METASTATIC BRAIN TUMOURS IN NORTHERN IRELAND: A RETROSPECTIVE REVIEW IN A CLOSED COMMUNITY WITH EMPHASIS ON SHORT TERM QUALITY OF LIFE.

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ABSTRACT

One hundred and nineteen consecutive patients with metastatic brain tumours who presented to the Provincial Neurosurgical Service in Northern Ireland were studied. The detection rate doubled after computerised tomography became available though the population in Northern Ireland over the years of study stayed relatively stable. Multiple tumours accounted for 38% while solitary tumours occurred mainly in the cerebellum or parietal lobe. Whereas 70% of patients presented with features of increased intracranial pressure and or lateralising neurological signs, 20% had only vague symptoms. The primary site was lungs in a third of cases but in 33 cases (27.5%), the site of origin remained unknown. 42% of those 76 cases operated were adenocarcinoma. More than 80% of these patients in whom excision of the tumours were done, had a better quality of life at one month compared with improvement in only a third after biopssy.

Keywords: Brain neoplasms, cerebral metastasis, epidemiology, outcome, surgical removal.

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INTRODUCTION

There have been few studies of metastatic brain tumour in a stable population in the literature (1). Although many papers had been published over the past few decades about the long-term treatment results of this particular group of brain tumours, there have been hardly any publications looking at the effects of surgery in the quality of life of patients. With these points in mind, we undertook to review all the brain metastases presented over a 13-year period to our regional neurosurgical services with respect to the effect of introduction of computerised tomographic (CT) scan and the short-term results in the patient's quality of life.

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Patients and methods

We reviewed retrospectively all patients with metastatic brain tumours in our neurosurgical services covering the whole of Northern Ireland between January 1973 and December 1985. A total of 119 cases were studied. During the study period the population of Northern Ireland remained relatively static at 1.5 million.

The clinical data were obtained by Retrospective Review of the case records. CT Scan was fully functional in 1979, from thence it remained the main diagnostic tool for brain tumours. Patients were treated symptomatically with or without biopsy or surgical decompression might be done.

Because of the extensive publications of results of long-term follow-up with respect to survival rate (2-9) it was our intention only to determine the outcome at one month with particular emphasis to the quality of life, i.e. whether patients were improved as a result of treatment.

Improvement was defined as neurological symptoms and signs improved without the appearance of new symptoms. Deterioration may refer to appearance of new symptoms, worsening of the patient's neurology or death.

RESULTS

Epidemiology

In the six years from 1973 to 1978, there were 42 patients treated giving an average of seven per year, but in the second six year period from 1979 to 1985 when CT scan was available, there was an increase to 77 patients, averaging 13 cases per year. The age incidence was given in Table I with most patients presenting between 50 and 70 years.

Table I
AGE INCIDENCE OF BRAIN METASTASIS

Age	No.	(%)
30	3	2.5
30+	9	7.6
40+	11	9.2
50+	41	34.4
60+	52	43.7
70+	3	2.5
Total	119	99.9

Location of Brain Metastasis

Most cases were either multiple or in the cerebellum with an increase in the detection of secondaries in those two sites in the later six years with the help of CT scan. Tumours at these two locations accounted for 55% of total (Table II).

Table II
LOCATIONS OF 119 BRAIN METASTASIS

Site	No.	(%)
SOLITARY		
Frontal	6	5
Parietal	18	15
Cerebellum	20	17
Temporal	6	5
Occipital	7	6
Medulla	1	1
Others	4	3
Combination	13	10
MULTIPLE	44	38

Presenting Features

The presenting features were divided into six broad groups (Table III). Whereas about 70% of patients presented with features of raised intracranial pressure or lateralising signs, 20% had only vague symptoms like headache and lethargy.

Table III
PRESENTING FEATURES OF THE 119 BRAIN METASTASIS

Presenting Features	No.	(%)
Moribund	3	(2.5)
Raised Intracranial Pressure	34	(28.3)
Lateralising Signs	39	(32.5)
Signs of Raised Intra-Cranial Pressure and Lateralising Signs	10	(8.5)
Psychiatric Symptoms	8	(6.5)
Only Vague Symptoms	25	(20.7)

Primary site of tumours

Despite a thorough search for primary sites of tumours, 33 cases were discharged with the primary site still unknown. Most cases had their primary site in the lungs followed by breast, colon and kidney (Table IV).

Table IV
PRIMARY SITE OF BRAIN METASTASI

Primary Site	No.	(%)
Lungs	42	37
Breast	13	10
Colon	12	10
Kidney	10	8.5
Stomach	1	1
Eye	4	3.5
Skin	2	2
Ovary	1	1
Thyroid	1	1
Unknown	33	27.5

Treatment Modality

Half of the patients had operative intervention (Table V) whereas 36% had only symptomatic treatment with analgesics and steroids.

Table V
TREATMENT MODALITY OF BRAIN METASTASIS

Treatment Modality	No.	(%)
Surgery only	60	(50)
Radiotherapy and Surgery	1	(1)
Chemotherapy and Surgery	5	(4)
Combined Surgery/ Radiotherapy/ Chemotherapy	10	(8)
Symptomatic Treatment only	43	(36)

Histology of Brain Metastasis

Of the 76 patients who had surgical treatment, most of them were found to be adenocarcinoma (Table VI). Squamous cell carcinoma and anaplastic carcinoma were next in common. There were four cases of melanoma.

Table VI
HISTOLOGY OF THE 76 BRAIN METASTASIS

Histology	No.	(%)
Adenocarcinoma	32	(42)
Squamous Cell Carcinoma	20	(26)
Anaplastic Carcinoma	17	(22)
Melanoma	4	(5)
Oat Cell Carcinoma	3	(4)
Total	76	(99)

Outcome at one month after surgical treatment

Sixty-eight patients were available for assessment one month after surgery. Eight other patients were lost to follow-up. Thirty-two had excision of the brain metastasis, 22 partial removal and 14 biopsy. Of significance was that in 84% of those cases who had excision, there was symptomatic improvement compared with 55% of those with partial removal of the brain metastasis. Only one third of those who had biopsy were improved at one month. (Table VII).

Table VII
NEUROLOGICAL OUTCOME OF 68 PATIENTS AT ONE MONTH AFTER OPERATION

Extent of Operation	Neurological Outcome Improved	Static	Deteriorated	Total
Excision	27 (84)	2 (6)	3 (9)	32 (100)
Partial Removal	12 (55)	5 (23)	5 (23)	22 (101)
Biopsy	5 (36)	3 (21)	6 (43)	14 (100)
Total	44 (65)	10 (15)	14 (21)	68 (101)

Percentage in Brackets

DISCUSSION

In general, secondary brain tumours account for 15 to 25% of brain neoplasms (10, 11). However, there have been only a few epidemiological studies of brain metastasis in a stable population which give rise to an annual incidence of 2.8 to 11.1 per 100,000 population (1, 12). The number of the cases presented to our centre cannot be regarded as the true incidence of brain metastasis although the population of Northern Ireland over the last 12 years remained relatively stable at 1.5 million. The reason was the 13 cases per annum presenting to our unit over the last few years probably under-represented the true incidence of secondary brain tumours in Northern Ireland, in that a number of cases who had known systemic cancer and florid neurological signs and symptoms might not be referred to our unit for neurosurgical assessment.

The value of CT scan in detecting secondary brain tumour was reflected by the two-fold increase in the number of cases presenting to our centre since CT scan was introduced. This increase may partly reflect the change in attitude in the treatment of secondary brain tumours.

As in most series the commonest brain metastasis are tumours of unknown origin and secondaries from carcinoma of lungs (11, 13). These two groups accounted for three-quarters of our cases. The tumours next in common were brain metastasis from breast, colon and kidney. With the advent of CT scan there was an increase in the number of cerebellar and multiple brain metastases detected. As expected these tumours were most commonly found in patients above the fifties.

The presenting features of these patients were of interest in that although most cases presented with symptoms and signs of increased intracranial pressure of lateralising signs, there had been an increase in the number of cases presenting with only vague symptoms like headache or minimal confusion. Psychiatric symptoms accounted for a small but significant number of patients.

The treatment of our patients was largely surgical recently especially if the brain metastasis was solitary. This was based on the recent experience of several authors reporting improved survival and even "cure" in certain cases following surgical removal of solitary brain metastasis (2-9, 14). Furthermore, surgery offers the histological confirmation of the tumour avoiding an incorrect clinical diagnosis (15). When the extent of surgical treatment was considered, it became clear that excision of the tumour offered the best result at one month; 84% were improved and only 9% deteriorated or died. Partial removal of the tumour gave rise to improvement in 55% of our cases at one month but 23% deteriorated. Biopsy offered the least favourable outcome of all surgical treatment; only a third improved. It would thus appear obvious from our results that surgical decompression by excision or partial removal offers an improved quality of life and it is our view that surgical removal should be performed if the brain metastasis is solitary and accessible, not only giving the patient a chance of improved survival as reported by other authors but also an improvement in the quality of life.

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