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COMPARATIVE STUDY OF CBC PARAMETERS AND ESR BETWEEN SCHIZOPHRENIA PATIENTS AND HEALTHY CONTROLS.

Psychiatry

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ABSTRACT

BACKGROUND: A growing body of evidence suggests that immunological and inflammatory mechanisms may play important roles in the pathophysiology of schizophrenia . Various immune alterations, such as increased frequency of activated lymphocytes, abnormal levels of inflammatory cytokines (Potvin et al. 2008, Müller 2013), and pathogenic autoantibodies (Zandi et al. 2011), have been observed in patients with schizophrenia.

MATERIALS AND METHODS: Cross-sectional study of 6 months at mgm psychiatry dept involving 100 schizophrenia patients and 100 controls after considering inclusion and exclusion criteria. Blood sample was collected for CBC parameters and ESR. PANSS and BPRS were applied.

RESULTS: Patient group has shown significantly MORE TOTAL WBC AND POLYMORPHS than control group. POLYMORPHS COUNT has significant positive correlation with duration of illness in month.

Haemoglobin has significant negative correlation with PANSS negative score and significant positive correlation with composite index.

CONCLUSION: Schizophrenia patients have raised CBC parameters as compared to healthy control and are positively correlated to duration of illness thus substantiating the inflammatory hypothesis of schizophrenia.

KEYWORDS

inflammation, immunological, schizophrenia,

INTRODUCTION

Schizophrenia is a complex and multifactorial mental disorder with well-defined symptoms and a lifelong course, but without a satisfactory biological explanation. A growing body of evidence suggests that immunological and inflammatory mechanisms may play important roles in the pathophysiology of schizophrenia (Rothermundt et al. 2001). Various immune alterations, such as increased frequency of activated lymphocytes (Nikkilä et al. 2001), abnormal levels of inflammatory cytokines (Potvin et al. 2008, Müller 2013), and pathogenic autoantibodies (Zandi et al. 2011), have been observed in patients with schizophrenia. However, further research is necessary to clarify the role of the immunological and inflammatory mechanisms in schizophrenia (Müller & Schwarz 2010).

The neutrophil–lymphocyte ratio (NLR) is a new, simple and inexpensive marker of the systemic inflammatory response (Zahorec 2001). Elevated levels of NLR were suggested to be associated with poor prognosis in patients with pancreatitis (Azab et al. 2011), coronary heart disease (Ayhan et al. 2013, Fowler and Agha 2013), and malignancy (Szkandera et al., 2013, Seretis et al., 2013). The findings of Semiz et al., 2014 study show that Neutrophil lymphocyte ratio (NLR) is increased in physically healthy, non-obese patients with schizophrenia when compared with physically and mentally healthy controls. According to this finding, elevated levels of NLR may be involved in inflammatory pathophysiology of schizophrenia.

Meta-analyses have reported that schizophrenia is related to inflammation, and that the levels of autoantibodies, oxidative stress parameters, and C-reactive protein (CRP) are higher in schizophrenia patients (Miller et al; 2014)

AIM

To assess the difference in Complete Blood Count parameters and ESR between schizophrenia group and normal healthy control.

METHODOLOGY

Venue: Banganga Mental Hospital, MGM, Indore
Study design: cross-sectional hospital based study
Sampling Technique: Purposive sampling technique
Sample size: 100 patients and 100 control

INCLUSION CRITERIA FOR PATIENTS

1. Diagnosis of Schizophrenia according to Diagnostic Criteria for Research of International Classification of Diseases -tenth edition (ICD-10) (WHO, 1993)
2. Patients who are drug naive or drug free for at least 4 months
3. Patients of male and female sex.
4. Patients aged between 18-60 yrs.
5. Patients giving written informed consent.

EXCLUSION CRITERIA FOR PATIENTS:

1. Having any other major physical or psychiatric co-morbidities.
   - alcohol or substance abuse, hypertension, diabetes mellitus, manifest heart disease, hepatic or renal failure, clinical evidence of active infection (respiratory, gastrointestinal or other systemic infection) , active or chronic inflammatory or autoimmune diseases, obesity (BMI >30 kg/m2).
   - Clinically significant abnormalities on the baseline physical examination (e.g., tachycardia, tachypnea, fever) or laboratory test results (e.g., anemia, leukocytosis, leukopenia, thrombocytosis).
2. Current scheduled use of corticosteroids, or other anti-inflammatory or immunosuppressive medication or immune modulatory agents.
3. Pregnancy.
4. Aged<18 or >60 years.
5. Subjects not giving consent.

INCLUSION CRITERIA FOR CONTROLS:

1. Age and sex matched normal healthy subjects.
2. Score of three or less on GHQ -12 (General health questionnaire).
3. Subjects who gave written informed consent.

EXCLUSION CRITERIA FOR CONTROLS

1. Any major physical or psychiatric disorder.
2. History of exposure to psychotropic drugs in past four months.
3. Current scheduled use of corticosteroids, or other immune modulatory agents.
4. Pregnancy
5. GHQ>3

PROCEDURE

After complete description of the study to the subjects, written informed consent was obtained from all participants. A detailed physical examination was done to rule out major medical or

neurological illness. Socio-demographic data was collected using the socio-demographic data sheet. After that clinical assessment was done on PANSS (The Positive and Negative Syndrome scale).

Blood tests

Twelve-hour fasting blood samples were drawn at about 9:00 AM from a large vein of each patient by applying minimal tourniquet force. For measurement of complete blood count and ESR, blood was drawn into a vacutainer tube, containing EDTA as an anticoagulant, and analyzed in an automated blood cell counter.

RESULTS

TABLE 1: Comparison Of Sociodemographic Variables Between Patient And Control Groups

Variables		Patients (N=100) n(n%)/ Mean ± SD	Control (N=100) n(n%)/ Mean ± SD	t/X2	P
Age in years		34.86 ± 10.31	34.38 ± 10.15	0.33	0.740
Total income of patients (per month)		10,380 ± 14288	20830 ± 22368	-3.93	0.000
Marital status	Married	65	59	0.764	0.382
	Unmarried	35	41		
Sex	Male	46	49	0.180	0.671
	Female	54	51		
Religion	Hindu	77	80	0.363	0.830
	Muslim	20	18		
	Christian	3	2		
Habitat of participant	Rural	71	60	2.677	0.102
	Urban	29	40		
Family type	Joint	46	45	0.020	0.827
	Nuclear	54	55		

*p< 0.05; **p< 0.01; ***p< 0.001

TABLE 2: Clinical Variables Of The Schizophrenia Group

Variable		Patients (N=40) n(n%)/ Mean ± SD
Duration of illness (months)		55.41± 53.06
Age of onset (years)		27.32± 9.26
Precipitating factor	Yes	100
	No	0
Course of illness	Acute	14
	Sub-acute	24
	Chronic	62
Drug status	Drug naïve	56
	Drug exposed in past	44
Past history	Not present	89
	Present	11
Family history	Not present	58
	Present	42
Diagnosis	Paranoid schizophrenia	61
	Undifferentiated schizophrenia	31
	Unspecified schizophrenia	8

TABLE 3: COMPARISON OF CBC PARAMETERS BETWEEN PATIENT AND CONTROL GROUP

Variable	Patient (Mean ± SD) N=40	Control (Mean ± SD) N=40	T	P
TOTAL WBC	6964.80±636.53	6531.00±764.82	4.352	0.000 ***
POLYMORPHS	4802.98±524.30	4440.06±733.64	4.02-0.05	0.000 ***
LYMPHOCYTE	1789.95±36.48	1803.23±1025.47	-0.123	0.902
MONOCYTE	102.50 ± 72.37	92.28 ±38.44	1.247	0.214
EOSINOPHIL	259.68± 167.49	265.67± 155.54	-0.262	0.794
Haemoglobin	10.76±0.98	10.53±0.83	1.798	.074
ESR	16.95±5.82	16.90±5.24	0.064	.949

***p< 0.05; **p< 0.01; ***p< 0.001**

TABLE 4: CORRELATION BETWEEN CBC PARAMETERS AND SOCIO-DEMOGRAPHIC/CLINICAL VARIABLES IN PATIENTS (N=100)

Pearson correlation(r)	Age in years	Total income of house	Education of participant	Duration of illness in month	Age of onset
TOTAL WBC	0.125	-0.083	-0.093	0.131	-0.050
POLYMORPHS	0.073	-0.081	-0.048	0.239**	-0.121
LYMPHOCYTE	-0.009	0.033	0.029	-0.053	0.137
MONOCYTE	0.079	-.0.020	-0.111	-0.080	0.246
EOSINOPHIL	0.108	-0.082	0.016	-0.078	-0.131
Haemoglobin	0.085	0.007	-0.133	0.071	0.143
ESR	0.112	-0.041	0.130	0.019	0.024

*p< 0.05; **p< 0.01; ***p< 0.001

TABLE 5: CORRELATION BETWEEN CBC PARAMETERS AND PANSS SCORES IN PATIENTS (N=100)

Pearson correlation(r)	PANSS positive score	PANSS negative score	PANSS GPS score	Composite index
TOTAL WBC	0.059	0.115	0.010	-0.056
POLYMORPHS	0.103	0.058	0.069	0.014
LYMPHOCYTE	-.0.046	0.104	-0.068	-0.107
MONOCYTE	0.003	-0.075	-0.117	0.061
EOSINOPHIL	0.017	0.112	0.041	-0.086
Haemoglobin	0.149	-0.209*	-0.152	0.248**
ESR	-0.072	0.150	0.169	-0.159

*p< 0.05; **p< 0.01; ***p< 0.001

DISCUSSION:

Mean age in years of patient group and control group was 34.86 ± 10.31 years. Patient group was more from low socio-economic status, rural background and were mostly female, hindu, married, from nuclear family. When age, sex, marital status, habitat, religion and family type were compared both patients and control were similar whereas patients had significantly less total income/month as compared to control group.

The mean duration of illness of patients was 55.41± 53.06 months. The mean age of onset of illness was 27.32± 9.26 years. Most of patients had no precipitating factor (100%), had chronic course of illness (62%), were drug naïve (56%), had no past history (89%), had no family history (58%), had the diagnosis of paranoid schizophrenia (61%).

There were no statistically significant difference between patient and control group in respect to LYMPHOCYTE, MONOCYTE, EOSINOPHIL, Haemoglobin, ESR .

Patient group has shown significantly MORE TOTAL WBC AND POLYMORPHS than control group.(p=0.000)

This finding is consistent with the findings of Semiz et al., 2014 which showed that Neutrophil lymphocyte ratio (NLR) is increased in physically healthy, non-obese patients with schizophrenia when compared with physically and mentally healthy controls.

In our study **POLYMORPHS COUNT has significant positive correlation with duration of illness in month** though Semiz et al., 2014 did not find any correlation between NLR and duration of illness.

Haemoglobin has significant negative correlation with PANSS negative score and significant positive correlation with composite index.

LIMITATIONS:

There is lack of longitudinal follow-up.
Baseline assessment was not matched.

CONCLUSION:

Schizophrenia patients have raised CBC parameters (total WBC counts and polymorphs) as compared to healthy control and polymorphs are positively correlated to duration of illness, thus substantiating the inflammatory hypothesis of schizophrenia.

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