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Review Article

ESTIMATION OF SERUM CREATINE KINASE ON TAKING ANTIPSYCHOTICS IN PSYCHIATRIC PATIENTS

[1]Lincy Joseph, [2]Mathew George and [3],*Sanju T Saji

[1]Department of Pharmaceutical chemistry, Pushpagiri College of Pharmacy, Thiruvalla-689107, Kerala, India
[2]Department of Pharmacology, Pushpagiri College of Pharmacy, Thiruvalla-689107, Kerala, India
[3]Department of Pharmacy Practice, Pushpagiri College of Pharmacy, Thiruvalla-689107, Kerala, India

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ABSTRACT

Creatine kinase (CK) is an enzyme with three isoforms BB/CK1, MB/CK2 and MM/CK3. Normal range is 22 to 198 U/L (units per liter). Serum creatine kinase (SCK) activity of the skeletal muscle form is sometimes moderately increased in psychiatric patient and may be massively increased as a result of muscle damage and serum creatine kinase activity increases in patients treated with antipsychotics drugs. Raised level of total creatine kinase has been detected in the serum of patients with psychiatric disorders. Different types of psychiatric disorders are present in the Indian population. Bipolar disorder, unipolar disorder, schizophrenia, attention deficit hyperactivity disorder, anxiety disorder, Patterns of belief, language use and perception of reality can become disordered (e.g., delusions, thought disorder, hallucinations). Antipsychotics also known as neuroleptics or major tranquilizers are a class of drugs used in the treatment of psychiatric disorders. There are two categories of antipsychotics: typical antipsychotics and atypical antipsychotics. This review is designed to estimate the serum creatnine kinase on taking antipsychotics in psychiatric patients and thus to find the type of antipsychotics having increased creatine kinase activity. The review shown that the estimation of serum creatine kinase on taking antipsychotics in psychiatric patients.

INTRODUCTION

A mental disorder, also called a mental illness or psychiatric disorder, is a disease that causes mild to severe disturbance in thoughts and /or behavior , resulting in an inability to cope with life‘s ordinary demands and routing (American Psychiatric Association, ?). There are many different categories of mental disorder, and many different facets of human behavior and personality that can become disordered. They are Anxiety or fear, other affective (emotion/mood) processes can also become disordered, Bipolar disorder (also known as manic depression), major depression, Patterns of belief, language use and perception of reality can become disordered (e.g., delusions, thought disorder, hallucinations). Psychotic disorders in this domain include schizophrenia, and delusional disorder. Schizoaffective disorder is a category used for individuals showing aspects of both schizophrenia and affective disorders (Katschnig, 2010).

Corresponding author: Sanju T Saji,
Department of Pharmacy Practice, Pushpagiri College of Pharmacy, Thiruvalla-689107, Kerala, India.

Antipsychotics also known as neuroleptics or major tranquilizers, are a class of drugs used in the treatment of psychiatric disorders, most notably schizophrenia, but also in disorders such as bipolar disorder, delusional disorder and increasingly for certain nonpsychotic disorders (King, 2002) Since the introduction of antipsychotic medication for the treatment of psychosis, a wide range of different types of drugs have been developed under this genre. The first generation of antipsychotic medication is known as the ‘typical antipsychotics’ and these were first discovered in the 1950s. Soon following their clinical use it was recognized that they caused extrapyramidal symptoms (EPS) in patients including Parkinsonism, tardive dyskinesia, akathisia and dystonia (Steck 1954). The severe side effects created a need for a new generation of these medications that would be more tolerable to the patient. Subsequently, second generations of antipsychotics were developed known as the ‘atypical antipsychotics’, the first of which was clozapine which was clinically introduced in the 1970s (Leucht *et al*., 2009). There are two categories of antipsychotics: typical antipsychotics and atypical antipsychotics. Most antipsychotics are available only by prescription.

Typical antipsychotics: Chlorpromazine (Thorazine), Haloperidol (Haldol), Perphenazine (Trilafon), Thioridazine (Melleril), Thiothixene (Navane), Flupenthixol (Fluanxol) Trifluoperazine (Stelazine) Atypical antipsychotics: Aripiprazole (Abilify), Clozapine (Clozaril), Olanzapine (Zyprexa), Paliperidone (Invega), Quetiapine (Seroquel), Risperidone (Risperdal), Zotepine (Nipolept), Ziprasidone (Geodon). Creatine kinase (CK) is an enzyme with three isoforms BB/CK1, MB/CK2 and MM/CK3. In a healthy adult, the CPK level in the blood serum varies with a number of factors (gender, race and activity), but normal range is 22 to 198 U/L (units per liter). (Michael, 1983) Higher amounts of serum CPK can indicate muscle damage from chronic disease or acute muscle injury. The skeletal muscle contains primarily MM; cardiac muscle contains primarily MB and MM. Brain tissue, GI system and genitourinary tract contain primarily BB (Bengzon, 1996).

Normally, total CK levels are virtually 100% MM isoenzyme also that catalyzes the reversible trans phosphorylation of creatine by adenosine triphosphate, plays a key role in energy transport in cells and neurons. (Andres, 2008) Serum creatine kinase (SCK) activity of the skeletal muscle form is sometimes moderately increased in psychiatric patient and may be massively increased as a result of muscle damage and SCK increases in patients treated with antipsychotics drugs. (Bengzon, 1996) Raised level of total CK has been detected in the serum of patients with psychiatric disorders. Current scientific literature indicates that patients with psychotic disorders can also have increased creatine kinase activity. This phenomenon may result from increased motor activity, increased tension and intense muscular activity in catatonic conditions (Tsung, 1981).

REVIEW OF LITERATURE

Anshu Gupta, et.al; (2015) conducted a study on Evaluation of total creatine kinase levels in a spectrum of neuro-psychiatric disorders in a tertiary neurosciences centre. Aim of this study was to usefulness of total creatine kinase as a screening tool in psychiatric patients. This studyincluded 102 patients with complaints pertaining psychiatric disorders in a tertiary neurosciences Centre in a metropolitan city. Blood samples in plain vial were received in Emergency Laboratory and total CK levels were measured .Results was observed that CK activity was raised in various psychiatric conditions-acute transient psychotic disorder, alcohol dependence syndrome, delirium, psychosis, mental retardation, catatonia, bipolar affective disorder (BAD), depression and mania , extra pyramidal syndrome, neuroleptic malignant syndrome and infarct. Conclusion of this study demonstrated that CK is a sensitive and an important screening parameter in diagnosis and monitoring psychiatric disorders (Anshu Gupta, 2015). MichaelGrube, *et al*. (2008) conducted a study onCreatine kinase associated with aggressive behavior in psychiatric patients. The aim of this study was to investigate to what extent pathological creatine kinase (CK) levels are associated with aggressive behavior in patients admitted to psychiatric facilities. It is based on the assumption that CK activity increases prior to a rise in motor activity and aggressive behavior. It should be noted that this assumption requires additional confirmation in more extended studies.

Method: Over a period of 3 months, the CK levels of 317 psychiatric inpatients were assessed immediately following admission to a secure ward. During the course of the patients' stay (mean: approximately 11 days), their aggressive behavior was independently assessed using the Staff Observation Aggression Scale (SOAS-R). Results: A receiver operating characteristic (ROC) analysis estimated an area under the curve (AUC) for subsequent aggressive behavior of 70.7% with a sensitivity of 70.1% and a specificity of 71.2%. When the variables involuntarily admission, lifetime history of aggression and absence of suicide attempts were also taken into account, the AUC was higher at 78.2%. Conclusion: Despite some methodological shortcomings in the collection of data, the study indicates that it could be useful to measure CK levels at the time of admission because elevated levels may indicate an increased risk of successive aggressive behavior for patients on secure psychiatric wards (Michael Grube, 2008)

Michael Segal *et al.* (2007) conducted a study on Serum creatine kinase level in unmedicated nonpsychotic, psychotic, bipolar and schizoaffective depressed patients. Aim to assess the possible differences in CK level in various forms of depression: major with and without psychotic symptoms, of bipolar depression and schizoaffective depression. Unmedicated hospitalized patients participated: nonpsychotic major depression (n=39), psychotic major depression (n=23), bipolar depression (n=23) and schizoaffective depression (n=24). The results indicate a biological difference between the nonpsychotic major depression and the psychotic cluster of depressive syndromes. CK serum level was significantly higher in nonpsychotic major depression than in all other forms of depression (Michael Segal, 2007)

Herbert Y. Meltzer *et al*. (1996) conducted a study on "Marked elevation of serum creatine kinase activity associated with antipsychotic drug treatment". The aim of this study was to characterize the sck increases in patients treated with novel antipsychotic drug. Possible causes of increases in sck activity, such as trauma, excessive physical activity, exacerbation of psychosis were assessed. Fifteen instances of massive increases in SCK activity were observed in 11 out of 121 patients (10%) treated with the following antipsychotic drugs: clozapine, loxapine, haloperidol, melperone, risperidone, or olanzapine. These increases in SCK activity were of the MM type and ranged from 1,206 to 177,363 IU/L (median, 9,600 IU/L) The onset of the increases was from 5 days to 2 years after initiating treatment, and the increases lasted 4 to 28 days (median, 8 days). Flulike symptoms were present in two of the patients, but the others were asymptomatic. It is unlikely these increases in SCK activity are related to acute psychosis, trauma, or the neuroleptic malignant syndrome. In conclusion, markedly increased sck levels were observed in patients treated with antipsychotics and also increased cell permeability (Herbert, 1996).

Conclusion

Antipsychotics have greater importance in psychiatric medical practice. All practitioners and patients should aware of its cardio metabolic side effects and risk factors. Creatine kinase also found among people taking antipsychotics. Thus subjects taking antipsychotics should monitor for laboratory evidence of elevation in serum creatine kinase.

The effect of serum creatine kinase on taking antipsychotics can be obtained and evaluated.

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