

Original article:

Study of serotonin level in autism

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Abstract:

Background and Objective; Autism spectrum disorder defines a complex and heterogeneous group of neurodevelopment condition. Serotonin is a neurotransmitter which is instrumental in control of sleep mood, and temperature regulation. Materials and methods= the present study was conducted in Samarth pathology laboratory. The study included 25 autistic children from arambh autistic school and 25 normal children in the age group of 1 -10 years were taken for control match. serotonin level was measured in Metropolis laboratory, Bombay. Result ;serotonin level was significantly increased in ASD children as compared with control. Conclusion; there is significantly increase in serotonin level of autistic children.

Key words : Serotonin level, autism

Introduction

Autism is a neurodevelopmental disorder of unknown etiology, but with a strong genetic basis. It develops and is typically diagnosed before 36 months of age. It is characterized by a behavioral phenotype that includes qualitative impairment in the areas of language development or communication skills, social interaction and reciprocity, and imagination and play. [1] Infantile autism was described by Leo Kanner in 1943 ,as 'autistic disturbances of affective contact' This syndrome has variously been described as autistic disorder ,pervasive disorder, childhood autism, Childhood psychosis and pseudo defective psychosis[2]. Causes of autism are multifactorial. Genetic factors play a significant role .Pre or perinatal brain injury is an important risk augmenting factor.. Neuroradiological and neurochemical studies suggest abnormalities in brain Structure and function is also a factor of autism.[3].

Elevated blood serotonin was the first biomarker identified in autism research Hlantley et al ,1977; Sachin and Freedman ,1961. Serotonin, is a neurotransmitter, having a role in control of sleep, mood, some types of sensory perception, body temperature regulation and appetite. 4. Abnormalities in brain 5-HT systems were reported..

Materials and methods

Present study was conducted in Department of physiology ,MGM's medical college Aurangabad. Study included 25 autistic children from "Arambh" autistic school and 25 normal children in the age group 1-10 years were taken for control match.

Methodology

After obtaining ethical clearance, a proper written informed consent was taken from the parents of autistic children. Blood samples were collected, in samarth pathology laboratory and for measurement of serotonin level in blood, and test were performed in Metropolis Healthcare limited ,using serotonin elisa

kit. Then reports were evaluated. To be included in the study, children were diagnosed patients of autism,

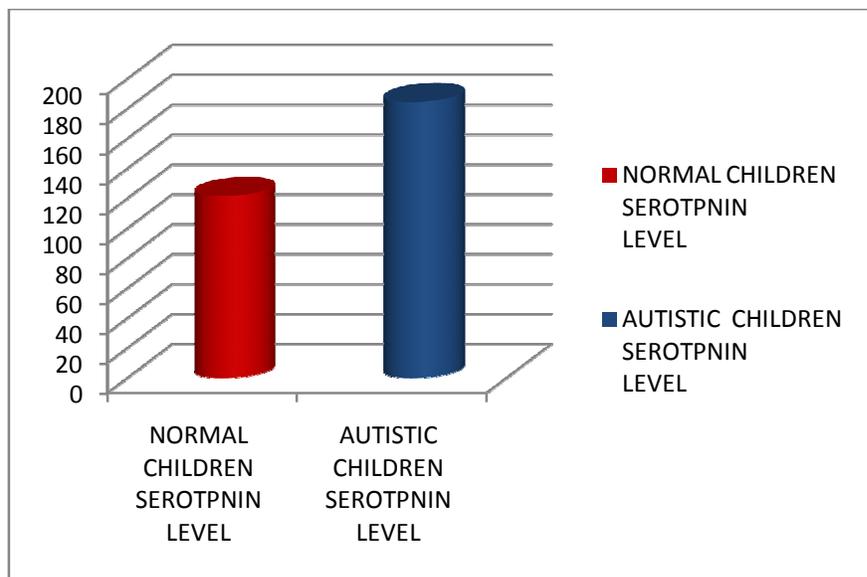
excluded from the study, children with other mentally disorder.

Observations

Normally, serotonin level in blood is 70 -270 ng/ml.

Table 1 : comparison of Normal Children Serotonin Level & Autistic Children Serotonin Level ng/ml

Sr. No.	NORMAL CHILDREN SEROTONIN LEVEL ng/ml	AUTISTIC CHILDREN SEROTPNIN LEVEL ng/ml	t test
1.	121.55 ± 82.25	184.45 ± 98.82	0.01



Discussion

Serotonin is a monoamine neurotransmitter ,having important role in brain development It is playing important role in processes such as neurogenesis, synaptogenesis and dendritic Maturation[.5].changes in serotonin levels during development have profound effects on these processes and on overall brain development[.6]. Research suggested that autistic individuals have abnormalities in serotonergic axon development. Azmitia et al found increased density of serotonergic pathway in the

forebrain of autistic individuals Across all ages[7].. it was suggested that overactivation of the serotonergic system lead to the increase In serotonergic tracts. Serotonin is involved in number of processes during cortical development and abnormal levels of Serotonin can lead to abnormalities in the organization of cortical neurons[8] Unusually high levels of serotonin can prevent normal spine development.[9] Theories suggest that autistic individuals have abnormal serotonin level during development.

But whether it is due to hypo or hyper synthesis is not cleared. It has been found that there is a decreased level of serotonin binding in the brains of autistic individuals. It may be due to abnormalities in serotonin receptors or transporters.

In 2008, Makkonen found that serotonin receptor transporter had decreased binding capacity in the medial frontal cortex of autistic individuals. In a theory of mind processes, the medial frontal cortex has been implicated, that is deficient in autistic individuals.[10]

The SLC6A4 gene is found on chromosome 17q11-12 and encodes one of the serotonin transporter genes. The 5-hydroxytryptamine transporter length polymorphism of the SLC6A4 gene is thought to play a role in the abnormalities seen in serotonin transporter binding in autism.

Serotonin receptors are not found exclusively in the brain, but also have targets on blood platelets. It has been shown that structure of serotonin molecules and serotonin transporter proteins in the CNS and in the blood are identical. Hyperserotonemia could be caused by a decreased ability of the platelets to bind serotonin or due to overall increased levels of serotonin in the body.[11] Study by Kazek et al.[11] found that autistic individuals have hyperserotonemia which may be caused by increased production of serotonin in the intestines.[12]

Conclusion

In autistic children, serotonin synthesis capacity increased gradually between the ages of 2 years and 15 years to values 1.5 times than adult normal values and showed no sex difference. Hyperserotonemia is common in autistic children..

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