DEPRESSION IN PARKINSONISM TREATED BY PREFRONTAL LEUCOTOMY.

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THIS is a description of a case of depression associated with post-encephalitic Parkinsonism, with signs predominating on the left side, treated by unilateral (right) prefrontal leucotomy.

E. W—, aged 39, admitted as a voluntary patient to the North Wales Counties Mental Hospital on November 25, 1943.

Family history.—No evidence of mental instability. No familial diseases.

Personal history.—Normal birth. No delay in development. Happy childhood. Reached top standard in elementary school. Not a good mixer, but well liked. Steady worker (general labourer). No serious illnesses or accidents, except symptoms of silicosis when 24. Gave up work and symptoms cleared within a year.

History of present illness.—Changes as observed by family: When patient was 27 years old (1931) becoming moody, disinclined to converse, somewhat irritable, sleeping a lot, developing intermittent fine shaking of left arm.

When 29 (1933): Quite solitary; worked only under persuasion. Shaking of arm more severe and constant when awake; walked stiffly.

When 33 (1937): Had lost all interest in his family; careless in his dress; sleeping most of the day. Began to say that "everything was due to his having sinned."

Mental deterioration continued. Periods of relative wellbeing became shorter. Seemed continually worried. Conversation became monosyllabic. Lacked all initiative.

When 39 (1943): Tried to strangle himself on five or six occasions. Finally, when rejected for national service, cut his throat with a razor. Fortunately did not sever any important structures. His shaking "prevented him from doing the job properly." Admitted a few days later.

Examination on Admission.

A. *Physical condition.*—Average build; fairly well nourished. Facies immediately suggested Parkinsonian syndrome. Other obvious signs confined to left side of body. The following findings suggested post-encephalitic Parkinsonism:

Head: Held forward, inclined towards left shoulder. Constant fine horizontal tremor.

Eyes: Look straight ahead. Pupils dilated; blinking infrequent.

Face: Mask-like, but right side moves more freely than left. Rarely smiles.

Mouth: Held slightly open. Right angle drawn upwards.

Tongue: Tremor.

Speech: Slow, and voice monotonous.

Right arm: No tremor or rigidity.

Left arm: Adducted, flexed at elbow, forearm supinated. Metacarpo-phalangeal and interphalangeal joints slightly flexed. Thumb extended and adducted. Adiadochokinesia. Tremor of wrist and hand.

Body: Spine extended. Movements deliberate. Turns *en masse*.

Lower extremities: Walks rather stiffly, putting feet down somewhat heavily (right less so than left).

General observations: Rather slow in initiating movements, but not seriously incapacitated when at ease. Under stress tremor of left hand is very severe.

Reflexes: Both knee jerks very brisk. Pseudo-clonus both ankles. No other abnormal findings.

Other clinical and laboratory examinations.—No significant changes.

B. *Mental condition.*—Appears anxious, but can give a good account of himself. States that he has been depressed for about six years. Believes that his shaking is the result of an illness contracted as a punishment for sexual irregularities committed before he was married. His sins will be visited on his children, one of whom is about to develop an illness similar to his. There is no cure for him. He might as well die now. Complains of headaches and giddiness.

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Progress of case.—Settled down fairly well. Belladonna and hyoscine medication was tried but not " pushed " because his mental condition was unaffected and his physical disability was not, ordinarily, serious. General therapeutic measures were unsuccessful. Five months after admission he was still depressed and anxious, solitary in manner, lethargic, and his delusions persisted.

Electrical convulsion therapy.—A course of E.C.T. was commenced on April 22, 1944. After three convulsions he showed an apparently complete remission of mental symptoms. He relapsed within a week. One to three further convulsions brought about equally good and equally short-lived remissions. He was given a total of 16 applications, the last one on July 24, 1944.

After three months of treatment his condition was practically unchanged. He insisted on going home " to die " if nothing further could be done.

Prefrontal leucotomy.—The main reasons which seemed to justify an attempt to relieve his distress by this operation were :

(1) A history of long duration.

(2) A depressive state.

(3) The failure of more orthodox methods of treatment.

(4) The result of E.C.T., which had shown his capacity to remit.

In view of the fact that physical symptoms indicated that the left side of his brain had been chiefly affected by the encephalitic process, it was felt that it might be of interest to observe the result of operating on the right side only.

Operation of right prefrontal leucotomy.—This was carried out by Lieut.-Col. D. G. Duff, F.R.C.S., Consulting Surgeon, on 14.vii.44, after premedication with morphia gr. $\frac{1}{4}$ and hyoscine gr. $\frac{1}{100}$ under local anaesthesia.

On arrival at the theatre he appeared confused. He kept up a rambling conversation, but would not reply to direct questions. He looked around as if hallucinated.

The brain was approached through a trephine opening with its centre 3 cm. from the midline on the coronal suture. Operation aimed at cutting the white matter in a plane about $\frac{1}{2}$ in. in front of the anterior horn of the lateral ventricle. It was expected to cut close to, and even into, the grey matter overlying the orbital plate, and to sever all the fibres of (at least) the lower two-thirds of the right frontal lobe.

During the operation he remained confused, mildly restless and apparently unaware of what was happening. On inserting the leucotome the anterior horn of the lateral ventricle was punctured. The instrument was withdrawn and re-inserted further forward. No ill-effect seemed to result and the operation was completed.

No tremors were observed during the operation. Eight hours after its conclusion occasional involuntary movements of left wrist and hand reappeared. Head tremor was not observed again. Tremors of wrist and hand increased on the fourth day after operation, but amplitude and frequency remained much reduced.

Post-operative sedatives were used as follows: Inj. phenobarbiton ·2 gm. one hour and morphine $\frac{1}{4}$ gr. nine hours after operation. Inj. phenobarbiton ·2 gm. on the following day. Phenobarbiton orally, 1, 1, $\frac{1}{2}$ gr. *nocte* for three days.

Further progress.—This was uneventful, and could in no manner be distinguished from that observed in cases which had been subjected to bilateral operation.

Condition on discharge.—He left hospital on 18.ix.44, two months after operation. He was not anxious, not depressed, a reliable worker, and anxious to return home. He was somewhat unconcerned about his illness and the operation but not unduly cheerful. He mixed well. Ideas of sin persisted, but he stated that " he was not bothering about those things now." His shaking did not worry him and he felt he " had to put up with it." His headaches had " practically gone," and he did not remember having complained of dizziness.

Re-examination.—He was seen again on 11.xii.44, five months after operation.

Physical condition.—The change in his facial expression was striking. He laughed readily, his eyes did not " stare " and he blinked frequently. His mouth was kept closed. There was no tremor of the head.

His right cheek moved more freely than his left. There was a brief flutter of the eyelids on looking up, which had not been noticed before operation.

Tremor of left wrist and hand was not constant, and severe only on two occasions of severe emotional excitement during the interview.

Other signs, attitude, gait and neurological findings were unaltered.

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Mental condition.—Conversation was rational. He was aware of the implications of the operation, and satisfied that he was " his old self again." He was not depressed or anxious. He had obtained work, enjoyed his leisure, and appreciated his home life. His delusions of sin " had gone." He stated, " I am still shaking a bit, but that does not worry me, as I can again earn a living wage."

Commentary.—The determining indication for leucotomy in this case was depression, but the results have also to be considered in relation to the patient's Parkinsonian state.

Many attempts to relieve by operative measures the distressing symptoms of Parkinsonism have been made. They include sympathetic ramisectomy, rhizotomy, extirpation of the premotor area, cutting of fibres of the internal capsule, and removal of the head of the caudate nucleus.

In reviewing results of these measures, Meyers states that the findings raise more questions than they can answer. The same is felt in regard to results in this case, although the following questions appear to be the most pertinent:

(1) What was the relationship between the patient's depression and his Parkinsonism? Was the depression psychogenic or was it due to organic changes in the brain?

(2) Why was a remission of the depression obtained by a unilateral operation? Freeman and Watts have stated that in their cases unilateral operation never resulted in recovery.

(3) How can the amelioration of physical symptoms be accounted for? Is the diminution of anxiety brought about by operation sufficient to explain it, or must it be considered as due to interference with pathways between cortex and basal ganglia?

I have to thank Dr. Roberts, Medical Superintendent, for permission to publish this case, and for his encouragement and helpful advice. I am also indebted to Prof. Golla for kindly bringing to my notice certain relevant literature, and to Dr. Duff for his description of the operative procedure.

Reference.

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