Latency Intervals of Moro Response: A Valuable Neuro-screening Tool

Moro response in healthy term newborns were studied to determine latency interval, time taken for optimal response (embracing movement of arms), and total duration of reflex response. Latency interval for onset of response was 0.41-0.49. Time taken for optimal response was 0.910-1.041s. Total duration of Moro response was 2.34 -2.59 s. Values were similar for males and females. Optimal response in babies born by cesarean section were significantly delayed than vaginal babies.

Key words: Latency, Moro response, Newborn, Screening.

Moro response is usually described as normal/abnormal or present/absent. However, deviant responses like, vigorous, weak and asymmetric responses have been shown to be closely linked with developmental outcome [1] and neurological impairment in newborns [2]. Studies on duration and quality of different events in normal response like the latency interval, optimal response and total duration of reflex response are few, and standard values for these durations are not available. The present study was undertaken to evaluate Moro response qualitatively, and determine normative values for latency interval and other components of a normal response

Latency interval of Moro reflex was defined as the time taken for onset of first sign of reflex response. Arc like embracing movement of arms following initial abduction was considered as Optimal response. The total time taken for a complete response was labeled as Completion. 91 healthy full term newborns, who remained asymptomatic for the first 48 hours after birth, were included in this prospective observational study. The study was carried on newborns after 48 hours (time for physiological stabilization) of birth. Head drop method was used to elicit Moro response [3] while the baby was alert, active and moving the limbs but not crying. Video recording was done simultaneously, and the investigator analyzed the video-clippings and calculated the various parameters with the help of a stop watch. Mean values were calculated for latency interval, optimization and total duration of response. Upper and lower limit was obtained by calculating the 95 % confidence interval for the means.

The range for latency interval of Moro response was found to be 0.41-0.49 seconds. The time taken for optimal Moro response was 0.91-1.04 seconds and the total duration for Moro response was 2.34-2.59 s. The values were similar for males and females. The mean values of newborn delivered through cesarean section were longer than babies delivered vaginally but was found to be statistically significant only for time taken for optimal response.

TABLE I VALUES OF VARIOUS PARAMETERS OF MORO REFLEX IN HEALTHY TERM NEWBORNS (*N*=91)

Parameter	*Values (s), mean (SD)*		
	Male (n=48)	*Female (n=43)*	*Overall*
Latency interval	0.42 (0.172)	0.48 (0.197)	0.45 (0.186)
Time taken for optimal response	0.97 (0.226)	1.02 (0.292)	0.998(0.259)
Duration of complete response	2.55 (0.59)	2.38 (0.625)	2.47 (0.61)

In view of these findings, a better assessment is possible by a standardized grading of Moro reflex in the form of an ordinal scale, as follows: 0 - Absent reflex; 1 - Long latency (>0.49 s); 2 - Normal range (0.41 -0.49s); and 3 - Short latency (< 0.41s).

For day-to-day use, the time taken to pronounce the word "thousand and one" is approximately 0.4-0.5 sec and will be a fair estimate of latency interval. Say "thousand and one" with the head drop. Onset of response both before and after the completion of the word "thousand and one" shall be considered as abnormal.

Hyperexcitability (short latency) may indicate behavior problems in later life like short concentration span, mood instability and learning difficulty while delayed excitability (long latency) may indicate severe nervous system pathology[4]. Results of our study are comparable with other studies [5,6], taking in to consideration the difference in methods and analysis.

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Bone Metabolism in Cow Milk Allergic Children

Children with cow milk allergy are suspected to develop calcium metabolism disturbances. We observed increased markers of bone turnover in these children. Children with cow milk allergy are more prone to develop the disturbances of the bone mineralization even in the first year of life.

Kew words: *Bone metabolism, Children, Cow milk allergy*.

Human and cow milk contains several factors active in the regulation of bone metabolism and mineralization of the growing skeleton. Children with cow milk allergy (CMA) are under a potential risk of eating insufficient quantity of calcium in the diet [1]. We aimed to analyze the markers of bone mineralization and metabolism through an observational study. Our studied group consisted of 25 CMA children (aged 8±4.2 months) and 65 healthy controls (4± 2.8 months). CMA was confirmed by standardized open oral food challenge [2]. Enrolled children were fed with extensively hydrolyzed or amino acid formulas. The duration of milk-free diet was 4±0.26 months. Vitamin D was administered to all the children from second week of life (666 I.U of cholecalciferol per day). The markers of bone metabolisms and turnover were analyzed from the serum and urine. The study was approved by the Ethical Committee.

In the control group of healthy children, all the examined parameters were within physiological ranges. Conversely, cow milk-allergic children showed lower serum and urine concentration of calcium (serum: 2.06±0.06 *vs.* 2.26±0.03 mmol/L, P=0.008; urine: 0.36±0.30 *vs.* 1.51±0.68 mmol/kg/day, P=0.008). Alkaline phosphatase (ALP) and its bone isoform (BALP), the two markers of increased bone turnover, were significantly increased in children with CMA (ALP: 9.07±0.59 µkat/L *vs.* 4.04±0.42 µkat/L, P=0.008; BALP: 87.67±3.88% of total serum ALP *vs.* 61.80±11.73% of total serum ALP, P<0.001). Serum osteocalcin and urine hydroxyproline did not differ between the two groups.

We found enhanced bone turnover in cow milk allergic children compared to healthy infants during the first year of life. Patients with cow milk allergy are at potential risk for osteopenia because their milk-free diet usually contains low calcium contents [3]. Appropriate substitution of essential minerals into the diet of cow-milk allergic children could result in complete resolution of the clinical symptoms of osteopenia and rickets [4].

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