

Cerebral Perfusion Abnormalities in Cases of Down Syndrome

A SPECT (single photon emission computed tomography using Tc-99m HMPAO) study of brain with segmental quantitative analysis was conducted to access the cerebral perfusion in cases of Down's syndrome (DS). Varying level of brain hypo-perfusion was documented, probably explaining the neurophysiologic basis of cognitive and neuropsychological deficits, which are not well understood in DS.

Key words: *Cognitive deficit, cerebral perfusion, SPECT, Tc-99m HMPAO, neuropsychological deficits.*

The neurophysiologic basis for these cognitive deficits (mental retardation, deficit in language and memory etc.) in down syndrome still remains poorly understood. Autopsy on these cases have reported decrease in the spinous processes of apical dendrites of the pyramidal neurons [1], lack of granular cells [2], early appearance of neurofibrillary tangles, senile plaques or both at the age of 30-40 years, and, incomplete or delayed myelination in some cerebrocortical regions viz. frontotemporal lobes and in cerebellocortex, especially in U fibers [2]. In general there is an overall decrease in metabolic need of oxygen to maintain the resting membrane potentials and hence, decrease, in cerebral perfusion [3-5]. Therefore, we conducted SPECT HMPAO study to assess the quantitative segmental cerebral perfusion in cortical and subcortical areas of brain in children with Down Syndrome.

We enrolled 10 patients with Down's syndrome (proved trisomy 21 on karyotyping) with 5 age matched control with mean age of 6 ± 1.5 years (4.5-8 years). In both groups, only those children were selected, whose EEG and MRI were normal. Informed consent was taken from parents. The study was approved by the Ethical Clearance Committee of Krishna Ram Ayurvedic Shodh Sansthan (KRASS).

The patients were evaluated by SPECT [6] using Technetium-99m *d, l*, hexamethylpropyleneamine

oxime [^{99m}Tc] HMPAO. Analysis was conducted for perfusion studies using segmental quantitative method (Xeleris brain SPECT segmental analysis application).

The results revealed a lower count values (30 to 45) in cases, as compared to control group (75-85), indicating a generalized perfusion abnormality in cases of DS ($P < 0.05$). The fronto-parieto-temporal region showed comparatively lower perfusion in comparison to other areas of brain in cases. Lower perfusion was also observed in subcortical areas.

Review of literature reported lowered cerebral perfusion in fronto-parieto-temporal region and reduced cortical activity in Down Syndrome [3-5]. A correlation between the degree of cerebral hypoperfusion in DS and retarded developmental was also reported, especially in personal-social and fine motor skills (such as stereotypic movements and echophenomena). The altered perfusion in left medial prefrontal cortex was associated with impairments in communication and social interaction [7,8] and altered perfusion in left anterior cingulate gyrus was associated with impairments in communication, social interaction and obsessive desire for sameness [9]. Sears, *et al.* [10] reported stereotyped and ritualistic behavior due to subcortical dysfunction, whereas poor functioning of paleocortically derived regions of the thalamus and basal ganglia were associated with defect in response modulation, planning, sequencing and attention.

This study provides a direction to understand the mechanism of cognitive dysfunction, abnormal responses to sensory stimuli, obsessive desire for same-ness, impairment in communication and social interaction observed in children with Down syndrome.

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Sunil Kumar Gupta and B Venkat Ratnam

*Krishna Ram Ayurvedic Shodh Sansthan, Anita Colony, Bajaj Nagar, Jaipur 302 015, India; and * Vardhman Nuclear Medicine Centre, SDM Hospital, Jaipur, India. drskg@yahoo.com*

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Seroprevalence of Hepatitis A Virus Antibody in Bijapur, Karnataka

We studied the seroprevalence of anti-HAV IgG in children of Bijapur a tier III city/backward district in Karnataka and its relation with sociodemographic parameters. Out of 142 children, 6 months to 15 years who were included, 63 (44.4%) were sero positive, suggesting that Bijapur is a low endemic area.

Key words: *Hepatitis A, IgG, Seroprevalence, Socioeconomic condition.*

In areas of high endemicity, most children are exposed to Hepatitis A virus (HAV) and the consequent acquisition of antibodies against the virus confers lifelong immunity. The changing scenario in the last 20 years in developing countries from high to low seroprevalence reflects the impact of living standards and environmental hygiene on prevalence of infection. In India, limited epidemiological data are available on HAV

infection, with a seroprevalence of anti HAV IgG exceeding 90% in adults. However, there have been recent reports of a decreasing prevalence in this country, suggesting that the seroprevalence of HAV antibodies is becoming similar to industrialized world.

We determined seroprevalence of anti-HAV IgG in a cross-sectional study carried out between November 2006 to April 2008. Children 6 months to 5 years age attending our hospital and children between age 5 years to 15 years from an urban and rural/slum school of Bijapur, were included.

Detailed socioenvironmental history and immunization history were taken. Children with history of jaundice, hepatobiliary disease and those who are already immunized against hepatitis A were excluded from the study. 2 mL of blood in plain vial was collected; ELISA test was done for anti HAV IgG (Wantai Biopharma antibody kit). Data was analyzed using Correlation coefficient and Z test.

The age distribution shows a significant transition of positivity for anti HAV IgG in the age group 3 to 4 years. As age increases seropositivity for anti HAV IgG also increases at the rate of correlation coefficient 0.684.