Prolactin level in patients with first-episode psychosis

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Objective
The objective of the study was to measure serum prolactin level in first-episode psychotic patients.

Design
A cross-sectional hospital-based study.

Patients and methods
This study was carried out at the Dermatology, Venereology, and Andrology Department of Assiut University Hospital, Egypt, to measure serum prolactin level in patients with first episode psychosis who did not receive any medication yet. It was carried out on 40 first episode psychotic patients and 40 age-matched control group.

Results
The study showed significant increase in serum prolactin level in antipsychotic-free patients with first-episode psychosis.

Conclusion
Men with first episode psychosis had higher prolactin level than that of control and increased duration of untreated psychosis leads to more hyperprolactinemia.

Keywords:
duration of untreated psychosis, first episode psychosis, serum prolactin

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Introduction

First episode psychosis is defined as the first presentation of a psychotic illness which include categorical diagnosis of schizophrenia, depression with psychotic features, acute and transient psychotic disorders, schizoaffective disorders, and a manic episode with psychotic features [1].

Prolactin hormone is mainly inhibited by dopamine which is synthesized in the hypothalamus and secreted into the anterior pituitary through the portal blood, where it acts on D2 receptors [2].

Prolactin is a peptide hormone secreted mainly by prolactin-producing cells (lactotroph cells) of the anterior pituitary. It is involved in many biological functions, including reproduction, pregnancy, lactation, growth, and development [3].

Psychotic symptoms can be caused by disturbance in the balance between one or more excitatory and inhibitory factors in response to reproductive hormones to the brain and consequent compensatory remodeling of synapses in specific brain areas [4].

The severity of the disease and effect on the patients depend on the duration of untreated psychosis (DUP), which is defined as the time from onset of psychosis until the start of adequate treatment. Onset of psychosis was identified differently among researches, some researches marked the onset with appearance of frank delusions and hallucination, others included the prodroma to the definition [5,6].

Patients and methods

Study design

The study is a cross-sectional hospital-based one. It was approved by the Institutional Ethics and Research Committee of Faculty of Medicine, Assiut University, Egypt. Patient selection was done after explanation of goals and expectations. The study participants (a 40 patients with first episode psychosis) were enrolled in the study. The nature of the study was explained to each participant and informed consent was obtained.

Patients

A total of 40 patients who were diagnosed by the Psychiatric Unit, Neurological and Psychiatric Department, Assiut University Hospital as having

first-episode psychosis. Diagnosis was made based on DSM-5 the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) and 40 age-matched control patients attending the andrology outpatient clinic were participated in the study. All patients were subjected to full history taking. Physical examination was done. Exclusion criteria included noncooperative patients, patients with a history of systemic disease (including hypothyroidism, diabetes mellitus or other endocrine or metabolic disorder, vascular disorders and neurological disorders) or on medical treatment, history of major head trauma or injury, and substance dependence. Serum prolactin level was measured. Venous blood samples were obtained from all participants to measure the prolactin level. The level was measured by chemiluminescence immunoassay using the IMMULITE1000 system (PRL) kit (Siemens, USA). Normal value of prolactin ranges from 2.50 to 17.0 ng/ml.

Results

Our study was conducted on 40 male patients with first-episode psychosis and 40 age-matched healthy male controls. Serum prolactin level was measured for each participant.

Sociodemographic characteristics of the studied cases

The mean age of first-episode psychotic patients was 33.83 ± 9.5 years, out of the 40 patients there were 25 (62.5%) smokers while 15 (37.5%) were nonsmokers.

Laboratory investigation of the studied cases

The mean of serum prolactin level of the patients was 26.06 ± 20.7 ng/ml [Table 1].

There was statistically significant increase in serum prolactin level in patients with first-episode psychosis than the control group.

The study included six (15%) patients with a brief psychotic disorder, 11 (27.5%) patients with first episode mania with psychotic features, 23 (57.5%) patients with schizophreniform disorder. The mean duration of the disease was 3.49 ± 0.3 months [Table 2].

Correlation between disease duration and prolactin level among cases

The study showed statistically significant positive correlation between disease duration and serum prolactin level **(***P* = 0.042, *r* = 0.277**)** (Fig. 1).

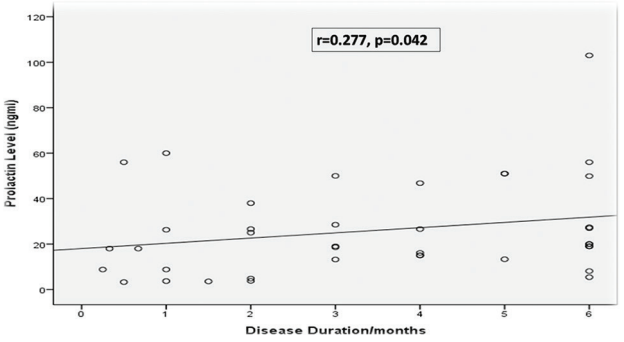
Table 1 Comparative analysis between cases and controls

Parameters	Control (*n*=40)	Case (*n*=40)	*P*
Age (years)			0.449
Mean±SD	35.45±9.6	33.83±9.5	
Median (range)	32 (20-61)	31 (17-56)	
Prolactin level (ng/ml)			**0.024**
Mean±SD	17.75±9.1	26.06±10.7	
Median (range)	16 (4-43)	19 (3.5-103)	

Table 2 Disease characteristics of the studied cases

Variables	Category	*n*=40
Disease duration in months	Mean±SD	1.49±0.3
	Median (range)	3.5 (0.25-6)
Diagnosis [*n* (%)]	Brief psychotic disorder	6 (15)
	First episode mania with psychotic features	11 (27.5)
	Schizophreniform disorder	23 (57.5)

Figure 1



Correlation between disease duration and prolactin level among cases.

Discussion

In this study, we measured serum prolactin level among 40 patients with first-episode psychosis. It revealed a mean of 26.06 ± 20.7 ng/ml, which indicates a high level of prolactin hormone among FEP patients than the control group. This is in agreement with other studies that found higher prolactin values in patients versus controls even though the patients and control both have normal values of cortisol, TSH, and ghrelin hormones [7,8].

There are recent reports on the increased level of prolactin hormone in patients with psychotic illness who did not yet receive any medication [7,9,10] also in high-risk mental state for psychosis [10,11].

It is difficult to understand the reason for the increased level of prolactin hormone in FEP patients as it could be multifactorial. It is likely that the higher serum prolactin levels in the group of patients compared with those in healthy controls is due to stress, although serum cortisol level was the same in both groups [12].

It has been found that patients with FEP have large pituitary volume which is due to the increase in the production of adrenocorticotropic hormone and prolactin hormone [13].

Psychological distress during prodromal states and emerging psychosis can increase the release of prolactin which is regulated by the thyrotropin-releasing hormone and ghrelin that might lead to hyperprolactinemia which lead to changes in structures of pituitary volume [14,15].

It has been estimated that hyperprolactinemia that is caused by stress response plays a role in triggering the outbreak of acute psychotic symptomatology [16].

Some researchers suggest that stress increased the level of prolactin secretion which triggers dopamine release through a feedback mechanism; this increase in dopamine secretion and transmission may explain the relation between stress and psychosis [16].

The alternate relationship between prolactin and hypothalamic dopamine secretion has been proven in many studies. It could be that the increased level of dopamine is to downregulate hyperprolactinemia that is caused by stress response in psychotic patients [17].

There are recent studies that looked for genetic variants in psychotic patients who had hyperprolactinemia. They examined the functional polymorphism of the prolactin gene. They found that the G allele was significantly more common in those patients, and pointed out that this variation was similar to that reported in autoimmune diseases [18].

Another study has examined the relationship between prolactin level, prolactin receptor genes, tardive dyskinesia, and treatment response but has failed to find a significant association in either case [19].

In this study, there is positive correlation between duration of disease and serum prolactin level. These explain more SD and hyperprolactinemia with increase in the DUP. This is in agreement with the study that found significant positive correlation between DUP and pituitary volume [20]. In line with the hypothesis of a 'neurotoxicity' of untreated psychosis, the longer the symptoms and psychological distress persist, the more pronounced the changes in structures of pituitary volume [16].

There are recent studies that have reported on a significant positive correlation between prolactin levels and negative symptoms of the disease [3,21,22]. There is also a relationship between serum prolactin level and severity of depressive symptoms which is concluded by some researchers. Besides the health side effects of hyperprolactinemia, the presence of abnormal prolactin concentrations before antipsychotic treatment is of theoretical interest [23].

There is evidence that people with psychotic symptoms have anatomical anomalies and metabolic abnormalities outside the brain that is not related to the effect of antipsychotic treatment [24]. Although dopamine exerts a tonic inhibitory effect on the release of prolactin, serotonin appears to play an important role in the release of this hormone as well [25].

Conclusion

All patients with first-episode psychosis should be assessed for prolactin level before starting antipsychotics. On the basis of our findings, clinicians should ask questions to detect hyperprolactinemia before starting treatment and during follow-up and should give patients the relevant information. Early intervention with drugs that has lower potential to elevate the prolactin level will improve the outcome and decrease the incidence of erectile dysfunction. Prolactin levels should be measured irrespective of whether symptoms of erectile dysfunction are present or not to avoid potential long-term complications of 'silent' hyperprolactinemia.

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Conflicts of interest

There are no conflicts of interest.

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