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Structural correlates of dysregulated cardiac autonomic function in offspring exposed to alcohol during antenatal period

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Background: Several lines of investigations have shown the deleterious effect of an alcohol on the autonomic nervous system. Also, evidences have shown altered brain volume in children who were exposed to alcohol in utero. It remains unknown whether any brain structural alterations correlate with cardiac autonomic regulation. In this study we measured the cardiac autonomic functions and brain volumes in children who were exposed to alcohol in the antenatal period and compared them with non-exposed control children.

Methods: Twenty eight children (age: 9 ± 2 years) in the antenatal alcohol exposed group and age, gender matched 30 non exposed healthy volunteers as a control (age: 10 ± 2 years) were recruited. HRV parameters were recorded and analyzed in the time and frequency domains using customized software. Magnetic resonance imaging was acquired as per standard protocol. Data was analyzed using both manual and automated morphometric methods.

Result: Low frequency power, normalized units (nu) and low frequency to high frequency ratio were significantly higher in the antenatal alcohol exposed children compared to the controls suggesting asympathetic predominance. Decrease in the gray matter volume was noted in right fusiform gyrus in prenatally alcohol exposed children when compared to controls. A positive correlation was noted with high frequency power and cingulate gyrus volume ($p < 0.001$). The low frequency (nu) also showed a positive correlation with the amygdala volume $p < 0.001$.

Conclusion: In this study we provide evidence for the deleterious long lasting effect of antenatal exposure of alcohol on cardiac autonomic regulation. Neuroimaging data supports the notion that structural aberration in amygdala and cingulate gyrus might have role in the dysregulation of cardiac autonomic function. Further prospective studies are needed to confirm the causal relationship between antenatal alcohol exposure, brain volume changes and autonomic dysregulation.

Biography

Talakad N Sathyaprabha is a Professor in the Department of Neurophysiology, NIMHANS Bangalore, India. She had published over 70 manuscripts in international journals and presented several lectures and research work in international scientific conferences. She is an eminent member of many professional bodies including Third World Organization for Women, Indian Academy of Neurosciences, Association of Physiologist and Pharmacologists of India, Neurological Society of India, Indian Academy of Neurology.

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