CEREBRAL DOMINANCE FOR LANGUAGE IN LITERATES AND ILLITERATES:
A STUDY WITH PATHOLOGICAL SUBJECTS

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Cameron, Currier and Haerer (1971) studied 65 patients who had left hemisphere damage in order to see whether there existed a relationship between literacy and language disturbances in these patients. They reported more language disturbances in literates and semi-literates than with the illiterates. Seventy eight per cent of their literate group and sixty four per cent of their semi-literate group exhibited language disturbances with the left hemisphere damage. Only thirty six per cent of their illiterate group had language disturbances.

Findings of their study led Cameron, Currier and Haerer (1971) to suspect that the language is not well planted in the dominant (left) hemisphere. They observed the degree of literacy to have certain effect on the presence or absence of language disturbances in left hemisphere lesions.

The cases of language disturbances with right hemisphere lesion in relation to literacy, have not been available with us extensively in literature at present, except for a single case report by Wechsler (1976).

Wechsler (1976) reported about an eighty three year old illiterate dextral woman having a persistent non-fluent aphasia with right hemisphere damage. Wechsler suggested that tbe neural mechanisms involved in learning to read and write may be critical for complete establishment and maintenance of language dominance in the left hemisphere, and that in the case of the illiterate dextral woman in the report, it was her failure to acquire reading and writing skills that altered the normal evolution of language lateralization and resulted in the right hemisphere assuming the dominant role.

In their study Cameron, Currier and Haerer (1971) have not made an attempt to compare the language disturbances in their groups with those of the right hemisphere lesioned patients, in relation to literacy. As already

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been said no extensive literature has been available with us regarding the language disturbances in right hemisphere lesioned patients in relation to literacy, except for a case report by Wechsler (1976). Hence the present study.

The study aimed at studying the right and left hemisphere lesioned patients with their level of education and language disturbances encountered by them. This was made an aim because it was thought that this will provide some more information in addition to that is already made available by Cameron, Currier and Haerer (1971) and also some more evidence for the Wechsler's (1976) findings. The study was mainly conducted to see whether there is any difference in the hemispheric dominance for the language in literates and illiterates.

METHODOLOGY

As the study aimed at studying the right, and left hemiplegics and determine the cerebral dominance in them by observing the language disturbances in them in relation to literacy, case files of right and left hemiplegics both in groups of literates and illiterates were necessary.

Case files were drawn from the All India Institute of Speech and Hearing, Mysore, India and the National Institute of Mental Health and Neuro Sciences, Bangalore, India.

In total 82 case files were drawn at a random order in the age group of 13 to 35 years. Of the 82 files, 35 belonged to literate right handed adults, who had education of three to eighteen years and who were using reading and writing skills till the date of stroke. Forty seven of the 82 files belonged to illiterate subjects, who had no education at all.

Of the 82 files, 56 belonged to right hemiplegics due to left hemisphere lesions and 26 to left hemiplegics due to right hemisphere lesions- Of the 56 right hemiplegic files, 28 belonged to literates and 28 to illiterates. 19 files of illiterates and 7 files of literates consisted the 26 left hemiplegic files.

Table A, depicts the distribution of literates and illiterates in right and]eft hemiplegic groups.

TABLE A

SUBJECTS/STDE OF HEMIPLEGIA	RIGHT	LEFT
LITERATES	28	17
ILLITERATES	28	19

RESULTS AND DISCUSSIONS

For the purpose of the analysis in the present study, hemisphere contralateral to the side of hemiplegia with language disturbances was considered as the hemisphere specialized for language. Only cases with definite language disturbances recorded in their files were considered for the study.

Dominant Hemisphere in Literates:

Of the 28 right hemiplegics with literacy 22 had language disturbances and of the 7 left hemiplegic literates 3 had language disturbances. This showed that 78.57 per cent of the 28 right hemiplegics had left hemisphere dominance for language, and 42.86 per cent of the left hemiplegics had right hemisphere dominance for language.

10 files of the 35 literates recorded intact language in them. Of the 10, six belonged to right hemiplegic groups. These were not considered for the study, as the dominant hemisphere could not be determined just based on the language intactness recorded and the hemisphere that is intact.

Literates, exhibited more language disturbances with left hemisphere lesions of the brain than with the lesions of the right hemisphere.

Dominant Hemisphere in Illiterates :

Of the 28, left hemisphere lesioned right hemiplegic illiterates 14 (50.00%) had language disturbances. In 15 (78.95%) of the 19 left hemiplegics with right hemisphere lesions had language disturbances.

18 of the 47 illiterate hemiplegic files (14 right hemiplegics and 4 left hemiplegics) recorded an intact language. Hence, they were not considered for the present study for the reasons already stated.

In illiterates, more language disturbances were observed with the brain than with the lesions of the left hemisphere.

In essence, 25 literate hemiplegics and 28 illiterate hemiplegics who had language disturbances with damage to either of the hemispheres were considered for the analysis of the study.

Hemispheric Differences in Literates and Illiterates :

Of the **25** literates, in whom the dominance for language was determined 22 had left hemisphere dominance and 3 had right hemisphere dominace. In 29 lliterates in whom the dominance was determined, 15 had right hemisphere dominance. Table B gives the tabular representation of the same.

TABLE B

SUBJECTS	RIGHT HEMISPHERE DOMINANCE FOR LANGUAGE	LEFT HEMISPHERE DOMINANCE FOR LANGUAGE
LITERATES	3	22
ILLITERATES	15	14

When these differences in number of subjects having different hemispheres for language were statistically treated using Chi-Square analysis, it was observed that these differences in hemishperic specialization for language in literates and illiterates were significantly different beyond 0.01 level of confidence at 1 degree of freedom with Chi-Square being equal to 9.519

It can be observed in the present study, that the instances of language disturbances are more in, illiterates with damage to either of the hemisphere is more when compared to the literates. Thus, it can be stated that the language is not well planted in either of the hemispheres of brain and that the possibility of a bilateral representation for language is more with illiterates than with the literates A more clear instance of language getting planted in the left hemisphere can be observed with the literates and this might be attributed to the acquisition of reading and writing skills. Hence, literacy seems to determine the left hemisphere dominace for language in most instances. However, as we can see some instances of language disturbances with right hemisphere lesions, there might be some other factors in addition to literacy which determine the language to left hemisphere.

SUMMARY

A study was done to see whether there was any difference in cerebral

dominance for language in literates and illiterates, by relating the damaged hemisphere with the language disturbances in groups of literate and illiterate right and left hemiplegics. In literates, more language disturbances were observed with the left hemisphere lesions than with the right hemisphere lesions. In illiterates, language disturbances were more with right hemisphere lesions than with that of the left. However, the instances of language disturbances were more with damage to either of the hemispheres of the brain in illiterates when compared to literates. Hence, acquisition of reading and writing skills seem to play an important role in determininig the cerebral dominance for language.

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