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A Comparative Study of Neurological Soft Signs in Patients of Schizophrenia and Obcessive Compulsive Disorder

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Abstract **Original Research Article**

Objectives; the objective of this study is to find out the casual relationship of neurological soft signs to schizophrenia and OCD. Methods: The study was initiated after taking approval of the Institute Ethics Committee. A total of 30 schizophrenic patients, 30 OCD patients and 30 controls were included in the study. Their diagnosis were confirmed by consultant and then were administered Neurological Evaluation Scale developed by Robert Buchanan. The accumulated data was then analyzed statistically. Results; This study shows higher prevalence of neurological soft signs in schizophrenia as compared to OCD patients and controls. Conclusion; to ascertain their role in etiogenesis and pathogenesis of schizophrenia and OCD further research is needed.

Keywords: Schizophrenia, Ethics Committee, pathogenesis, OCD.

INTRODUCTION

The term "soft neurological signs" was first used by Loretta Bender in 1947 [1]. Neurological soft signs are defined as non- normative performances on motor or sensory tests which would be identical to tests of traditional neurological examination but elicited from an Individual who shows none of the features of fixed or transient neurological disorder. To consider a sign as a soft neurological sign, it should have following features.

No association should exist between an observed behavior and a positive history of neurological disease or trauma

It should not be apathognomic sign of any neurologic disease or encephalopathy.
It should not indicate any specific CNS pathology [2]

Neurological soft signs are considered a normal occurrence in childhood; however, improve as the child grows olderTherefore they are considered to represent a development phenomenon [3]. However, in certain clinical populations these signs persist or remerge. Soft neurological signs reflect disturbed cortical-subcortical connectivity and cortical-cortical interneuronal connectionswhich are also evident from reduced cortical/subcortical volume [4].

Soft neurological signs have been extensively studied in Schizophrenic patients and OCD patients. Schizophrenia is characterized by delusions, hallucinations, disorganized speech and behavior,negative symptoms and prolonged course[5]. Krapelin described disorders of equilibrium, tremorand disdidochokinesia which are considered under the domains of soft neurological signs today [6] Soft neurological signs are present more frequently in schizophrenics than other patients suffering from other psychiatric illnesses and normal individuals. S. Devabhaktuni found high prevalence of NSS in negative subtype of schizophrenia patients with positive family history of schizophrenia (29) Torrey observed in 1980 that soft neurological signs are associated with more chronic and severe forms of schizophrenia.

OCD remains as one of the most intriguing and disabling illness characterized by presence of obsessions and compulsions which constitute the core clinical feature of OCD. Obsessions are characterized by "recurrent and persistent thoughts, images or impulses that are perceived as intrusive, inappropriate which the patient usually admits as irrational, excessive, and unwanted and product of their own mind and not imposed from without". Compulsions are defined as "repetitive behaviour or mental acts that the person feels driven to perform in response to an obsession or accounting to certain rule that must be applied rigidly

and usually aimed at preventing or reducing the distress"[7].

Although findings regarding neurological soft signs in OCD are scarce compared with schizophrenia, some studies found an increased rate of neurological soft signs in patients with OCD compared with healthy subjects [8]. There is also growing evidence for cognitive dysfunction in OCD. Studies have reported impairment in visuospatial ability, executive function, attention, concentration, and working memory in OCD subjects. These deficits further lead to impairment in social and occupational functioning leading to increased distress and disability in OCD patients [9].

The presence of Neurological soft signs and cognitive deficits in OCD is indicative of underlying neuroanatomical and neurophysiological dysfunction and that OCD is a brain disease [10]. OCD affects the younger population and is known to cause significant impairment in individual social and occupational productivity. This disability can now be linked to the defective higher mental functions secondary to neurological dysfunction and not just the obsessive symptomatology as thought previously [11].

The question that remains to be answered is whether soft neurological signs are unique for different psychiatric disorders or they are a property of these disorders in general. There is however paucity of research studies in this aspect. This study is one of the first attempts to compare the prevalence of neurological soft signs in Schizophrenia, OCD and normal controls.

AIMS AND OBJECTIVES

(1) To study the prevalence of soft neurological signs in patients of schizophrenia and obsessive compulsive disorder.
(2) To compare the soft neurological signs in patients of schizophrenia, obsessive compulsive disorder and normal controls.

MATERIAL AND METHODS

Thirty consecutive patients of each schizophrenia disorder and obsessive compulsive disorder presenting in a tertiary hospital in North India in the Department of Psychiatry were selected for the study. In addition 30 age and sex matched patients, who have no personal or family history of mental illness, admitted in the surgical wards of hospital were selected as control subjects.

All patients were subjected to a detailed psychiatric examination.

Schizophrenia and obsessive compulsive disorder were diagnosed according to ICD-10 diagnostic criteria. The diagnosis was confirmed by a faculty member to avoid any error. Subjects suffering from Epilepsy, Mental retardation. Anyorganic brain disorder, Systemic physical illness (except control subjects), Alcohol dependence or drug abuse, Uncooperative patients/patients with severe psychosis whose attention and concentration prevented cooperation were excluded from the study.

All subjects were administered the Neurological Evaluation Scale devised by Robert W. Buchanan and Douglas W.Heinrichs to record the neurological soft signs present. This consists of a battery of 26 test items.Each item was scored on a three point scale ie 0 no abnormality, 1 for mild but definitive impairment, 2 for marked impairment(except for snout and suck reflex which were scored 0 or 2).This instrument included representative items from three functional areas of interest namely.

- Integrative sensory dysfunction reflected in bilateral extinction, agraphaesthesia, astereognosis, right-left confusion and impaired audio-visual integration.
- Motor in coordination reflected in tandem walk, finger to nose, finger to thumb opposition and disdiadochokinesia.
- Impaired sequencing of complex motor acts reflected in fist- ring, fist-edge-palm and Ozeretski tests.

In addition cerebral dominance, short term memory, frontal release signs and eye movements were also tested.

The accumulated data was then compared separately for differences between patient group and control subjects the differences observed were then analyzed for statistical significance by standard methods.

RESULTS

Most of the schizophrenics were 20-30 years old males, studied up to secondary level, Sikhs, urban, unemployed and married whereas most of OCD patients were 30-40 years old males, studied up to secondary level, Hindus, urban and married (Table).

Table-1: Showing socio-demographic profile of patients

Parameter	Category	Schizophrenia	%	OCD	%	Control	%
Age(years)	10-20	3	10.00	8	26.66	3	10.00
	20-30	13	43.33	5	16.66	3	10.00
	30-40	8	26.66	14	46.66	16	53.33
	40-50	1	3.33	2	6.66	6	20
	50-60	5	16.66	1	3.33	2	6.66
Gender	Male	19	63.33	19	63.33	15	50.00
	Female	11	36.66	11	36.66	15	50.00
Education Level	Illiterate	0	0.00	2	6.66	2	6.66
	Primary	7	23.33	2	6.66	3	10.00
	Middle	5	16.66	3	10.00	5	16.66
	Secondary	15	50.00	16	53.33	15	50.00
	Graduate/PG	3	10.00	7	23.33	5	16.66
Religion	Hindu	10	33.33	16	53.38	12	40.00
	Sikh	20	66.66	14	46.62	18	60.00
	Other	0	0.00			0	0.00
Residence	Rural	13	43.33	14	46.66	16	53.33
	Urban	17	56.66	16	53.33	14	46.66
Marital Status	Married	14	46.66	14	46.66	26	86.66
	Single	14	46.66	14	46.66	4	13.33
	Divorcee	2	6.66	2	6.66	0	0.00
Occupation	Unemployed	10	33.33	1	3.33	2	6.66
	Shopkeeper	3	10.00	3	10.00	5	16.66
	Farmer	5	16.66	8	26.66	8	26.66
	Office worker	4	13.33	2	6.66	4	13.33
	Householder	7	23.33	8	26.66	9	30.00
	Student	1	3.33	8	26.66	1	3.33
Family Type	Joint	15	50.00	14	46.62	18	60.00
	Nuclear	15	50.00	16	53.38	12	40.00

Neurological Soft Signs in Subject Groups. Most of the neurological soft signs were present in schizophrenic patients as compared to OCD patients and controls.

Table-2: Neurological soft signs in subject groups

Neurological Soft Signs	Schizophrenics	OCD patients	Controls
1.Tandem Walk	3	1	0
2.Rombergs Sign	0	0	0
3.Adventitious Overflow	0	0	0
4.Tremors	14	5	1
5CerebralDominance Right	26	28	29
Left	1	2	0
Mixed	3	0	1
6.AV Integration	8	2	0
7.Stereognosis	2	1	0
8.Graphesthesia	18	8	1
9.Fist Ring Test	26	20	6
10.Fist EdgePalm Test	13	3	0
11.Ozeretski Test	18	16	3
12.Memory	13	6	2
13 Rhythem Tapping Test	9	8	1
14.Rapid Alternating Movements	3	0	0
15.Finger Thumb Opposition	2	0	0
16.Mirror Movements	4	13	2
17.Extinction	3	5	0
18.Right Left Confusion	8	5	2
19.Synkinesis	5	3	1
20 Convergence	0	0	0
21Gaze Impersistence	2	0	0
22 Finger Nose Test	12	5	1
23 Glabellar Reflex	10	7	2
24 Snout Reflex	2	0	0
25Grasp Reflex	0	0	0
26 Suck Reflex	0	1	0

Neurological soft sign score in subject groups were more in schizophrenic patients as compared to OCD patients and controls with Signicance, Non-Signicance (NS), Highly Signicance (HS) as shown in Table3)

Table-3: Soft sign score in subject groups

Serial No.	Neurological Soft Sign	Schizophrenics	OCD patients	Controls	Significance
1.	Tandem Walk	3	1	0	Schizo vs controls NS Schizo vs OCD NS OCD vs controls NS
2.	Romberg's Sign	0	0	0	Not found in any group
3.	Adventious Overflow	0	0	0	Not found in any group
4.	Tremors	14	5	1	Schizo vs controls HS Schizo vs OCD Significant OCD vs controls NS
5.	A V Integration	13	2	0	Schizo vs controls HS Schizo vs OCD Significant OCD vs controls NS
6.	Stereognosis	2	1	0	Schizo vs controls NS Schizo vs OCD NS OCD vs controls NS
7.	Graphesthesia	24	10	1	Schizo vs controls HS Schizo vs OCD Significant OCD vs controls Significant
8.	Fist Ring Test (Right) (Left)	49 49	30 28	5 6	Schizo vs controls HS Schizo vs OCD Significant OCD vs controls HS
9.	Fist Edge Palm Test (Right) (Left)	19 19	4 3	0 0	Schizo vs controls HS Schizo vs OCD HS OCD vs Schizo NS
10.	Ozeretski Test	33	21	3	Schizo vs controls HS Schizo vs OCD NS OCD vs controls HS
11.	Memory	18	7	2	Schizo vs controls HS Schizo vs OCD NS OCD vs controls NS
12.	Rhythem Tapping Test	15	12	1	Schizo vs controls Significant Schizo vs OCD NS OCD vs controls Significant
13.	Rapid Alternating Movement (Right) (Left)	 1 4	0 0	0 0	Schizo vs controls Significant Schizo vs OCD Significant OCD vs controlsNo difference
14.	Finger Thumb Opposition (Right) (Left)	1 1	0 0	0 0	Schizo vs controls NS Schizo vs OCD NS OCD vs controls No difference
15.	Mirror Movements	4	18	2	Schizo vs controls NS Schizo vs OCD Significant OCD vs controls HS
16.	. Extinction	3	7	0	Schizo vs controls NS Schizo vs OCD NS OCD vs controls Significant
17.	Right Left Confusion	15	6	2	Schizo vs controls Significant Schizo vs OCD NS OCD vs controls NS
18.	Synkinesis	10	4	0	Schizo vs controls Significant Schizo vs OCD NS

					OCD vs controls NS
19.	Convergence	0	0	0	No finding
20.	Gaze impersistence (Right) (Left)	2 2	0 0	0 0	Schizo vs controls NS Schizo vs OCD NS OCD vs controls No difference
21.	Finger Nose Test (Right) (Left)	9 12	4 5	1 1	Schizo vs controls HS Schizo vs OCD Significant OCD vs controls NS
22.	Glabellar Reflex	17	12	2	Schizo vs controls Significant Schizo vs OCD NS OCD vs controls NS
23.	Snout Reflex	4	0	0	Schizo vs controls NS Schizo vs OCD NS OCD vs controls No difference
24.	Grasp Reflex	0	0	0	No finding
25.	Suck Reflex	0	1	0	Schizo vs controls No finding Schizo vs OCD NS OCD vs controls NS

DISCUSSION

An increased prevalence of neurological soft signs has been found in schizophrenia [30] 2and OCD. It has been suggested that in conditions like schizophrenia and OCD which run a prolonged course over several years, these signs show stability over time and serve as trait markers. In the present study, soft neurological signs were studied in 30 schizophrenics, OCD and compared with 30 ages and sex matched admitted patients in surgical wards of the hospital.

All subjects were subjected to a comprehensive neurological evaluation scale (NES), consisting of a battery of 26 items devised by Buchanan and Heinrichs.

The study groups were compared under three headings.

1. Schizophrenia versus controls

Compared to normal controls, the schizophrenics had a higher prevalence of soft signs. Highly significant differences were found for the following tests

a. Tremors; All positive (46.66%) scored 1 as compared to normal (16.66%) indicating the tremors were always fine ($p<0.001$)
b. Impaired audio-visual integration existed in 26.66% cases of schizophrenia but not in any controlsubjects($p<0.01$)
c. Agraphaesthesia; the prevalence in schizophrenia was 53.33% as against 3.33% in controls ($p<0.001$).
d. Fist-ring test; Most schizophrenics (86.66%) performed very poorly in this test with a severity score of 2 whereas only 20% control displayed this abnormality ($p<0.000001$)
e. Fist edge palm test was positive in 43.33% schizophrenics but not in any control subjects ($p<0.0001$)
f. Ozeretskitest was found positive in 53.33% schizophrenics but only 10% controls(p,0.0001)
g. Memory defects occurred in 43.33% schizophrenics and 6.66% controls($p<0.01$)
h. Finger-nose testthis sign was prevalent in 40% schizophrenics and only 3.33% controls($p<0.001$)

Significant differences were also found forrhythem tapping test, rapid alternating movements, right-left confusion, synkinesis and glabellar tap.

No significant differences from controls were found for tandem walk, Romberg's sign and adventiousover flow, stereognosis finger-thumb opposition, mirror movements, extinction, convergence, gaze impersistence, snout reflex grasp reflex and suck reflex. The above results are similar to those of the previous studies [8, 9, 12-20]. Obcessive Compulsive Disorder versus controls

OCD has also been shown to be associated with neurological dysfunctions. In the present study following neurological abnormalities were found significantly more in OCD than in normal controls.

a. Agraphaesthesia-The prevalence was 26.66% compared to 3.33% in normal controls.
b. Fist-ring test- 63.33% patients were impaired as compared to 20% controls.
c. Ozeretski test- It was positive in 53.33% patients of OCD and 10% normal controls.
d. Rhythem tapping test- 26.66% patients of OCD were impaired as compared to 3.33% of controls.
e. Mirror movements-43.33% patients of OCD made errors as against 6.66% controls.
f. Extinction- This phenomenon was observed in 16.66% patients of OCD but not in any control subject.

Other tests that were positive in OCD were tremors, abnormal audiovisual integration, impaired short term memory, finger-nose test and glabellar reflex but they did not reach significance.

The above results agree with the results of Hollander [21-24]

2. Schizophrenia versus Obcessive Compulsive Disorder

The following abnormalities were found significantaly different between the two groups.

a.Tremors-Prevalence is higher in Schizophrenia(46.66%) than OCD(16.66%)

b. Audiovisual integration -It is more often impaired in Schizophrenics (26.66%) than in OCD(6.66%).

c. Agraphaesthesia-More schizophrenics (53.33%) had this abnormality than OCD (26.66%).

d. Fist ring test-Schizophrenics (86.66%) were worse than OCD (63.33%).

e. Fist edge palm test-Schizophrenics (43.33%) were more than OCD (10%).

f. Rapid alternating movements-10% Schizophrenics made errors on this test whereas none from OCD.

g. Mirror movements -This was the only test where patients of OCD (43.33%) outnumbered Schizophrenics (13.33%).

h. Finger nose test-40% schizophrenics made errors in this test as compared to 16.66% patients of OCD.

Above findings are consistent with studies [25-28].

CONCLUSION

The present study concludes that as compared to normal control schizophrenics had a higher prevalence of soft signs. Highly significant differences were found for fist-ring test, fist-edge palm test, tremors, impairment of audio-visual integeration, Ozereski test, memory disfunction and finger nose test. Significance was also reached for tests like rhythem tapping, right-left confusion, rapid alternating movements, synkinesis and glabellar tap.

Patients with OCD also showed increased prevalence of soft signs as compared to controls. Significant differences were seen in agraphaesthesia, first ring test, Ozeretskitest,rhythem tapping test, mirror movements and extinction.

The schizophrenics when compared with OCD patients showed significantaly higher impairment on tests fortremors ,audiovisualintegration, agraphaesthesia, fist ring test, fist edge palm test, rapid alternating movements and finger nose test.Impaired mirror movement was shown more by OCD patients than Schizophrenics.

The higher prevalence of soft neurological signs in schizophrenia and OCD has expanded the evidence for organic basis in the etiology and pathogenesis of schizophrenia and OCD.

However there is a need for a universally accepted, structured and reliable procedure for rating neurological soft signs so that results as well as comparisons across studies can be bone authentically.

Present study was non blind, sample size was small. It was not strictly possible to include only drug naïve patients. The effect of medication on soft signs could not be determined and it may be significant. Soft signs could not be studied ingrosally psychotic schizophrenics. Therefore the relation of soft signs to the severity of schizophrenics could not be determined.

Further research eliminating above limitations needed. A structured and reliable procedure for rating the soft signs must be developed. A systematic effort to relate soft neurological signs to the more intensive and technologically sophisticated procedures is needed to clarify their neuro anatomical significance.

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