeding should be infant-led. Professional support was provided to mothers whenever they needed.

Breastfeeding was monitored during the first feeding, and at 12 (10-14), 24 (22-26) and 48 (46-50) hours during the hospitalization period by 6 experienced nurse and 2 doctors, and was assessed using the LATCH and IBFAT assessment tools. Simultaneously, mother's confidence in breastfeeding was scored using the BSES-SF.

Mothers and their infants were discharged from the hospital if infant's suck-swallow-breathe coordination was established and two successful feedings were completed according to the IBFAT and LATCH tools. LATCH scores >8 and IBFAT scores >10 were considered as successful. IBFAT scores of the mothers >2 were interpreted that they were satisfied from the experience of breastfeeding. Infants'weights were monitored daily for the first 3 days, and every other day thereafter in our clinic reached their birth weights by a elecrirical scale. Infants were divided into two groups according to maximum weight loss in postnatal follow up: (1) ≥10% weight loss and (2) those with <10% weight loss. Comparisons were made between these two groups. Infants with ≥10% weight loss were monitored with sodium, blood urea nitrogen, creatinine, uric acid and bilirubin measurements and were given expressed breastmilk or formula until they gain sufficient weight. After sufficient weight gain was achieved (20-30g/day), infants were fed only breast milk.

Instruments: The LATCH breastfeeding assessment tool was developed by Jensen, Wallace and Kelsay in 1994 to assist healthcare professionals in evaluating the breastfeeding techniques of mother/infant dyads [22]. The tool provides a systematic documentation and standardization. Each letter in the acronym describes a different area of assessment. L describes the ability of the infant to latch onto the breast, A describes audible swallowing noted at the breast, T describes the type of the nipples, C describes the comfort level of the mother regarding her breasts, and H measures the amount of help mother requires to position her baby at the breast. A numerical score (0,1,2) is assigned to each measure for a possible total score of 10.

The Infant Breastfeeding Assessment Tool (IBFAT) was developed to measure rooting, fixing and suckling behavior of the infant during a feding [16]. The first item of the tools assesses whether the infant is quite alert, drowsy, crying or sleeping at the start of the feed. Items 2 through 5 measure infant's readiness to feed, rooting, fixing and suckling behaviors. Item 6 assess the satisfaction of the mother with the breastfeeding experience. The range of scores for each component is 0-3. BSES-SF; a 14 –item self report instrument, was used to measure breastfeeding confidence. All items are anchored with a 5-point Likert-type scale where 1 indicates 'not at all confident' and 5 indicates 'always confident'. Items are presented positively and summed to produce a score ranging from 14 to 70, with higher scores indicating higher levels of breastfeeding self-efficacy.

Statistical Analysis: Data were analyzed using the Statistical Package for the Social Sciences software (version 15.0; SPSS Inc. Chicago, IL, USA). Frequency and percentage distributions of the data were calculated. While normally-distributed variables were compared using the independent-samples t-test, Mann Whitney U test was used to compare variables with skew distribution. The relationship and correlation between variables were assessed using a chi-square test and the Spearman's correlation coefficient, respectively. Comparisons between LATCH and IBFAT scores measured at different time points were performed using the Wilcoxon signed-rank test. A p value <0.05 was considered statistically significant. Sensitivity, specificity, positive and negative predictive values for the LATCH and IBFAT assessment tools were calculated.

Results

One hundred ninety six infants who were born in the Obstetrics & Gynecology Clinic of Gazi University between December 2011 and February 2012 were evaluated for our study (60 were born via SVD and 136 via CD), after excluding premature infants, twins, those who required intensive care, and infants lost to follow-up. 151 mother/infant dyads were included. The rate of breastfeeding initiation was 100%. During the follow up period we have observed the mean percentage weight loss

as 7.0±2.7% and going into detail revealed that 24 (15.9%) infants had ≥10% weight loss within the first five days of life. Of these infants, 3 (12.5%) had

a BUN level >20 mg/dL, 2 had a creatinine level >1 mg/dL, 3 (12.5%) had a uric acid level >8 mg/dL and 7 (29%) had hypernatremia (sodium level >145mEq/L).

The mean time to hospital discharge was 37.1±15.3 hours (range: 24-85 hours).

We have elaborated the LATCH, IBFAT and BSES-SF scores in infants with ≥10% weight loss and those with <10% weight loss in Table 1. The sensitivity and specificity of LATCH and IBFAT scores in predicting excess weight loss are summarized in Table 2. Comparison between tests were given Table 3.

Table 1. Relationship between LATCH, IBFAT and BSES-SF scores and percentage weight loss

	(mean+SD) median (min-max)	≥10 Weight loss (n=24)	<10 Weight loss (n=127)	p*
LATC H scores	First feeding	6.7±2.4 7 (0-10)	7.8±2.0 8 (1-18)	0.033
	At 12 hours	7.5±1.8 7 (3-10)	8.6±1.8 9 (4-18)	0.006
	At 24 hour	7.4±2.1 8 (3-10)	8.9±1.5 9 (4-10)	<0.001
	At 48 hour	7.4±2.3 7 (3-10)	9.1±1.2 9 (5-10)	0.016
IBFAT score of the infant	First feeding	9.4±2.6 10 (3-12)	9.9±2.4 11 (0-12)	0.345
	At 12 hours	8.7±2.0 8.5 (4-12)	9.9±2.6 11 (0-12)	0.001
	At 24 hour	9.4±2.2 10 (3-12)	10.5±2.2 11 (0-12)	0.002
	At 48 hour	10.0±2.6 11.5 (5-12)	10.9±2.1 11 (5-17)	0.559
IBFAT score of the mother	First feeding	1.7±0.8 2(0-3)	2.1±0.8 2 (0-3)	0.014
	At 12 hours	1.3±0.9 1 (0-3)	2.1±0.9 2 (0-3)	<0.0001
	At 24 hour	1.3±1.0 1 (0-3)	2.2±0.8 2 (0-3)	<0.0001
	At 48 hour	1.7±1.2 1.5 (0-3)	2.3±0.7 2 (1-3)	0.087
BSES-SF	First feeding	52.3±8.2 52 (39-66)	58.9±7.1 59 (35-70)	<0.001
	At 12 hours	55.0±8.5 55.5 (31-66)	60.9±6.6 62 (35-70)	0.001
	At 24 hour	56.0±10 59 (30-69)	62.8 65 (42-70)	<0.001

Table 2. Receiver operating curve (ROC) analysis of LATCH, IBFAT and BSES-SF scores in predicting ≥10% weight loss

		AUC	95 % CI	Cut Off Value	Sensi-tivity	Spec-ificity
LATCH scores.	First feeding	0.635	0.553-0.712	6	41,67	77.95
	At 12 hours	0.673	0.592-0.747	7	54.17	74.8
	At 24 hours	0.727	0.649-0.796	8	66.67	74.8
	At 48 hours	0.718	0.566-0.841	7	58.33	88.57
IBFAT score of the infant	First feeding	0.559	0.476-0.640	6	20.83	90.55
	At 12 hours	0.712	0.632-0.782	10	83.3	58.3
	At 24 hours	0.689	0.608-0.762	11	91.7	40.2
	At 48 hours	0.528	0.376-0.677	8	25	94.4
IBFAT score of the mother	First feeding	0.645	0.563-0.721	1	37.5	82.7
	At 12 hours	0.741	0.663-0.808	1	66.7	78
	At 24 hours	0.752	0.675-0.819	1	58.3	84.3
	At 48 hours	0.657	0.502-0.790	1	50	88.2
BSESS-SF score	First feeding	0.733	0.655-0.802	54	70.8	75.6
	At 12 hours	0.723	0.645-0.793	64	91.7	42.5
	At 24 hours	0.731	0.653-0.800	61	75	65.4
		0.748	0.598-0.864	56	58.3	91.4

Table 3. Pairwise comparisons for ROC curves

p*	First feeding	At 12 hour	At 24 hour	At 48 hour
LATCH-IBFAT	0.1815	0.3697	0.5457	0.0957
LATCH-IBFAT (mother)	0.8668	0.2076	0.6861	0.5883
LATCH-BSESS-SF	0.1838	0.4682	0.9491	0.8075
IBFAT-IBFAT(mother)	0.1306	0.5514	0.2230	0.0789
IBFT-BSESS-SF	0.0476	0.8412	0.4561	0.0191
IBFAT (mother)-BSESS-SF	0.2858	0.0634	0.7408	0.2704

*Delong et. al., 1988

Discussion

Despite the benefits of breastfeeding for the mother and infant, studies reported increased incidence of hypernatremic dehydration in exclusively breastfed infants [23-25]. In a previous study the excess weight loss was observed as 7.7% and hypernatremia as 35% of

686 breastfed term infants [5]. Another study reported a dehydration rate of 2.4% among 2.788 breastfed term infants [26]. In our study, we observed excess weight loss in 24 of exclusively breastfed infants (15.9%). Although hypernatremia (>145 mEq/L) was noted in 5 (29.2%) of 24 infants with dehydration, only 3 (12.5%) infants had a serum sodium level ≥150 mEq/L. The rate of hypernatremic dehydration in whole study group was 3.3%.

When we analyze the previous studies, high LATCH scores in the first day of life were reported to be associated with high breastfeeding rates at 6 weeks [17]. Riordan et al. [17] reported that low LATCH scores were associated with nipple and breast discomfort and this resulted in early weaning. Kumar et al. [11] assessed LATCH scores once every 8 hours on day 1 and once daily thereafter, and reported that mothers who had a LATCH score ≥ 9 at 16 to 24 hours were 1.7 times more likely to be breastfeeding at 6 weeks as compared to those with lower LATCH scores. The authors recommended support and close follow-up for those with low LATCH scores[11]. In another study, It has been shown that low LATCH scores are resulted from nipple and breast discomfort and that this causes early weaning [27]. Therefore, it is recommended that the underlying reason should be investigated breastfeeding success can be increased by eliminating the underlying reasons.

Our present study is the first to assess the role of LATCH and IBFAT assessment tools in predicting excess weight loss in the early neonatal period. The LATCH and IBFAT scores has been significantly low in infants with high rate of weight loss and these test could be used as an indicator. However the sensitivity and specifity of these tests are quite low and the negative predictivity is high which leads us to define mothers with high scores before discharge in order not to prolong hospital stays. On the other hand, the mother infants dyads with low scores should be follow up very closely.

To our knowledge, this is the first study to evaluate the role of LATCH and IBFAT assessment tools in predicting excess weight loss in the early neonatal period. Assessment of mother/infant dyads using breastfeeding assessment tools may enable the detection and close monitoring of infants at risk for inadequate breastfeeding. Moreover, mother/infant dyads that achieve higher scores in these tests can be discharged earlier, avoiding unnecessary hospitalization.

Declaration of conflicting interests

The author declared no conflicts of interest with respect to the authorship and/or publication of this article.

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