PAPERS AND ORIGINALS

Use of neurosurgery for psychological disorder in British Isles during 1974-6

B M BARRACLOUGH, N A MITCHELL-HEGGS

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Summary and conclusions

All 44 neurosurgical units in the British Isles replied to a postal questionnaire asking about their use of neurosurgery during 1974-6 for functional mental illness. A total of 431 operations was reported, representing a yearly rate of 3.4 operations per million population aged over 15. The numbers of operations declined from 158 in 1974 to 119 in 1976. Four units did two-thirds of the operations. Stereotactic methods for locating the site for the lesion were used in two-thirds of procedures. Mood disorders, anxiety states, and obsessive-compulsive neurosis were the conditions most commonly treated.

Introduction

Functional neurosurgery (preferred by the Society of British Neurological Surgeons to the term leucotomy or psychosurgery) continues to be used for severe mental illness resistant to other forms of treatment. The *Hospital In-patient Enquiry* puts the number of such operations performed yearly in England and Wales at 200-300,¹ though the DHSS believes that this may be 100% in error owing to the small number of discharged patients on which the estimate is based. Furthermore, the coding completed by discharging hospitals may include operations for conditions such as Parkinson's disease and epilepsy.² The absence of national statistics became apparent during the public controversy in 1975-6 surrounding the application by the Royal College of Psychiatrists to conduct a controlled trial of functional neurosurgery. Questions in the House of Commons (11 during 1976) and publicity through the

media served to underline the tentative nature of available statistics.

In 1977 the Royal College of Psychiatrists and the Society of British Neurological Surgeons agreed to co-operate and survey by postal questionnaire all neurosurgical units in the British Isles, including Eire. The aims were: (1) to discover the number of operations carried out during 1974-6, these three years being the most recent for which statistics were available, and which allowed fluctuations to be evened out; (2) to see whether the operations were evenly spread among the units or concentrated in a few; (3) to ascertain the parts of the brain preferred as sites for placing lesions and the techniques used for making them; (4) to find the extent to which stereotactic or freehand methods were used; (5) to discover the types of disorders treated neurosurgically; and (6) to get the opinion of neurosurgeons on the value of neurosurgery for mental illness.

We report the results of the survey, which was designed by us. Opinions expressed are our own.

Method

The questionnaire (see Appendix), which was approved by the research committee of the Royal College of Psychiatrists and the Society of British Neurological Surgeons, was posted to the heads of 44 neurosurgical units, whose names had been provided by the Society of British Neurological Surgeons. They were asked to return the questionnaire even if no patients had been treated. To encourage replies six questions were asked, only one relating to numbers. A second questionnaire was sent to the three units doing the most operations (see table I) asking for numbers of operations by diagnosis. The period covered by the survey was 1 January 1974 to 31 December 1976.

Results

All units returned the questionnaire, which is a measure of the interest that neurosurgeons have in the treatment.

UNITS PERFORMING FUNCTIONAL NEUROSURGERY

Altogether 431 operations for psychiatric illness were performed during the survey period in 31 (70%) of the 44 units (table I)—namely, 26 (70%) of the 37 units in England and Wales, all four of the

MRC Clinical Psychiatry Unit Graylingwell Hospital, Chichester, West Sussex PO19 4PQ

B M BARRACLOUGH, FRACP, scientific officer

Department of Psychiatry, St George's Hospital, London SW17 0QT
N A MITCHELL-HEGGS, MRCP, honorary senior registrar (research)

Scottish units, and the unit in Northern Ireland. No operations were reported from the two units in Eire. Over half of the operations (248—58%) were carried out in three units, 285 (66%) in four, 361 (84%) in 11, and none in 13 (table I).

The average number of leucotomies performed yearly in Great Britain and Northern Ireland over the three years was 3.4 per million population aged over 15; this, however, conceals regional differences. The rate for England and Wales was 3.6 per million (411 operations), for Scotland 1.2 (14 operations), and for Northern Ireland 0.6 (six operations).

There were 158 operations in 1974, 154 in 1975, and 119 in 1976. The fall in 1976 coincided with the publicity concerning functional neurosurgery. In Scotland the decline was from seven operations in 1974 to one in 1976. In England and Wales the change was from 149 in 1974 and 146 in 1975 to 116 in 1976. The four units that performed two-thirds of the operations did five fewer in 1976 than in 1974, the other 27 units doing 24 fewer; thus publicity had the greatest influence on units doing the fewest operations.

SITING OF LESIONS AND METHODS USED

There was much variation in the preferred site for placing lesions (table II), some of which may have resulted from different sites being favoured for different illnesses, though the questionnaire did not

TABLE I—Use of neurosurgery for functional mental illness by neurosurgical units in British Isles during 1974-6

No of operations per unit	No (%) of units	Total No (%) of operations performed
127*	1	127 (29)
65*	1	65 (15)
56*	1	56 (13)
37	1	37 (9)
Total	4 (9)	285 (66)
15	1	15 (3)
14	1	14 (3)
12	1	12 (3)
11	1	11 (3)
9	1	9 (2)
8	1	8 (2)
7	1	7 (2)
Total	7 (16)	76 (18)
6	5	30 (7)
5	2	10 (2)
4	2	8 (2)
3	4	12 (3)
2	3	6 (1)
1	4	4 (1)
Total	20 (45)	70 (16)
0	13 (30)	0
Grand total	44 (100)	431 (100)

*Units replying to second questionnaire.

TABLE II—Lesions used by units performing functional neurosurgery during 1974-6 and estimated proportions of patients subjected to each type

	No (%) of units* (n = 31)	Estimated percentage of patients (n = 431)
Lower medial quadrant	10 (32)	16
Rostral	9 (29)	7
Bimedial	8 (26)	6
Cingulotomy/cingulotomy	8 (26)	10
Stereotactic limbic	4 (13)	13
Standard	3 (10)	3
Stereotactic subcaudate	2 (6)	30
Amygdalotomy	1 (3)	<1
Bilateral lesions in fundus striae terminalis	1 (3)	<1
Combined stereotactic lesions in cingulum and subcaudate regions	1 (3)	<1
Division of fornix	1 (3)	<1
Hypothalamotomy	1 (3)	<1
Lower-quadrant prefrontal and paramedian prefrontal	1 (3)	<1
Multifocal leucocoagulation by acute and chronic indwelling electrodes of rostral, standard limbic, and subcaudate sites	1 (3)	6
Orbital leucotomy	1 (3)	<1
Temporal lobotomy	1 (3)	3

*Twelve units used more than one site.

TABLE III—Techniques used to make lesions in units performing functional neurosurgery during 1974-6 and estimated proportions of patients so treated

	No (%) of units* (n = 31)	Estimated percentage of patients (n = 431)
Leucotome	21 (68)	30
Thermocoagulation	7 (23)	29
Suction	5 (16)	13
Isotopes	1 (3)	29

*Six units used more than one technique.

TABLE IV—Functional mental disorders treated by neurosurgery in the 31 units conducting such operations during 1974-6

	No of units		No of units
Depression	24	Intractable pain	4
Anxiety	20	Schizophrenia	4
Obsessive-compulsive neurosis	19	Self-destructive behaviour	3
Repeated violence	6	Hysterical syndromes	0
Anorexia nervosa	5	Sexual psychopathology	0

TABLE V—Diagnoses of patients treated by the three units responsible for 248 (58%) of the 431 operations performed during 1974-6

	No (%) of patients
Depression	155 (63)
Anxiety, tension, and phobic states	30 (12)
Repeated violence	21 (8)
Obsessive-compulsive neurosis	18 (7)
Schizophrenia (including schizoaffective psychosis)	14 (6)
Other	8 (3)
Anorexia nervosa	1 (<1)
Self-destructive behaviour	1 (<1)
Hysterical syndromes	0
Intractable pain without demonstrable organic pathology	0
Sexual psychopathology	0
Total	248 (100)

permit this to be analysed. Mood disorders, however, accounted for over three-quarters of patients treated.

Freehand methods were used in 26 (84%) of the 31 units, and stereotaxis in 11 (35%); six used both methods. We estimate that about two-thirds of all operations were conducted by a stereotactic method. In fact, 225 (52%) of the operations were carried out in the five units using only stereotactic methods, and a further 117 (27%) in the six units using both methods.

LESION-MAKING TECHNIQUES

Thermal and radioisotope techniques for making lesions were used in only eight units but on an estimated 58% of patients in the survey (table III). In contrast, suction and the leucotome were used in 26 units on some 40% of patients. Those units doing the fewest operations tended to use the older methods.

DISORDERS TREATED

Mental illnesses most commonly treated were, in order of prevalence, depression, anxiety states, and obsessional disorder (table IV). Three units reported operations for self-destructive behaviour, and six used neurosurgery to treat conditions associated with repeated violence.

Table V lists the diagnoses of patients treated in the three units responsible for 248 (58%) of the operations and which replied to the second questionnaire. Mood disorders—namely, depression, anxiety states, obsessive-compulsive neurosis, schizoaffective psychosis, and manic depressive psychosis—accounted for some 85% of the diagnoses. Two-thirds of the patients were depressed. The pattern of diagnosis was similar in two units, but in the third 21 patients (32%) had been treated for conditions associated with repeated violence.

VALUE OF FUNCTIONAL NEUROSURGERY

Of the 30 surgeons giving their views on leucotomy, most, including those no longer using the operation, thought that it was valuable. A paediatric neurosurgeon thought that it should not be used for children. Another surgeon had reservations about treating mental

illness by injuring the brain; in his experience leucotomised patients did not improve. A third considered that such operations should be undertaken in regional centres because of the special experience gained by treating many cases. Our survey shows that in England and Wales this has already happened to a large extent.

Discussion

So far as we know in no other country has there been a survey of neurosurgical units giving information as complete as in the present one. The questionnaires were addressed to the heads of the 44 units and the Society of British Neurological Surgeons had commended the survey to their members; there is therefore no reason to doubt the accuracy of the returns.

Comparing the number of operations performed with that estimated by the *Hospital In-patient Enquiry* confirms that the DHSS figures may be inaccurate. Fewer operations are being undertaken than was thought.

Not unexpected was the finding that the operation is concentrated in so few places, which agrees with the observation in the USA.³ If such concentration continues an increasing proportion of operations will be conducted by stereotaxis and the lesions made by radioisotope or thermal methods. More accurately placed lesions and less trauma to brain tissue should result from these changes. Furthermore, the preparation of patients for surgery and their rehabilitation should improve.

This survey was conducted when leucotomy had come under great scrutiny and been the target of public criticism. The need for improved statistical returns is now clear. Our results will be a useful standard with which to compare those of the procedure used by the DHSS for collecting similar information.

The DHSS is collecting statistics on psychosurgery for 1977 (retrospectively) and 1978, by enquiry to the mental hospitals which refer patients for operation. Our method asked the operating surgeons to provide the numbers—a method which avoids both omissions and double counting. From 1979 the DHSS plans a similar approach to the hospitals where the operations are performed.

When the Royal College of Psychiatrists tried to obtain funding for a controlled evaluation of leucotomy it sent a questionnaire to a random sample of 80 consultant psychiatrists, members of the college in the UK, asking if they favoured such an evaluation. Over 80% were in favour and, furthermore, said that their clinical practice in referring patients would be affected by the result.

The need for an independent evaluation of leucotomy becomes even more evident when considering what happened during the three years covered by the survey. The influence of public opinion on medical decisions seems to have resulted in a sharp fall in the number of patients receiving the operation—from 158 in 1974 to 119 in 1976. Opponents of the operation may approve of the change, but if it successfully relieves mental illness resistant to other treatments ill people may have been deprived of effective treatment. The public's best protection when there is doubt about a controversial treatment is a controlled evaluation.

Mr P R R Clarke, secretary of the Society of British Neurosurgeons, advised us on the design of the questionnaire and provided the list of

heads of neurosurgical units in the British Isles. Miss Jane Boyce undertook the postal survey. Thanks are due to the administrative heads of the neurosurgical units for completing the questionnaire. Mrs V Kewell analysed the results.

Appendix

Text of questionnaire sent to heads of neurosurgical units in British Isles in 1977

Were any neurosurgical procedures for the treatment of psychiatric illness performed in your department in the period 1/1/74 to 31/12/76?	YES
(Psychiatric illness excludes epilepsy)	NO
If the answer is NO—go to question 6	
If the answer is YES—please answer these further questions:	
1. How many such procedures were performed in each year?	1974 _____ 1975 _____ 1976 _____
2. Which of the following procedures were used?	Please Tick
Amygdalotomy	_____
Bimedial leucotomy	_____
Cingulotomy/cingulotomy	_____
Lower medial quadrant leucotomy	_____
Rostral leucotomy	_____
Standard leucotomy	_____
Stereotactic limbic leucotomy	_____
Stereotactic subcaudate tractotomy	_____
Temporal lobotomy	_____
Thalamotomy	_____
Other (Please state _____)	_____
3. In siting the lesion which procedures were used?	_____
Freehand	_____
Stereotaxis	_____
4. Which techniques for making lesions were used?	_____
Cryogenic probe	_____
Implanted electrodes	_____
Isotopes	_____
Thermocoagulation	_____
Leucotome or brain cannula	_____
Other (Please state _____)	_____
5. Which conditions have been treated with neurosurgery?	_____
Anorexia nervosa	_____
Anxiety, tension, and phobic states	_____
Depression	_____
Hysterical syndromes	_____
Intractable pain without demonstrable organic pathology	_____
Obsessive-compulsive neurosis	_____
Repeated violence	_____
Schizophrenia	_____
Self-destructive behaviour	_____
Sexual psychopathology	_____
Other (Please state _____)	_____
6. Would you care to say something about the value of leucotomy?	_____

References

- 1 Department of Health and Social Security, *Hospital In-patient Enquiry*. London, HMSO, annually.
- 2 Department of Health and Social Security, personal communication, 1975.
- 3 National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, *Report and Recommendations on the Use of Psychosurgery*. Washington, USA, 1976.

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ONE HUNDRED YEARS AGO On January 18th, a midwife delivered Mrs Bishop, of Richard Street, Birmingham, of a full-grown healthy male child. On the third day after her confinement, she came downstairs and resumed her ordinary employment, feeling quite well. On the morning of February 4th (the seventeenth day after her former accouchement), she sent for me, stating that she felt the sensation of something moving in her abdomen. Very shortly after my arrival, I delivered her of twins, a boy and girl, each one being full-grown and quite healthy. The placentae were softened and more

of the consistence of jelly than anything else, and had to be scooped away by hand. However, the mother and three children are doing exceedingly well, and the uterus is rapidly resuming its natural size. The most remarkable feature of the case is that, all through the case, there had been an entire absence of "pains," and she observed to me that, had she been asleep, she does not think that my manipulations in delivering her would have awoken her. She is the mother of ten children besides the above, and is a corpulent, strong, and healthy woman. (*British Medical Journal*, 1878.)