Medical Memoranda

Parietal Lobe Inadequacy in Mental Deficiency

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Few authors have speculated about the connexion between functional and anatomical defects in the brains of mental defectives. This is probably because pathological changes in defectives are often so diffuse that there seems little prospect of pursuing it satisfactorily. Ashby and Stewart (1934) estimated the area of the medial cross-section of the corpus callosum and found a significant correlation between area and mental age. However, the relation was nullified because there was a general trend for body size to fall off with a lower mental age, and closer analysis showed that the change in area of corpus callosum was part of a general change in body size. Lassek (1946) measured the cross-sectional area of the medullary pyramids in 11 patients with congenital malformations and concluded that the pyramids had a full quota of normal-looking fibres in spite of microcephaly, microgyri, atrophic frontal lobes, and almost complete disappearance of white matter in the cerebrum.

Sylvester (1966) analysed encephalometric data from 84 brains of mental defectives and found eight brains with smallness in the linear dimensions of the superior and inferior aspects of the parietal lobes. Wilcoxon's matched-pairs signed-ranks method (Siegel, 1956) showed a significant difference beyond the 0.05 level when the criteria were compared with those of 11 brains from non-defectives. The defective brains were normal in seven other dimensions, so that the diminution in size was restricted to the parietal lobes (Table I). Neuropathological changes were

TABLE I.—Brain Weights and Linear Measurements

	No.	Brain Weight (g.)	Mean Dimensions of Cerebral Hemispheres (cm.)									
			Superior Frontal	Superior Parietal	Posterior Parietal	Inferior Frontal	Inferior Parietal	Anterior Parietal	Orbital Surface	Thalamic Length	Thalamic Width	
Non-defectives	11	1,275	11.2	6.3	6.7	7.7	7.8	8.4	3.3	3.3	1.8	
Posterior callosal thinning group	8	1,185	11.7	5.1	6.7	8.2	6.5	8.2	2.8	3.2	1.7	

not found in them, and it was concluded that the affected lobes were hypogenetic. Five of the patients were epileptic. Difficulties in space perception were known to exist in two patients, but specific tests for parietal lobe dysfunction had not been done on the others.

The study was extended and the brains of 16 epileptic defective patients whose epilepsy dated from infancy were measured. They were also found to have significantly reduced dimensions of the parietal lobes beyond the 0.05 level on the *t* test. They were known to have had performance intelligence quotients less than verbal performances (Blundell, 1966).

After this study we decided to use a battery of tests, designed to reveal difficulties which are seen in those with known parietal lobe lesions, on 20 young epileptic patients whose histories dated from infancy and to compare them with a control group of 20 non-epileptic defectives matched for verbal intelligence (Blundell, 1966) (Table II). Eleven visuomotor tests distin-

guished between the experimental and control groups at the 0.001 level, and six verbal and information tests failed to distinguish the groups.

TABLE II.—Details of Sample

	Epileptics (N = 20)	Controls (N = 20)
Mean verbal I.Q.	61.4	61.7
„ age	17.3	17.2

Whereas it is generally accepted that a typical subnormal pattern on the Wechsler intelligence scales indicates a performance I.Q. better than the verbal I.Q., it was found that among the epileptic group this pattern was reversed (Table III) to a highly significant level (beyond 0.001). This constant finding is perhaps peculiar to patients in hospitals for the subnormal, their entry being due to this specific handicap. Lydia

TABLE III.—Comparison by *t* Test—Standard Scores. 20 Epileptics and 20 Controls

Wechsler Subtests	Mean Experimental Group	Mean Control Group	<i>t</i> -Value	Significance
Information	4.55	5.5	1.69	N.S.
Comprehension	5.65	6.1	0.75	„
Arithmetic	3.95	5.1	1.84	„
Similarities	7.6	7.7	0.11	„
Digit span	6.45	6.75	0.32	„
Vocabulary	5.85	5.9	0.08	„
Digit symbol	2.1	6.75	5.96	0.001
Picture completion	5.6	8.5	3.67	0.001
Block design	2.9	8.4	5.81	0.001
Picture arrangement	3.85	7.15	4.09	0.001
Object assembly	4.1	10.25	6.49	0.001
Visuomotor tests:				
1. Nebraska blocks (40)	13.4	32.9	8.78	0.001
2. Sticks (18)	8.0	14.8	5.53	0.001
3. Séguin board (15)	6.8	12.45	6.49	0.001
4. Bender Gestalt (30)	16.55	25.9	5.60	0.001
5. Paper folding (14)	5.3	10.3	5.27	0.001
6. W.I.S.C. mazes (21)	5.35	13.35	4.29	0.001
Ravens matrices (36)	14.65	22.75	5.63	0.001
Total verbal (Wechsler)	34.05	36.65	0.80	N.S.
„ performance „	18.55	41.05	7.12	0.001

West (personal communication, 1966), in a report on 240 epileptic children attending a special school for epileptics, found that 39 showed spatial handicaps. Thus it is clear that not all epileptic patients suffer from a visuomotor disability.

We concluded that those subnormal epileptics whose symptoms date from infancy are likely to show a dysfunction of the parietal lobe related to reduced dimensions within the parietal lobes, since it is in these patients that a visuomotor dysfunction is found.

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