

SERUM PROLACTIN LEVEL AND SEVERITY OF PSYCHOPATHOLOGY IN PATIENTS OF SCHIZOPHRENIA

AMRESH SHRIVASTAVA & MANOJ TAMHANE

ABSTRACT

Serum prolactin level was measured in 20 male and 11 female drug naive patients of schizophrenia. Subsequently, these patients were treated with antipsychotics and ECTs. The severity of psychopathology at the baseline and subsequent improvement at the end of 3 weeks and 6 weeks was assessed on modified brief psychiatric rating scale (BPRS).

Contrary to the expectations, a two fold increase in serum prolactin level was observed in drug naive male and female patients of schizophrenia. The difference was found to be statistically significant in males. No correlation was observed between the baseline serum prolactin level and the severity of baseline psychopathology and subsequent improvement in psychopathology at the end of 3 weeks and 6 weeks. From the present study it seems that baseline serum prolactin level in drug naive patients of schizophrenia may not be a reliable indicator of psychopathology and prognosis.

Key words : Serum prolactin levels, schizophrenia

Prolactin is an anterior pituitary hormone. The release of prolactin from the anterior pituitary is regulated by prolactin inhibitory factor (PIF), which is the neurotransmitter dopamine. Increased dopaminergic activity in the mesolimbic dopaminergic projections has been postulated in schizophrenia (Kaplan et al. 1994). Elevated serum prolactin levels have been considered virtually unavoidable in most patients treated with therapeutic doses of conventional antipsychotics which block the dopamine receptors (Hamner & Arana, 1998). It is likely that serum prolactin level which gives us the idea about the dopaminergic activity at the infundibulo-pituitary axis, may also reflect the mesolimbic dopaminergic activity. On the basis of this hypothesis it may be postulated that in drug naive patients of schizophrenia, due to increase in dopaminergic activity, there may be decrease in serum prolactin level and there may be a negative correlation between severity of psychopathology and serum prolactin level i.e. higher the dopamine levels, higher the

psychopathology and lower the serum prolactin level. Various studies (Chatterjee, 1988; Kleinman et al., 1982; Kuruville et al., 1986; Meltzer et al., 1974) have reported normal or lower serum prolactin levels in drug naive patients of acute schizophrenia or decreased prolactin level in patients of chronic schizophrenia without ventricular dilatation. Some of studies have predicted association between early relapse following neuroleptic withdrawal and low serum prolactin levels (Brown & Laughren, 1981; Liberman et al., 1990). If some correlation can be established between the baseline serum prolactin levels and severity of psychopathology in drug naive patients of schizophrenia, the serum prolactin level can be used as an objective parameter for monitoring the improvement and course in schizophrenia.

In order to test this postulate, the present study was undertaken with the following aims : i) to study the serum prolactin level (baseline) in the drug naive patients of schizophrenia; ii) to study the correlation between the baseline serum

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prolactin level and severity of psychopathology at the baseline and iii) to study the correlation between baseline serum prolactin and improvement in psychopathology after treatment with antipsychotics and ECTs at the end of 3 weeks and 6 weeks.

MATERIAL AND METHOD

Site : The study was conducted in a non-governmental psychiatric treatment center - Silver Mind Hospital, Mumbai.

Sample : 31 consecutive patients (20 males and 11 females) who were attending the outpatient department of the hospital and who satisfied the inclusion and exclusion criteria were included in the study.

Inclusion criteria : i) satisfying ICD-10 criteria (WHO, 1992) for schizophrenia; ii) first episode; iii) drug naive patients (who have never received any antipsychotic in the past) and iv) consent & willingness to participate in the study and maintain follow up for a period of at least six weeks.

Exclusion criteria : i) presence of any other psychiatric morbidity, like alcohol dependence which is likely to interfere with diagnosis and follow up; ii) presence of any concurrent medical or endocrine disorder; iii) pregnant or lactating women, iv) history of delivery in last 1 year and v) patients on any other medications which are likely to alter the prolactin levels.

All the patients were clinically examined, individually interviewed and diagnosed by a consultant psychiatrist and required data was collected as per the specially prepared proforma for the study. Objective data was obtained from one of the close relative accompanying the patient.

In order to assess the severity of psychopathology, all the patients were rated on Brief Psychiatric Rating Scale (BPRS) (Overall & Graham, 1962) at the baseline and at the end of 3rd and 6th weeks.

5 ml of plain venous blood was collected before giving any medication for serum prolactin level which was estimated by radio-immuno assay (RIA) technique. Control values given with the RIA-kit for males and females were

confirmed by running 31 blood samples (20 males, 11 females) from healthy normal volunteers after obtaining their informed consent.

All the patients were treated with haloperidol 15-45 mg/day, trihexyphenedyl 6-12 mg/day and a course of 8 modified ECTs on alternate day basis.

As mentioned earlier the improvement was assessed on BPRS at the end of 3 weeks and 6 weeks.

The baseline serum prolactin in drug naive male and female patients of schizophrenia was compared with that of controls using student's t-test. Correlation coefficient between the baseline serum prolactin level and scores on BPRS at the baseline, 3 weeks and 6 weeks in male and female patients was obtained.

RESULTS

The sample consisted of 20 males and 11 females. Out of these 1 male patient and 3 female patients were dropped out of analysis as their serum prolactin levels were very high (more than 100 ng/ml). This may be due to accidental exposure to neuroleptic drugs. So 19 male patients and 8 female patients were included in the final analysis. The mean (sd) age of the male patients (n=19) was 23.2 (4.8) years and female (n=8) population was 22.3 (5.6) years.

The control group also consisted of 20 male and 11 female volunteers. The mean (sd) age of male volunteers was 22.6 (3.8) years and female volunteers was 21.3 (4.5) years.

The study group and the volunteers were comparable on age (males : $t=0.83$, d.f.=37, N.S.; females : $t=0.21$, d.f.=17, N.S)

The mean (sd) baseline serum prolactin level in drug naive patients of schizophrenic males (n=19) was found to be 28.37 (11.26) ng/ml and in females (n=8) was 48.31 (24.46) ng/ml. These values were two folds higher than the values in control males (n=20) 12.20 (5.05) ng/ml and females (n=11) 23.72 (7.98) ng/ml (for males $t=2.30$, d.f.37, $p<0.05$; for females $t=0.33$, d.f.=17, $p>0.05$). The difference was statistically significant in males but it was not found to be

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TABLE 1
CORRELATION COEFFICIENT BETWEEN SERUM
PROLACTIN AND BPRS (MALES)

	Value of r (n=19)	Significant		
		t	d.f.	p
Baseline	0.195	0.81	17	N.S.
At 3 weeks	0.223	0.94	17	N.S.
At 6 weeks	0.098	0.098	17	N.S.

TABLE 2
CORRELATION COEFFICIENT BETWEEN SERUM
PROLACTIN AND BPRS (FEMALES)

	Value of r (n=8)	Significant		
		t	d.f.	p
Baseline	0.071	0.17	6	N.S.
At 3 weeks	0.46	1.26	6	N.S.
At 6 weeks	0.50	1.41	6	N.S.

significant in females probably due to a relatively small sample size.

Table 1 & 2 shows the correlation coefficient between serum prolactin and BPRS scores at baseline, at the end of 3 weeks and 6 weeks in males and females respectively. It was noted that there was no significant correlation between the baseline serum prolactin level and scores on BPRS at the baseline and at the end of 3 weeks and 6 weeks in males as well as in females.

DISCUSSION

Serum prolactin has been studied in a variety of psychiatric disorder like schizophrenia, mania (Cookson et al. 1982) and depression (Linkowski et al. 1986, Maeda et al. 1975). As mentioned earlier some of the studies have reported normal or reduced serum prolactin level in drug naive patients of schizophrenia (Chatterjee 1988, Kleinman et al. 1982, Kuruvilla et al. 1986, Meltzer et al. 1974). In contrast to these studies and contrary to the hypothesis of the present study a significantly higher baseline serum prolactin level was observed in males as well as in females. Elevated serum prolactin levels have been reported after stress, hypoglycemia, & neuroleptics (Hamner & Arana, 1998, Maeda et al. 1975, Sacher et al. 1973). As mentioned earlier, a lower serum prolactin

was expected in drug naive patients of schizophrenia due to increased activity of dopaminergic system but instead a significantly higher level was noticed in these patients. The increase was statistically significant in males. In female patients, though the level were higher, it was not found to be statistically significant probably due to high standard deviation and small sample size. The increased prolactin level in drug naive patients of schizophrenia was unexpected, intriguing and difficult to explain.

There was no correlation between the serum prolactin level and score on BPRS at the baseline, at the end of 3 weeks and 6 weeks.

It seems that serum prolactin level depends on number of factors such as sex of the patient, physical and psychological stress, hypoglycemia etc., apart from presence or absence of psychiatric disorder and use of psychotropic drugs. It has also been proposed that prolactin secretion pattern is different in acute state (Roncoroni, 1989) and marginal or significant increase in the level of prolactin may be expected primarily due to 'nondopaminergic excitatory factors' of prolactin secretion (Victor, 1985).

This suggests that serum prolactin level can not be reliably used as an objective indicator of psychopathology in patient of schizophrenia as postulated in the study.

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