Evaluation of Brief Cognitive Rating Scale of Anemic Patients and Comparison with Control

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ABSTRACT

Present study has been done to determine the association between cognitive dysfunctions assessed by BCRS and anaemia. 30 patients with anaemia were matched against 30 controls. The tool BCRS was presented as mean and analyzed using students t test , and chi square test.

Anaemics had very highly significant dysfunction on the domains of concentration recent memory and past memory of BCRS. Anaemic patients had significant circumscribed areas of cognitive dysfunctions compared to the control group but a clear relation between the severity of anaemia and the severity of cognitive dysfunction could not be established.

KEY WORDS: Anaemia; Cognitive Dysfunctions; Hemoglobin; BCRS

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INTRODUCTION

Anaemia is related to cognitive performance, especially attention, in preschool and school children. Studies have found significant differences in IQ between children iron deficiency anemia and iron replete children[1]. They also found that vocabulary scores differed significantly among iron deficit anaemics and iron deficit replete groups. In a study of iron deficient adolescent girls, researcher has found improvement in vocabulary performance after eight weeks of iron supplementation although there was no change in attention measures[2]. All the chronic medical conditions with restored hemoglobin levels did not have much neurocognitive deficits. Supplementation with 10mg ferrous sulfate per kilogram body weight per day for 3 months in anaemic subjects resulted in apparent improvement in hematological status and learning achievement scores[3]. Studies on pre and post psychological test data showed that iron deficient anemia produces alterations in cognitive process related to visual attention and concept acquisition and these alterations are reversed with iron treatment[4]. There is evidence of a positive association between iron status and IQ, language and school achievement test but there is no support for the internal validity of the hypothesis that this association is casual[1]. Studies on children suggests that 6-7 year old children who had suffered from iron deficiency during the 6th-18th months of life, showed less ability to concentrate, were more clumsy and more hyperactive when compared to group of children who did not have iron deficiency during the first 2 years of life[5]. In the recent years attention has been focussed on the behavior disturbances which accompany iron deficiency.

A considerable number of studies have shown that infants with iron deficiency have a lower developmental index, lack interest in their environment, have a shorter attention span and diminished cognitive ability. Correlation studies have found association between iron deficiency anemia, poor cognitions, motor development and behavioral problems[6]. Longitudinal studies consistently indicate that children anemic in infancy continue to have poor cognition , poor school achievements and more behavioral problems in mid of their childhood. The problem in its vast magnitude if identified at an appropriate time warrants management to modify neurocognitive defects caused by it. This subject to assess cognitive dysfunction using BCRS in anaemias is of extreme importance and sparsely studied in psychiatry and needs to be studied using structured instruments. Therefore present study was done to know the impact of anemia on various cognitive

functions. The objectives of study were to determine the cognitive dysfunctions in anemia patients and its comparison with that of controls.

MATERIAL AND METHODS

This was a single point non-invasive study of cases of anemia involving administration of a battery of neuropsychological tests to assess the cognitive function in the patient group and control group which has been group matched for age, gender and education. The study was done on patients attending medical OPD of E.L.M.C Lucknow and K.G.M.U. Lucknow. All subjects gave informed consent for the study. Purposive random sampling technique was applied. The sample consisted of first 30 patients diagnosed as anemia selected from the various in patient wards.

Inclusion Criteria (Anaemic Patients)

1. Informed consent
2. Age group 18-55 years
3. Diagnosis of Anemia confirmed by haematological tests

Exclusion Criteria: (Anaemic Patients)

1. History suggestive of other significant physical (such as HIV, Hepatitis etc.) or neuropsychiatric disorder which can cause cognitive impairment such as; seizures, cerebrovascular disorders, dementia, nerurodegenerative disorders, systemic illness with known cerebral consequences, depression, anxiety, psychotic illnesses either presently or in the past.
2. Evidence of psychoactive substance dependence or significant abuse.
3. Those patients receiving the medication associated with cognitive side effects like tricyclic antidepresents, antipsychotics and lithium.
4. Family history of psychiatric illness in first degree relative.

The control group subjects consisted of subjects not having anemia (Hb > 11.0g/dl). A written informed consent had been taken for participation after explaining the purpose and design of study to each subject. The psychiatric status was assessed by using a structured clinical interview to know the psychiatric status. Hematological investigations like hemoglobin, TLC, DLC, ESR, peripheral blood film were done. The psychiatric status was assessed by using a structured clinical interview. These patients were then assessed for cognitive functions using standardized neuropsychological tests. Tools used

were Socio Demographic and clinical proforma, Brief cognitive rating scale (BCRS)[7]. Data were presented as mean ± SEM and Students't' test used to find the significant differences between the two groups. Chi-square test has been used to study the association between socio-demographic and clinical parameters.

RESULTS:-

There were 13 (43.33%) males and 17(56.67%) females in the case group. There were 15(50%) males and same females in the control group. There was no significant gender difference between the case and the controls.

There was no statistically significant difference between the controls and cases in their place of residence. People from the urban base formed the largest group in the cases followed by people from the rural (36.67%) and semi urban (23.33%) groups. In the control group maximum number of people came from urban base (40%) followed by people from semi-urban (36.7%) and rural (23.3%) base. Table 1 shows result from brief congestive rating scale of anaemic and control group patients.

Table:1 Brief Cognitive Rating Scale of Anaemic and Control Group Patients

	Group	Number of Patients	Mean±SD
Concentration	Anaemic	30	2.20 ± 0.76
	Control	30	1.43 ±0.50**
Recent memory	Anaemic	30	2.13 ± 0.50
	Control	30	1.46 ± 0.50**
Past memory	Anaemic	30	1.56 ± 0.57
	Control	30	1.00 ± 0.02**
Orientation	Anaemic	30	1.50 ± 0.57
	Control	30	1.30 ± 0.46*
Functioning self care	Anaemic	30	1.13 ± 0.34
	Control	30	1.00 ±0.05*

*(P<0.05) and ** (P <0.01)

Discussion and conclusion

The study revealed that there is a significant cognitive impairment in anaemia patients compared with controls which persisted even after correction for confounding factors. Various neuropsychological tests to test different cognitive abilities were administered to the anaemic patients at the time of detection of anaemia. The mean age in the present study was 28.3 years for control group and 28.5 year for the cases. It is well established that impairments in cognitive functions are often seen with anaemia but a number of confounding factors are also known to play an important role[8]. The confounding factors which occur in association with anaemia could be malnutrition, poverty, low maternal IQ, poor maternal education, low birth weight. In general, there are well circumscribed areas of cognitive deficits in anaemic patients. These deficits have been observed at all stages of life-infancy, childhood, adolescents and adults. Neuropsychological examination of specific cognitive functions indicates that some cognitive functions are affected more than the others by age. Majority of the subjects in this study were females in the cases and an equal number of males and females in the control group (50% each). Gender matching has not been done in previous studies in case of infants but most of the studies done in the adult population have involved females[9].This sample composition was similar to the sample composition done on adult females. Other study was done on non anaemic dolescent girls who were unmarried[2]. Not surprisingly, most of the studies examining cognitive dysfunction in anaemia have included it in their neuropsychological assessment although not as a sole measure of cognitive function. The use of BCRS in measuring cognitive impairment in anaemia is a novel strategy as hither to (till data) no studies have employed it in their battery of neuropsychological tests. Statistical analysis in the present study revealed very highly significant impairments in orientation, concentration, recent memory and past memory domains of BCRS which matches favorably with domain trends noted in SMMSE. A major plus point of BCRS is the provision of a scale for assessing the various domains of BCRS. The term cognition refers to the highest level of various mental processes such as perception, memory, abstract thinking, reasoning and problem solving and also planning, choosing, enactment / application of various strategies.

Current study was a cross-sectional one. Since cognition is a measure of change in an individual over time, longitudinal studies are more reliable.

The genesis of cognitive deficits in the anaemic patients is complex. However it appears that such deficits do exist and are associated with longer duration of anaemia and also increased severity of anaemia and also the occurrence of nutritional anaemia during the period of active brain development. Even modest reduction in cognitive function results in substantially increased risk of dementia over several years. Since the different studies provide conflicting reports on the reversibility of the cognitive deficits cost by anaemia, it is better to prevent the onset of cognitive deficit due to anaemia by preventing the anaemia itself rather than to treat them once they have appeared. This study found cognitive dysfunctions in anemic patients, (having nutritional anemias) which are well circumscribed and occur in specific domains of cognitive functioning. These require domain-specific neuropsychological tests to be detected.

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