



STUDY OF BIOCHEMICAL PARAMETERS AND UNDERLINE OXIDATIVE STRESS IN PATIENT OF MAJOR DEPRESSION

Biochemistry

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ABSTRACT

Introduction: Depression is a mental disorder of global concern, in India there is an increase incidence of depression due to drastically change in life style , urbanization and increase work pressure to perform best.

Aim: Our study focused a change in biochemical parameters due to underline oxidative stress in patient of depression

Material & method: Our hospital based case control study was done on 100 subject to find out a difference in levels of biochemical parameters in cases of depression as compared to control.

Result: Cases of depression have found to have significant change in levels of biochemical parameters suggestive of an increase in oxidative stress as compared to control.

Conclusion: Evaluation of important biomarkers could help in diagnosis of associated illness occur due to increase in level of oxidative stress in patient of depression.

KEYWORDS

MDD, Oxidative Stress, DSW-V, Malondialdehyde, Superoxide Dismutase

INTRODUCTION :

Depression is mental illness that leads to frequent change in mood, thoughts, behavior and physical health, As described in the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM- V) [1], the hallmark of major depressive disorder (MDD) is the occurrence of depressed mood (dysphoria) and loss of interest in activities that were rather pleasurable in the past (anhedonia) for a duration of at least two weeks .It's an extremely common illness affecting people of all ages, genders, different socioeconomic groups and religions in India and all over the world. Globally, an estimated 322 million people were affected by depression in 2015[2]. India is home to an estimated 57 million people (18% of the global estimate) affected by depression. With India witnessing significant changes (including globalization, urbanization, migration, and modernization) that is coupled with rapid socio demographic transition, depression is likely to increase in the coming years.

Various research studies have been done in recent years to find out the etiological factors responsible for this psychosomatic illness, some researchers have found out that pro inflammatory state depicted by increase oxidative stress and altered biochemical parameters in major depression.[3] One of the study have shown an strong association between glial cell line derived neurotropic factor and causation of depressive illness.[4]

Aim of our study is to find out the serum levels of biochemical parameters that has been altered in major depression due to underline increase in oxidative stress.

MATERIALS & METHODS:

A hospital based study was carried out by department of biochemistry, subharti medical college in association with psychiatric OPD of chatrapati shivaji subharti hospital, meerut, UP, india, after obtaining ethical clearance from institutional ethical committees, study was carried out for a period of six month. A total of 100 age and sex matched subject included in our study. Among them 50 were healthy controls and 50 were newly diagnosed cases of major depression. Inclusion criteria were cases diagnosed as major depression by psychiatrist doctor attending patient in psychiatric OPD involving both sexes between the age group 20-60 years. Diagnosis of major depression was determined by DSM-IV criteria [5, 6].

After taking informed consent, venous blood was collected in a sterile vacutainer under aseptic precaution from selected subjects after overnight fasting. Heparinized whole blood was used for measurement of GPx, Serum and plasma separated and analyzed for various biochemical parameters. The parameters suggestive of oxidative stress were estimated, Plasma sample was used for determination of MDA and it was quantified by OxiSelect TBARS assay kit15 on double beam UV/ Vis spectrophotometer. GPx was estimated by assay kit from Randox 16 on semiautoanalyzer. Vitamin C was estimated by colorimetry using Lowry, Lopez and Bessey, Other significant biochemical parameters were also analyzed such as Fasting Blood Glucose, alkaline phosphatase

(ALP), alanine transaminase (ALT), aspartate transaminase (AST), total cholesterol (TC), high density lipoprotein-cholesterol (HDL-C), uric acid (UA), total bilirubin (Tbil), tests for all these parameters were performed by automatic biochemical analyzer.

STATISTICAL ANALYSIS:

Data was analyzed by using unpaired test and results were expressed as mean±SD, p value <0.05 was considered as statistically significant.

RESULTS:

Parameters	control	cases	p-value
MDA (nmol/ml)	2.1 ± 0.9	4.6 ± 0.34	0.001
GPx (U/L)	4542.05 ± 531.12	3066.55 ± 442.91	0.001
Vitamin C (mg/dl)	2.69 ± 0.17	1.34 ± 0.22	0.001
Uric acid (mg/dl)	4.2±1.3	3.20 ± 0.15	0.001

TABLE 1 shows comparative results of serum uric acid ,MDA, Vitamin C and GPx .

It was observed that mean levels of vitamin C ,GPx and uric acid were low in cases as compared to control but MDA levels found to be significantly high in cases as compared to control

Biochemical parameters	cases	control	p value
Alkaline Phosphatase (U/L)	97±3.7	5 4±1.3	<0.001
Alanine Transaminase (U/L)	74 ±4.1	32±1.1	<0.001
Aspartate Aminotransferase (U/L)	78±3.4	29±2.1	<0.001
Fasting Blood-Glucose (mg/dl)	138±5.3	85±4.2	<0.001
Total Bilirubin (mg/dl)	0.24±0.35	0.33±0.21	0.013
Total cholesterol	133±12	201±4.1	<0.001
HDL	31±3.4	42±3.1	<0.001

TABLE2: comparative analysis of various biochemical parameters in cases and control

From our results it were observed that there had significant difference found in values of ALP,AST,ALT between cases and control ,increase values of liver enzyme has been depicted in cases suggestive of an underlying stress in patient of major depressive disorders , we were not observed any significant differences in values of total bilirubin in both groups. Fasting blood glucose levels were found to be significantly impaired in cases as compared to control, the values of total cholesterol and HDL was also found significantly low in cases as compared to controls.

DISCUSSION:

Pathophysiology of major depressive disorders remain unclear, various studies has been done during past decade to conceptualized the etiological factors responsible for this psychosomatic illness, researchers had proposed numerous inflammatory and neurological markers that has been found to get deranged with progression of illness in cases of depression, but nothing has been consolidated. In our study we have tried to do a cumulative comparison of biochemical markers which are suggestive of an underlying oxidative stress along with the

study of some of the important biochemical test that has to be done in patient of MDD (major depressive disorder) to determine the pathological condition related to course of illness. In our study we have found an increase level of MDA in cases of depression which is suggestive of increase in lipid per oxidation of cell membrane due to release of free radicals [7] GPx and vitamin C levels found to be low in these subjects as compared to control which was also suggestive of an increase in oxidative stress [8,9]. We have done a thorough comparison of important blood analytes in both cases and control such as fasting blood glucose levels which was found to be significantly raised in cases that could be explained by the increase level of oxidative stress which as an important role in generation of insulin resistance[10], various studies have indicated an inverse relationship between an insulin action and oxidative stress[11,12], one of the studies have found that oxidative stress can decrease insulin sensitivity by GLUT-4 deficiency[13]. In our study we have also measured the levels of total cholesterol (TC) and High density lipoprotein in both the study group, the level of both the parameters were found to be significantly low in cases of major depression as compared with healthy controls, various research studies reported an association between low level of total cholesterol and major depression. Papakostas et al. suggested that low serum cholesterol levels are related to decline in serotonergic response [14], some researcher have found in their studies low level of cholesterol also affects the metabolism of serotonin leading to depression and poor control of aggressive impulses, which can further leads to an overall risk of suicidal tendencies.

CONCLUSION:

Our study have tried to established a link between oxidative stress and altered level of some of the important biochemical parameters in major depressive disorders, our results were suggestive of the impact of oxidative stress in cases of depression reflected in values of blood biochemical parameters, from our study we can conclude that it should be mandatory to have through clinical investigation to rule out the associated illness in cases of depression due to increase in oxidative stress so that overall quality of life get improve and we can decrease the overall rate of morbidity and mortality in such cases.

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