

소아재활

게시일시 및 장소 : 10 월 19 일(토) 08:30-12:30 Room G(3F)

질의응답 일시 및 장소 : 10 월 19 일(토) 11:00-11:30 Room G(3F)

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Validity of the TIMP-SI test to Assess Motor Development in Preterm Infants

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Introduction

Preterm infants are high risk group for developmental delay. The Test of Infant Motor Performance Screening Items test (TIMPSI) is a shorter screening version of the Test of Infant Motor Performance. The aim of this study was to assess the relationship between TIMPSI and the Alberta Infant Motor Scale (AIMS) in preterm infants.

Method

Total 139 infants were scheduled to receive TIMPSI at 34-40 weeks postmenstrual age (PMA), 1 month, and 3 months corrected age (CA) and AIMS at 4, 8, 12-months CA. The association between the z-score on the TIMPSI and AIMS percentile ranks (PR) was analyzed. The age at which the best correlation occurred between TIMPSI and AIMS was selected for analysis of sensitivity and specificity for predicting AIMS performance below the 10th PR at 4, 8, and 12 months.

Results

Baseline characteristics of the infants are shown in Table 1. TIMPSI at 34-40 weeks PMA, 1 month, and 3 months CA showed correlation with AIMS at 4 and 8 months CA ($p < 0.05$), except TIMPSI at 1 month CA and AIMS at 4 months CA (Table 2). However, TIMPSI at all periods were not related with AIMS at 12 months CA. The best TIMPSI to maximize specificity and correctly identify 86% of the infants above versus below the 10th PR at 4 months was a TIMPSI at 34-40 weeks PMA with a cut-off point of 2 SD below the mean (Table 3). The same cut-off point correctly identified 74% of the infants at 8 months. However, the best TIMPSI to maximize specificity and correctly identify 84% of the infants above versus below the 10th PR at 12 months was a TIMPSI at 3 months CA with a cut-off point of 2 SD below the mean.

Conclusion

TIMPSI scores significantly predict AIMS PR 4 to 8 months later. TIMPSI at 34-40 weeks PMA has the greatest validity for predicting motor performance on the AIMS at 4 and 8 months, whereas TIMPSI at 3 months CA has the greatest validity for predicting motor performance on the AIMS at 12 months.

Table 1. Clinical and demographic characteristics (total n=139)

	Values
Gestational age	
weeks < 28	29 (20.9)
28 ≤ weeks < 32	55 (39.6)
32 ≤ weeks < 37	55 (39.6)
Birthweight	
grams < 1000	37 (26.6)
1000 ≤ grams < 1500	45 (32.4)
1500 ≤ grams < 2500	54 (38.8)
2500 ≤ grams	3 (2.2)
Male : Female	69 (49.6) : 70 (50.4)
Bronchopulmonary dysplasia	16 (11.5)
Retinopathy of prematurity	13 (9.4)
Radiology	
Normal	68 (48.9)
Periventricular leukomalacia	11 (7.9)
Intraventricular hemorrhage	54 (38.8)
Necrotizing enterocolitis	5 (3.6)
Infants who received TIMPSI at 34-40 weeks PMA	80 (57.6)
Infants who received TIMPSI at 1 month CA	86 (61.9)
Infants who received TIMPSI at 3 months CA	113 (81.3)
Infants who received AIMS at 4 month CA	135 (97.1)
Infants who received AIMS at 8 months CA	90 (64.7)
Infants who received AIMS at 12 months CA	71 (51.1)

Values are mean standard deviation or n(%)

TIMPSI, Test of Infant Motor Performance Screening Items test; AMIS, Alberta Infant Motor Scale; PMA, postmenstrual age; CA, Corrected Age

Table 2. Pearson's correlation between TIMPSI and AIMS test results at various ages

TIMPSI z-score measure	AIMS PR at 4 months CA	AIMS PR at 8 months CA	AIMS PR at 12 months CA
TIMPSI at 34-40 weeks PMA			
<i>r</i>	0.281	0.326	0.117
<i>p</i>	0.013*	0.012*	0.395
<i>n</i>	78	59	55
TIMPSI at 1 month CA			
<i>r</i>	0.208	0.278	0.111
<i>p</i>	0.056	0.036*	0.423
<i>n</i>	85	57	54
TIMP at 3 months CA			
<i>r</i>	0.317	0.230	0.177
<i>p</i>	0.001*	0.043*	0.188
<i>n</i>	114	78	57

TIMPSI, Test of Infant Motor Performance Screening Items test; AMIS, Alberta Infant Motor Scale; PMA, postmenstrual age; CA, Corrected Age

Table 3. Summary of diagnostic efficiency of TIMPSI in predicting performance on AIMS at 4, 8, and 12 months

	TIMPSI cut-off score	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Overall correct classification %
AIMS below 10th centile at 4 months						
TIMPSI z-score at 34-40 weeks PMA (n=77)	≤-0.5	100.00	0.00	10.39	-	10.39
	≤-1	87.50	17.39	10.94	92.31	24.68
	≤-2	37.50	91.30	33.33	92.65	85.71
TIMPSI at 1 month CA (n=81)	≤-0.5	90.00	33.80	16.07	96.00	40.74
	≤-1	90.00	57.75	23.08	97.62	61.73
	≤-2	80.00	56.34	20.51	95.24	59.26
TIMPSI at 3 month CA (n=114)	≤-0.5	84.62	33.66	14.10	94.44	39.47
	≤-1	69.23	69.31	22.50	94.59	69.30
	≤-2	46.15	86.14	30.00	92.55	81.58
AIMS below 10th centile at 8 months						
TIMPSI z-score at 34-40 weeks PMA (n=58)	≤-0.5	100.00	0.00	31.03	-	31.03
	≤-1	83.33	15.00	30.61	66.67	36.21
	≤-2	33.33	92.50	66.67	75.51	74.14
TIMPSI at 1 month CA (n=56)	≤-0.5	91.67	38.64	28.95	94.44	50.00
	≤-1	83.33	47.73	30.30	91.30	55.36
	≤-2	83.33	65.91	40.00	93.55	69.64
TIMPSI at 3 month CA (n=77)	≤-0.5	76.19	32.14	29.63	78.26	44.16
	≤-1	68.75	73.33	40.74	90.00	72.73
	≤-2	38.10	89.29	57.14	79.37	75.32
AIMS below 10th centile at 12 months						
TIMPSI z-score at 34-40 weeks PMA (n=53)	≤-0.5	100.00	0.00	15.09	-	15.09
	≤-1	87.50	20.00	16.28	90.00	30.19
	≤-2	37.50	88.89	37.50	88.89	81.13
TIMPSI at 1 month CA (n=52)	≤-0.5	66.67	43.48	13.33	90.91	46.15
	≤-1	66.67	52.17	15.38	92.31	53.85
	≤-2	66.67	65.22	20.00	93.75	65.38
TIMPSI at 3 month CA (n=55)	≤-0.5	75.00	34.04	16.22	88.89	40.00
	≤-1	50.00	78.72	28.57	90.24	74.55
	≤-2	37.50	91.49	42.86	89.58	83.64

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