

EUROPSYCHOLOGICAL PATTERN AMONG HIV-1 INFECTED ASYMPTOMATIC MOTHERS REPORTING TO ANTENATAL CLINIC, AT AIIMS

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Abstract

Objective: The objective of the present study is to determine whether the HIV-1 infection in asymptomatic stage can have any statistically significant impact on neuropsychological performance.

Material & Methods: The stratified purposive sampling technique was used for the selection of subjects. 41 HIV-infected asymptomatic subjects were selected for the study over a period of seven months at AIIMS, New Delhi.

Result: The cognitive deficits can occur in individuals during the early phase of HIV-1 infection. 41 asymptomatic HIV positive patients were enrolled, (N-41, 15 males & 26 females) from PPTCT Center, AIIMS. On assessing the neuropsychological pattern, we found impairment in some neuropsychological pattern. The main impairment was observed in areas of tactile (66%), memory (39%), intelligence processes (26%), and arithmetic (17%). A small number of subjects also showed impairment in motor (4%) and visual functions (2%). No subject indicated any deficit in reading, writing expressive and receptive speech areas.

Conclusion: We have observed greater deficit in tactile, intelligence, memory and arithmetic areas. The decrement in performance on specific neuropsychological tests implicates an early and selective involvement of different brain areas.

Key words: Intratympanic (IT) injection, sensorineural hearing loss, dexamethasone.

INTRODUCTION

Infection with the human immune deficiency virus (HIV) can have a significant impact on the central nervous system (CNS) as well on the immune system. The mental changes may include difficulty in ability to think clearly,

irritable behaviour and slowness of movements. HIV also affects the visual-spatial processes and performance of the memory, difficulty in abstracting, sequencing actions and thoughts. HIV can affect cognition in a variety of ways and

at any point during the course of infection or illness. The direct impact of HIV on the CNS usually causes a sub acute encephalopathy characterized by a global loss of cognition across areas of functioning including attention, concentration, memory, psychomotor speed, motor control, language, and visual/spatial perception. The effects of HIV resulting in an overall “slowing” (decreased precision of concentration and psychomotor control), which has been termed AIDS dementia complex. The deterioration of intellectual functions generally seen with advanced HIV infection is also seen early in the course of HIV infection (1). Brew Rosenblum and Price (1988) estimates that early in the course of AIDS, one fourth of all patients demonstrate subclinical to mild cognitive deficits. Subacute encephalitis affects 22 to 36 percent of patients with neurologic complications. (2)

Several earlier studies have also documented that there is an increased risk of neuropsychological impairment. Prevalence of neurocognitive impairment in the asymptomatic or mildly symptomatic stages of HIV infection remains controversial but some studies confirmed moderately elevated risk of neuropsychological impairment in the early stages of HIV infection (3, 4).

In the asymptomatic subject, generally, the first abilities to be affected include information-processing speed, psychomotor skills, learning efficiency, and the retrieval of stored information. The primary symptoms noticed by patients and or others around them early in the course of illness involve subtle failures in memory and concentration. More recently acquired information is easily misplaced or

forgotten, as are everyday items and occurrences. There is an overall “slowness” in thinking, as demonstrated in answers to questions and the processing of ‘new’ information. As illness progresses, declines in orientation to time and place, coherence of thoughts, fine and gross motor co-ordination and strength become prominent. More and more cognitive lapses involve mistakes in ‘old’ knowledge and routines. Heaton et al (2004) reported that HIV infection could be associated with subtle to severe neuropsychological deficits ranging from subtle to severe. (5) Baldewicz et al (2004) compared cognitive performance in clinically asymptomatic HIV-1 seropositive (HIV-1 Positive) men to HIV-1 seronegative men over an 8 years period of time. (6) They reported HIV-1 positive asymptomatic patients performed poorly than the HIV-1 negative group on speed of information processing.

Based on the hypothesis that some degree of neuropsychological impairment is present in asymptomatic HIV subjects and due to the scarcity of Indian based literature and inconclusive findings this study was undertaken to explore the pattern of neuropsychological impairments among HIV asymptomatic subjects.

MATERIAL AND METHODS

Study area: The subjects were selected from the Prevention of Parent to Child Transmission of HIV/AIDS Centre (PPTCT), Department of Obstetrics and Gynaecology, All India Institute of Medical Sciences, New Delhi (AIIMS).

Study Sampling: The stratified purposive sampling technique was used for the selection of subjects. 41 HIV-infected asymptomatic subjects were selected for the study over a period of seven months from January 2006 to July 2006.

All subjects received Pre and Post test counselling. In study include those Subjects belonging to reproductive age group were selected on the basis of HIV antibody test (Reactive samples were reconfirmed with two additional ELISA / Rapid tests as per NACO guidelines), both male and female who were HIV positive but clinically asymptomatic were selected for the study and subjects were able to read and write. We exclude to person whose had History of psychoses and major depression, history of mental retardation, epilepsy and significant head injury, Subjects with any systemic illness interfering with test performance and CD4 counts less than 200.

Study Tools: 1. Personal Information Sheet: A detailed comprehensive schedule was developed to collect information on gender, age, education, marital status, economic condition, and other illness related details. It also provided inputs on composition and nature of their families and friends. **2. AIIMS Comprehensive Neuropsychological Battery:** This test battery was used in the study to assess cognitive functions among the subjects. Prof. Surya Gupta and others constructed this battery (AIIMS, 1998). It contains information on the patient's cognitive functioning capability related to reading, writing, arithmetic, and memory, intelligence skills together with expressive speech, receptive speech capabilities, and motor functions. The results of reliability study of the AIIMS Comprehensive Neuropsychological Battery have indicated high coefficient values (0.79 to 0.98) with an average of 0.89. The test scores are least affected by time variance.

MATERIAL AND METHODS

As a first step after screening a written request explaining the purpose and importance of the study was explained to the subjects selected for the study. Informed consent was obtained from the subject regarding the research study, followed by review of the files of prospective subjects to obtain the background information. Once the rapport was established with the subject, personal information record was completed. This was followed by individual administration of neuropsychological assessment in a distraction free environment in one or two sessions depending upon the circumstances.

Statistical Analysis

The scoring of the tools used in this study was conducted according to the scoring instructions in their respective manuals. Data was analyzed by using mean, standard deviation, and percentage scores by SPSS package.

RESULT

41 asymptomatic HIV positive patients were enrolled, (15 M & 26 F) from PPTCT Centre, AIIMS. On assessing the neuropsychological pattern using the neuropsychological battery among these asymptomatic patients, we found impairment in some neuropsychological pattern as shown in Table-1. The main impairment was observed in areas of tactile (66%), memory (39%), intelligence processes (26%), and arithmetic (17%). A small number of subjects also showed impairment in motor (4%) and visual functions (2%). No subject indicated any deficit in reading, expressive and receptive speech areas. On comparing the neuropsychological presentation the males showed more neuropsychological impairment

Table-1. Comparison of Neuropsychological Impaired functions in male and female

Neuropsychological Scale	Impaired functions in %	Impaired functions in %
	Females (n-26)	Males (n-15)
Motor	11	7
Tactile	46	66
Visual	0	0
Receptive speech	0	0
Expressive speech	0	0
Reading	0	0
Writing	0	0
Arithmetic	7	13
Memory	30	26
Intelligence processes	19	13

than female as shown in fig. -1. The males showed more tactile function impairment (M-80%, F- 61.5%), & memory impairment (M-60%, F- 26.9%), was seen, other areas affected were almost same in both groups. When compared according to CD4 count, impairment was mainly seen when CD4 count ranged 200-500 compared to when CD-4 count was more than 500. The tactile (71%) & memory (19%) functions were affected almost similarly in both CD4 count groups.

According to the age group, the tactile (65%), memory (31%) function mainly affected subjects 15 to 35 years age group. In the age group of 15-25 years intelligence process & arithmetic was affected (31.3% & 25%) respectively.

The effect of education on neuropsychological behaviour was also studied. The impairment mainly affected subjects with low education level. In the low education level, tactile (77.8%), memory (66.7%), arithmetic (33.3%) & intelligence (55.6%) was observed. At the Graduation & PG education level, small numbers of subject were affected.

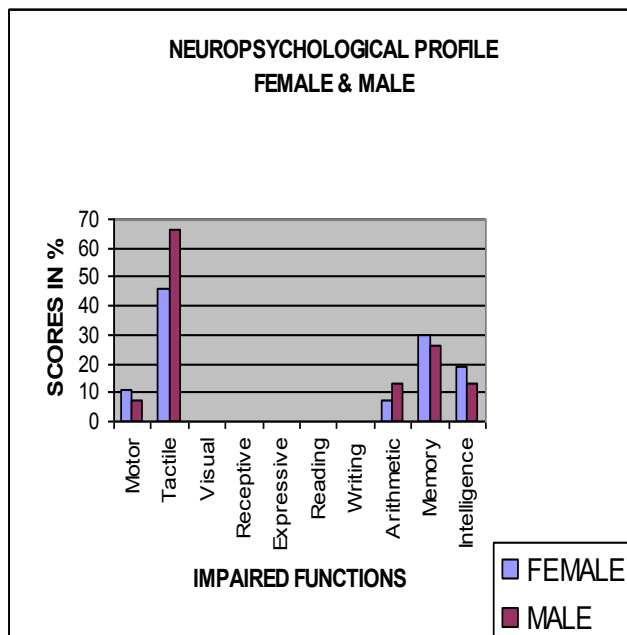
DISCUSSION

This study adds to the growing evidence of increased risk of neuropsychological impairments even in the early asymptomatic phase of HIV-1 infection. In our study the asymptomatic patients showed impairment mainly in area of tactile (66%), memory (39%), and intelligence process (27%). A small number of patients also showed impairment in areas of motor (4%), and arithmetic (17%). Our findings suggest that detectable cognitive changes are seen, particularly in tactile, memory, arithmetic and intelligence areas.

Our findings also is supported by a recent study by Kevin R, Noeline (2007), where that HIV positive asymptomatic patients showed deficits on verbal learning, memory, speed of processing, attention, and executive functioning compared to HIV negative controls. Former neuropsychological studies quantitatively support the clinical findings of AIDS dementia complex and are at times helpful in conforming both the presence and characteristic profile of the cognitive impairment.(7) One of the earliest study conducted by Navia and Price (1987) reported that up to 25% of patients with early HIV disease may present with neurological symptoms. White Heaton & Monch (1995) documented presence of cognitive impairments

among HIV asymptomatic subjects. HIV related neuropsychological impairment was generally mild in the asymptomatic stage of infection, and most affected areas were attention, speed of information processing, and learning efficiency.

Bar Graph Presentation Figure-1



Poutiainen & Elovorra (1996) reported that patients with symptomatic infection had higher frequency of complaints than subjects at asymptomatic stage. Another study by Mark Roger et al (2002) found motor functioning, executive skills, and information processing speed among the cognitive domains showing the greatest deficits in the early stages of HIV infection. Whereas, we have observed greater deficit in tactile, intelligence, memory and arithmetic areas and the pattern of neuropsychological deficits found in this study is similar to what has been found in the earlier studies.

These findings are perhaps the most important or useful in the longitudinal aspect of

HIV/AIDS infection. The neuropsychological impairments are likely to have an impact on a patient's ability to maintain employment outside of the home, or to complete activities to maintain the household. When this happens, many others are affected as well. Additional longitudinal studies are required to identify both stage of onset and degree of neuropsychological impairment as disease progression occurs.

Limitations

Some of the limitations of the study are discussed in the light of future research. The study was meant to assess the pattern of cognitive functioning in asymptomatic subjects using AIMS Comprehensive Neuropsychological Battery. We selected only 41 subjects and evaluated them for cognitive functions. The results obtained with this small sample suggest a definite indication of deficit even in the early phase of HIV infection. However it would better to study a larger sample so as to able to generalize the results obtained in the present study. Our study is one time study of the subjects; longitudinal study of these subjects would be more fruitful to assess any temporal association of neuropsychological functions among HIV-infected asymptomatic subjects. Lower socioeconomic status, decreased access to health care and decreased nutritional status factors are some of the compounding factors that can interfere with the study results.

CONCLUSIONS

As noted by Becker J, T et al (1995), we need to increase our efforts to better understand the nature and clinical significance of cognitive deficits in early HIV infection and AIDS. It is therefore especially important to confirm

findings between research centres and in different parts of the country. Our findings along with those of Grant I et al (1995), suggests that frontal lobe, basal ganglia, and related neuronal connections are primarily involved in HIV infection. However previous longitudinal studies of cognitive functions have focussed on patients who progress in terms of disease stage, the present study avoided this potential confounding factor by enrolling asymptomatic subjects only. The decrement in performance on specific neuropsychological tests implicates an early and selective involvement of different brain areas.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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