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Treatment of Autism Spectrum Disorder (ASD) with Ultra Low Dose Bremsstrahlung Radiation (ULDBR) produced by Phosphorus-32: Initial Clinical Observations

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Abstract
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Abstract

Objectives:

This IRB approved study was to observe the therapeutic effect of ultra-low-dose bremsstrahlung radiation produced by 32P source on autism spectrum disorder.

Methods:

31 children diagnosed with autism based on DSM-5 criteria were selected (26 boys and 5 girls, mean age of 7, range 4-16y). A 1.85 MBq solution of P32 was diluted evenly dripped onto a filter paper to create a uniform radioactive source, covered with a 0.03 mm thick lead foil on the surface, and sealed in a plastic bag to generate an applicator treatment source. The P32 bremsstrahlung dose rate was 1~2×10-6 SV/h, measured with a Autoness 6150AD-6/H radiation detector. The applicator with the lead foil side was placed respectively on the forehead, bilateral temporal tops, and occipital region. A treatment course consists of twenty days. The initial treatment lasted one hour, and subsequent treatment times were adjusted according to the Phosphorus-32 decay factor.

All children were assessed using the Childhood Autism Rating Scale (CARS) and Autism Behavior Checklist (ABC), before treatment, and three-month after. Among them, five children underwent PET-MR fluorodeoxyglucose-18 (FDG) brain metabolic imaging before and three months after treatment. Images was processed using SPM12 software. Wilcoxon signed tank sum test was used to compare the scores pre/post treatment.

Results:

27 (87%) out of 31 subjects had improved CARS scores. The average CARS scores significantly decreased from 59.8 (SD 24.0) pre-treatment to 42.7 (SD 24.3) post-treatment ($p< 0.001$). 24(77%) subjects had improved ABC scores. The average ABC scores significantly decreased from 41.0(SD 15.9) pre-treatment to 31.5 (SD 9.2) post-treatment ($p< 0.001$). Eight subjects did not improve on either ABC or CARS score, including three subjects did not improve on both scores. Out of the eight cases, seven exhibited cognitive improvements, such as enhanced eye contact, responsiveness, and language comprehension. The 8th child showed significant emotional stability, no longer having tantrums without cause, and experienced noticeable improvements in sleep disorders.

The comparison of PET/MR brain 18F-FDG metabolic imaging before and after treatment in the five cases shows that there were significant changes in metabolism and volume of certain brain regions after treatment, suggesting qualitative changes in brain function and even structure following the treatment.

During the treatment, some children experienced 3-7 days of abnormal excitement and reduced sleep duration. No other significant side effects were observed during treatment, and a three-month follow-up showed no regression. These children's growth and development appeared to be normal.

Conclusion(s):

This is the first study reporting the ground breaking and encouraging therapeutic effect of ultra-low-dose P32 bremsstrahlung radiation on treating children with autism. Extensive further research is warranted to explore the mechanism of action and best clinical practices.