Is There a Link Between PTSD and Autistic Disorders – A Description Based on Steroid Hormones

Med Benedikt Gasser*

Faculty of Medicine, University of Bern, Switzerland, Europe

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*Corresponding author: Med Benedikt Gasser, Faculty of medicine, University of Bern, Mittelhusstrasse 43 CH-3000 Bern.

Abstract

Some hints exist that there might be a relationship between PTSD and Autism in the way that in both entities steroid hormone homeostasis plays a central role, with mainly an involvement of androgens in Autism and with glucocorticoids in PTSD. From an (neuro) anatomical point of view for both clinical entities Hypothalamus-Pituitary-Adrenal gland structures are crucial, whereby for Autism additionally sex organs especially testes with its ongoing steroid homeostasis has relevance.

Introduction

Autism is described as pervasive development disorder. In the DSM-5, Autistic Disorder, Asperger’s Disorder and PDD-NOS are replaced by the diagnosis of Autism Spectrum Disorder [1]. Autism spectrum disorders are generally characterized as difficulties in communication and social interaction as well as special behavior such as retaining routines and insisting on sameness or special interests [1]. Interestingly, newer findings from Switzerland imply, that there is a link between socioeconomic factors and autism spectrum disorders [2]. Already in the first work by Hans Asperger [3] it was described that some children were from one child families and it was implied that the manner and kind of parents were predisposing factors for this disorder. However, also newest analyzes from Switzerland imply that very often children with a diagnosis of Autism have an immigrational or a foreign background yielding to a possible similarity with post-traumatic stress disorders (PTSD) [2]. It was shown for the area of Zürich (the biggest city in Switzerland) in a cohort of 147 children with a typical relationship of boys to girls that concerning communicational skills, interestingly in 53% more than one language was spoken at home affecting behavior in general and especially communicational skills (mean 1.6 languages) [2-4]. In this cohort the share of families with immigrational background was clearly increased and only in 13% of the families German (the local language) was mothers’ language of the children, whereby these findings are in line with others [2,5,6]. However, situation differs from region to region in Switzerland and from a therapeutic point of view it was several times mentioned that schoolish setting is secondary, however more important are adequately educated caregivers [2,7-9].

Evidence acquisition

From different side a link between PTSD and autism was made [10]. Although some hints exist that no single abnormality characterizes all individuals with PTSD [11], often CRH-ACTH-Glucocorticoid system is addressed. Hints exist that PTSD is mainly characterized by a dysregulation of homeostasis of Cortisol and his stimulating parameters such as CRH, ACTH with its associated (neuro)anatomical structures such as Hypothalamus, Pituitary-or adrenal gland and often additionally Hippocampus [12-15]. More general a glucocorticoid dysregulation also on receptor level was implied in PTSD and therefore especially an involvement of zona fasciculata in adrenal gland is indicated [15-21]. In autism an often described hyperandrogenemia is described, which is also in line with typical stated theories such as extreme male theory of autism [22-25]. Analyses in amnion fluid showed increased concentration of Δ4 sex steroids such as progesterone, 17α-hydroxy-progesterone, androstenedione and testosterone [26]. An involvement of adrenal gland and additionally testes in boys and probably ovary in girls as location of steroid hormone synthesis is likely [22-25]. As a consequence, the control underlies the GnRH respectively FSH and LH regulation. Although, in its clinical presentation it is often difficult to distinguish on organ level probably different signal cascades are altered yielding to the differences in these two disorders.

Discussion

Some hints exist that there might be a relationship between PTSD and Autism. However, there are clear differences between these two entities in its etiopathogenetic development. Autism is
a pervasive development disorder often beginning in early childhood and persisting over the whole life [1,2,10]. Nevertheless, besides some equalities in clinical presentation the underlying mechanism seem to differ yielding to differences in clinical presentation. Posttraumatic stress disorder is associated with hypothalamus-pituitary-adrenal (HPA) axis response to stressors, but links to neurophysiological and neuroanatomical changes are unclear [27].

Concerning autism it’s allowed to presume that milder forms of autistic disorder evoke through decades of stimuli-reaction answer or not. In Hypothalamus-pituitary-adrenal gland axis, probably in a similar way as in PTSD. As a way to an understanding HPA Axis respectively steroid hormones can be mentioned for ASD as well as PTSD. Increased stress yields to an increased activation of CRH on Hypothalamus level with stimulating effect on ACTH on pituitary level provoking an answer on adrenal gland level. To sum up, the involved steroid hormones in both entities differ and research focus is much more on androgens for autism whereas on glucocorticoid in PTSD indicating the relevance of steroid hormone homeostasis for both disorders.

References


