

# Thoracic metastases

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**ABSTRACT** One hundred and four patients are reviewed who were found to have thoracic metastases arising from distant primaries. Ninety lesions were intrapulmonary and the remainder involved other thoracic structures, such as chest wall and pleura. The tissue diagnosis was established in all but eight patients. Cases were included only if review of the histology revealed that both primary and secondary tumours were identical. The chest lesion was the presenting feature of the disease in 21 patients. In the remainder, the interval between treatment of the primary and appearance of the thoracic metastasis varied from a few months to 25 years. Twelve patients had metastatic sarcoma. The remainder had metastases from the gastrointestinal tract (29), from the genitourinary tract (32), from breast primaries (18), and a miscellaneous group (13) which included five instances of malignant melanoma and metastases from adrenal, laryngeal, and thyroid primaries. The metastases were treated surgically in 47 patients. In the light of cell type, availability of nonsurgical methods of treatment, site of metastasis, and survival, an attempt is made to evaluate the place of surgery in the management of thoracic metastatic disease.

Metastatic malignant disease involving thoracic structures is frequently not amenable to surgical treatment. However, all patients should be assessed for surgery and the lesion resected whenever possible since morbidity and mortality from thoracic surgery is low.<sup>1 2</sup> It is important to establish a tissue diagnosis as nonsurgical methods of treatment of some tumours can result in survival of reasonable length and quality. In many cases the diagnosis is made by examination of the resected specimen. As resection does not exclude the subsequent use of nonsurgical methods of treatment, it is essential for the surgeon to work closely with his oncological colleagues.

In this paper I review 104 patients with thoracic metastatic disease, giving the results of surgery in 47 and of non-surgical methods of treatment in the remainder.

## Methods

The 104 patients (0.95%) were found among 12 000 seen at the Thoracic Surgical Unit at Harefield Hospital between 1968 and 1980. Just under half the patients were women and ages ranged from 20 to 80 years. In 92 patients the metastases

came from a carcinoma and in 12 from a sarcoma. Ninety lesions were intrapulmonary and the remainder involved other thoracic structures, such as the chest wall and pleura. Details of the primary sites, treatment and five-year survival are given in table 1.

In patients with metastases from a carcinoma the primary site was the alimentary tract in 29, the genitourinary tract in 32, the breast in 18, and various other organs in 13. In the sarcoma group the primary site was bone in five, muscle in six, and joint in one.

The surgical investigation and assessment of these patients followed the usual pattern, and note was taken of a past history of malignancy even if several years previously. Such a history was obtained in 83 of the 104 patients.

A tissue diagnosis was established before treatment in 62 instances (table 2). Where lesions were assessed as operable there was a tendency towards thoracotomy rather than invasive procedures for diagnosis as well as treatment. In 34 patients examination of the resected specimen provided the diagnosis. The diagnosis was presumptive and based on history and clinical and radiological findings in eight patients whose poor general condition precluded invasive investigations or surgery.

There was no past history of malignancy in 21 patients, the chest lesion being the presenting feature of the disease (table 3).

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Table 1 Primary sites, treatment, and survival in 104 patients

Primary site	Number	Not resected		Resected	
		Number	Survived five years	Number	Survived five years
Large bowel	22	8	—	14	3
Stomach	4	1	—	3	—
Oesophagus	3	3	—	—	—
Kidney	8	5	1	3	1
Bladder	5	4	—	1	—
Prostate	2	2	—	—	—
Penis	1	—	—	1	—
Testis	5	3	1	2	—
Cervix	10	6	—	4	1
Uterus	1	1	—	—	—
Breast	18	15	—	3	1
Skin	5	3	—	2	—
Thyroid	3	2	—	1	1
Larynx	2	1	—	1	—
Adrenal	1	—	—	1	—
Lymphatic	1	1	—	—	—
Lung	1	—	—	1	—
Sarcoma	12	2	—	10	—
Totals	104	57	2	47	7

Table 2 Methods of diagnosis in patients with thoracic metastases

	Patients	Past history malignancy	
		Yes	No
Bronchial biopsy	25	24	1
Mediastinoscopy	10	8	2
Pleural biopsy	5	4	1
Open biopsy	12	5	7
Needle biopsy	6	2	4
Cytology	4	4	—
Presumptive	8	8	—
Resection	34	28	6
Totals	104	83	21

Table 3 Tumour sites in 21 patients with no previous known malignancy

Primary site	Secondary site	
	Lung	Chest wall, pleura
Large intestine	3	1
Stomach	3	—
Oesophagus	1	—
Kidney	2	3
Prostate	2	—
Testis	1	—
Breast	1	1
Thyroid	1	2
Totals	14	7

**Results**

Forty-six of the 104 patients died within one year of diagnosis of the thoracic metastasis, all from recurrence. A further 16 died between one and two years, but three of these deaths were from unrelated causes, with no evidence of recurrence. Sixteen patients died after between two and six years, one from renal failure with no evidence of recurrence. Twenty-six patients are currently alive—19 at varying intervals up to five years (nine of whom have recurrence) and seven at intervals over five years (one of whom has recurrence). Details of nine patients surviving more than five years are given in table 4.

**PRIMARY SITE, HISTOLOGY, AND SURVIVAL**

*Large bowel*

This group included 22 patients all with adenocarcinoma. Twenty patients died at intervals up to six years, with an average survival of 18 months, but

three of these deaths were not caused by tumour. Two patients are alive and well at 10 and 11 years. Altogether three patients (14%) survived five years.

*Stomach and oesophagus*

There were seven patients in this group, five with adenocarcinoma and two with squamous cell carcinoma. All patients died within 15 months, with an average survival of six months.

*Kidney*

There were eight patients in this category, seven with clear-cell adenocarcinoma, and one with papillary carcinoma. Six died from recurrence at intervals up to five years, with an average survival of 20 months. Two patients are alive, at 14 months and five years, both with recurrence. Two patients (25%) survived five years.

*Bladder*

Of five patients all with transitional-cell carcinoma, three died within eight months. One died at three

Table 4 Details of patients surviving five years or more

Primary site	Histology	Primary-secondary interval (y)	Secondary site	Surgical treatment	Result
Large bowel	Adenocarcinoma	4	R lower lobe	Segmental resection	Died 6 years, recurrence
"	"	5	R upper lobe	Lobectomy	Well at 10 y
"	"	5	R lower lobe	Lobectomy	Well at 11 y
Kidney	"	7	R lower lobe	Lobectomy	Died 5 yr, 1 month, recurrence
"	"	0	Sternum	—	Alive 5 y, with recurrence
Testis	Seminoma	1	L lower lobe	—	Well at 5 y
Cervix	Squamous	4	L lower lobe	Lobectomy	Well at 5 y
Breast	Adenocarcinoma	3	L upper lobe	Lobectomy	Well at 7 y
Thyroid	Follicular carcinoma	0	Rib	Rib resection	Well at 6 y

years from pulmonary embolism after a second resection and one is alive at six months, but has recurrence.

#### Prostate

Of two patients, both with adenocarcinoma, one died at three months and one is alive at eight months but has recurrence.

#### Penis

One patient with a squamous carcinoma died at two months, with recurrence.

#### Testis

There were five patients in this group. One with chorion-carcinoma died at 10 months with recurrence. Three patients had a primary teratoma, two died of recurrence at 20 months and three years, and one is alive and well at one year.<sup>3</sup> One patient with a seminoma is alive and well at five years, without resection.

#### Cervix

Of 10 patients, all with squamous cell carcinoma, seven died at intervals up to 32 months, with an average of 10 months, but one death was not related to tumour. Three patients are alive and well at 21 and 29 months and five years.

#### Uterus

One patient with an adenocarcinoma of the uterus is alive and well at 57 months, without surgical treatment.

#### Breast

This group contained 18 patients—four intraduct carcinoma, seven adenocarcinoma, six spheroidal-cell carcinoma, one polygonal-cell carcinoma. Thirteen patients died from recurrence at intervals up to 46 months, with an average survival of 18 months. Four are currently alive at intervals up to four years and one is alive and well at seven years.

#### Skin

Five patients, all with malignant melanoma died from recurrence within 11 months.

#### Thyroid

Of the three patients in this category one with an anaplastic carcinoma died within one month of

recurrence, one with an adenocarcinoma is alive at six months with recurrence, and one with a follicular carcinoma is alive and well at six years.

#### Larynx

Of two patients, both with squamous cell carcinoma, one died at nine months from recurrence and one is alive at 18 months but with recurrence.

#### Adrenal

One patient with an undifferentiated tumour died at 15 months with recurrence.

#### Lymphatic

One patient with a non-Hodgkin's lymphoma died at eight months with recurrence.

#### Lung

One patient with a haemangiopericytoma is alive, but with recurrence, at three years, having had two resections.

#### Sarcoma

There were 12 patients with sarcoma. Two had an osteogenic sarcoma and are currently alive and well at three and 10 months. Two patients had a fibrosarcoma—one died from recurrence at six months, and one is alive and well at four years, having had two resections. One patient with a Ewing's sarcoma is alive at 14 months with recurrence, and one with a rhabdomyosarcoma died at 11 months from recurrence. Five patients had a primary leiomyosarcoma—four died from recurrence at intervals up to four years, but with an average survival of 37 months, and one is alive and well at two years. One patient with a synovioma died at 28 months, from unrelated causes, having had two resections.

#### PRIMARY-SECONDARY INTERVAL AND SURVIVAL

In 21 patients, all with secondary carcinoma, the chest lesion was the presenting feature of the disease (table 3). Sixteen died from recurrence within 27 months of diagnosis, their average survival being nine months. Five patients are still alive but four of them have recurrence. Two patients (10%) have

survived for more than five years, though one of these has recurrence (table 4). The "silent" primary therefore does not preclude long-term survival.

In 54 patients metastases appeared within five years of diagnosis of the primary tumour, which was a carcinoma in 46 and a sarcoma in eight. Thirty-nine died at intervals up to six years, with an average survival of 15 months. Fifteen patients are alive, only three with evidence of recurrence. Four patients (7%) of the whole group survived five years, three are alive and well, and one died from recurrence after six years.

Sixteen patients had a primary-secondary interval of between five and 10 years, 15 having a carcinoma and one a sarcoma. Twelve patients died at intervals up to five years, with an average survival of 20 months, but three of these deaths were not caused by the tumour. Four patients are alive, one with evidence of recurrence. Three patients (19%) in the whole group survived five years, two are alive and well at 10 and 11 years, and one died from recurrence after five years.

Thirteen patients had a primary-secondary interval greater than 10 years, 10 having a carcinoma and three a sarcoma. Eleven died at intervals up to 56 months, with an average survival of 23 months, but two of these deaths were not caused by tumour. Two patients are still alive, but both have recurrence and no patient in this group survived five years. The longest intervals before the development of a metastasis were 25 years (synovioma) and 23 years (Ewing's sarcoma).

Overall the best results were seen in patients with a primary-secondary interval of between five and 10 years.

#### RESECTION AND SURVIVAL

Metastases were treated by resection in 47 patients (45%), 37 having a carcinoma, and 10 a sarcoma.<sup>4</sup> Details of the operations performed and five-year survivors are given in table 5. Thirty-one of the 47 patients died at intervals up to six years, with an average survival of 23 months, but six of these deaths were not caused by tumour. Sixteen patients are currently alive. Only two of these have recurrence and five are alive and well between five and 11

years after resection. In the whole group seven patients (15%) survived five years.

Four of the resected patients each had one further resection of a metastasis.<sup>5</sup> Two have died, at two and three years respectively after their original operation, but neither of these deaths was caused by tumour; one is alive at three years after the original operation but with evidence of recurrence, and one is alive and well at four years with no evidence of recurrence.

Fifty-seven patients were treated without resection. Forty-eight died at intervals up to five years, with an average survival of 11 months. Nine are currently alive, but seven have recurrence; two are alive and well at four and five years respectively, with no evidence of recurrence. In the whole group two patients (4%) survived five years.

#### Conclusions

Many of the findings in this study are summarised by consideration of the nine patients who survived five years (table 4).

The most common primary tumours giving rise to thoracic metastases were in the gastrointestinal and genitourinary tracts. The most common cell type was adenocarcinoma of varying differentiation.

Bronchoscopy is a valuable procedure not only in assessing a pulmonary lesion for surgery but also for establishing the tissue diagnosis by biopsy in a number of patients.<sup>6,7</sup> Positive biopsy does not necessarily indicate a poor prognosis.

In five-year survivors the interval between treatment of the primary and diagnosis of the thoracic metastasis ranged from nought to seven years. In the series as a whole the best survival was seen in patients with a primary-secondary interval of between five and 10 years.

Seven of the nine five-year survivors had their metastases resected. This is the treatment of choice in all suitable instances,<sup>1,2</sup> whether the metastasis is in the lung or some other part of the thorax. Surgery is not, however, a prerequisite for long-term survival.

Determination of the histology of the tumour and the site of the primary is essential as certain tumours respond to nonsurgical treatment. Close communication with an oncologist is therefore necessary if the most effective method of management is to be determined.

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Table 5 Treatment and results in resected cases

Operation	Number	Survived five years
Pneumonectomy	10	—
Lobectomy	27	5
Segmental or wedge resection	7	1
Chest wall excision	2	1
Excision of extra-pleural deposit	1	—
Totals	47	7(15%)

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