

## Surgical treatment of bronchogenic carcinoma in patients over the age of 80 years old

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**ABSTRACT :** From 1979 to 1986, pulmonary resection for bronchogenic carcinoma were performed in twelve patients over age 80. There were ten men and two women. The ages of the patients were 81 in three, 82 in three, 83 in four and 84 in two. The histologic cell types were adenocarcinoma in seven patients, squamous cell carcinoma in four, and large cell carcinoma in one.

Eight patients were Stage I ( $T_1 N_0 M_0$  4 and  $T_2 N_0 M_0$  4) 3 were Stage III ( $T_2 N_2 M_0$  2 and  $T_3 N_1 M_0$  1) and one was Stage VI.

The operative procedures undertaken were lobectomy in 5, segmentectomy in 3 and wedge resection in 4. Mediastinal nodes dissection was performed in 6 patients. There were ten curative resection and 2 were incurative.

No operative deaths occurred. 6 patients had died, 2 of their disease, 2 of gastric cancer and 2 of other disease 5-50 months after operation. 6 patients are alive and well without disease 10-54 months after surgery.

The results of this report indicate that pulmonary resections can be performed safely with low mortality and longterm survival in the patients over the age of 80. Because pulmonary resection for bronchogenic carcinoma remains the only effective form of therapy, the decision on whether to perform a pulmonary resections in patients over age 80 should be based not on age but on the patient's cardiovascular status and pulmonary reserve.

Elderly patients over 70 years old have been increasing and there are some debate concerning about surgical treatment of the patients over 80 years with lung cancer.

In this article, we review the cell type, the operative procedure, postoperative complications, and survival of the patients with lung cancer over 80 years old.

### PATIENTS

From 1979 to 1986, 832 pulmonary resections were performed for the patients with lung can-

cer in the Nagasaki University Hospital and Ooita Prefectural Hospital. In these patients, there were twelve patients over the age of 80 (10 males and 2 females) listed in Table 1. Their ages ranged from 80 to 84 years with a mean of 82.4 years. All these patients were judged to be suitable for pulmonary resection based on chest roentgenograms, bronchoscopy, computed tomography and scintigraphy.

Seven patients (58%) were asymptomatic at the time of diagnosis, who were discovered the abnormal mass lesions by chest roentgenograms at the time of admission for another organ

**Table 1.** Age and Sex of Patients over 80 years old operated upon for bronchogenic carcinoma

sex	age	Age Group						Total
		80	81	82	83	84	85<	
male		1	1	3	4	1	0	10
female		0	1	0	0	1	0	2
Total		1	2	3	4	2	0	12

mean 82.4

disease or mass screening. Five patients had symptoms, cough in two, chest pain in one, bloody sputum in one, and compression feeling in the back in one, respectively.

Cell types for 12 patients is listed in table 2. Adenocarcinoma was most frequently affected in seven patients, squamous cell carcinoma in four and large cell carcinoma in one. There were no patients with small cell carcinoma in our series.

Pathological staging by TNM classification were Stage I in eight patients (66.7%), Stage III in three and Stage IV in one. The patient with Stage IV had solitary pulmonary metastasis with same lobe, which was discovered at the time of thoracotomy. Nine patients had neither hilar nor mediastinal nodes metastasis.

Preoperative complications of the patients is listed in Table 3. Cardiovascular complications (hypertension or ECG abnormality) were found in five patients. One patient had left upper lobectomy for lung cancer at the age of 71.

The operative procedures undertaken were lobectomy in five (41.7%), segmentectomy in three and wedge resection in four. The lung preserving operations were chosen frequently. There was no patients in whom pneumonectomy was employed. (Table 4)

**Table 2.** Cell type and Stage

Cell type	Stage I	Stage II	Stage III	Stage IV	Total
Adeno ca.	4		3		7
Squamous cell ca.	3			1*	4
Large cell ca.	1				1
Small cell ca.					
Total	8		3	1	12

\* Pulmonary metastasis

**Table 3.** Preoperative complications

Complications	No. of Patients	%
Cardiovascular	5	41.7
Respiratory	2**	16.7
Renal	2	16.7
Diabetic	1	8.3
No	4	33.3

\*\* : lung resection (pulmonary tuberculosis, lung cancer)

Complete mediastinal node dissections were performed in six patients. In other six patients, pick up examination of mediastinal lymph nodes were performed, because of no evident lymph nodes swelling judged during operation.

All patients except one had curative operation, one was considered as non-curative because of intrapulmonary metastasis which was detected at thoracotomy.

Eleven patients received neither chemotherapy nor radiotherapy after surgery. One patient had radiotherapy into the mediastinum postoperatively.

## RESULTS

There was no operative death within 30 days after operation.

**Table 4.** Type of operation

Type	No. of Patients		
	Mediastinal (+)	Node Dissection (-)	Total %
Pneumonectomy			
Lobectomy	4	1	5 (41.7)
Segmentectomy	1	2	3 (25.0)
Wedge resection		4	4 (33.3)
Total	5	7	12 (100.0)

Table 5. Postoperative complications

Complications	No. of Patients	%
None	8	66.7
Difficulty of expectoration	2	16.7
Pneumothorax	1	8.3
Cardiac failure	1	8.3
Operative mortality	0	
Hospital Death	0	

The postoperative complications occurred were, difficulty of sputum expectoration in two patients, pneumothorax in one, and mild cardiac failure in one. (Table 5) These complications were well controlled by bronchoscopic aspiration of sputum, insertion of small tube into the trachea, chest tube insertion and drainage, or medication of digitalis. All patients were discharged from hospital.

Six patients died. Two of them died from their diseases, two from gastric cancer, and two from other causes.

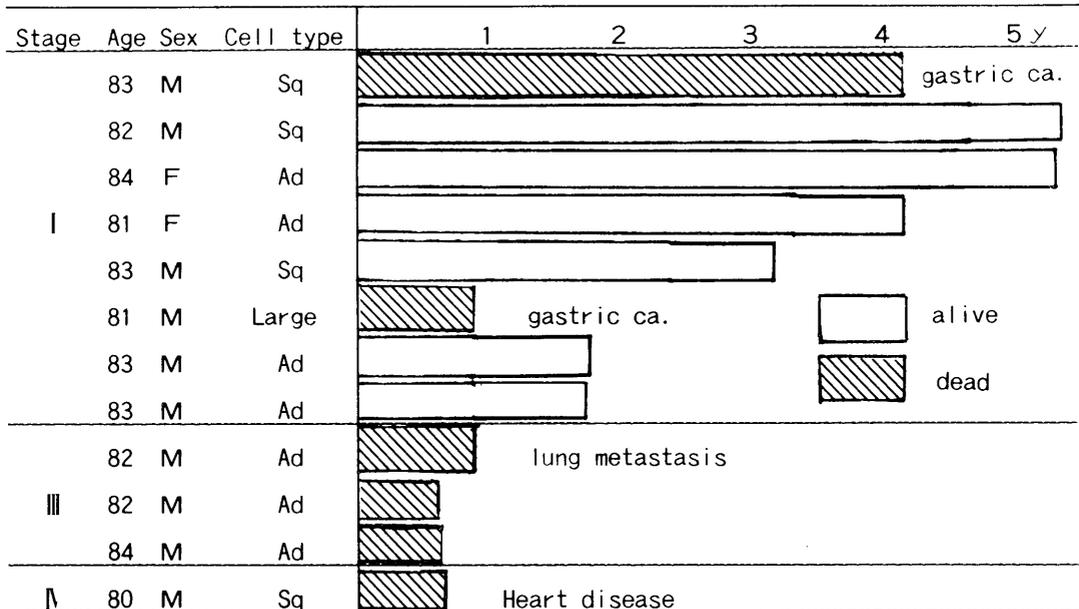
Six patients have been alive without disease for periods ranging from 22 months to 65 months after operation. Prognosis of the patients with Stage I was relatively well. Five

of eight patients with Stage I lung cancer survived more than three years. (Fig. 1) Operative procedures in these patients were lobectomy in two, segmentectomy in one, and wedge resection in two.

DISCUSSION

The number of the patients with bronchogenic carcinoma over 70 years old continues to rise in the past 10 years.<sup>1)</sup> There were a lot of literatures regarding surgical treatment for lung cancer in patients aged 70 and over. HARVIE, *et al.*<sup>2)</sup> reported the favorable survival rate following recovery from resection and supported the continued use of surgical resection for lung cancer in elderly patients. Similar conclusions were reached by SENSENING,<sup>3)</sup> KIRSHI,<sup>4)</sup> and WALSH.<sup>5)</sup>

However, reports concerning the pulmonary resection for bronchogenic carcinoma in the patients over 80 years are a few. KIRSHI<sup>4)</sup> reported five cases over 80 years. OHATA<sup>6)</sup> collected 33 cases and HATTORI and colleague<sup>7)</sup> reviewed five cases. In our series, 12 patients over 80 years of age with lung cancer underwent surgical resection and obtained long-time survivals. In



Abbreviations : Sq=Squamous cell carcinoma ; Ad=Adenocarcinoma ; Large=Large cell/carcinoma

Fig. 1. Survivals of the Patients over 80 years operated upon for bronchogenic carcinoma

KIRSH series, two of five patients survived more than five years.

Since many persons over 70 years with bronchogenic carcinoma have marginal cardiovascular status or pulmonary reserve, careful patient selection for surgery and postoperative management are essential. Respiratory complications such as atelectasis or pneumonia often occurs after surgery in the elderly patients with lung cancer.<sup>8)</sup> HATTORI reported that a postoperative complication rate was 80%, EVANS<sup>9)</sup> reported that postoperative mortality was 20%, and KIRSH did 14% of mortality rate after surgery. In our series, there were no operative deaths and hospital deaths. Pre- and post operative careful managements (physiotherapy and sputum aspiration after operation) were important to prevent these fatal complications.

Limited resections underwent in half of our patients and lobectomies were performed in the rest. Limited resection was advocated by JENSIK and associates<sup>10)</sup> for elderly patients to preserve pulmonary function. If the lung tumors were located peripherally in the lung and the size less than 3cm without hilar or mediastinal nodes involvement, the wedge resection or segmentectomy have benefits from the point of view of the curability and operative risk. On the other hand, the patients with pneumonectomy had high postoperative mortality and morbidity and poor prognosis.<sup>11)</sup> Then, the procedure of pneumonectomy should not be applied for the patients over 80 years of age from a poor cardiopulmonary reserve. KIRSH<sup>4)</sup> advocated the following guidelines to indicate insufficient pulmonary reserve.

1. Resting hypercapnia or hypercapnia with exercise ( $PCO_2 > 45$  mmHg).
2. Hypoxemia at rest or following exercise despite hyperventilation ( $PO_2 < 50$  mmHg).
3. An  $FEV_{1.0} < 2000$  ml,  $FRC < 2000$  ml or  $MVV < 50\%$  of predicted value in those in whom the pneumonectomy is required.
4. An  $FEV_{1.0} < 1500$  ml in those whom a lobectomy is required.
5. A predicted postoperative  $FEV_{1.0}$  800 ml.

In our series, five patients survived more than three years, and six patients are alive from 22 to 65 months after operation. They all had Stage I lung cancer. All patients with Stage III and

IV died within one year after surgery with their diseases. Surgical treatment might have no benefit for advanced lung cancer in the patients over 80 years. Similar conclusions were reached by Hattori and associate.<sup>7)</sup>

The good candidate for surgical treatment of the patients with lung cancer over the age of 80 are Stage I and II disease, reasonable cardiopulmonary reserve and good performance status. The limited operation should be employed as well as lobectomy depending on the size and location of the tumor and cardiopulmonary reserve.

The results of our series indicate that pulmonary resections can be performed safely with low mortality and long term survival in the patients over the age of 80. Because the pulmonary resection for bronchogenic carcinoma remains the only effective form of therapy, the decision on whether to perform pulmonary resections in patients over 80 should be based not on the age but on the cardiovascular status, pulmonary reserve and extent of tumor.

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