

Short Term Monitoring of Auditory Nervous System in Infantile Hyperbilirubinemia

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Neonatal hyperbilirubinemia is one of the most prevalent clinical conditions in the first week of life [1-3]. Approximately, 8 to 11 percent of neonates involved in hyperbilirubinemia which may cause severe neurological damage, but by doing timely actions such as phototherapy and blood exchange transfusion serious consequences are effectively controlled. Despite of using modern medical methods and equipment for the treatment of neonatal hyperbilirubinemia, some studies indicate the negative consequences of this disorder in adulthood [4]. The findings of the recent study indicated disorders similar to those of the fronto-striatal network, and also in the hyperbilirubinemia group showed symptoms of the ADHD spectrum, according to which researchers suggest a link between hyperbilirubinemia and other neurodevelopmental disorders. In the contrary, Wong, *et al.* in 2006 suggested that hyperbilirubinemia had a transient toxic effect on the auditory pathway of the brainstem provided that immediate treatment is started [5].

Recently, the author conducted research on the comparison of auditory brainstem responses (ABRs) in two groups of infants who were jaundiced and jaundiced with blood exchange transfusions with a group of healthy infants. The study was done to show the short term effects of hyperbilirubinemia on the brainstem part of the central auditory nervous system (CANS). A total of 59 infants (59 ears) participated in this study, ranging in age from 4 to 9 months, and were divided into 3 groups, which are: healthy infants group (HG 23 infants), jaundiced group (JG 20 infants), and jaundiced with blood exchange transfusions group (JEG 16 infants). The following items were also considered as inclusion criteria for all subjects in all 3 groups:

All of the infants were term and at least 4 months have passed since the treatment of hyperbilirubinemia

Having an ABR response with a click stimulus.

No middle ear problems and transient hearing loss.

No problems during pregnancy according to the parents (such as hypoxia, hypothermia, etc.)

Absence of problems at birth according to the parents (such as meningitis, facial cranial abnormalities, etc.).

No pregnancy infections according to the parents (such as TORCH and sepsis, etc.).

No family history of hearing loss (including congenital or genetic hearing loss).

Absence of congenital or metabolic diseases associated with hyperbilirubinemia such as thalassemia, Gilbert syndrome, galactosemia, glucose-6-phosphate dehydrogenase deficiency, etc.

ABR test was performed four months after hyperbilirubinemia treatment. ABR test using click 0.1 msec and chirp stimuli was done at 60 and 20 dB nHL. The latency and amplitude of the wave V and I - III, III - V, and I - V interpeak intervals were recorded.

Analysis of the findings of this study showed that infants of JG and JEG groups had responses with delayed latency compared to HG group. Another considerable finding was the higher amplitude of the wave V with click stimulus at the intensity of 20 dB nHL compared to the chirp stimulus. Thus, according to the results of this study, it seems that click stimulus is more efficient to chirping to obtain infantile hearing threshold. Besides checking the ABR response at 60 dB nHL of intensity has shown that the morphology of the waves was sharper using the click stimulus rather than chirp. On the other hand, it was concluded that there is a difference between the ABR responses of infants with blood exchange transfusion using click and chirp stimulation, so this finding confirms that neurotoxicity can be observed in the JEG group even in a short period of time. Based on the findings of this study, the authors suggest that other auditory electrophysiological tests be performed to assess the condition of the auditory higher pathways as well as the nerve fibers associated with other senses.

Bibliography

1. Olusanya BO., *et al.* "Risk factors for severe neonatal hyperbilirubinemia in low and middle-income countries: a systematic review and meta-analysis". *PLoS One* 10.2 (2015): e0117229.
2. Bhutani VK., *et al.* "Neonatal hyperbilirubinemia and Rhesus disease of the newborn: incidence and impairment estimates for 2010 at regional and global levels". *Pediatric Research* 1 (2013): 86-100.
3. American Academy of Pediatrics Practice Parameter. Management of hyperbilirubinemia in the healthy term newborn". *Pediatrics* 94 (1994): 558-565.
4. Hokkanen L., *et al.* "Adult neurobehavioral outcome of hyperbilirubinemia in full term neonates-a 30-year prospective follow-up study". *Peer Journal* 2 (2014): e294.
5. Wong V., *et al.* "Short- and Long-Term Outcome of Severe Neonatal Nonhemolytic Hyperbilirubinemia". *Journal of Child Neurology* 21.4 (2006): 309-315.

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