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Interrelationships Between Neuropsychological Data and Social Problems in Epilepsy

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Social problems and problems in neuropsychological functioning are the rule rather than the exception in individuals with seizure disorders. According to Rodin (4), one of the world's foremost epileptologists: "There is practically no epileptic patient who is not confronted with some type of psychosocial problem . . ." (p. 74). In one study, for example, Rodin et al. (5) discovered that fewer than one of four individuals with seizure disorders was free of intellectual and behavioral problems and neurological handicaps. Similarly, when a specialized neuropsychological battery was developed to assist in the evaluation of individuals with seizure disorders, only 25% of the individuals with confirmed seizure problems performed within the normal range (2). The reasons for these problems are not difficult to find; they include neurological problems, social stigma, difficulties in accepting the existence of seizures, and problems in employment. In clinical work, it has long been suspected that individuals with outstanding psychosocial problems tend to demonstrate problems in brain functions (neuropsychological impairment) as well. The purpose of this chapter is to explore the interrelationships between neuropsychological impairment and psychosocial problems in epilepsy.

METHODS

Subjects

One hundred adult epileptic patients with diverse seizure types and etiologies were examined in detail for this study. All were seen as patients in our Comprehensive Epilepsy Program, which specializes in working with individuals having difficult to manage seizure disorders. As primary diagnoses, approximately one-half had complex partial attacks, one-fifth had elementary partial attacks, one-fifth had generalized tonic clonic seizures, and the rest had other types. The average age at onset was approximately 13

years, with an average duration of 14 years. These were young adults who were typically in their late 20s and who had high school or secondary school diplomas. There were 46 males and 54 females. All but 10 were Caucasian. No subject was included whose performance on any of the tests was incomplete or invalid.

Tests Administered

Two sets of tests generally described as "neuropsychological" were used to evaluate adequacy of brain functions. First, intelligence was evaluated by means of the Wechler Adult Intelligence Scale (WAIS) in the standard manner. Second, signs of problems in brain functions were examined by means of a specialized neuropsychological battery specifically developed to assess individuals with seizure disorders. This battery consists of a series of 16 neuropsychological tests, each of which has been shown to be sensitive to problems in brain functions in epilepsy (2). The tests permit the evaluation of a broad range of functions, including sensory-perceptual abilities, motor performance, memory, ability to attend to the task, language-related skills, visualspatial functions, and problem solving. On each test, performances falling inside and outside normal limits can be identified, and a summary measure of all 16 tests is the total number of tests falling outside normal limits.

There were also two basic indicators of functioning generally described as "psychosocial." The first of these was the Minnesota Multiphasic Personality Inventory (MMPI), which provides an objective index of the various types of emotional concerns. Such an inventory, however, does not necessarily tap problems that may appear with persons having seizure disorders.

Several colleagues and myself (3) developed the Washington Psychosocial Seizure Inventory (WPSI) to more exactly identify problems peculiar to epilepsy. Seven psychosocial areas are assessed by this inventory. Family Background evaluates a person's view of the home in which the early years were spent, including perceived security and stability of the home as well as acceptance by parents. Emotional Adjustment is evaluated in a general fashion with items emphasizing depression, tension, anxiety, inability to concentrate, and generalized fatigue. Interpersonal Adjustment assesses a person's ease in relating to others, as well as the extent of social relationships. The degree to which seizures are perceived as related to employment and the extent to which the person is happy with the job situation are evaluated by Vocational Adjustment. Related to employment is Financial Status, which assesses the extent to which money is available to meet basic needs. The person's ability to accept the existence of the seizure problem without undue worry or embarrassment is evaluated by Adjustment to Seizures. The patient's compliance in taking medication and the view of the doctor in terms of confidence and congeniality are assessed by Medicine and Medical Management. Finally, an indication of Overall Psychosocial Functioning is also

provided. These scales were developed on the basis of the judgment of professionals about adequacy of adjustment within each psychosocial area; an item-by-item empirical approach was used in scale formation. We have found this test, more than any other test or inventory, to provide helpful information in evaluating the psychosocial problems of epileptics.

Analyses

Four test scores were used as summary indicators of the four basic procedures. The WAIS Full Scale IQ was employed as a summary of intelligence. The percentage of scores outside normal limits on 16 neuropsychological tests on the Neuropsychological Battery for Epilepsy was used as an index of neuropsychological impairment. The average MMPI profile elevation given in standard score form but omitting Mf was considered an index of emotional functioning. Finally, the score on the Overall Psychosocial Functioning Scale of the WPSI was given as a general index of psychosocial functioning. For each of the two neuropsychological indicators, the 100 subjects were divided into four groups by logical criteria and assessment of psychosocial functioning was made on the MMPI and the WPSI. In the same fashion, division of subjects into four groups was done on the basis of the indicators of psychosocial functioning and assessment of neuropsychologic performances was made. The division of subjects for each variable is detailed in Table 1. One-way analyses of variance were used in all statistical computations.

TABLE 1. *Division of subjects into ranges of functioning*

Area of functioning (and basic variable)	Ranges of functioning[a]			
	1	2	3	4
Intelligence (WAIS Full Scale IQ)	111 and above (20)[b]	90–110 (48)	80–89 (21)	Up through 79 (11)
Neuropsychologic impairment (% scores outside normal limits)	0–25 (26)	26–50 (26)	51–75 (23)	76–100 (25)
Emotional adjustment (MMPI profile elevation)	Up through 59 (24)	60–69 (34)	70–79 (34)	80 and above (8)
Psychosocial functioning (WPSI Overall Scale)	Profile range 1 (18)	Profile range 2 (19)	Profile range 3 (56)	Profile range 4 (7)

[a]Ranges labeled with higher numbers identify groups with decreased abilities and/or increased problems.
[b]*N*.

RESULTS

Table 2 summarizes the results in brief form. When these patients were grouped by intellectual level, no statistically significant differences across the groups were found on MMPI variables. A few differences did appear when psychosocial functioning as evaluated by the WPSI was evaluated. Decreased intelligence was associated with increased psychosocial problems, but both

TABLE 2. *Summary of statistical differences with patients grouped according to basic variables*

Outcome variable	No. of differences	Nature of differences
	Intellectual level[a]	
Emotional adjustment (MMPI)	0/10 (0%)	Very slight trends with dullest group having the poorest adjustment
Psychosocial functioning (WPSI)	3/8 (38%)	Limited relationships with decreased intelligence associated with greater familial, vocational, and overall psychosocial problems
	Neuropsychological impairment	
Emotional adjustment (MMPI)	5/10 (50%)	With increased impairment, increases in somatic concerns, depression, anxiety, unusual thoughts, and social introversion
Psychosocial functioning (WPSI)	5/8 (62%)	Orderly increases in a variety of psychosocial problems with increases in brain impairment
	Emotional adjustment	
Intelligence (WAIS)	2/14 (14%)	Slight trends with more emotional problems associated with decreased intelligence
Neuropsychological impairment	7/17 (41%)	Orderly increases in impairment with increasing emotional problems; relevant tests required accurate perception, freedom from distractibility, motor speed, and language functions
	Psychosocial functioning	
Intelligence (WAIS)	8/14 (57%)	Orderly decreases on both verbal and performance intelligence with increasing psychosocial problems
Neuropsychological impairment	9/17 (53%)	Orderly increases in impairment with increasing psychosocial problems; relevant tasks required accurate perception, motor speed, memory, problem solving, and freedom from distractibility

[a]Patient grouping category.

the scope and the magnitude of these relationships were limited. It is apparent that when individuals are segregated by intellectual level, relatively few differences in psychosocial adjustment are observed.

When the patients were divided according to extent of neuropsychological impairment, a larger number of correlations were found with psychosocial variables. With increasing impairment, there was a greater tendency for the appearance of emotional problems often found in the neuroses. When the WPSI was examined across the groups, differences appeared in the emotional, interpersonal, vocational, and financial areas, as well as with respect to overall functioning. The indicators of vocational problems and overall functioning rendered the greatest differences, with more psychosocial problems associated with increased impairment in brain functions.

When the patients were divided by average MMPI profile elevation, only slight differences in intellectual level were seen, none of which were found on the summary IQ measures. Orderly increases in neuropsychological impairment with increasing emotional problems were observed. The tests on which the differences appeared did not focus on a single type of function, but performance on a variety of measures showed decreases with increasing emotional problems. The greatest differences were seen on tasks requiring simple perception, attention to the task, and speed of response.

Division of patients by overall level of psychosocial problems as evaluated by the WPSI resulted in differences on measures of both intelligence and neuropsychological impairment. WAIS Verbal, Performance, and Full Scale IQs all demonstrated orderly decreases with increased psychosocial problems. As with the analysis based on MMPI profile elevation, decreases were seen on a variety of neuropsychological tests, with a few more functions showing differences than with the MMPI. The decreases were orderly.

DISCUSSION

The most salient finding arising from this study is that adequacy of brain functions as evaluated by neuropsychological tests is consistently related to extent of psychosocial problems in epilepsy. Persons with more impairment in brain functions tend to have more psychosocial problems, and vice versa. It is likely that such persons have fewer adjustive resources with which to meet the demands of everyday life, and more problems thus develop. It is possible, of course, that psychosocial problems eventually have a deleterious effect on performance as the person becomes caught up in emotional and interpersonal concerns.

It is of interest that the most intimate relationships between the neuropsychological and psychological areas are found when the testing procedures developed specifically for work with epileptics are considered. Thus the Neuropsychological Battery for Epilepsy and the WPSI were most closely

related intermediate relationships were produced when only one of these was involved, and the weakest relationships were found when neither were considered. In the latter case, the MMPI and the WAIS were compared. Regardless of how subjects were grouped, only slight relationships were discovered. One can see the importance of using specialized test measures by visualizing how few relationships would have appeared had only the WAIS and the MMPI been employed in this study.

When the correlations between the psychosocial and neuropsychologic areas are considered, no one pattern of neuropsychologic deficits associated with psychosocial problems emerges. It is also true that no one pattern of psychosocial problems is associated with neuropsychologic deficits. It is likely that there is no simple, one-to-one connection between these areas; each is complex and multiply determined. The possibility exists that some other variable could be used to help sort out these relationships. Such a variable might be diagnosis, since individuals with complex partial attacks might demonstrate a different interaction between these variables. It has not been possible to consider this variable in this chapter, although our preliminary analyses suggest that individuals from the partial complex group tend to have a slightly larger number of psychosocial problems while being slightly less impaired neuropsychologically.

Of the neuropsychological deficits associated with increased emotional and psychosocial problems, those pertaining to the Perceptual Examination undoubtedly are of greatest interest. It was observed that errors made under conditions of simple unilateral and bilateral stimulation correlated more with psychosocial and especially with emotional problems than did the more complex tasks, in which the fingers had to be individually identified or in which numbers were written on the fingertips. Why this is the case and why the more complex cognitive measures were not more strongly represented is not clear. It was observed with the analysis based on MMPI profile evaluation that perceptual errors pertaining to the right side of the body were more related to emotional status than those pertaining to the left side of the body. Since 87 of the 100 patients were right-handed, one might conclude that simple perceptual problems relating to the preferred side of the body are associated with the greatest emotional difficulties. Further work in this area is required before any final conclusions can be drawn.

The results of this study are consistent with that of another investigation (1), in which it was demonstrated that the neuropsychological battery and the WPSI were more closely related to vocational status than were the MMPI, the WAIS, seizure type, and seizure frequency. By such studies, we have raised the possibility that the more specialized test measures may be more related both to each other and to adjustment in life than either the more general tests or any of a number of seizure-related variables. Such a contention must be viewed as speculative until further investigations have been completed.

SUMMARY

In summary, this chapter demonstrates certain relationships between neuropsychological and psychosocial variables. With respect to intelligence, there appears to be no significant relationship with emotional status as evaluated by an objective inventory, such as the MMPI. There is a limited relationship with psychosocial functioning as evaluated by the WPSI. This is best demonstrated when people are grouped according to differing levels of psychosocial functioning rather than when they are stratified by intellectual level.

With respect to neuropsychological impairment, more consistent relationships are demonstrated with emotional status. The most consistent relationships are seen between neuropsychological impairment and psychosocial functioning as evaluated by the WPSI, regardless of how people are stratified. In general, increased problems in brain functions are associated with increased psychosocial problems, and vice versa.

Additional studies are currently being completed at our facility to more exactly define the relationships reported herein. Regardless of the results of these studies, the present findings clearly document that adequacy of brain functions is reflected in adequacy of social adjustment. Furthermore, since both neuropsychological functions and social adjustment are relevant to quality of life for the person with epilepsy, a detailed study of these areas deserves a high priority in our efforts to provide a better life for individuals affected by this disorder.

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