ANTIOXIDANT STATUS AND FATTY ACIDS IN ADOLESCENTS WITH ASPERGER SYNDROME AND FIRST EPISODES OF EARLY-ONSET PSYCHOSIS

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INTRODUCTION:

•Evidence suggests that oxidative stress-mediated cell membrane pathology and impairment of lipid metabolism may be involved in the physiopathology of autism spectrum disorders and schizophrenia [1,2].
•The brain is one of the most enriched tissues in the body in lipids such as the eicosapentaenoic acid (EPA) and the docosahexaenoic acid (DHA), which contribute to membrane structure and function [3].
•Several studies have reported significantly reduced levels of polyunsaturated fatty acids (PUFAs) in plasma and red blood cell membranes from patients with schizophrenia and autism [4].

PURPOSE OF THE STUDY:

The aim of this study was to explore the differences in oxidative status and plasma PUFAs as indicators of cell membrane integrity in two groups of adolescents, one with Asperger syndrome (AS) and another with a first episode of early-onset psychosis, and compare them with healthy controls.

METHODS:

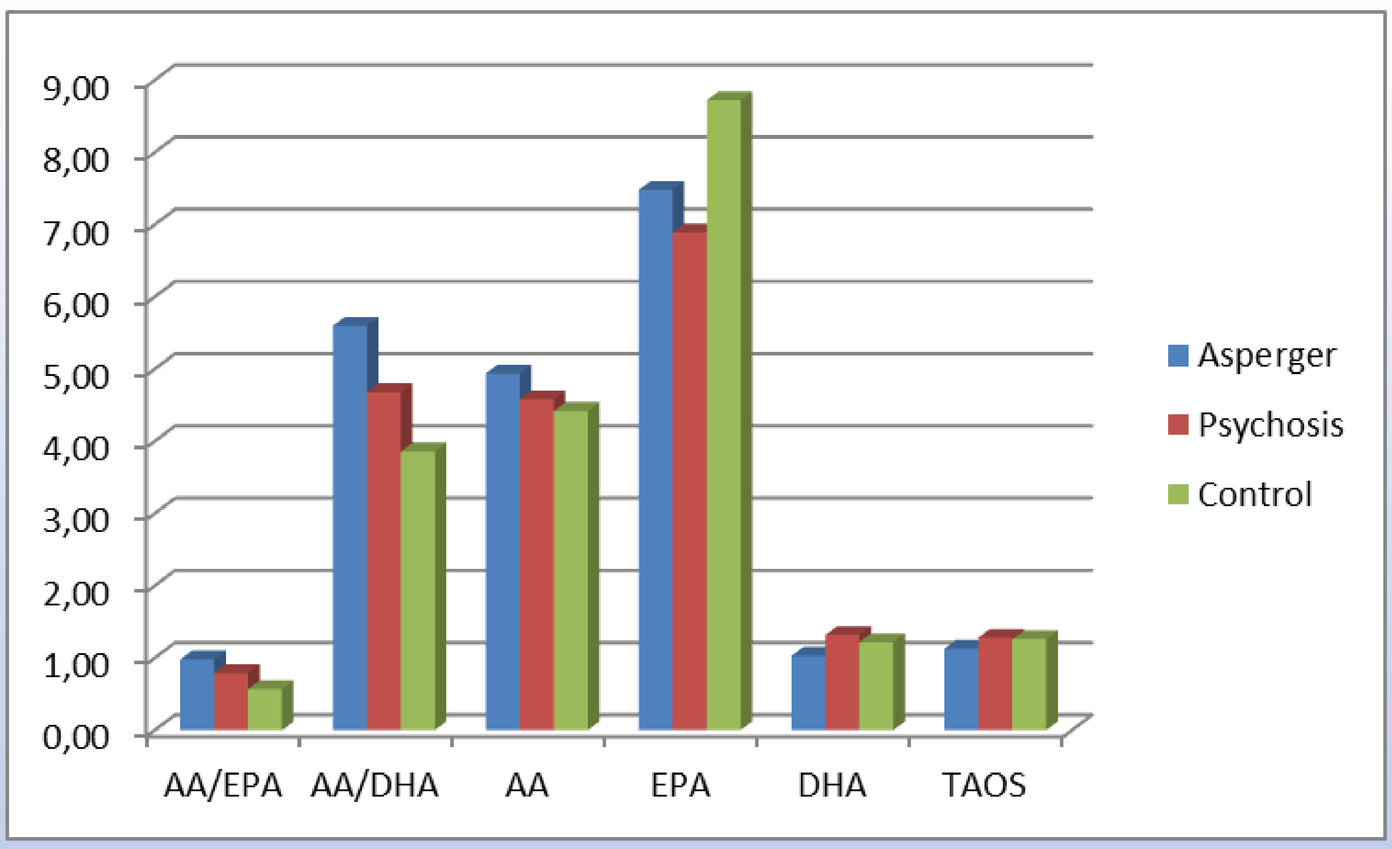
- Twenty-four adolescents with AS (mean age 12.7 ± 2.5 years, 95.8% male), 24 with a first episode of psychosis (mean age 15.9 ± 1.2 years, 66.7% male) and 23 controls (mean age 13.1 ± 3 years, 87% male) participated in the study. Inclusion criteria: age 7-17 years; diagnosis of first episode early onset psychosis or AS. Exclusion criteria: mental retardation, neurological disorders, history of head trauma and pregnancy.
- Fasting venous blood samples were collected into EDTA evacuated tubes. After immediate centrifugation, plasma and whole blood aliquots were transferred into cryogenic tubes and stored frozen at -80 ºC. PUFAs were analyzed in plasma using a gas chromatograph. Plasma Total Antioxidant Status (TAOS) was measured with a TAOS Assay Kit.
- For the statistical analysis, because a number of measured variables did not come for normal distribution, they were analyzed using non-parametric tests (Kruskal-Wallis and Mann-Whitney).

RESULTS:

PUFA composition in plasma and TAOS levels are shown in Table 1. The plasma TAOS was statistically significantly lower in the AS group compared with the healthy controls and with the psychosis patients. No differences were found in total PUFAs or any PUFA individually, except for eicosapentaenoic acid in psychosis. However, significant differences were found in total phospholipids both in AS and psychosis as compared with the controls. The AA/DHA ratio (arachidonic acid n=6/docosahexaenoic acid n=3) was significantly higher in AS.

	ASPERGER (n=24)	PSYCHOSIS (n=24)	CONTROL (n=23)	Between groups (p)	Asperger vs Control (p)	Asperger vs Psychosis (p)	Psychosis vs Control (p)
Total FA	519.28±182.9	559.05±206.43	490.57±206.21	0.183	0.088	0.584	0.158
Total PL	0.56±0.20	0.68±0.48	0.39±0.39	0.036	0.041	0.184	0.030
AA/EPA	0.98±1.58	0.79±0.71	0.57±0.36	0.591	0.596	0.389	0.399
AA/DHA	5.6±2.16	4.68±2.47	3.86±1.12	0.016	0.004	0.162	0.184
AA	4.94±1.05	4.58±1.35	4.42±1	0.484	0.259	0.360	0.853
EPA	7.48±1.93	6.89±2.05	8.72±2.27	0.109	0.239	0.340	0.038
DHA	1.03±0.53	1.32±1.00	1.22±0.47	0.156	0.099	0.097	0.797
TAOS	1.13±0.21	1.28±0.28	1.26 ±0.25	0.017	0.043	0.007	0.312

Table 1. *PUFA composition in plasma and TAOS levels. Results are shown as mean ± SD. PL: Phospholipids; FA: Fatty acids; AA: Arachidonic acid; EPA: Eicosapentaenoic acid; DHA: Docosahexaenoic acid; TAOS: Total Antioxidant Status.*



CONCLUSION

Reduced antioxidant defense and abnormal cell membrane composition are found in AS. Abnormal lipid composition may also contribute to the pathophysiology of psychosis. This study supports the development of novel therapeutic strategies to decrease oxidative stress in AS and psychosis.

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