

LEUCOTOMY—A RECENT DEVELOPMENT.*

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IN 1947 the Board of Control published its report on the results of 1,000 leucotomies, citing therein a mortality of 6 per cent. Five years later Dr. W. S. Maclay, in his Presidential Address to the Section of Psychiatry of the Royal Society of Medicine, referred to 180 deaths during the interval, a mortality of approximately 2 per cent. Although this is a striking improvement there is still cause for apprehension, for by far the greatest proportion of fatalities arise out of haemorrhage. The second causative factor in fatal issues is infection. Something must be done to put psycho-surgery on a yet safer basis.

When originally I undertook to perform leucotomy it was not without a feeling rather of reproach, for mutilation no doubt it must be. However I first of all went to watch my psychiatrist colleagues applying chemical or electric convulsive therapy—so disturbing was the exhibition at that time that thereupon I decided that the surgical approach was possibly a less traumatic measure. One's earlier experiences, of course, were based on chronic institutional patients, many of whom had had much previous treatment often including recurring series of convulsive treatments. Many if not most of the patients had proven intractable to all other forms of treatment, consequently any prospect of a return to normal social life was poor indeed, if not lacking completely. Working on such material meant that one encountered some patients with quite gross atrophic changes in the brain. As no such shrinkage was related to mental disease, on the submission of the psychiatrists of the institution, it led me to seek an explanation in treatment. The more experience one has gained the more does one feel that electro-convulsive therapy has been responsible for much atrophic change, possibly arising out of repeated diffuse petechial haemorrhages.

At that time the requirements of leucotomy were best described by Freeman and Watts, and it was a modification of their technique that one put into practice. Results were encouraging in selected cases and a series of cases accumulated that showed promise, at times remarkable. During the course of this early series a case of haemorrhage occurred, requiring the reflection of a bone flap in order to expose the vessel and control the bleeding. It was then that a full appreciation of what should be required of any surgeon who undertakes leucotomy was realised: he must have had neurosurgical training if he is to be capable of dealing with the complications with which he may be

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faced. One should realise that haemorrhage arising out of leucotomy may even require resection of the frontal pole of the brain in order to expose the damaged vessel. Increasing experience brought one into contact with other psychiatrists and other mental establishments. In some of these institutions a new problem presented—that of being invited to operate under conditions upon which even old-fashioned back-room boys would have frowned. Herein rests one of our present difficulties—what should one undertake where no satisfactory accommodation for surgical operations is available? Not infrequently I have met the comment “Mr. So-and-So has operated here a number of times.” Leucotomy, like any other surgical procedure should not be undertaken unless proper hygienic precautions are possible, and the apparatus necessary to neurosurgery is at hand. Only by taking such precautions are we to avoid that second disaster, sepsis.

We must ask ourselves seriously why so many different forms of surgical intervention avail; e.g., *Topectomy*, *Cortical Undercutting*, *Thalamotomy*, *Cingulectomy*. Have these various methods any factor common to all? The aim of surgery surely is to disrupt such connecting pathways as relay impulses inducing the individual's response to his thoughts. It appears that interruption in fronto-thalamic pathways is an anatomical requirement of operation. Of the different methods applicable it seems to me that leucotomy is the simplest procedure of all; less cerebral damage arises out of it, the risks of complications are less, post-operative epilepsy is less frequent, and it appears improbable that any of the other methods has anything better to offer in terms of functional (physiological) effects. From controlled section I have yet to see intellectual deterioration.

During the course of observation of many cases one has been struck by certain side effects of operation: changes in blood pressure, in prominence of the eyes, in respiration. A grossly enlarged thyroid in a seriously depressed patient shrank under vision, and an uncontrollable diabetes became controllable. These effects together with other forms of response rather suggest that leucotomy may well do something other than produce an undoubted quelling of nervous tension. The work of Fulton and others has drawn attention to the import of the frontal cortex overlying the orbital roof in relation to autonomic control, and later of course to the function of the cingulate gyrus. One has gained the impression therefore that the important and effective part of frontal leucotomy is related mainly to division of white matter in the lower and mesial segment.

Whereas I had carried out many leucotomies aimed at division of the greater extent of frontal white matter, the early cases were generally chronic psychotics who had failed to respond to other forms of treatment or who had made some improvement which had not persisted, and one worked under a certain degree of apprehension lest damage should occur leading to apathetic, blunted, detached or inaccessible patients. As one gained in experience it became reasonable to offer the benefits of leucotomy to rather different types of individuals. These cases have not been the same chronic incurables; moreover persons of good intellect have been involved. The risk then of dulling or deterioration has caused one even more concern. The technique of the operation involved will be described.

THE AUTHOR'S METHOD OF PERFORMING LEUCOTOMY.

The incision in the scalp is made in the line of the coronal suture after the manner of Freeman and Watts. Division of tissue is carried to the bone and a self-retaining retractor introduced. A cranial defect of three-quarters to one inch in diameter is fashioned with a trephine centred at a point six centimetres above the upper border of the zygoma. The disc of bone excised is retained in sterile warm saline, pending replacement.

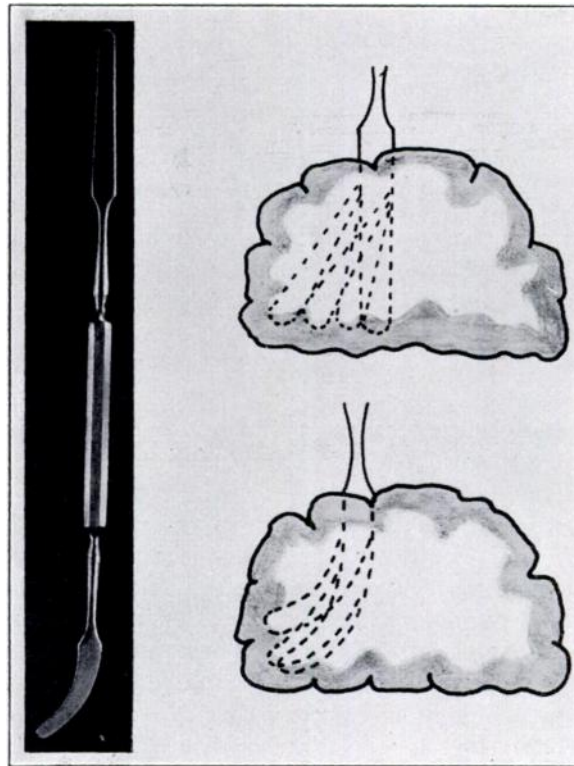


Diagram to show how the leucotome is applied.
The author's leucotome.

Bleeding from the dura-mater duly controlled by diathermy, a V-shaped incision is made in that membrane permitting reflection of a small triangular flap.

A site on the cortex is selected, small overlying blood vessels are coagulated, then a short incision (about 0.75 cm.) is made. Through the incision a brain cannula is inserted and directed towards a like point on the opposite side of the head. By encountering the lateral ventricle in this or subsequent insertions, the position of the anterior horn is determined. Likewise by suitable direction of the cannula downwards and inwards, the margin of the lesser wing of the sphenoid is detected. Thickness of the cerebral white matter is assessed by

measurement of the distance between the surface wound and the falx after making due allowance for the width of the cortex traversed. With these data the plane of the proposed section is selected and is registered by a straight instrument retained by an assistant in apposition with the surface of the head during succeeding manoeuvres.

On account of restricted exposure and the desire for curtailment of cortical damage a double ended leucotome is required, one blade straight, the other curved.

Division of white matter is not made with a sweeping action but by a series of stabs with the straight blade applied at varying angles from the horizontal, followed by the curved blade in a requisite number of movements applied in the long axis of the blade. No greater pressure is applied than the weight of the instrument held between the thumb and index finger. By this simple manoeuvre the resistance on engaging a blood vessel is easily appreciated and a slight deviation in the course of the blade permits circumnavigation of the vessel.

On completion of the section a forceful stream of warm saline is thrust at the cortical opening—the lips of the incision are separated thereby and staining of escaping fluid reveals the degree of haemorrhage, if any.

All bleeding controlled, the dural flap is replaced, then retained by a suture. The disc of bone is then replaced and the overlying wound closed in layers.