

Surgery for lung cancer with distant metastasis

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The usefulness of surgery for lung cancer patients with distant metastasis (M_1) was evaluated on the basis of clinical experience with 30 patients in whom pulmonary resections were indicated including the resections of metastatic tumor mass in 19 patients.

- 1) The prognoses of pulmonary resections for M_1 lung cancers were not necessarily satisfied. The overall results were 39% in 1 year survival, 10% in 3 years and 6% in 5 years respectively. As compared with not resected 37 patients, the prognosis of pulmonary resection was superior to that of non-resection. Surgery for M_1 lung cancer is of benefit in prolonging the survival time during a period of 6 months to 1 year following operation.
- 2) Resection of metastatic tumor mass was not effective to improve the outcome of surgery.

In conclusion, surgery for M_1 lung cancer is adequate for prolongation of the 6 month survival, and improving quality of life by alleviation of symptoms.

INTRODUCTION

Much has been said that lung cancer at times is much rapidly spreading with complex mechanisms. According to TNM classification, M signifies a presence of metastasis to the distant organs. At present, advances in a method detecting a presence of metastatic lesion have been achieved. It, therefore, is possible to determine the more precise indication of surgery. It is also noteworthy to know as to

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whether surgery for M₁ lung cancer patients is of benefit to make survival time longer rather than those of non-surgical one.

This study was undertaken to assess the value of surgery for M₁ lung cancer patients on the basis of clinical experience.

PATIENTS

Thirty patients with distant metastasis were operated upon at the First Department of Surgery, Nagasaki University School of Medicine for the past 20 years from 1965 to 1984. Table 1 showed involved organs. Metastatic sites were the cervical lymph nodes in 12 (40%), the bone in 8 (26.7%), the lung in 5 (16.7%), the brain in 3, the skin in one and contra-lateral mediastinal lymph node in one respectively.

According to the histologic findings, adenocarcinoma is seen in 18 (60%), squamous cell carcinoma in 8 (26.7%), large cell carcinoma in 3, and small cell carcinoma in one. In this series, lung resection was mainly indicative of those who were metastasizing to the cervical lymph nodes and the bone.

Table 2 showed simultaneous resection of metastatic lesions performed in 19 (63.3%). Combined resection of the primary tumor with metastatic one was made as far as possible. In cases with the cervical lymph node metastasis, the choice of mid-sternotomy was made to dissect out the mediastinal and cervical lymph nodes.

Table 1. The metastatic sites and histology in 30 patients with M₁ lung cancer who underwent surgery.

Metastatic site		Sq.	Ad.	Larg.	Undiff.
lymph node in the neck	12	3	7	1	1
bone	8	2	4	2	
lung	5	3	2		
brain	3		3		
skin	1		1		
Contralateral mediast, node	1		1		
Total	30	8	18	3	1

Sq: Squamous cell carcinoma

Ad: Adenocarcinoma

Larg: Large cell carcinoma

Undiff: Undifferentiated carcinoma

Table 2. Combined resection of the lung and the metastasis in patients with M₁ lung cancer.

Metastatic site	Cases	Combined resection	Op. mode
cervical node	12	7	cervical node dissection
rib	3	3	
clavicula	1	1	partial resection
scapula	1	1	
vertebrae	3	0	
lung	5	4	partial resection
brain	3	1	excision of metastasis
skin	1	1	excision of metastasis
contralateral med. node	1	1	mid-sternotomy
Total	30	19	

Table 3. Relation between T and N factor in patients with M₁ lung cancer.

TN Factor	T and N Factors
T ₁ N ₀ 1	T ₁ 4
T ₁ N ₁ 1	T ₂ 18
T ₁ N ₂ 2	T ₃ 8
T ₂ N ₀ 3	N ₀ 6
T ₂ N ₁ 2	N ₁ 4
T ₂ N ₂ 13	N ₂ 20
T ₃ N ₀ 2	
T ₃ N ₁ 1	
T ₃ N ₂ 5	

In case with brain metastasis, a brain tumor resection was selectively preferred to a primary lung tumor one. In the two cases with brain metastasis, although brain metastatic tumors were resected, primary lung tumors were left because another metastatic lesion quickly appeared at the bone prior to an attempt to resect the primary lung tumor in one and brain metastasis was multiple in the other.

According to TNM classification, T₂N₂ cases were in predominance as shown in Table 3. As for T and N factors, T₂ was seen in 18 and N₂ in 20 respectively.

There was no experience with operative death. The prognoses for M₁ lung cancer patients following surgery were compared with those for not resected M₁ lung cancer patients as indicated in Fig. 1. It showed significantly better prognosis until 6 months after surgery rather than that of not resected patients. It was not so significant

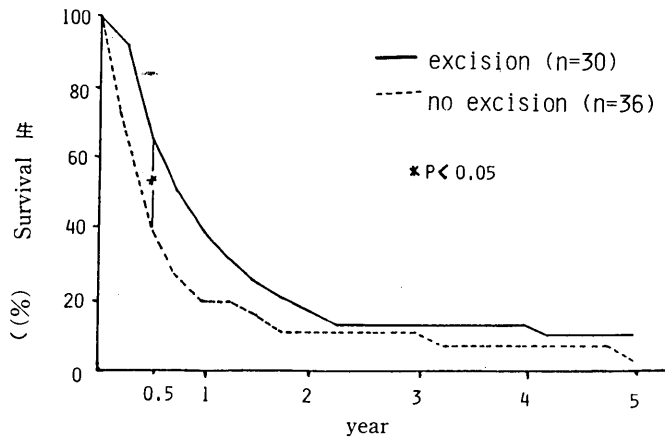


Fig. 1. Prognosis for those who underwent pulmonary resection.

Table 4. Prognosis for those with metastasis in the neck.

Case	Age	Sex	Hist. type	T	N	Neck dissect.	Combined therapy	Prognosis
1	49	M	ad.	2	2	(-)	C	died 4y
2	57	M	la.	1	1	(-)	C + R	died 1.6y
3	40	F	und.	2	2	(+)	C	died 1.1y
4	70	M	ad.	3	2	(+)	C	died 11m
5	38	F	ad.	2	2	(-)	C	died 11m
6	67	F	ad.	2	2	(+)	R + C	died 10m
7	25	F	sq.	2	2	(-)	R + C	died 6m
8	55	F	ad.	3	2	(+)	R + C	died 6m
9	59	M	ad.	2	2	(-)	C	died 3m
10	31	F	sq.	2	2	(+)	C	died 3m
11	44	M	ad.	2	2	(+)	R + C	died 3m
12	64	M	sq	2	2	(+)	C	died 1m

M: Male F: Female C: Chemotherapy R: Radiation y: Year m: Month

difference in survival of one year or more after surgery between both groups.

In 12 patients with cervical lymph node metastasis, Table 4 showed that adenocarcinoma took the precedence involving the cervical lymph nodes, accompanying N_2 in all but one. There was no difference in survival between neck dissection group containing 7 cases and no neck dissection one containing 5 cases.

In 8 patients with bone metastasis as shown in Table 5, adenocarcinoma dominated rather than squamous cell carcinoma and large cell carcinoma. There was no close relationship between factors in which 5 cases showed N_2 (62.5%) in contrast to 3 cases with N_0 (37.5%). The involved bones were rib in 3, vertebra in 2, scapula, ilium, and clavicle in one respectively. There was no site of predilection for bone metastasis.

Table 5. Prognosis for those with bone metastasis.

Case	Age	Sex	Hist. type	T	N	Metastatic site	Excision	Combined therapy	Prognosis
13	55	M	ad.	1	2	lumbal vertebrae	(-)	C + I	died 2.2y
14	52	M	la.	3	2	scapula	(+)	C + I	died 1.6y
15	63	M	ad.	3	2	ilium	(-)	C	died 7m
16	56	M	sq.	2	0	rib	(+)	R + C	died 6m
17	47	M	ad.	2	2	rib	(+)	C	died 6m
18	51	M	la.	3	0	rib	(+)	R	died 4m
19	64	M	sq.	2	2	clavicula	(+)	C	died 4m
20	70	M	ad.	3	0	cervical vertebrae	(-)	C + I	died 3m

C: Chemotherapy R: Radiation I: Immunotherapy

Table 6. Prognosis for those with lung metastasis.

Case	Age	Sex	Hist. type	T	N	Excision for metastasis	Combined therapy	Prognosis
21	47	F	sq.	1	0	(+)	R	alive 17y
22	64	F	ad.	2	0	(-)	C	died 1.8y
23	75	M	sq.	2	1	(+)	C	died 1.6y
24	62	M	ad.	3	1	(+)	C	died 4m
25	63	M	sq.	2	1	(+)	(-)	died 2m

C: Chemotherapy R: Radiation

Table 7. Prognosis for those with brain metastasis and others.

Case	Age	Sex	Hist. type	T	N	Location	Excision	Combined therapy	Prognosis
26	68	F	ad.	2	0	brain	(-)	C	died 1.9y
27	32	F	ad.	3	2	brain	(-)	C+I	died 8m
28	61	M	ad.	2	0	brain	(+)	R+C+I	died 6m
29	54	F	ad.	1	2	skin	(+)	R+C+I	died 1.1y
30	66	M	ad.	2	2	contralateral nodes	(+)	C+I	died 6m

C: Chemotherapy R: Radiation I: Immunotherapy

The resection for involved bone was not beneficial in prolonging the survival time as compared with no resection group.

In 5 cases with lung metastasis there was no predominance in histologic patterns as shown in Table 6 and also no relation to N-factor. Four out of 5 cases underwent resection of metastatic lung tumors. It, however, is not necessarily effective to prolongate the survival time.

In cases with metastases into brain, skin, and contralateral mediastinal lymph nodes

as indicated in Table 7, all of them were adenocarcinoma and they also did not relate to the graded nodal involvement. No different effects of surgery on their prognoses were noticed between resection and no resection groups.

DISCUSSION

To assess the usefulness of surgery for M₁ lung cancer patients, 66 cases were clinically evaluated in whom 30 cases underwent resection and 36 cases did not receive any surgery.

The prognosis of surgery for M₁ patients was not satisfied, that was 39% in 1 year, 10% in 3 years and 6% in 5 years. The survival until 6 months following surgery was apparently improved and it was statistically significant ($P < 0.05$). It, however, was impossible to elongate the survival time over 6 months or more after surgery.

It is sometimes reported¹⁾⁻³⁾ that a few patients who underwent a combined resection with metastatic tumor mass could survive long term. This fact is encouraging surgeons to extend the surgical indication for advanced lung cancer patients. It is noteworthy that extended surgical resection is effective to relieve grave sufferings even temporarily.

The authors take it into consideration that surgical indications for distant metastasis arising from lung cancer are

- 1) solitary lesion of metastasis, which is able to deal with once even if multiple lesions
- 2) feasibility of removal with easy access to metastatic lesion and
- 3) ensurance of fair general condition able to tolerate an operative insult.

In general it is accepted that adenocarcinoma predominates in producing distant organ metastases. In this present study, 60% of M₁ lung cancer patients were adenocarcinomas. It is more likely that clinically occult metastasis to the distant organs may exist in adenocarcinomas of lung cancer. It is believed that most of distant metastases from cancers arise via blood stream.

Nodal involvement in the neck was extending from the involved nodes in the mediastinum with either successive or skip spreading. It should be born in mind that the liver, the bone and the adrenal gland are vulnerable to metastasis from lung cancer. It is said that the frequency of metastasis to the lung is also referable to atypisum of the malignant cell, size of the tumor mass and severity of nodal involvement.

The routes of hematogenous metastases to the lung are considered to be 1) hilar

lymph nodes-venous angle-SVC-RV-PA,PA 2) PV-LV-bonchiabl artery 3) systemic circulation-Vena Cava-RV 4) involved PA-periphery of the lung. It is now easy to detect a brain metastatic tumor by CT scan. In case with brain metastasis, it is reasonable to say that cancer cells are spreading in whole body. Resection of brain metastatic tumor, however, is of value to reduce the high cerebrospinal pressure and to sustain quality of life even in short term.

STORTEBECKER⁵⁾ believes that both the primary tumor and the metastasis from whatever source should be excised to extend the survival which is a 7.8 month average survival period when the primary tumor is not removed. This opinion is encouraging surgeons to improve the prognosis for M1 lung cancer patients.

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