

CASES OF BRAIN METASTASIS PRESENTING AS THE FIRST SIGN OF SYSTEMIC CANCER

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SYNOPSIS

Fifty-one consecutive patients with brain metastasis as the first sign of systemic cancer operated upon over the last 12 years at the Regional Neurosurgical Centre at Royal Victoria Hospital, Belfast, Northern Ireland, were studied. With the advent of CT scan its detection was increased almost threefold with a concomitant increase of cerebellar and multiple brain secondaries. Lung was the commonest primary site subsequently found and adenocarcinoma was the type most often seen even in those cases where a search for primary site failed. Surgical treatment resulted in a favourable outcome in more than half of the patients and the mortality rate at one month was 9.8%.

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INTRODUCTION

Secondary brain tumours account for 15 to 25% of brain neoplasms(1). The commonest brain metastasis is tumour of unknown origin accounting for about one third of the total, followed by secondaries from lung and breast(2,3). Usually systemic cancers present first at their primary site and the interval between their discovery to the time cerebral metastasis appearing varies with the type of the tumour. It may be relatively short in term of months for lung and kidney cancers and melanoma or very long, perhaps years, for cancers of breast, gastro-intestinal tract and sarcomas(3). However, systemic cancers may declare themselves with metastasis to the brain. We undertook to study this subgroup of brain metastasis which presented to our centre over the last 12 years.

METHODS

The case records of all 119 patients with intracranial metastasis diagnosed and treated in Northern Ireland's only Regional Neurosurgical Centre at the Royal Victoria Hospital, Belfast, between 1973 and 1984 were reviewed. Only those cases who had biopsy or excision and not known to have extracranial malignancies before admission were identified. A total of 51 such cases (47%) were found. Most of these patients were referred from physicians and surgeons throughout the Province of Northern Ireland. The rest came from the Neurological Regional Centre at the same hospital. Throughout the study period, the population of Northern Ireland remained fairly constant at about 1.5 million.

The age, sex distribution, locations of the metastasis, site of primary subsequently identified, presenting features, histological findings, modes of treatment and outcome were scrutinised.

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The cerebral metastasis were divided into solitary and multiple and the location defined as the lobe most involved if solitary. The presenting features were classified into six broad groups, lateralising signs, symptoms and signs of increased intracranial pressure, confusion only, psychiatric symptoms, headache only and fits.

Before 1979, computerised tomography was not available, therefore an attempt was made to separate those cases diagnosed with and without the help of CT scan. The treatment modalities included surgery in all cases whether it was biopsy, excision or shunt with or without adjuvant radio-therapy or chemotherapy.

The usual practice in this centre was that after initial diagnosis and treatment, most patients were referred back subsequently to their local hospitals for follow-ups. Because of this and because long term outcome after surgery for metastatic brain tumour has been widely studied(2,4,5,6) the one month outcome after surgery was studied. The patients were allocated to one of the four outcome groups - improved, static, deteriorated or dead at one month. A patient was classified under the deteriorated group if the original presenting features worsened or new symptoms and signs developed. Improvement would mean improvement in the presenting clinical features with the absence of development of new symptoms.

A search for the primary site of tumour was made in each case during the hospital stay. This included detailed history taking, thorough physical examination, routine chest radiographs, urine and blood investigations with additional special biochemical radioisotope or further X-rays if warranted.

RESULTS

Epidemiology

There were 31 male and 20 female patients giving rise to a male: female ratio of 3:2. The age incidence of these 51 cases was given in Table 1 which also subdivided the study period into two six year periods; the second six years after 1979 when CT scan was available. There was an almost three-fold increase of such cases when CT scan was used. The peak age groups were between 50 and 70 in both study periods.

Presenting Clinical Features

The presenting features were tabulated into Table 2. About 50% of patients presented with lateralising signs and symptoms and 40% with symptoms and signs of in-

creased intracranial pressure. Seven patients had only persistent headaches and one was only confused. Fits and psychiatric symptoms were observed in a small minority.

Location of Brain Metastasis

Before CT scan was available, most brain metastasis were found in the temporal and parietal area. However, with the advent of CT scan, cerebellar secondaries formed the largest group (Table 3) probably because CT scan is more sensitive in detecting such secondaries than investigations hitherto used. There was also a rise in the number of multiple secondaries detected.

Primary Sites

The results of a search of primary site of the brain secondaries were given in Table 4. Lung was the commonest primary site (41%). Despite detailed search the primary site of about one-third of the cases remained unknown. Breast, colon, kidney and stomach accounted for the rest.

Histology of Brain Metastasis

More than one third of the cases were adenocarcinoma due to a sharp rise in the later six year period (Table 5). Anaplastic and squamous cell carcinoma were next most frequent. The biopsy specimen obtained in five cases did not yield conclusive histological proof although the primary tumours were found during investigation. The histology of the 14 brain secondaries with unknown primary on discharge were further studied (Table 6). Adenocarcinoma accounted for one-third of cases. One case only revealed sarcoma.

Type of Surgery and Treatment of Brain Metastasis

Two thirds of the patients had biopsy and one third excision. One patient had a shunt (Table 7). Two patients had adjuvant radiotherapy and three had adjuvant chemotherapy.

Outcome After Treatment at One Month

The neurological outcome at one month after surgical treatment was given in Table 8. More than half (56.8%) were improved and only about one quarter (23.5%) deteriorated or died.

The five patients who had either adjuvant radiotherapy or chemotherapy were all improved at one month.

DISCUSSION

Brain metastasis presenting as a first sign of systemic cancer is a unique group of brain tumours, in that, the primary systemic cancer is not known and a fairly urgent diagnosis of the intracranial condition is required. Brain biopsy and excision remained the best diagnostic procedure and treatment in that it is the only way when histological proof is possible. Raskind in 1969(7) presented a series of his patients simulating brain metastasis and the final diagnoses were abscess, meningioma, chronic subdural haematoma or glioma. Even with the help of CT scan, differentiation of brain abscess and meningioma from brain metastasis can be difficult. Surgical excision or partial decompression also offers good palliation of neurological symptoms, the technique is often easier than operation for glioma in that they are mostly superficial, and there is usually a good demarcation between tumour and surrounding brain. Rarely, long term survival, even cure,

TABLE 1
AGE INCIDENCE OF BRAIN METASTASIS
PRESENTING AS THE INITIAL SIGNS

Age	YEAR OF STUDY		Total
	1973-1978	1979-1984	
30	1	3	4
40	1	8	9
50	6	10	16
60	6	15	21
70	0	1	1
TOTAL	14	37	51

has been reported (4-5, 8-10).

Our results showed that this particular subgroup of brain metastasis is more common in male than female patients and that with the CT scan becoming available, the detection of such cases almost tripled. Cerebellar secondaries and multiple brain metastasis were more frequently diagnosed and operated upon. Most patients were markedly disabled from localising signs or increased intracranial pressure although a small percentage had only persistent headache.

TABLE 2
PRESENTING FEATURES OF THE 51 BRAIN
METASIS

Presenting features	Number
Lateralising Signs	25
Symptoms and signs of increasing ICP	21
Confusion only	1
Psychiatric symptoms	3
Headache only	7
Fits	

TABLE 3
DISTRIBUTIONS OF LOCATION
OF THE 51 BRAIN METASTASIS

Site	To Year Of Study	
	Number with Respect 1973-1978	1979-1984
SOLITARY:		
Cerebellum	2	8
Frontal	1	5
Parietal	4	6
Temporal	3	3
Occipital	1	4
Thalamic	0	1
Multiple	3	7

TABLE 4
PRIMARY SITE OF BRAIN METASTASIS
PRESENTING INITIALLY WITH
NEUROLOGICAL FEATURES

Primary Site	Number With Respect to Year Of Study		Percent of Total
	1973-1978	1979-1984	
Lungs	9	12	41.1
Breast	0	5	9.8
Colon	1	3	7.8
Kidney	1	3	7.8
Stomach	0	1	2.0
Unknown	3	13	31.4

TABLE 5
HISTORY OF 51 BRAIN METASIS PRESENTING INITIALLY
WITH NEUROLOGICAL FEATURES

Histology	Number with respect to year of study		Percent of Total
	1973-1978	1979-1984	
Adenocarcinoma	3	17	39.2
Anaplastic carcinoma	6	5	21.6
Oat cell carcinoma	1	1	3.9
Squamous cell carcinoma	2	9	21.6
Transitional cell carcinoma	1		2.0
Sarcoma		1	2.0
Failed biopsy	1	4	9.8

**TABLE 6
HISTOLOGY OF 14 BRAIN SECONDARIES
WITH UNKNOWN PRIMARY ON DISCHARGE**

Histology	Number	(%)
Adenocarcinoma	5	35.7
Anaplastic	3	21.4
Squamous cell	4	28.5
Sarcoma	1	7.1
Transitional cell	1	7.1

**TABLE 8
NEUROLOGICAL OUTCOME AT ONE
MONTH AFTER SURGERY**

Outcome Group	Number	(%)
Improved	29	56.8
Static	10	19.6
Deteriorated	7	13.7
Dead	5	9.8

**TABLE 7
TYPE OF SURGERY FOR THE 51 BRAIN SECONDARIES**

Type of Surgery	Number with respect to year of study		Percent of Total
	1973-1978	1979-1984	
Biopsy	10	22	62.7
Excision	3	15	35.3
Shunt	1		2.0

Unlike brain metastasis in general with cancer of unknown primary site as the commonest(2), lung cancer was the commonest primary site for brain metastasis presenting as the first sign.

Our results compare favourably with the results of surgical treatment for brain metastasis in general: the mortality rate at one month being only 9.8% with 10 to 32% of most series(3,4,5,8,11). More than half of our patients were improved at one month.

In conclusion, we presented a special subgroup of brain metastasis which were the first sign of systemic cancer and recommended surgical biopsy and excision as a treatment of choice with the prospect of more than a half of the patients having an improved quality of life. It is also the only sure way of making the correct diagnosis.

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BOOK REVIEW

PERIPHERAL IRIDECTOMY — SURGICAL: ARGON: YAG

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Angle closure glaucoma is an important cause of blindness in Singapore. Locally it is estimated that angle closure glaucoma occurs more frequently than open angle glaucoma in a ratio of 4:1. Peripheral iridectomy, or the creation of a hole in the peripheral iris as a direct communication between the posterior and anterior chamber of the eye, is a simple and effective mean both to treat some of the affected eyes, as well as to prevent the fellow eye from secondary angle closure attack. Peripheral iridectomy can be performed either by surgery and more recently, by both argon and yag laser.

In his 8th book, *Peripheral Iridectomy – Surgical: Argon: Yag*, Dr Arthur S M Lim has done very well to present this important procedure which has a great impact in the prevention of blindness in Asia. From his vast clinical experience of over 1,000 cases, he writes a very concise and clear account on both the established surgical method as well as the state of the art laser method of peripheral iridectomy. The photographs, about 100 of them, are superb and the illustrations are clear and precise. In fact, every ophthalmologist should be able to perform similar procedures by following the instructions step by step.

The shortcomings of this book are few. Most notably regret is the lack of clinical data either from the author himself or from other workers in this field. Also, some discussions on the less common indications and complications of treatment are rather superficial.

This book contains a host of useful pearls for the practising ophthalmologist. It is particularly useful for the newly qualified ophthalmologist as well as the eye trainee.

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