APPENDIX F

CALCAP Reaction Time

Bibliography and Selected Abstracts from Articles and Conference Presentations

Attached are abstracts from articles and conference presentations that contain valuable information about clinical and research applications of the CalCAP test battery, as well as psychometric properties of the instrument.

Suggested Readings about Reaction Time and CALCAP

(Research that uses the CALCAP procedures is highlighted with italics)

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Computerized and Conventional Neuropsychological Assessment of HIV-1-infected Homosexual Men

Eric N. Miller, PhD; Paul Satz, PhD; and Barbara Visscher, MD, DrPH

Department of Psychiatry and Biobehavioral Sciences and School of Public Health, University of California, Los Angeles

Neurology, 1991, Vol. 41, pp. 1608-1616

Article Abstract

We administered a battery of computerized and conventional neuropsychological measures to a group of 507 HIV-1 seronegative, 439 asymptomatic HIV-1 seropositive (Centers for Disease Control [CDC] groups 2 and 3), and 47 symptomatic HIV-1 seropositive (CDC group 4) homosexual/bisexual men enrolled in the Los Angeles center of the Multicenter AIDS Cohort Study. Tasks included multiple measures of attention, reaction time, memory, and psychomotor speed.

Comparison of group means revealed significant differences in performance between HIV-1 seronegative and symptomatic HIV-1 seropositive men on computerized measures of choice reaction time and on conventional measures of memory and motor speed. These findings are consistent with previous research in this area and support the sensitivity of both computerized and conventional neuropsychological instruments for detecting cognitive changes found in symptomatic HIV-1-infected individuals. Asymptomatic seropositive men, on the other hand, did not differ significantly from seronegative subjects on any of the computerized or conventional neuropsychological measures.

Only 13% of the asymptomatic HIV-1 seropositive men showed abnormal performance on a composite measure of cognitive functioning from the computerized test battery. This proportion did not differ significantly from that of seronegative controls (14%), but was significantly lower than the percentage of abnormal findings observed among symptomatic HIV-1 seropositive subjects (28%).

Results from this study support the hypothesis that the frequency of neuropsychological abnormalities in asymptomatic HIV-1-infected homosexual men is low and not statistically different from that of seronegative controls.

For more information, consult the full article in Neurology, 1991;41:1608-1616.

Computer-based neuropsychological screening for AIDS dementia complex

Jonathan L. Worth, Cary R. Savage, Lee Baer, Elizabeth K. Esty and Bradford A. Navia

Departments of Psychiatry and Neurology, Massachusetts General Hospital and the Departments of Psychiatry and Neurology, Harvard Medical School

AIDS, 1993, Vol. 7, pp. 677-681

Article Abstract

Objective: To test the efficacy of reaction time (RT) measures as a screening test for AIDS dementia complex (ADC).

Design and methods: Forty-two patients with mild-to-moderate ADC and 33 healthy HIV-1-seronegative control subjects took a computer-administered battery of four RT measures: simple RT, choice RT, and two types of sequential RT (1 and 2).

Results: The performance of the ADC group was significantly worse than that of the control group on all four RT measures, but not all tasks were equally sensitive. The two tests of sequential RT were found to be the best discriminators, and receiver operating characteristic curve analyses indicated that the optimal cut-off z score was 1.0 for both tests.

Conclusions: These preliminary results suggest that computer-based RT, using these two measures of sequential RT, may provide a sensitive method of detecting HIV-1-associated cognitive deficits.

For more information, consult the full article in AIDS, 1993;7:677-681.

COMPUTERIZED SCREENING FOR HIV-RELATED COGNITIVE DECLINE IN GAY MEN: CROSS-SECTIONAL ANALYSES AND ONE-YEAR FOLLOW-UP

Eric N. Miller*, Paul Satz*, Wilfred Van Gorp*, Barbara Visscher**, Jan Dudley**
*UCLA Neuropsychiatric Institute, **UCLA School of Public Health, Los Angeles, California
International Conference on AIDS, 1989, Vol. 5, p. 465

Objectives. To standardize and validate a computerized neuropsychological (NP) screening battery for early identification of cognitive decline in HIV-infected individuals.

Methods. A cohort of 537 HIV-1 seronegative (SN), 433 asymptomatic seropositive (ASP), and 92 symptomatic seropositive (SSP; ARC or AIDS) native English-speaking gay men (the Los Angeles cohort of the Multicenter AIDS Cohort Study) with no history of learning disability were administered a computerized NP screening battery together with a traditional NP screening battery. Of this cohort, 698 were seen for one follow-up visit, and 327 were seen for a second follow-up visit. Both the computerized and traditional batteries were designed to tap cognitive domains representative of NP deficits found in HIV-related encephalopathy, including motor speed, verbal memory, rapid visual scanning of verbal and nonverbal materials, and divided attentional skills. Subjects were designated as 'outliers' on the traditional and computerized measures if they scored two or more SDs below the mean for SN's on 2 or more measures.

NP Screening Battery	Computerized Screening Battery
1. Trail-Making, Parts A & B	1. Simple Reaction Time
2. Grooved Pegboard Test	2. Choice Reaction Time/Sequential Reaction Time
3. Rey Auditory Verbal Learning Test	3. Lexical Discrimination
4. WAIS-R Digit Span	4. Visual Selective Attention
5. Symbol Digit Test	5. Response Reversal and Rapid Visual Scanning
6. Verbal Fluency	6. Form Discrimination

Results. There was considerable agreement between the computerized and traditional screening measures, with the two sets of measures agreeing on outlier status from 84-87% of the time across the three visits. A factor analysis of the measures (shown below using the SN control group, n = 509) showed independent clustering of the computerized and traditional measures. This factor structure was replicated using the asymptomatic SP group (n = 436).

FACTOR ANALYSIS (PRINCIPAL COMPONENTS, VARIMAX ROTATION)

CRT Choice RT	.80*				
CRT Sequential RT	.67				
CRT Lexical Discrim	.78				
CRT Select Attention	.70				
CRT Visual Scanning	.73				
CRT Form Discrim	.54				
RAVLT Trial 5		.81			
RAVLT Trial 7		.90			
RAVLT Trial 8		.90			
RAVLT Recognition		.68			
Trails A			-.59		
Trails B			-.62		
Symbol Digit			.48		
DigSpan Forward			.75		
DigSpan Backward			.75		
Verbal Fluency			.52		
CRT Simple 2				.68	
CRT Simple 6				.79	
CRT Simple 10				.78	
Grooved Pegboard, Dominant					.89
Grooved Pegboard, Nondom					.86

Both the computerized and traditional screening measures identified approximately the same numbers of SN and SP men as being outliers at each visit. The percentages of outliers for each measure are shown on the next page. As can be seen from this table, discrimination of the SN and SP groups is significantly improved when results from both the computerized and traditional screening measures are taken into consideration.

Cross-Sectional Analyses	Seronegative	Asymptomatic Seropositive	Symptomatic Seropositive	Chi-Square Significance
Baseline (Visit 1)	(n = 537)	(n = 433)	(n = 92)	
Neuropsychology (NP)	7% outliers	9%	15%	.0251
Computer (RT)	7%	11%	12%	ns
Neuropsych or Computer	13%	18%	23%	.0163
Six-Month Follow-up (Visit 2)	(n = 355)	(n = 289)	(n = 54)	
Neuropsychology (NP)	8%	13%	13%	ns
Computer (RT)	7%	10%	9%	ns
Neuropsych or Computer	13%	20%	19%	.0366
One-Year Follow-up (Visit 3)	(n = 171)	(n = 128)	(n = 28)	
Neuropsychology (NP)	8%	12%	18%	ns
Computer (RT)	5%	13%	14%	.0367
Neuropsych or Computer	12%	23%	32%	.0056

Attrition at six-month and one-year follow-ups was greater for subjects identified as outliers at Visit 1 than for subjects identified as normal at Visit 1 (subject loss at Visit 2 = 45% of outliers vs. 34% of normals; Visit 3 = 75% of outliers vs. 60% of normals). Selective attrition may have resulted in some underestimation of the sensitivity of these screening measures. Also, some improvement in the symptomatic group may have been related to the availability of AZT beginning at Visit 2.

In addition to these cross-sectional analyses, we computed the numbers of individuals who had shown significant decline from Visit 1 to Visit 2 and from Visit 1 to Visit 3 on the computerized and traditional screening measures. 'Decline' was operationally defined as a drop of 1 SD or greater on 3 or more measures.

Longitudinal Analyses	Seronegative	Asymptomatic Seropositive	Symptomatic Seropositive	Chi-Square Significance
Six-Month Follow-Up	(n = 355)	(n = 289)	(n = 54)	
Neuropsychology Screen	11% declined	15%	13%	ns
Computer Screen	10%	18%	24%	.0039
Neuropsych or Computer	20%	30%	32%	.0103
One-Year Follow-Up	(n = 171)	(n = 128)	(n = 28)	
Neuropsychology Screen	14% declined	14%	20%	ns
Computer Screen	16%	15%	24%	ns
Neuropsych or Computer	29%	26%	33%	ns

A significantly higher proportion of asymptomatic SP subjects showed decline on the computerized measures from Visit 1 to Visit 2 than did SN subjects (Chi-Square = 6.45, $p < .02$), although this finding was not replicated at one-year follow-up. Similarly, the symptomatic SP subjects showed greater decline on the computerized measures from Visit 1 to Visit 2 than did the SN subjects (Chi-Square = 6.92, $p < .01$), although again this finding was not replicated at one-year follow-up. No such finding was obtained for the traditional neuropsychological screening battery either at six-month or one-year follow-up. The percentage of subjects showing a similar level of improvement ranged from 4-7% at six-month follow-up and from 5-15% at one-year follow-up for both the computerized and traditional measures across subject groups. There were no significant differences among the subject groups in level of improvement.

Conclusions. These findings suggest that computerized techniques may prove practical as a rapid, efficient and inexpensive screening tool for detecting early cognitive decline in HIV-infected individuals, although these measures work best in conjunction with traditional neuropsychological measures. When used longitudinally, this type of measure appears to have slightly greater sensitivity for identifying individuals at risk for HIV-encephalopathy than do traditional neuropsychological screening procedures.

Use of Computerized Reaction Time in the Assessment of Dementia

Eric N. Miller
UCLA Neuropsychiatric Institute; Los Angeles, California
Neurology, 1992, Vol. 42, p. 220

Objectives: It is well-established that HIV-1-Associated Cognitive/Motor Complex is characterized by motor slowing similar to that seen in subcortical dementias. The current study was designed to evaluate the effectiveness of computerized reaction time (RT) and conventional neuropsychological procedures for assessment of cognitive changes secondary to HIV infection. Reaction time procedures should prove especially sensitive for detecting this kind of motor slowing.

Methods: Subjects. Subjects were drawn from the Los Angeles cohort of the Multicenter AIDS Cohort Study, a longitudinal epidemiological study of the natural history of AIDS. This cohort is a relatively homogenous sample of young, well-educated, gay and bisexual men who have been studied at semi-annual intervals since 1984. We selected only those subjects who met diagnostic criteria for HIV-1-Associated Cognitive/Motor Disorder as defined by the American Academy of Neurology AIDS Task Force (1991). Nine subjects received a diagnosis of HIV-1-Associated Dementia Complex, and 32 subjects received a diagnosis of HIV-1-Associated Minor Cognitive/Motor Disorder using diagnostic criteria defined by the American Academy of Neurology AIDS Task Force (1991). All subjects had been tested repeatedly at semi-annual intervals using both reaction time measures and conventional neuropsychological tests.

Materials. Reaction time was assessed using the California Computerized Assessment Package (CALCAP; Miller, 1991) which includes 4 measures of simple reaction time and six measures of choice reaction time. Conventional neuropsychological procedures include the Trail-Making Test, Symbol Digit Modalities Test, and the Grooved Pegboard Test.

Data Analyses. Changes in performance across time were evaluated by computing difference scores between mean test performance before and after diagnosis of HIV-1-Associated Cognitive/Motor Complex.

Results: HIV-1-Associated Minor Cognitive/Motor Disorder. Decline in reaction time was observed on all 10 of the simple and choice reaction time measures following diagnosis of HIV-1-Associated Minor Cognitive/Motor Disorder. Mean levels of decline ranged from 0.1 SD for simple reaction time to 1 SD for choice reaction time. Nineteen out of 32 subjects (59%) declined 1 SD or greater on one or more reaction time tests. Sixteen subjects (50%) showed a comparable decline on a composite measure of the Trail-Making, Symbol Digit and Grooved Pegboard tests.

HIV-1-Associated Dementia Complex. Decline in reaction time was observed on seven out of 10 simple and choice reaction time measures. Mean level of decline ranged from ½ to 1 SD. Seven out of nine subjects (78%) declined 1 SD or greater on one or more reaction time tests. Only five subjects (56%) showed a comparable decline on a composite measure consisting of the Trail-Making, Symbol Digit and Grooved Pegboard tests.

Conclusions: The magnitude of change seen on reaction time testing was comparable to, or greater than, changes observed using conventional neuropsychological procedures. These data demonstrate the sensitivity of reaction time measures for detecting changes in motor functioning, and support the use of reaction time procedures for assessment and monitoring of symptoms of dementia and other cognitive slowing.

Presented at the Annual Meeting of the American Academy of Neurology, San Diego, California, May 5, 1992.

For more information about this study or the CALCAP Reaction Time procedures, contact: Eric N. Miller, Ph.D.; UCLA Neuropsychiatric Institute; 760 Westwood Plaza, Room C8-747; Los Angeles, CA 90024; (310) 825-2070

The Effects of Sociodemographic Factors on Reaction Time and Speed of Information Processing

Eric N. Miller, Eric G. Bing, Ola A. Selnes, Jerry Wesch, & James T. Becker
UCLA NPI, Johns Hopkins Hospitals, Howard Brown Memorial Clinic, University of Pittsburgh
Journal of Clinical and Experimental Neuropsychology, 1993, Vol. 15, p. 66

Performance on conventional neuropsychological testing is known to vary as a function of age and years of formal education, particularly among older and less well-educated individuals. We recently reported that, in addition to the effects of age and education, there may be an interaction between ethnicity and years of education on conventional neuropsychological testing procedures (Bing et al., 1991).

These kinds of studies highlight the need to develop age- and education-appropriate normative data, and to develop separate norms for different sociocultural groups, at least when utilizing traditional neuropsychological measures. The effects of these sociodemographic variables on more novel measures of reaction time and speed of information processing, however, are less well understood.

We report here the effects of age, education, and ethnicity on multiple measures of simple and choice reaction time. These effects are evaluated within a relatively homogeneous sample of young, well-educated men enrolled in the Multicenter AIDS Cohort Study (MACS).

METHODS

Subjects: The study cohort included 1526 native English-speaking men from the MACS evenly divided between medically asymptomatic HIV-1 seropositive subjects and HIV-1 seronegative control subjects. We have previously reported that there are no differences between seronegative and medically asymptomatic seropositive subjects in this cohort, both for conventional neuropsychological exams (Miller et al., 1990; Selnes et al., 1990) and for computerized reaction time measures (Miller, Satz & Visscher, 1991; Miller et al., 1990).

Of this cohort, 1400 were Caucasian, 58 Hispanic (with English as their first language), and 68 African American. Subjects ranged in age from 22 to 76 (mean age = 38, SD = 7.4). Mean educational level was 16 years (SD = 2.3; range = 9 to 21 years).

Procedures: Subjects in this cohort were administered a 10-minute computerized reaction time task. This task consisted of a simple reaction time procedure and two choice reaction time procedures using a basic Go-No Go paradigm designed to assess different two types of decision-making: basic pattern matching (match the number '7') and serial pattern matching (match 2 numbers in sequence).

RESULTS

Subjects were compared on the measures of simple and choice reaction time using multiple regression with all major sociodemographic factors entered simultaneously. Age and education were treated as continuous variables; ethnicity was treated as a categorical variable using dummy coding. Alpha was set at .05 for all analyses. The multiple regression analyses showed significant main effects for age on simple reaction time and basic pattern matching. There were significant main effects for years of education on simple reaction time only.

A breakdown of reaction time scores by age is shown in Table 1 (statistical tests were performed using age as a continuous variable—strata of age shown on the next page are for illustrative purposes only). This table illustrates a strong linear trend toward motor slowing with advancing age, even for individuals in their 30s and 40s.

Among the different ethnic groups, Hispanic Americans differed significantly from the other subjects on simple reaction time and basic pattern matching. The African American subjects differed significantly from the other subjects on simple reaction time only. There were no differences among the ethnic groups on serial pattern matching, nor were there significant effects of age or education for this measure. A breakdown of reaction time performance by ethnic group is shown in Table 2.

Table 1	Ages 20-29 Mean	(SD)	Ages 30-39 Mean	(SD)	Ages 40-49 Mean	(SD)	Ages 50+ Mean	(SD)
N	140		781		487		118	
Years of Education	15	(2.2)	16	(2.2)	16	(2.4)	17	(2.7)
Simple Reaction Time (in msecs)	348	(102)	352	(98)	363	(121)	375	(108)
Choice Reaction Time (in msecs)								
Basic Pattern Matching	395	(37)	401	(45)	403	(45)	407	(41)
Serial Pattern Matching	536	(87)	536	(98)	536	(97)	527	(100)

Table 2	Caucasian Mean	(SD)	Hispanic Mean	(SD)	Af. American Mean	(SD)
N	1400		58		68	
Age (in years)	38	(7.3)	36	(6.6)	40	(10.1)
Years of Education	16	(2.3)	15	(2.3)	15	(2.4)
Simple Reaction Time (in msecs)	354	(100)	389	(130)	395	(189)
Choice Reaction Time (in msecs)						
Simple Pattern Matching	401	(43)	413	(54)	396	(44)
Serial Pattern Matching	535	(96)	534	(101)	545	(119)

DISCUSSION

Our data suggest that investigators must consider the effects of age and years of education on reaction time measures, particularly for simple reaction time measures. These results also suggest that there are ethnic differences in how subjects respond to the task demands of reaction time procedures. For example, both African Americans and Hispanic Americans were, as a group, less likely to respond rapidly to a simple reaction time paradigm, even though they performed as well as other subjects on the more demanding choice reaction time paradigm of serial pattern matching. The choice reaction time measures present stimuli at a rapid pace determined by the type of task and controlled by the computer. The simple reaction time procedures, on the other hand, are self-paced and require only that the subject respond "as quickly as possible" after seeing a stimulus appear on the screen.

We have found in our longitudinal studies that, while choice reaction time remains quite stable across time, there is a slight slowing in simple reaction time as subjects become more familiar with the task. Thus, the simple reaction time procedures, unlike the choice reaction time tasks, are more susceptible to motivational factors and differing interpretations of "as quickly as possible."

For clinical and research purposes, these results indicate that normative data for reaction time measures, as with conventional neuropsychological procedures, need to be generated independently for different ethnic groups as well as for different levels of age and education.

For additional information, contact: Eric N. Miller, Ph.D., UCLA Neuropsychiatric Institute, 760 Westwood Plaza, Room C8-747; Los Angeles, CA 90024; (310) 825-2070.

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Cognitive Testing Using Reaction Time and Traditional Neuropsychological Procedures

Eric N. Miller
UCLA Neuropsychiatric Institute
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Overview: Reaction time (RT) measures often are viewed as more sensitive than traditional neuropsychological tests for studying the subtle kinds of cognitive changes that may occur in the early stages of many kinds of brain disease. We have studied the relative usefulness of two neuropsychological screening batteries — one consisting of traditional neuropsychological procedures and one consisting of multiple measures of simple and choice RT.

Methods: Subjects were 1034 native English-speaking men evenly divided between medically asymptomatic HIV-1 seropositive subjects and HIV-1 seronegative controls. All subjects were drawn from the Los Angeles cohort of the Multicenter AIDS Cohort Study, a longitudinal epidemiological study of the natural history of HIV infection. This cohort is a relatively homogenous sample of well-educated, gay and bisexual men who have been tested at semi-annual intervals using both RT tasks and traditional neuropsychological tests. RT was assessed using the California Computerized Assessment Package (CALCAP; Miller, 1991) which includes 4 measures of simple RT and six measures of choice RT (Go-No Go; Lexical Discrimination; Sequential Memory; Visual Distraction; Response Reversal; Form Discrimination). Traditional neuropsychological procedures included the Trail-Making Test, Rey Auditory Verbal Learning Test, Symbol Digit Modalities Test, Digit Span, Verbal Fluency, and the Grooved Pegboard Test. The RT procedures were evaluated for internal consistency reliability, test-retest reliability, and concurrent validity. The relationship between the traditional and computerized procedures was evaluated using factor analysis.

Results: The simple RT measures showed high internal consistency reliability (coefficient alpha = .77-.95), but low 6-month test-retest reliability (.20-.29), suggesting that the psychomotor skills measured by this task are assessed in a uniform manner across the multiple trials of each individual task, but that these skills vary considerably depending on state variables such as mood, attention, fatigue, etc. By contrast, the choice RT measures showed excellent internal consistency reliability (.81-.96) and 6-month test-retest reliability (.43-.68) that was comparable to that seen using the traditional neuropsychological measures (.47-.77).

A factor analysis of the RT and traditional NP tasks was performed and showed that the tasks measure 3 primary factors from the traditional neuropsychological testing (brief memory and attention; manual dexterity and motor speed; verbal learning and memory) and 2 factors from the RT testing (separate factors for simple and choice RT). These findings suggest that the RT tasks measure skills that are different from those assessed using traditional neuropsychological procedures. Despite this finding, the RT tasks and the traditional procedures showed considerable overlap in classification of outlier status. Subjects were designated as 'outliers' if they scored 2 SDs below the mean on two or more measures, or if they scored 3 SDs below the mean on any one measure. Using these criteria, the RT and the traditional measures agreed on outlier status 85% of the time. 51% of individuals identified as outliers on the RT tasks and 50% of individuals identified as outliers on the traditional neuropsychological tests were identified as having abnormal clinical neuropsychological or neurological exams on follow-up.

There were 41 individuals with multiple neuropsychological testing who developed HIV-associated Cognitive Motor Disorder. For these individuals, the magnitude of change seen on RT testing was comparable to, or greater than, changes observed using traditional neuropsychological procedures.

Conclusions: These findings show that simple and choice RT tasks measure at least two domains of cognitive functioning that are relatively independent of the psychomotor skills assessed by traditional neuropsychological tests. When properly developed and administered, RT tasks have psychometric properties that are comparable to those found in traditional neuropsychological procedures. RT measures are best seen as complementing, rather than replacing, traditional neuropsychological procedures.

The Use of Computer-Based Measures of Complex Reaction Time in Depressed HIV-1 Infected Patients

M Halman, NM Hamburg; CR Savage, JL Worth
Massachusetts General Hospital
Psychosomatics, 1995; Volume 36, page 175

Objective: Computer-based measures of reaction time provide a sensitive screening method for HIV-1-associated cognitive deficits. As major depression is frequent in the course of HIV disease and also thought to confound certain cognitive measures, we sought to evaluate the change in performance on a cognitive screening test in HIV-1 infected patients treated for major depression.

Method: All patients completed a Beck Depression Inventory (BDI), a computer-based measure of sequential reaction time (SQRT2) and a semi-structured psychiatric examination, and met DSM-III-R criteria for major depressive episode. Patients were treated and reevaluated at six month follow-up with a repeat BDI and SQRT2. At follow-up, patients were classified into two groups based on treatment response: 1) responders as defined by BDI < 14 or decreased by 50%; and 2) non-responders. The two groups were matched on age, education, CD4+ lymphocyte count and initial BDI score.

Results: Twenty-one depressed HIV-1 infected patients were examined. Ten were classified as responders and eleven as non-responders. On initial SQRT2, non-responders showed a trend toward slower performance (SD), 706.00 (70.96) vs. 638.80 (92.22) msec (t=1.882, df=19, p=.075), as compared to responders. Responders showed no significant change on their follow-up SQRT2 time (+7.300 msec); (p=.83), whereas non-responders showed a significant slowing in performance (-50.727 msec); (t=-2.514, df=10, p=.03). Pearson correlations between BDI and SQRT2 at both initial and follow-up times showed no significant correlations for both groups.

Conclusions: Although clinical lore suggests that major depression should be treated before performing cognitive testing on an HIV-1 infected patient, this study's findings suggest that successful treatment of major depression does not result in significant changes in cognitive performance on a complex reaction time measure known to be sensitive to HIV-1-associated cognitive deficits. Impairment on SQRT2 may also predict poor outcome in depressed patients, possibly by identifying the presence of significant cognitive deficits at the initial evaluation.

For more information, contact: Mark H. Halman, MD, FRCP(C); Massachusetts General Hospital - ACC 812; Boston, MA 02114.

Cognitive Performance during Long-Term Respirator Wear While at Rest

Caretti DM
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Article Abstract

Cognitive performance was studied in six male and three female subjects exposed to two randomly administered 10-hour measurement periods, a control condition without a respirator, and a respirator wear trial requiring continuous wear, under nonexercise conditions. Reaction time and decision-making speed were assessed using a series of simple and choice reaction time tasks at the start of each test iteration and after hours 2, 4, 6, 8 and 10 of testing. Subject anxiety levels were assessed along with reaction time measures. Visual tracking ability was measured after each hour of testing. Reaction time and decision-making speed did not differ significantly between control and respirator conditions at any time throughout the 10 hours of testing. Female volunteers exhibited significantly faster reaction times and decision-making speeds than males independent of respirator wear conditions and time of measurement. Subject anxiety increased significantly from initial measurements after 8 hours of testing for each condition, but no differences were observed between conditions at any time. Respirator wear did not detrimentally influence visual tracking ability. These findings suggest that respirator wear over a relatively long time period under nonexercise conditions should not significantly inhibit cognitive function.

Neuropsychological Function in Patients with Increased Serum Levels of Protein S-100 After Minor Head Injury

K Waterloo, T Ingebrigtsen, B Romner
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Article Abstract

Protein S-100 is a calcium binding protein, synthesized in astroglial cells in all parts of the central nervous system (CNS). We have previously reported high serum levels of protein S-100 in patients after minor head injury (MHI). A battery of conventional and computerized neuropsychological measures was administered to two groups of MHI patients. Neuropsychological outcome at 12 months postinjury was examined in a group of 7 patients with increased serum levels of protein S-100 after MHI and 7 age- and sex-matched controls without detectable S-100 in serum after MHI. Our results demonstrate no overall cognitive dysfunction in either of the two groups. Our findings indicate specific dysfunction on measures of reaction time, attention and speed of information processing for the S-100 group. Posttraumatic depression does not explain the neuropsychological differences between the groups. These findings support that increased serum levels of protein S-100 may be of predictive and prognostic value for longlasting neurocognitive abnormalities after minor head injury. Presence of S-100 in serum may indicate the presence of diffuse brain damage. Our results suggest that information processing measures in computerized neuropsychological assessment are more sensitive for detecting small signs of neurocognitive abnormalities after MHI than conventional test batteries.

Neuropsychological Performance and HIV-1 in Ethnic Minority Samples of Women and Men: Serostatus Effects, Comparative Data and Methodological Considerations

Durvasula, R.S., Miller, E.N., Myers, H.M, Satz, P., & Wyatt, G.

Background and Rationale: As rates of HIV and AIDS continue to rise among women and ethnic minority group members, larger scale cross-sectional and longitudinal studies of neuropsychological (NP) performance among HIV-positive individuals from these understudied groups are needed. To date, much of the work assessing NP function in these groups has focused largely on cohorts of injection drug users (IDUs), a subgroup of individuals not representative of the majority of HIV infected men and women from ethnic minority groups.

Samples: The present data are derived from two separate studies on the psychosocial, medical, and NP sequelae of HIV infection: (a) the UCLA/Drew Women and Family Project, a longitudinal study of a multiethnic sample of 400 women and (b) the African American Health Project, a cross-sectional study of 502 African American men. Both studies were conducted in Los Angeles County, and the samples are comprised of HIV + and HIV - individuals at varying stages of infection, with a range of substance abuse histories.

Results: Preliminary analysis of baseline data from the women's samples (N=190) reveal a trend toward slower motor speed among HIV positive women as assessed by both the Grooved Pegboard ($F(2,163) = 2.7$; $p < .07$) and the Finger Tapping Test ($F(2,111) = 5.2$ $p < .007$), controlling for age, education, and recent drug exposure. In contrast, analysis of performance by a subsample of HIV + and HIV - African American men from the AAHP (N=237) on the Grooved Pegboard revealed no differences as a function of HIV serostatus. While women did not evidence any HIV serostatus differences on measures of reaction time (as assessed by the California Computerized Assessment Package (CalCAP), multivariate analysis revealed HIV serostatus effects for men on this test, with symptomatic seropositive men evidencing significantly poorer performance than asymptomatic seropositive men ($F(2,214) = 2.26$, $p < .04$), with significant univariate effects for Sequential Reaction Time I ($F(2,214) = 4.63$, $p < .01$) and Sequential Reaction Time II ($F(2,214) = 5.48$, $p < .005$). Both women and men were administered the WHO-Auditory Verbal Learning Test, a supraspan list learning test similar to the RAVLT and CVLT, and neither group evidenced differences as a function of HIV serostatus on this test. These findings are consistent with the primary deficit in psychomotor functioning captured by studies conducted with both IDUs and cohorts of White men, but, as has been seen in other studies, the specific measures that are most sensitive vary across different study samples, gender, and ethnic groups.

Conclusions: While both men and women evidence differences as a function of serostatus, the domains in which differences are observed vary across these two samples. While differences in education or other demographics may partially account for the dissociation between the men's and women's samples, other issues, including the differential contribution of substance use will be addressed. These discrepant findings highlight the importance of circumspection when generating conclusions from studies examining multiethnic samples or any other groups for whom appropriate culture fair tests or normative data are not available. Comprehensive characterization of samples, as well as careful assessment and quantification of psychosocial and demographic data are essential for accurate interpretation of findings obtained from any studies of the NP sequelae of HIV in understudied groups. Implementation of these issues into study design and execution will be discussed with a focus on methods of assessing sociodemographic factors, selection of culture-fair tests and recruitment and retention of ethnic minority samples, particularly women.

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