Estradiol production suppressed by prolactin in at-risk mental state and first episode psychosis female patients? Preliminary results

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Background

Clinical, epidemiological and basic research studies have confirmed that estradiol can have protective effects in schizophrenic psychoses.(1) At the same time many patients with schizophrenic psychoses even antipsychotic naïve at-risk mental state (ARMS) patients show hyperprolactinemia (2,3,4) and gonadal dysfunction with estrogen deficiency in women and possibly testosterone deficiency in men.(1)

The aim of this study was to investigate the relation between the stress hormone prolactin and the sex hormones estradiol in women and testosterone in men in ARMS and first episode psychosis (FEP) patients.

Methods

The data analyzed in this study were collected within the prospective ***F*rüh*e*rkennung von *Psy*chosen *(FePsy)*** study,(5) which aims to improve the early detection of psychosis. From January 2012 until January 2017 all patients who met requested criteria for prolactin analyses were included. The blood sampling took place between 8 and 10 am after overnight fast and 30 minutes of rest. Patients were asked to avoid stress, sports, physical activity, stimulation of the breast and smoking during at least 12 hours before blood taking.

We performed a linear regression model to evaluate the association between prolactin and estradiol in women and prolactin and testosterone in men. Sex hormones (Estradiol and Testosterone) served as dependant variables respectively and prolactin and group (ARMS/FEP) as independent variables. Age and current antidepressant use have been included as covariates in the analyses.

Table 1

	[ALL] N=69	ARMS N=51	FEP N=18	p.overall
Gender:				0.496
Women	14 (20.3%)	9 (17.6%)	5 (27.8%)	
Men	55 (79.7%)	42 (82.4%)	13 (72.2%)	
Age	25.3 (6.38)	24.6 (5.78)	27.3 (7.68)	0.187
Years of education	11.9 (2.46)	11.8 (2.43)	11.9 (2.62)	0.865
Antidepressants_ever	23 (33.3%)	21 (41.2%)	2 (11.1%)	0.042
Antidepressants_currently	19 (27.5%)	17 (33.3%)	2 (11.1%)	0.123
Anxiolytics_ever	6 (8.70%)	3 (5.88%)	3 (16.7%)	0.178
Anxiolytics_currently	4 (5.80%)	1 (1.96%)	3 (16.7%)	0.052
BPRS Depression/Anxiety	9.02 (3.60)	8.81 (3.58)	9.61 (3.70)	0.431
BPRS Psychosis/Thought Disturbance	6.97 (3.63)	5.34 (1.69)	11.5 (3.80)	<0.001
BPRS Activation	5.22 (1.74)	5.12 (1.72)	5.50 (1.79)	0.442
BPRS Negative symptoms	4.81 (2.46)	4.24 (1.86)	6.39 (3.22)	0.014
BPRS total score	39.1 (10.5)	35.3 (7.83)	49.5 (10.1)	<0.001

ARMS = At-risk mental state, FEP = First episode psychosis

Results

51 antipsychotic-naïve ARMS (42 men, 9 women) and 18 antipsychotic-naïve FEP (13 men, 5 women) patients met the inclusion criteria (Table 1). In women, estradiol was negatively associated with prolactin (β = -1.05, p = 0.007). ARMS patients had significant lower estradiol levels (mean = 228 pmol/l, SD = 148) than FEP patients (mean = 934 pmol/l, SD = 445) (β = -0.75, p = 0.004).

Furthermore, there was an interaction effect between group (ARMS/FEP) and estradiol levels (β = 1.04, p = 0.006) which was due to a non-significant positive association of estradiol with prolactin in ARMS and a non-significant negative association of estradiol with prolactin in FEP patients.

In men there was a positive association of testosterone with prolactin (β = 0.37, p = 0.012) but no significant main effect of group and no significant interaction effect between group and prolactin.

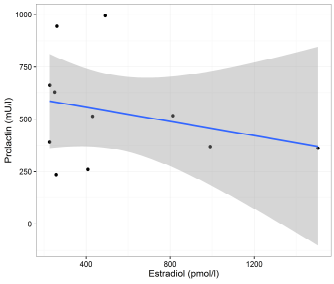

Figure 1. Negative association of Prolactin and Estradiol serum levels in women (ARMS and FEP patients).

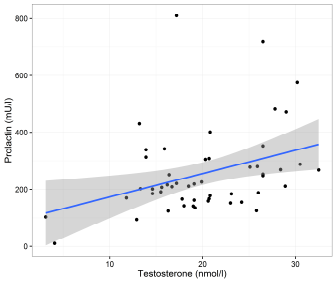

Figure 2. Positive association of Prolactin and Testosterone serum levels in men (ARMS and FEP patients).

Conclusion

Theses preliminary results point toward a relation between prolactin and estradiol in women with an ARMS or a FEP. The often observed estrogen deficiency in women with psychosis could therefore be explained by the stress hormone prolactin suppressing the gonadal axis already in very early untreated stages of emerging disease.

In ARMS or FEP men prolactin does not seem to influence the gonadal axis in the same way as in women.

On the basis of our small sample no definite conclusion can be drawn. Further investigations have to be conducted to clarify the association of estradiol and testosterone with prolactin.

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Disclosure Information

All authors declare not to have any conflicts of interest that might be interpreted as influencing the content of the manuscriopt.