

REFLECTIONS ON LEUCOTOMY

WITH PARTICULAR REFERENCE TO ROSTRAL OPERATIONS

BY

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In a recent book, Tow (1955) reported in detail the results of an intensive investigation carried out a few years ago of a group of mainly neurotic patients subjected to the operation of standard prefrontal leucotomy in the plane of the coronal suture. The effect of the operation on the personality of these patients, the nature and extent of which the book describes, was in many cases deplorable. It has long been recognized that the standard operation is capable of doing great damage to the personality—for example, Ström-Olsen and Tow (1949)—and a large amount of work has been done, particularly in the U.S.A. and in this country, in developing modifications of leucotomy which are therapeutic without inflicting grievous damage on the intellect and personality. It is therefore regrettable that a recent article in the popular press, describing Tow's book, should have implied that his findings could be applied without qualification to the estimated 20,000 patients in this country who have been leucotomized.

Sargent (1953) virtually gave up the standard operation in neurotics in 1942. He has campaigned ever since for the use of modified procedures. Freeman (1953), the foremost American leucotomist, has for five years almost abandoned the standard operation, even in psychotics, in favour of his transorbital leucotomy; this has, however, not become popular in this country. In general, the use of the standard operation has been restricted to patients suffering from chronic psychoses, and even in these cases the work of Greenblatt and Solomon (1953) indicates that the modification called "bimedial" is at least as effective and far less damaging to the personality. Nevertheless, so long as psychoneurotic patients continue to be subjected anywhere to major frontal cuts it is inevitable that the frequent ill effects should lead to concern which is amply justified. It should at the same time be more generally recognized that modified leucotomies—for example, orbital undercutting (Ström-Olsen and Northfield, 1955)—carried out in suitable cases, carry a much smaller risk of doing harm, and may be therapeutic where no other form of treatment is.

Present Investigation

It is the purpose of this paper to present briefly the results of one type of modified operation, McKissock's (1951) rostral leucotomy, in 240 patients, and to discuss some of the conclusions to which they give rise. These cases have already been reported at greater length elsewhere (Pippard, 1955a, 1955b, 1955c).

Towards the end of 1952 I was invited by Dr. Desmond Curran and Mr. Wylie McKissock to undertake, as an unbiased observer who had had no say in the selection of the cases for operation, a follow-up study of all the latter's rostral leucotomies. During the four years 1949-52, 240 patients had had the operation, and McKissock (1951) reported the preliminary results in 100 cases. During 1953-4 I traced most of these patients, and between one and half and five years after operation visited 175 of them in their

homes and another 35 in hospitals, travelling over much of England and to Northern Ireland and Scotland in order to do so. Follow-up was refused or was for some reason impracticable in 17 cases,* and 13 patients had died, 10 from causes unrelated to the operation, before the survey was made. I had long informal interviews with the patients and with their relatives and friends and any who could add to the picture, in order to find out how they felt, what they could do, etc.

Most large series of cases reported in the literature have consisted mainly of chronic psychotics, mostly schizophrenics, and less than 10% of leucotomies have been done on psychoneurotics. Nearly half of the cases here discussed were psychoneurotic or psychopathic, and a third suffered from affective disorders, mostly depressions.

Three patients died as a result of operation (two from cerebral haemorrhage and the third from acute pancreatitis and paralytic ileus). There was only one operative death in 177 consecutive blind rostral operations; this patient and one of the others who died were amongst the 17 known to have been hypertensive before operation. Major non-fatal cerebral haemorrhage occurred in 1.7% and less severe bleeding in perhaps another 5%. Lasting serious personality changes were left by these operative complications in only three cases. Epileptic fits occurred at some time in the follow-up period in 9 out of 196 patients who had not previously had fits, but, except for one who had severe status epilepticus 14 months after operation, none had more than a few isolated fits, and in one case the depression for which leucotomy was done cleared up only after a short series of fits more than a year after operation.

Apart from a risk of post-operative mania in a special group of cases discussed below, I have now covered the only important operative complications encountered. To summarize, there is an operative mortality of the order of 1% and a risk of lastingly serious personality damage, as a result of cerebral haemorrhage, in a similar proportion. Epilepsy has occurred in about 5%, but it is exceptional for it to have been of any consequence.

Results from the Rostral Method

I have elsewhere (Pippard, 1955a) described in some detail the therapeutic results and the rating scales which I used to assist the classification of results into good, fair, or poor. Table I gives the bare figures, and for simplicity only the

TABLE I

	Good	Fair	Poor
Uncomplicated affective disorders:			
Recurrent endogenous depression ..	9	3	4
Recurrent depression in which reactive factors are more important ..	9	2	2
Single depression	14	4	7
	32	9	13
Psychoneuroses:			
Tension states	8	8	5
Obsessional states	10	4	6
Hypochondriasis	2	1	5
Psychopathic personality	5	1	9

figures for the 118 blind operations on patients suffering from affective disorders, psychoneuroses, and psychopathic personalities. If the good and fair results are regarded as "worth while," the results were worth while in three-quarters of the affective disorders, in two-thirds of psychoneuroses, and in two-fifths of the psychopaths. It must be remembered that the prognosis in these cases was regarded as poor without operation, and, though this may not always have been correct, the figures do indicate that the operation is able to relieve illness. The relief of symptoms, while complete in some cases, tends to be less than, though still

* From the information available there were no grounds for supposing the result in these 17 cases to be significantly different from those in the rest.

comparable with, that following more extensive frontal cuts. It is particularly good in the affective disorders and especially in cases of involuntional depression.

It is necessary to ask what price is paid for such results in terms of personality degradation. Table II sets out the personality changes in 59 patients recovered from affective disorders after McKissock's standard leucotomy, as reported

TABLE II

	Standard	Rostral
Virtually no personality change, or changes so slight as to make no significant difference ..	16 (27%)	28 (38%)
Slight changes present but making no important difference in their lives ..	10 (17%)	42 (57%)
More marked changes so that families are constantly aware of them ..	12 (20%)	2 (2.5%)
Patients difficult to live with, but less so than ever before ..	4 (7%)	2 (2.5%)
Positively undesirable changes ..	17 (29%)	0

by Partridge (1950), and the corresponding changes in 74 comparable cases after rostral leucotomy by the same surgeon—that is, psychoneurotics and depressives regarded as symptom-free or much improved. To summarize, the undesirable changes noted by Partridge were of importance in the lives of about 50% of the patients in his selected group, but negligible in more than 95% of comparable patients after rostral leucotomy. I have described these comparatively slight changes in another paper (Pippard, 1955b). Not infrequently, in patients symptomatically improved, the personality changes were felt by both patient and relatives to be improvements on his old self.

It is worth while examining in more detail those cases in which the patients were thought to be worse in any way after rostral leucotomy.

An aggressive psychopath, who had already suffered one attack of alcoholic encephalopathy, and who had been a heavy drinker from adolescence, became even more bad-tempered and did not improve in any way. Some months before he was leucotomized, as a rather forlorn hope, an earlier psychiatric adviser, unusually well qualified to express an opinion, had advised against operation.

A middle-aged hysterical valetudinarian became even more of a hysterical invalid after an initial improvement, but it is considered that this was not due to the operation so much as to a failure of the operation in a type of case in which it usually proves unhelpful.

Similar considerations apply in the cases of two other middle-aged hysterical hypochondriacs who gained no relief but in whom minor personality deficits appeared so that on balance they are worse.

Five patients who suffered from depression in the presence of early senile or arteriosclerotic dementia, and another who had a progressive familial cerebro-cerebellar degenerative condition, were ultimately worse, but this was to be attributed more to the progression of their organic disease than to the operation, which did, indeed, relieve the depression in most cases. I do not consider leucotomy to be contraindicated merely because there is evidence of early dementia.

Three recurrently depressed patients suffered a change in the psychosis which necessitated their remaining in hospital; in one the illness changed to a state in which mania and depression alternated at intervals of a few days, and the other two became chronic manics (and were not improved by subsequent standard leucotomy).

Two patients whose leucotomy was complicated by cerebral haemorrhage, with, inevitably, extension of the lesion far beyond what was planned, suffered changes similar to those seen after standard leucotomy. Another, a depressed post-encephalitic, was unconscious for two weeks after a massive operative haemorrhage and now remains in a state of euphoric dementia which her family regard as a vast improvement on her former misery; medically speaking, this is a disastrous result.

Three patients committed suicide between 9 and 26 months after rostral leucotomy.

Allen (1956) refers to the effect of unsuccessful leucotomy in causing a patient to lose hope; this was, I think, a factor in the suicide of two of the three patients, and in a third case which I have encountered recently (not in this series).

I cannot accept the implication that a treatment should be used only if it always works; it is unfortunate that patients often believe that if leucotomy fails nothing else can or will be done, but it is equally unfortunate that it is sometimes true, and it is also true that many patients commit suicide even without a leucotomy. The trouble with these patients was not that they were made worse but that leucotomy failed to relieve their distress.

If, therefore, we leave out of account those cases in which pre-existent and recognized organic brain disease was present and in operating on which a calculated and, in my opinion, justified risk was taken, and those who are worse as a result of operative haemorrhage, there remain the alcoholic psychopath, two middle-aged hysterics, and the three depressives who are definitely worse as a direct result of operation. In the case of the psychopath the bad result followed an ill-advised operation. The three depressives are in a different category, and mention must be made of the whole group of depressives, including those who are better.

Hypomanic Episodes

Eighteen patients had recurrent endogenous depressive illnesses, the first breakdown occurring before the age of 40. In none of these had there been previous attacks of mania. Seven of the 18 (including the three cases mentioned above as being worse) have had manic or hypomanic episodes since operation. In one of these it seemed that her lifelong cyclothymic mood swings continued, but from a higher basic level; another became persistently but mildly hypomanic, a state regarded by her family as an improvement on her depression. Of five patients operated on during the course of their only (non-involuntional) depression, two passed through hypomanic phases, in one case lasting 18 months and subsiding slowly, the other lasting five months from about four months after operation; he became involved in serious marital and business difficulties as a result.

Of 21 involuntional depressives only one passed through a short-lived hypomanic episode, immediately after operation. *No case of hypomania occurred in any other diagnostic group.* The considerable (1 in 3) risk of a manic illness developing in depressives who can be classed as manic-depressives, although there is no previous history of mania, should lead to caution in the use of rostral leucotomy (and possibly of other forms of psychosurgery too) if there is a family history of depressive breakdowns or a cyclothymic personality.

Effect on Intellectual Efficiency

So far, then, the indications are that with the exception of surgical disasters it should be possible to avoid, by careful selection of cases for operation, the likelihood that anyone will be made worse by rostral leucotomy, or even suffer anything but slight personality damage. It so happened, however, that amongst the 240 patients there were only six men who had held responsible positions in the professions: two of these were suffering from very severe psychotic illnesses, two from depression complicating arteriosclerotic dementia, one had been retired for many years, and the only one who was in a position to resume his work was a clergyman who returned to his parish 10 days after operation and was better able to carry on despite persistence of some symptoms. The evidence does not therefore exist which would allow one to say what would be the effect of rostral leucotomy upon the intellectual efficiency and judgment of anyone in a highly responsible position. So far as less exacting work is concerned, many patients have resumed work as nurses, school teachers, stationmaster (with promotion), and as skilled tradesmen. No patient had shown sufficient pre-operative artistic ability to judge the effect of rostral leucotomy on this.

It is instructive to compare the figures for the group of 118 patients referred to in Table I, some of whom were already "long-stay" hospital patients, with those reported by Ström-Olsen and Tow (1949) after standard leucotomy in patients admitted to hospital for operation because of

"severe neurotic depression, obsessive-compulsive neurosis, and chronic tense hypochondriasis." They noted that 76% of cases were relieved of illness but only 24% could work. The figures after rostral leucotomy are 64 cases (54%) symptom-free or much improved, and 67 (57%) working at a standard up to or but little less than their best previous. Of the 64 symptomatically much improved 56 (87%) are included in the latter figure. In the rostral series failure to achieve a good work adjustment was chiefly related to inadequate symptomatic relief; after standard leucotomy objectionable personality deficiencies are of greater importance.

During the follow-up of cases I had the opportunity of seeing 27 patients whose initial unsuccessful rostral operation had been followed by more extensive unilateral or, in 19 cases, bilateral incisions. Of these latter 19 cases, only 3 could be considered "good" results, and in one of these there was a typical frontal-lobe syndrome: the patient had become an empty, giggling, tactlessly out-spoken creature, but her husband much preferred this to the difficult hysteric she had been before. The other "good" results were in depressives of good previous personality and were not marred by such troublesome frontal-lobe deficits. Personality deterioration due to standard leucotomy was serious in 8 out of 10 psychoneurotic or depressed patients, in 2 of whom, both young women, the result was appalling (Pippard, 1955c). It is an operation which should never be done in inadequate "vulnerable" personalities.

Partridge (1950) has, however, shown that even after standard leucotomy it is possible for doctors, dentists, etc., to return to practice and to be reasonably good at it (though not as good as they had been before). It seems likely that after the lesser rostral incision such responsible work would be possible with perhaps even a negligibly diminished sense of responsibility. This conclusion must never, however, lead us to forget that any leucotomy is a brain-destroying operation not lightly to be undertaken merely because it is simple and comparatively safe. Few would go as far as Winnicott (1951) in maintaining "the right to suffer, and even to commit suicide, with the brain . . . intact," particularly if they have had much to do with the intolerable distress which leucotomy may relieve even when all else has failed, or with the gratitude such as was expressed by patients and their relatives not once or twice, but many times during my follow-up study.

Difficulties of Decision

The decision to leucotomize a psychoneurotic patient does, however, involve a moral as well as a clinical judgment whether the degree of suffering warrants it. Where suffering and incapacity are great the moral aspects of the decision may not be strongly felt. The decision will be more difficult in the case of highly gifted patients who are less seriously incapacitated and who may lose some of their gifts after operation. The decision may be difficult, too, when patients demand leucotomy, all other reasonable treatment having failed, particularly if they threaten suicide as an alternative. I think that in these cases it is right to refuse unless, apart from the threat, the operation is indicated. There is a tendency to leucotomize, as a last resort, even in unsuitable cases (after all, it does work sometimes in unexpected cases), but this tendency should be resisted, for in the long run it will only discredit the operation; already many people feel that we sometimes go too far in our concern to relieve distress, which may sometimes be our own rather than the patient's.

Discussion

Certain general findings seem to emerge during a study of the progress of these 240 patients. The final result appears to depend upon a number of interacting factors which do not permit of simple analysis: (1) The quality of the patient's previous personality as shown in his life history. (2) The sort of illness and the effect it has had upon personality organization; the amount of distress suffered. (3) The

social environment, the effect of the patient's illness upon it; his capacity after operation to adjust to his home environment and to deal with his difficulties; the capacity of his associates to adjust to him. All these are partially determined by the other factors, and all are profoundly influenced by the extent of the leucotomy incision, itself a somewhat uncertain factor, as well as by other unpredictable factors, especially social and environmental.

Even if some of these factors can be assessed reasonably well by careful and repeated clinical examination, assisted where necessary by psychological testing, and even if, with the help of social workers, a clear picture emerges of the home situation and the attitudes of relatives and employers to the patient and his attitudes towards them, there remain the unpredictable factors, many of them chance occurrences which may profoundly affect the final result.

As I have already stated, rostral leucotomy rarely produces striking changes in personality. Patients who have throughout life, for example, been timid, insecure, and dependent upon others, or emotionally cold, rigid, and unadaptable, or psychopathically uncontrolled and unstable, are unlikely to be very different after operation. Where the condition for which leucotomy is proposed appears to be an almost inevitable result of such a personality, then leucotomy cannot, at any rate by itself, be expected to bring about much improvement. Where, on the other hand, a patient has, in the past, shown a capacity for friendship, a good work record, emotional stability, etc., where, in other words, he has had a good personality which has not been disorganized by illness, then, provided that the symptoms are of a type known to be influenced by leucotomy, the operation may be expected to bring about a good result.

In writing this I am conscious of grossly oversimplifying, but I want to stress the point, which Sargant has frequently made, that the best results from rostral leucotomy (or other modified procedures) will be in the better personalities.

A patient with a good previous record whose illness—for example, an involitional depression—is relieved by rostral leucotomy will probably deal satisfactorily with his environmental difficulties afterwards. Where the personality is less adequate the result will depend not only upon the relief of symptoms but also upon the capacity of the individual to deal with his "problems," including what may be very unsatisfactory relationships with his family and at work. Unless these "problems" can be satisfactorily resolved he may soon relapse. It is here that social case work may be needed to temper the wind, and it is here too that chance may affect the results for good or bad. In this series, examples of such chance occurrences were the decision by two wives to leave their leucotomized husbands, who thereupon strikingly improved; and the appearance of a suitor, at just the right moment, to support a young woman in her otherwise hopeless and inadequate attempt to deal with her mother.

Patterns of behaviour, including those initiated by illness, tend to become more and more fixed by repetition and long custom, and may become virtually unalterable components of the personality which rostral leucotomy may not significantly change. For example, five patients had obsessional neuroses characterized by entrenched ritualistic behaviour carried on for many years: in none of these was the result of leucotomy good. In five others the onset of their obsessional illness was definitely related in each case to a specific stress situation causing emotional conflict: the duration of illness was shorter in these cases and the result in each case was good. Table I shows that the result of operation was good in 5 out of 16 psychopathic personalities. In each of these five there was a marked improvement in behaviour, but such improvement appeared only where the psychopathic behaviour was closely related to emotional distress (bearing out Cattell's (1953) experience). All remained psychopaths and usually a continuing source of anxiety, albeit diminished, to their relatives and friends. No

"inadequate drifters" or "aggressive" psychopaths were significantly helped. The psychopathic personality as such is not amenable to treatment by leucotomy, but in some cases the disturbed behaviour, based upon real distress as distinct from merely deficient control, may be helped.

Conclusion

In conclusion, I believe leucotomy to have a useful and, indeed, valuable place in the treatment of mental illness. It is, however, destructive and potentially harmful, and should be carried out (as I believe that in general it is carried out) only after careful consideration, and certainly not because "there is nothing else we can do." The major frontal cuts have little to offer which cannot be achieved by more limited incisions, and their power to do harm is very great. At the present time there appears to be a reaction against "psychosurgery," based upon the experience of the ill effects of standard leucotomy. It would be a pity if what is good in this method of treatment were to be abandoned because it has sometimes been carried out too enthusiastically in the wrong type of case. It is unfortunate that the misleading publicity given to the bad results of some standard operations sometimes leads patients and their relatives to refuse a modified leucotomy.

Summary

A personal follow-up study of 240 patients after rostral leucotomy is briefly described.

It is shown that this limited frontal operation is capable of giving relief from distressing symptoms somewhat less than, but comparable with, that given by standard leucotomy.

Unpleasant personality changes followed in less than 5% of cases; where these occurred the reason was to be found in wrong selection of cases or in operative complications, which are rare but probably unavoidable.

Some of the factors are discussed which should be borne in mind in selecting cases for operation; the most important are: (1) the established personality patterns, shown in detailed study of the patient's life history, since these are least likely to be altered by operation; (2) the type of illness, particularly whether it has developed insidiously in an inadequate or otherwise unsatisfactory personality, or whether it appears, more sharply defined, against a background of a "good" personality; (3) the extent to which symptoms depend upon distress, whether of tension, depression, or ruminative thinking; (4) the patient's life situation and the possibility of his being able to adjust to it, or for it to be adjusted to him, after his symptoms have been relieved by operation; and (5) various unpredictable chance factors, particularly social and surgical.

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NYSTAGMUS AS A PHYSICAL SIGN IN ALCOHOLIC INTOXICATION

BY

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The high incidence of nystagmus found in motorists suspected of "being under the influence of drink" (Howells, 1952) gave rise to speculation concerning its significance as a physical sign. It was known that nystagmus could be produced by the intravenous injection of quick-acting barbiturates (Bender and Brown, 1948), and it has since been reported that nystagmus has been found in methylpentynol ("oblivon") intoxication (Marley, 1955).

In order that further information might be obtained a preliminary laboratory investigation was carried out. Ethyl alcohol was given by mouth to volunteers to confirm that alcohol produces nystagmus and to determine the approximate amount of alcohol needed to produce this effect. The second stage involved the measurement of reaction time before the taking of the alcohol and again after the onset of nystagmus. Finally, alcohol was given in the form of whisky or gin in order to determine whether the resulting nystagmus differed from that produced by an equivalent amount of ethyl alcohol.

Experimental Procedure

The volunteer subjects, whose ages ranged from 20 to 29, were all medical students in their clinical years and with one exception were all males. The reaction time was determined just before taking alcohol, at least two and a half hours after the last meal. The alcohol was diluted with an equal volume of lime juice and water and was consumed during a period of ten minutes.

At intervals during the hour subsequent to taking alcohol the presence of nystagmus or any other eye sign was noted, and as soon as any nystagmoid movements were observed the reaction time was redetermined. The experiments were carried out on single subjects or in groups of two. On many occasions the subject was accompanied by a friend, so that the laboratory seldom contained fewer than four people. The first five subjects sat in the open laboratory facing a signal light. A circuit was devised so that the interval of time between the stimulus and the subject's response was, by operating a morse-key switch, represented graphically on a cathode-ray oscillograph and the result recorded by photography. The next four subjects were each seated in an air-conditioned metal box of 70 cu. ft. (1 cu. m.) which was both lightproof and soundproof. The stimulus was still a visual signal from a small red neon light, but the response was made by extending the partially flexed left index finger. Three silver suction electrodes were placed over the extensor indicis muscle, and the response was recorded on one channel of a conventional encephalograph. This provided a continuous electromyogram, and when a second channel was connected with the signal-light circuit it was possible to measure the reaction time directly from the recording paper.

Subjects 10, 11, and 12 were seated in the open laboratory, and the stimulus was a click from a loud-speaker. The response was the extension of the index finger, and the time of its appearance, together with that of the stimulus, was recorded in a manner similar to that used in the previous group. The intervals between recordings were taken up in casual conversation, which appeared to flow with greater

The appointment of Charles C. Colby, III, medical librarian for the University of Missouri, as librarian of the Boston Medical Library, the third largest medical library in the United States, was announced recently. He succeeds the late James F. Ballard.