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Part I.—Original Articles.

SYMPOSIUM ON PRE-FRONTAL LEUCOTOMY.*

THE INDICATIONS FOR PRE-FRONTAL LEUCOTOMY.

By T. PERCY REES, M.D., M.R.C.P., D.P.M.,
Medical Superintendent, Warlingham Park Hospital.

THE frontal lobes form the latest stage in the evolution of the brain. There has been much speculation as to their functions, and they have been described by some as biological luxuries and parasitic growths. It is, however, inconceivable that an organ appearing so late in the scheme of evolution should be completely devoid of function. Since the introduction of pre-frontal leucotomy evidence as to their function has been growing, and it may be said that the consensus of opinion now is that the frontal lobes are concerned with imagination, the social sense, self-consciousness, and the projection of the self into the future; these functions are synonymous with Freud's super-ego, so that, in fact, we may regard the frontal lobes as the seat of the super-ego.

The essential feature of pre-frontal leucotomy, according to Freeman and Watts, is the division of the fibres connecting the frontal lobes with the thalamus. The thalamus is the seat of the instincts—Freud's libidinous impulses. Functional mental disorder in the terms of Freudian psychology is due to a conflict between the super-ego and the libido, or, to put it in anatomical terms, between the frontal lobes and the thalamus.

This hypothesis, which may have no basis in fact, is nevertheless helpful in choosing suitable cases for prefrontal leucotomy, and in explaining its effects. Without the frontal lobe there can be no super-ego, without the super-ego no conflict, and without conflict, no functional mental disorders.

Among the most common symptoms of mental conflict are anxiety, groundless fears about the future, suicidal tendencies, self-mutilation, states of tension, destructiveness and attacks of uncontrollable violence, and it is patients who exhibit any of these symptoms to a marked degree who derive the greatest benefit from leucotomy.

There are doubtless many people who go through life making little or no use of their frontal lobes and leading a merely vegetative existence. Others spend so much time wondering what other people are thinking about them and what the future has in store for them that their activities are completely paralysed. It is good for us to show some regard to what others think of us and even to what we think of ourselves, and sometimes to contemplate the future, but when this is done to such a degree as to prevent us from reacting in a normal manner to our existing environment, then the frontal lobes call for the attention of the physician, and if he is not successful, the surgeon.

The super-ego is largely a product of education and upbringing, and this may account for the fact that the results I have seen are incomparably better in the

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private than in the rate-aided patients, or perhaps it would be more accurate to say in the educated than in the uneducated patients.

The effects of the operation, in well-selected cases, are often immediate and sometimes dramatic. The patient loses his fears, his anxiety, his apprehension and nervous tension. His delusions may persist, but they no longer worry him nor affect his conduct. The introvert becomes extraverted, sometimes even hypomanic, and self-consciousness is replaced by a feeling of self-confidence. According to Hunt, there was no appreciable difference in the intelligence quotient in a series of 40 patients before and after operation.

In my own series of 30 patients there were two post-operative deaths. Nine patients have been discharged, of whom five are earning their own livelihood, three are middle-class housewives managing their own homes, and one is attending a Ministry of Labour Centre for training in engineering. Of the 19 remaining in hospital, 6 are very much the same as they were before the operation; the others show varying degrees of improvement, particularly in conduct and ease of nursing management. I anticipate that three more should be well enough for discharge within the next two or three months. To me the most striking feature is that none of the patients can be deemed to be worse after the operation than before.

Effects of Leucotomy in Different Forms of Mental Disorders.

It will be seen from what has already been said that pre-frontal leucotomy is indicated not in any specific type of mental disorder, but rather for the relief of such symptoms as anxiety, apprehension, self-mutilation, suicidal tendencies, destructiveness, attacks of violence and states of tension which may be found in many forms of psychoses or psycho-neuroses. Nevertheless, it may be profitable to consider the effects of leucotomy in some types of mental disorders.

(a) *Schizophrenia.*—Although the results of pre-frontal leucotomy in schizophrenia have not been so satisfactory as in some other forms of mental disorder, it is possibly upon schizophrenics that most leucotomies have been performed in this country. The best results have been obtained in patients who are excitable, restless, destructive, violent, or who show suicidal impulses or tendencies to self-mutilation; in other words, in cases where there are symptoms suggestive of active mental conflict. Many such patients get temporary remissions following convulsion therapy. Such remissions, however, are often of very short duration, and I can recall one patient who could only be managed by the nursing staff provided she had a daily convulsion. This patient, who had a pre-frontal leucotomy about sixteen months ago, made rapid improvement after the operation and, according to her own doctor, is now apparently quite well and is running her own house.

Some schizophrenics are apparently well immediately they recover from the anaesthetic; in other patients the beneficial effects of the operation may be delayed for six months or longer. A complete social recovery cannot be expected in every case and sometimes the patient is left with his delusions and hallucinations, but they no longer worry him nor do they affect his conduct.

The worst results in schizophrenia are obtained in patients who lead a purely vegetative existence and show no evidence of active mental conflict. They generally belong to the simple or hebephrenic group, and there are grounds for believing that these are organic nervous diseases and not functional mental disorders. They show little appreciable change after the operation, neither do they respond to any other known form of treatment. It is a waste of time severing the connections of frontal lobes that have ceased to function; furthermore, inferences drawn from statistics which include the results obtained from a large number of such cases may bring the operation of pre-frontal leucotomy unfairly into disrepute.

(b) *Depressive states.*—Excellent results in the treatment of depressive states, particularly involutional depressions, by pre-frontal leucotomy have been reported by various writers. Unfortunately for the surgeon, the results of convulsion therapy are so good that there are very few patients left for him to deal with, and the number of chronic melancholics in mental hospitals that practise shock-therapy has been reduced to-day almost to vanishing point. However, there still are some cases who do not respond to shock therapy or who continually relapse. Such patients may, with advantage, be submitted for operation.

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(c) *Obsessional neurosis.*—It appears from the literature that the best results of all in pre-frontal leucotomy are obtained in the obsessive tension states. Many of these obsessions produce little or no disability, and it is only in a relatively small proportion of such cases that their disability is so severe as to render it necessary for them to enter a mental hospital.

Psycho-analysis is often unsuccessful in severe obsessional states, and, where the disability persists in spite of treatment, and is so great as to require the patient to enter a mental hospital or to prevent him from earning his livelihood, the operation is indicated.

When to Operate.

Perhaps the most difficult question of all to decide in connection with the indications for pre-frontal leucotomy is the stage in the disease at which the operation should be performed. Although good results have been reported in cases of five years', or even of twelve years' standing, most people will agree that the operation should be performed, if it is expected to give the best results, at a much earlier stage, but some undoubtedly will maintain that such an operation should not be carried out at all. Emotional attitudes of violent and unreasoning opposition are not uncommon when a new form of treatment is introduced. This was, and still is, the case with Freudian psychology and, more recently, with shock-therapy, so that it is not in the least surprising to find similar opposition to an operation on the brain which is undoubtedly a destructive operation, and leaves the patient incapable of reaching the highest form of mental development.

Pre-frontal leucotomy, however, does not represent the first effort of the surgeons to alleviate mental suffering. The tonsils, the sinuses, the appendix, the clitoris, the ovaries and the testes have on numerous occasions provided the field of action for surgeons collaborating with psychiatrists in the treatment of mental disorders. What is, indeed, surprising, is that the brain, the organ of the mind, has been left alone for so long. There is a tendency in mental hospitals to practise certain forms of treatment to the exclusion of others, and whether a patient is given psychotherapy, electric convulsion treatment, insulin comas, or somnifaine or deprived of his tonsils, may depend very largely on the hospital to which he is admitted. Psychiatry is not an exact science, and shows no signs of becoming one in the near future. This being the case, psychiatrists especially should be eclectics, and always ready to apply any treatment known to have been beneficial in any particular case.

The first stage in the treatment of any mental disorder, or in fact preceding any treatment, is the exclusion of organic disease, whether it be organic disease of the nervous system or of some other organ, or a focus of chronic sepsis which interferes with the normal working of the nervous system. Until this is done, we cannot be certain that we are dealing with a functional mental disorder.

The most logical way of dealing with mental conflict is the readjustment of the relationship between the frontal lobes and the thalamus, or perhaps one should say between the super-ego and the id, by means of psycho-analysis. Unfortunately, this method of treatment is not always possible, and, where possible and practicable, not always successful in relieving the symptoms.

The aim and purpose of the other forms of treatment of mental conflicts resulting in functional mental disorders are the same, namely, to put the frontal lobes at rest. Fortunately there are other methods of doing this besides pre-frontal leucotomy. The great majority of mental conflicts are resolved by means of a little alcohol, a night's sleep, bromides or a change of environment.

Further efforts to curb the activities of the frontal lobes may be made by the administration of drugs of the narcotic group, such as somnifaine, and, where these are unsuccessful, coma-producing agencies, such as insulin, cardiazol and electrically induced convulsions. The success of these methods of treatment is due to the fact that the frontal lobe, which is the last part of the brain to appear, and the super-ego, which is concerned with the highest psychic functions, are the first to be affected, and, where unconsciousness supervenes, are the last to recover.

It is only when all these methods of medical treatment have failed, or have been deemed to be inapplicable to any particular case, and after having satisfied ourselves that the prospects of spontaneous recovery are so remote that they can be regarded, for practical purposes, as non-existent, that we should consider surgical

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intervention to sever, once and for all, the connections between the pathological frontal lobes and the thalamus.

The time that should elapse after the onset of illness before seeking surgical aid varies in each particular case. It is important, on the one hand, not to operate on anyone who is likely to respond to some less severe form of treatment. On the other hand, it is unfair both to the patient and to the surgeon to defer the operation until such a time as the personality has completely disintegrated. I have recently made it the practice for all patients who have been in the hospital for twelve months to be seen in conference by all the medical staff on the first Wednesday of every month. This has the advantage of bringing fresh minds to bear upon each individual case. I am not suggesting that no one should have a pre-frontal leucotomy until he has been twelve months in a mental hospital, but I do suggest that no one should be in a mental hospital for longer than twelve months without the possibility of his being relieved by pre-frontal leucotomy being considered.

To sum up, the indications for pre-frontal leucotomy are functional mental disorders with symptoms of active conflict which have failed to respond to other methods of treatment, and where the prospects of spontaneous recovery are remote.

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