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Lung Cancer and Its Operable Brain Metastasis: Survival Rate and Staging Problems

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Background. **We assessed the survival rates regarding different stages of operable lung cancers causing operable brain metastasis in patients with or without cancer-related symptoms. The correlation between survival rates and the disease-free interval between lung surgery and metastasectomy was studied.**

Methods. **Sixty-five patients were operated on for lung cancer and brain metastases. The disease-free interval was divided into 5 subgroups: 0–2 months, 3–5 months, 6–11 months, 12–23 months, and 24 months and beyond. The study group comprised of patients with lung cancer in the following stages: 17 patients in stage I (1 patient in stage IA, 16 patients in stage IB), 16 patients in stage II (2 patients in stage IIA, 14 patients in stage IIB), 9 patients in stage IIIA, 4 patients in stage IIIB, and 19 patients in stage IV. Forty-four patients were symptom-free for lung cancer and 21 patients manifested lung cancer related symptoms.**

Results. **The 5-year survival rates were as follows: stage I = 22%, stage II = 20%, stage IIIA = 22%, stage IIIB = 0%, and stage IV = 23% after lung resections. There were no significant differences in the 5-year survival rates regarding the disease-free interval subgroups after brain metastasectomies ($p = 0.19$): disease-free interval 0–2 months = 22% and disease-free interval 24 months and beyond = 23%. The 5-year survival rate after metastasectomy was significantly greater (26% vs 5%) in patients without lung cancer related symptoms ($p = 0.05$).**

Conclusions. **The 5-year survival rate in stage I, II, IIIA, and IV lung cancer with operable hematogenous brain metastases corresponds to that in the customary stage IIIA (23%). The disease-free interval exhibited no significant impact on the survival rate. The complaint-free status exhibits a significantly greater impact on the survival rate in hematogenic metastasis.**

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The brain is the most frequent site of distant metastasis in patients with lung cancer without lymph node (N) involvement [1] and in N1 disease the relapse site was distant in 65% of the patients [2]. The cumulative incidence of brain metastasis 5 years after lung cancer surgery was 16%—the incidence being lower in patients with non-small-cell lung cancer than in those with small-cell lung cancer [3]. Neoadjuvant chemoradiotherapy has reduced the incidence of distant metastases except in the brain [4], yet 32% of the patients treated with preoperative chemotherapy present brain metastases [5]. After an accelerated multimodality therapy, nearly half of stage IIIA and IIIB patients exhibit systemic recurrence that is usually manifested in the brain [6].

Using the tumor (T), node (N), metastasis (M) (TNM) classification, a brain metastasis could be classified in group M1, stage IV [7], but the 5-year survival rate for solitary operable brain metastases in synchronous patients (stage IV) is 11% [8]. The TNM system does not distinguish solitary operable distant metastases from multiple inoperable distant metastases, but instead pools all of these patients into group M1.

In the occurrence of a lung metastasis from another organ, the disease-free interval (DFI) exhibited considerable relevance as a prognostic variables with regard to multicenter studies. If the DFI was longer than 36 months, the survival rate was greater than instances of a shorter DFI period [9]. Regarding the recurrence of a brain metastasis, it was indicated that if the interval between primary tumor surgery and the appearance of its cerebral metastasis was longer than 2 years, then the overall brain freedom from progression was considerably greater [10].

In our study we examined the survival rates of these lung cancer patients in different stages. Evaluation was performed to reveal how the DFI influences the survival rate after lung and brain surgeries. This study attempts to examine whether the stages of lung cancer or the DFI in these occurrences indicate an actual prognostic value.

Patients and Methods

In this multicenter (three thoracic surgery departments in Hungary) retrospective study, the data of 65 patients

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who underwent lung resection for primary lung cancer and brain metastasectomy for metastasis of the primary lung cancer between 1992–2001 were analyzed. The patients were divided into two groups depending on whether they exhibited synchronous or metachronous metastases. A metastasis was considered as synchronous if it appeared within 2 months of the detection of lung cancer.

Synchronous Patients

Nineteen patients (11 females, 8 males) exhibited synchronous brain metastases; their mean age was 46.5 years (33–65). In all 19 patients the diagnosis of brain metastasis was based on neurologic symptoms (12 patients experienced paresis, 12 patients experienced headaches, 2 patients experienced convulsions, and 2 patients experienced vertigo) and brain computed tomography (CT) and/or magnetic resonance imaging (MRI) confirmed the brain tumor. As a routine, CT examination is performed for the diagnosis of cerebral metastasis. MRI investigation is only necessary when CT does not reveal cerebral disorders but the symptoms are typical of that.

All of the tumors (metastases) were surgically accessible, solitary, and larger than 2 cm. In 18 out of the 19 synchronous patients the first surgery performed was brain metastasectomy. For these patients a chest roentgenogram in the preoperative period revealed the lung cancer. Craniotomy and tumor removal was performed for all of these patients. The pathology verified the source of the metastasis: 11 patients exhibited adenocarcinomas, 2 patients exhibited adenosquamous carcinomas, 2 patients exhibited squamous cell carcinomas, and 3 patients exhibited large cell carcinomas of the lung.

After an uneventful postoperative period, a standard pulmonological examination was performed including a clinical examination, blood tests, a chest roentgenogram, a chest CT, bronchoscopy, an upper abdominal CT, and bone scintigraphy. If the chest CT revealed a mediastinal lymph node larger than 1 cm, mediastinoscopy was performed. If mediastinoscopy verified no one or only a single-level mediastinal lymph node metastasis, lung resection was performed. In 16 out of 18 patients CT did not reveal mediastinal lymph node enlargement. In the remaining 2 patients mediastinoscopies were performed: one was negative and the other indicated a single-level mediastinal metastasis for which lung resection was performed without neoadjuvant chemotherapy.

Resections for lung cancer are detailed in Table 1. Two out of 19 patients experienced chest pain as a complaint for lung cancer, whereas 17 patients were symptom-free for lung cancer. The mean interval between metastasectomy and lung resection was 1.8 (1–5) months. There was no postoperative mortality after either lung or brain surgery. The tumor was staged according to the TNM system [7]. The tumor and lymph node status of the lung cancers is detailed in Table 2.

With regard to adjuvant treatment all patients received 30 Gy whole-brain and 10 Gy tumor bed irradiation according to the international standard [11]. Three patients received it before lung surgery and 15 patients received it after the lung surgery. Patients with metastatic mediastinal lymph nodes received adjuvant mediastinal irradiation and chemotherapy.

Table 1. Surgery of Lung Cancers

	Synchronous Patients (n = 19)	Metachronous Patients (n = 46)	All Patients (n = 65)
Right pneumonectomy	1	7	8
Right upper lobectomy	3	10	13
Right middle lobectomy	0	1	1
Right lower lobectomy	2	1	3
Right-wedge resection	2	3	5
Left pneumonectomy	1	11	12
Left upper lobectomy	1	7	8
Left lower lobectomy	5	2	7
Left-wedge resection	4	2	6
Exploration	0	2	2

One patient in the synchronous group was initially operated on for lung cancer. Before surgery no neurologic symptoms were evident and a brain CT examination was therefore not performed. After right pneumonectomy a convulsion developed and brain CT revealed a brain metastasis. An urgent metastasectomy was performed, but the patient died within 2 days. The status of the lung adenocarcinoma was T2N0M1. The postoperative mortality in the synchronous group was 5.3%.

Metachronous Patients

Forty-six patients (13 females, 33 males) exhibited metachronous metastasis. Their mean age was 57.5 years (36–73). In Hungary, there is a roentgenogram screening program available for adults to detect tuberculosis and occasionally patients with lung cancer, however if cancer-related symptoms or complaints are not evident, the cancer remains undetected. Nineteen patients experienced cancer-related symptoms (5 patients experienced chest pains, 4 patients exhibited pneumonia, 4 patients

Table 2. Tumor (T) and Node (N) Status of Lung Cancers

	Synchronous Patients (n = 19)	Metachronous Patients (n = 46)
T1N0	3	1
T2N0	6	17
T1N1	2	1
T2N1	0	5
T3N0	0	9
T1N2	1	0
T2N2	5	6
T3N1	0	2
T3N2	0	1
T4N0	0	1
T4N1	0	0
T4N2	1	1
T2N3	1	2

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experienced chills, 3 patients experienced dyspnea, and 3 patients experienced coughs), whereas 27 patients were symptom-free.

The standard investigation regarding lung cancer includes a chest CT, an ultrasonography of the abdomen, a pulmonological examination, and blood tests. Brain CT examinations and bone scans were performed when a patient indicated unique symptoms for brain or bone metastasis. At the beginning of the studied period (early 1990s), induction chemotherapy was not a routine procedure and 5 patients with N2 disease verified by CT, neoadjuvant chemotherapy and preoperative mediastinoscopy were not performed. In the late 1990s, preoperative CT revealed 3 patients with single-level N2 disease and in 2 of these patients the mediastinal lymph nodes were 1 cm. Mediastinoscopy was not performed and none of these patients received induction therapy. One patient with small cell lung cancer without mediastinal lymph node involvement received chemotherapy before the lung resection. At present N2 disease indicated using a chest CT prompts preoperative mediastinoscopy and if metastasis is confirmed, then neoadjuvant chemotherapy is performed.

Resections for the lung cancers assessed are listed in Table 1 and the T and N statuses are detailed in Table 2. Histology revealed 17 patients with adenocarcinomas, 10 patients with adenosquamous carcinomas, 11 patients with squamous-cell carcinomas, 6 patients with large-cell carcinomas, and 2 patients with small-cell lung cancers. In patients with mediastinal lymph node metastasis (8 patients exhibited N2, 2 patients exhibited N3), adjuvant chemoradiotherapy was administered. Forty-five out of 46 patients manifested neurologic symptoms at the onset of the brain metastasis, which was revealed using either CT or MRI. The mean disease-free interval between lung and brain surgery was 19.46 (8–84) months. After metastasectomy each patient received whole-brain (30 Gy) and tumor bed (10 Gy) irradiation.

Brain recurrent metastases developed in 21 patients (32.3%) and spine cord metastases developed in 2 patients after the cerebral metastasectomies. Sixteen out of 21 patients with recurrent brain metastasis underwent remetastasectomy and 5 out of 16 patients underwent second remetastasectomies. Two out of 21 patients underwent stereotactic radiosurgery and 3 patients received only conservative treatment because of multiple recurrent lesions. In 2 patients recurrent spinal cord metastases were removed. The mean interval between the first brain metastasis and the recurrent brain secondary tumor was 13.1 (2–60) months.

Surgery

Resections for lung cancer are indicated in Table 1. Pneumonectomy was performed in 20 out of 65 patients (31%)—2 out of 19 patients (10%) in the synchronous group and 18 out of 46 patients (39%) in the metachronous group. Indications for pneumonectomy were as follows: metastatic lymph node infiltration in the hilum of the dependent lobe to the surrounding bronchus or vessels (6 patients), endobronchial invasion of the tumor to the main stem bronchus or to the neighboring lobar bronchus (5 patients), direct invasion of the tumor to the neighboring lobe via the fissure (4 patients), direct invasion of the tumor to the surrounding bronchus or vessels (3 patients), and completion pneumonectomies (2 patients). Wedge resection was carried out in 11 out of 65 patients (16.9%). Lobectomies were performed on 32 patients (49.2%). Two (3%) explorations were performed in the metachronous patients only.

The survival rate was assessed using the Kaplan–Meier method with an SPSS 11 computer program (SPSS Inc., Chicago, IL). Because of the small number of patients with stage IA and IIA, stages of lung cancers were grouped and the survival rate was calculated together in stage IA and IB as stage I and in stage IIA and IIB as stage II. Stages IIIA, IIIB, and IV were separately mentioned. Patients were grouped into four DFI subgroups: DFI 0–2, denotes disease free less than 2 months (synchronous group); DFI 3–5 denotes disease free between 3–5 months, DFI 6–11 denotes disease free between 6–11 months, DFI 12–23 denotes disease free between 12–23 months, and DFI 24 denotes disease free greater than 24 months.

Results

Patients and Lung Cancer Related Symptoms

The mortality rate was 1.5% after lung resection (1 patient expired), and 6.1% after brain metastasectomy (4 patients

Table 3. Stage Distribution of Lung Cancer Between Patients With or Without Lung Cancer Related Symptoms

	Patients With Cancer Related Symptoms		Patients Without Cancer Related Symptoms		
Stage	No. of Patients	Percentage	No. of Patients	Percentage	Significance (p Value)
IA	0	0	1	2.2	0.49
IB	6	28.6	10	22.7	0.61
IIA	1	4.8	1	2.2	0.59
IIB	5	23.8	9	20.4	0.76
IIIA	4	19.0	5	11.4	0.41
IIIB	2	9.5	2	4.5	0.43
IV	3	14.3	16	36.4	0.069
All	21	100	44	100	

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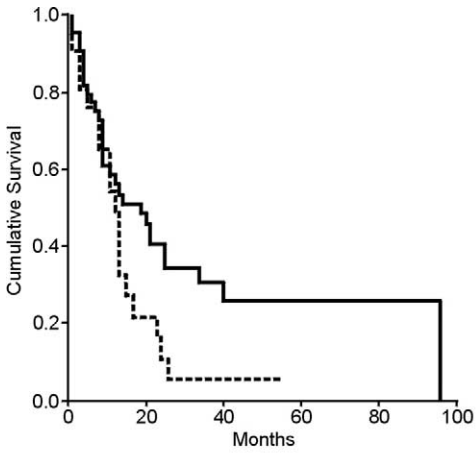
Table 4. Stages of Lung Cancers at the Time of Lung Surgery

	Synchronous Patients (n = 19)	Metachronous Patients (n = 46)	All Patients (n = 65)
IA	0	1	1
IB	0	16	16
IIA	0	2	2
IIB	0	14	14
IIIA	0	9	9
IIIB	0	4	4
IV	19	0	19

expired). The overall mortality rate was 7.7% (5 out of 65 patients). Forty-four patients (67.7%) were symptom-free for lung cancer and only 21 patients (32.3%) experienced some symptoms that could be related to lung cancer. The stage distribution of lung cancer in patients with or without symptoms for lung cancer is indicated in Table 3. There were no significant differences regarding the stages of lung cancers between patients with or without cancer related symptoms. T and N status and the stages of the tumors are detailed in Tables 2 and 4.

Among the 19 synchronous patients, preoperative CT only revealed two mediastinal lymph node enlargements. In one patient, mediastinoscopy did not reveal lymph node metastasis, so a lung resection was performed and final pathology confirmed an N2 disease at levels 5 and 6 (T1N2M1). In the other patient, mediastinoscopy verified a single-level N2 disease and lung resection was performed. Final pathology confirmed the abovementioned N2 metastasis and an additional metastatic lymph node was identified around the contralateral main stem bronchus (N3) (T2N3M1). Out of the remaining 17 synchronous patients without mediastinal lymph node enlargement revealed by preoperative CT, N2 metastases were confirmed by final pathology for 6 patients: three of these tumors were located in the left lower lobe and the metastasis developed in lymph node level 9; two of the tumors were located in the left upper lobe and the metastasis developed in lymph node level 5; 1 tumor was situated in the right lower lobe with a mediastinal lymph node metastasis at level 9. Levels 5 and 9 cannot be detected by standard mediastinoscopy and the CT was not able to reveal these metastases.



patients at risk	12 months	24 months	36 months	48 months	60 months
patients with symptoms	9	2	1	1	0
patients without symptoms	23	11	8	6	4

Fig 1. Survival rate after brain metastasectomy in patients with (dashed line) *or without* (solid line) *lung cancer-related symptoms.*

Survival Rate

The 5-year overall survival rate for lung surgery was 21% and the median duration of survival was 25 months (95% confidence interval (CI) 17.8–32.1). After brain surgery, the corresponding data were 19% and 19.27 months (95% CI 9.5–16.6). The 5-year survival rate in synchronous and metachronous patients are detailed in Table 5.

After lung surgery the overall 5-year survival rate for patients with complaints was 10%, and the median survival time was 30 months. The corresponding data were 27% and 23 months for patients without complaints of lung cancer. The differences were not significant ($p = 0.53$).

After brain surgery, the overall 5-year survival rate for patients without lung cancer related complaints was 26% and the median survival time was 19 months. The corresponding data for patients with complaints of lung cancer were 5% and 12 months. The differences were significant ($p = 0.05$) (Fig 1).

For adenocarcinoma-type lung cancers, the overall 5-year survival rate after lung surgery was 23% and the median survival time was 31 months. The corresponding data for the nonadenocarcinoma-type lung cancers was

Table 5. Survival Rate in Synchronous and Metachronous Patients

	Synchronous Patients (n = 19)		Metachronous Patients (n = 46)		
	5-Year Survival Rate	Median Survival Time	5-Year Survival Rate	Median Survival Time	*p* Value
After brain metastasectomy	24%	19 months	16%	12 months	0.21
After lung resection	23.5%	18 months	19.9%	30 months	0.17

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Table 6. Five-Year Survival Rates at Different Stages of Lung Cancers

	5-Year Survival Rate After Lung Surgery (%)[a]	5-Year Survival Rate After Brain Surgery (%)[a]	5-Year Survival Rate After Lung Surgery (%)[b]
pIA +	22	27	pIA 67
pIB			pIB 57
pIIA +	20	15	pIIA 55
pIIB			pIIB 39
pIIIA	22	13	pIIIA 23
pIIIB	0	0	cIIIB 5
pIV	23	24	cIV 1

[a] This study. [b] American Joint Committee on Cancer (AJCC) and The International Union Against Cancer (UICC) [7].

c = clinical staging; p = pathological staging.

18% and 20 months. The differences were not significant ($p = 0.32$).

In lymph node negative patients (N0) after lung surgery, the overall 5-year survival rate was 24% and the median survival time was 27 months, as compared with a 16% survival rate and a median survival time of 23 months in patients with lymph node metastases. The differences were not significant ($p = 0.65$).

Survival data related to the different stages of lung cancer are detailed in Table 6. There were no significant differences in the survival rates concerning the stages of lung cancer ($p = 0.42$).

The 5-year survival rate in the DFI subgroups are detailed in Table 7. There were no significant differences in survival rates between the DFI subgroups ($p = 0.19$).

Comment

Similar to instances of lung metastasis from other organs [9], it was examined whether DFI is an important prognostic value after metastasectomy or not. Granone and associates indicated that their DFI ranged between 3–24 months [12] and there were no significant differences in survival rates between synchronous and metachronous patients. Burt and associates indicated that 60% of the distant metastases developed within patients 2 years after lung surgery [13]. Neoadjuvant treatment reduced the DFI, yet it was only 7.5 months in the study performed by Law and associates [4] In our study the mean DFI for metachronous patients was 19.46 months ranging between 8–84 and 80% of the recurrences appeared within 24 months. Interestingly the recurrence rate of cerebral metastasis appeared an average of 13.1 months (2–60) after the metastasectomy.

If the DFI was longer than 36 months in a patient who exhibited lung metastasis from a tumor of another organ, the survival rate was significantly greater than in a patient who exhibited a shorter DFI period [9]. In contrast with the abovementioned statement, our study indicated that the DFI is not predictable for the prognosis occurrence of an operated solitary brain metastasis from an operable lung cancer. There was no significant impact regarding the DFI on the survival rate after brain metastasectomy. (Table 7).

In our study there was no significant difference in the 5-year survival rate between synchronous (23.5%) and metachronous (19.9%) patients after lung surgery, respectively. In the study by Okumura and associates the intrapulmonary metastasis most frequently resulted from a T2 tumor (54.5%) [14] and, likewise, in our study T2 was recognized to be the most frequent tumor characteristic (64.7% of all the patients). These data indicated that T2 lung cancer can be regarded as a potential source of hematogenic metastasis.

The histologic type of lung cancers that initiate brain metastasis is typical. Moazami and associates indicated that this was evident for 55% of metachronous patients [15]. Okumura and associates indicated that 73% of the intrapulmonary metastases were adenocarcinomas [14]. In our study 73% and 58% of the carcinomas were adenocarcinomas and adenosquamous carcinomas in the synchronous and metachronous patients, respectively.

Bonnette indicated the 5-year survival rate of patients with adenocarcinoma metastasis to be significantly greater than for other types of cancer and a greater 5-year survival rate was observed in N0 patients than in N+ patients [8]. Using univariate analysis, Granone detected a significantly greater survival rate in N0 and adenocarcinoma than in N+ and other types of lung cancer patients [12]. In our study there was no significant difference in the 5-year survival rate between the adenocarcinoma type (23%) and other types (18%) of lung cancer and there were no significant differences in the 5-year survival rate between patients with (16%) and without (24%) lymph node metastasis.

Performance status was a predictive value regarding brain metastasis from lung cancer [12, 16]. Lung cancer related symptoms were experienced by 32% of our patients, but there were no significant differences in the stages of lung cancer between patients with or without cancer related symptoms (Table 3). Despite this result, a significant difference was observed in the 5-year survival rates of lung cancer patients with or without complaints

Table 7. Survival Rate and Disease-Free Interval (DFI) Data

	5-Year Survival Rate	Median Survival Time (months)
DFI 0–2 months	22%	19
DFI 3–5 months	17%	13
DFI 6–11 months	11%	9
DFI 12–23 months	21%	17
DFI 24 months and beyond	23%	12

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after brain surgery (5% and 26%; $p = 0.05$) (Fig 1). The complaint-free status exhibits a significantly greater impact on the survival rate in hematogenic metastasis patients, also.

The 5-year survival data are indicated in Table 5. In our study the values in stages I– IIIA and IV are reasonably close to each other, ranging from 13%–27%, and there are no significant differences in survival rates between the abovementioned groups. In stages I and II, the 5-year survival rate is worse than that in the database of the American Joint Committee on Cancer (AJCC) and the International Union Against Cancer (UICC) [7], as well as compared with that in stage IIIA (23%). In stage IV, the survival rate is 23%–24%, which is much greater than that in stage cIV in the AJCC and UICC database. Burt and associates determined no significant difference in the 5-year survival rate in stage I–II and stage III–IV groups regarding patients with brain metastasis [13]. The staging system they used was the one applied before 1997, but the conclusions were the same as ours.

The current staging of lung cancer [7] is very detailed with regard to the tumor and node status. The metastasis status (M) is divided into three subgroups. (1) MX: the presence of distant metastasis cannot be assessed, (2) M0: no distant metastasis, and (3) M1: distant metastasis present. (Separate metastatic tumor nodules in the ipsilateral nonprimary-tumor lobes are also classified as M1.) A lung cancer with a solitary, operable brain metastasis is classified as M1 in stage IV, but the 5-year survival rate in the vast majority of these patients is much closer to that indicated in stage IIIA. In a study of intrapulmonary metastases, Okada and associates concluded that the TNM classification for intrapulmonary metastasis from 1997 is less acceptable for surgical-pathological staging than the revision in 1992 and the non-small-cell carcinoma with ipsilateral intrapulmonary metastasis can be regarded as representing a locally advanced disease rather than a systemic one [17].

We only studied a relatively small number of patients, but concerns regarding the probability of survival rate led us to suppose that survival after a lung cancer of stage I, II, IIIA, and IV with a solitary brain metastasis corresponds to that in customary stage IIIA, as presented by AJCC and UICC. We can conclude that there is no significant impact regarding DFI between primary lung cancer surgery and the appearance of the brain metastasis on the survival rate after brain metastasectomy. The designation of "synchronous" and "metachronous" marks only the time that the cerebral metastasis appeared; otherwise it sustains no prognostic value. There were no significant differences regarding survival rates between lung cancers with or without lymph node metastasis. On the basis of this statement we recommend lung surgery after brain metastasectomy in synchronous patients with N0, N1, and single-level N2 diseases as well.

Finally there were no significant differences in stages between lung cancers with or without cancer related symptoms. Lung cancer related complaint-free status, though, exhibits a significantly greater impact on the survival rate in hematogenic metastatic patients.

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DISCUSSION

DR THOMAS A. D'AMICO (Durham, NC): I appreciate this paper and I think this is an important topic, but I do not want some important facts to be overlooked.

I hope you are not suggesting that every patient diagnosed with a synchronous brain metastasis should undergo pulmonary surgery. For the patients who present with synchronous lesions, it would be interesting to know how you would sort out who should actually undergo lung surgery. For example, I do not think you are saying that we should perform pneumonectomy for patients with N2 disease and a brain metastasis. So when patients present with synchronous tumors, which ones should undergo resection? What is the value of mediastinoscopy in helping you to decide that? Also, most importantly, how do you treat these patients after their lung surgery? Frequently oncologists will not want to administer chemotherapy because there is no "disease" to follow and, yet, because we know adjuvant chemotherapy is likely to benefit patients at any cancer stage, should we be more aggressive to ensure that these patients be given postoperative chemotherapy? Finally, should all of these patients receive cranial irradiation as well?

Thank you very much.

DR FURAK: Thank you very much for this question. This is a debated topic in the literature, too.

In the beginning of this period in 1992, there was, of course, no routine preoperative chemotherapy. In synchronous patients, I consider that regarding N2 disease we have to perform mediastinoscopy to determine whether there is metastasis. At this point we have to be decisive regarding to how to continue. As we demonstrated the complaint-free patients exhibited a considerably improved survival rate after the hematogeneous metastasis. Accordingly if we can achieve this complaint-free status with the surgery, I think that we should consider it. If the patient exhibits no widespread multilevel metastasis in the mediastinum and if after administering neoadjuvant chemotherapy the downstaging causes N0 status, we must perform this surgery. This is not a clear-cut question however. As far as I am aware, a randomized study of this type in this field has not been realized. Our practice is to perform the abovementioned surgeries if no multilevel metastasis in the mediastinum exists.

DR HIRAN C. FERNANDO (Pittsburgh, PA): Dr Furak, in your presentation you stated that you had included some stage IIIB patients. How were these patients staged at IIIB? Was this assessed on the basis of a satellite nodule within the same lobe or on the presence of a pleural effusion?

DR FURAK: It was because of the satellite nodule, T4.

DR FERNANDO: Were there any survivors with regard to the stage IIIB patients?

DR FURAK: No.

DR DANIEL L. MILLER (Atlanta, GA): A show of hands. When a patient presents with a synchronous metastasis and they exhibit questionable N2 disease, how many of you would resect that patient or would you, instead, first perform a mediastinoscopy? Who would perform mediastinoscopy on that patient before resection? (A show of hands.) If it is positive how many of you would avoid that option and never operate on them again? (A show of hands.) Would anybody provide "so-called" neoadjuvant treatment to a patient and then reexamine them at a later date? (A show of hands.) A few. Thank you.

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