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Surgery for lung cancer as the second primary malignancy

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Following a successful treatment of the first oncological disease, the second malignancy can develop. This retrospective study was designed to evaluate the efficacy of surgical treatment results for patients with the second primary lung cancer (2PLC) depending on the site of the first primary tumor (1PT).

Materials and methods. From 2005 to 2009, 88 patients (pts) were treated in the Subdivision of Thoracic Surgery and Oncology, Institute of Oncology, Vilnius University, with lung cancer as the second primary malignancy. 29 patients (33%) underwent surgery: 17 pts (58.6%) – lobectomies, 2 pts (6.9%) – pneumonectomies, 9 pts (31%) – anatomical segmentectomies and 1 pt (3.5%) – bilobectomy. All lung resections were performed with lymph nodes dissection. We had neither major complications nor mortality 30 days after surgery. Stages of 2PLC were as follows: IA-B stage (st.) – 19 pts (65.5%), IIA-B st. – 7 pts (24.1%), and IIIA-IV st. – 3 pts (10.3%). Lung cancer morphology was the following: squamous cell – 11 pts (37.9%), adenocarcinoma – 13 pts (44.8%), large cell carcinoma – 4 pts (13.8%), small cell lung cancer – 1 pt (3.5%). First primaries of the patients were as follows: larynx – 6 pts (207%), lung – 2 pts (6.9%), stomach – 3 pts (10.3%), colon and rectum – 4 pts (13.8%), kidney – 4 pts (13.8%), prostate – 4 pts (13.8%), breast – 2 pts (6.9%), gynecology – 2 pts (6.9%) and haematologic malignancies – 2 pts (6.9%). According to 1PT localization patients were divided into 4 groups: airways, gastrointestinal, urology and other malignancies.

Results. 1- and 3-year survival was 69% and 27.6% (60.9% and 30.4% for males; 27.6% and 16.7% for females). 3-year survival for the first primary cancer was 37.5% in urological cancers, 14.3% in gastrointestinal, 37.5% in airway cancers and 16.7% in other cancer cases. Survival by stage of 2PLC was as follows: IA-B st. – 33.3%, IIA-B st. – 28.6%, respectively. No patients survived for 3 years with IIIA-IV st. of 2 PLC. By morphology of 2 PLC there were adenocarcinoma cases in 14.3%, squamous cell carcinoma in 50.0%. One patient with small cell 2 PLC has lived so far.

Conclusions. 1. The site of the first primary tumor is not a significant prognostic factor for surgical outcomes of the second primary lung cancer ($p > 0.5$). 2. Statistically significant survival rates did not differ by gender and histological type of 2PLC. 3. A statistically significant survival difference was obtained only between the patients with IA-IIB st. and IIIA-IV st. of 2PLC ($p = 0.0013$).

Key words: surgical treatment, second primary lung cancer

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INTRODUCTION

Following a successful treatment of the first oncological disease, the second malignancy can develop. 4.2% of gastric cancer patients had a second malignancy and lung cancer was detected in 28.4% cases (1). Lung cancers account for 5% of second primary cancers after breast cancer (7) and 7.2% after oral cavity cancers (9). For the highest-risk subgroups of head and neck cancers, second primary cancers occur in 4% of patients per year (2). There are evidences that the second primary lung cancer worsens treatment results of cancer patients (10, 12). This retrospective study was designed to evaluate the efficacy of surgical treatment results for patients with the second primary lung cancer (2PLC) depending on the site of the first primary tumor (1PT).

MATERIALS AND METHODS

From 2005 to 2009, 88 patients (pts) were treated in the Subdivision of Thoracic Surgery and Oncology, Institute of Oncology, Vilnius University, with lung cancer as the second primary malignancy. 59 pts (67%) were not treated surgically and were excluded. 29 pts (23 males (79.3%) and 6 females (20.7%)) underwent surgery. For 17 pts (58.6%) we performed lobectomies, for 2 pts (6.9%) pneumonectomies, for 9 pts (31%) anatomical segmentectomies and for 1 pt (3.5%) bilobectomy. Each lung resection followed mediastinal lymph nodes dissection. We had neither major complications nor mortality 30 days after surgery. Distribution of patients by 2PLC stages was as follows: IA stage (st.) – 11 pts (37.9%), IB st. – 8 pts (27.6%), IIA st. – 2 pts (6.9%), IIB – 5 pts (17.2%), IIIA-IV st. – 3 pts (10.3%). Histological types of the lung cancer were squamous cell carcinoma – 11 pts (37.9%), adenocarcinoma – 13 pts (44.8%), large cell carcinoma – 4 pts (13.8%), small cell lung cancer – 1 pt (3.5%). First primaries of the patients were in the larynx – 6 pts (20.7%), lung – 2 pts (6.9%), stomach – 3 pts (10.3%), colon and rectum – 4 pts (13.8%), kidneys – 4 pts (13.8%), prostate – 4 pts (13.8%), breast – 2 pts (6.9%) and gynecological organs – 2 pts (6.9%). For 2 pts (6.9%) 1PT were haematologic malignancies. All of these patients had metachronous 2PLC (identified later than one year). Patients were divided into 4 groups according to 1PT localization due to a small number of cases: airways – 8 pts (27.6%), gastrointestinal – 7 pts (24.1%), urology – 8 pts (27.6%) and 6 pts (20.7%) of other malignancies.

RESULTS

The average age of patients was 65.86 years (SD ± 8.81). 1- and 3-year survival of patients were 69% and 27.6%. A statistically significant difference in survival between the genders has not been established (p = 0.7492) and is presented in Table 1. 3-year survival by the first primary cancer was the following: urological cancers – 37.5%, gastrointestinal – 14.3%, airways – 37.5% and other – 16.7% (Table 2). There was no statistically significant difference by the first primary site (p = 0.9992) (Fig. 1). Survival by stage of 2PLC was as follows:

Table 1. Patient survival from secondary lung cancer by gender (p = 0.7492)

Gender	Patient No.	Average age (±SD)	Survival years (±SD)	1-year survival, %	3-year survival, %
Males	23	66.39 (±8.60)	2.53 (±2.35)	60.87	30.43
Females	6	63.83 (±10.15)	2.61 (±0.86)	100.00	16.67
All pts	29	65.86 (±8.81)	2.55 (±2.11)	68.97	27.59

Table 2. Patient survival from secondary lung cancer by the first primary tumor

Primary tumor group	Patient No.	Average age (±SD)	Survival years (±SD)	1-year survival, %	3-year survival, %
Urology	8	72.13 (±5.54)	2.65 (±3.04)	50.00	37.50
Gastro-intestinal	7	67.57 (±10.20)	2.44 (±1.74)	71.43	14.29
Airways	8	60.63 (±4.84)	2.80 (±2.18)	75.00	37.50
Other	6	62.50 (±10.48)	2.21 (±1.19)	83.33	16.67

IA-B st. – 33.3%, IIA-B st. – 28.6% (Fig. 2 and Table 3). No patients survived for 3 years with II-IA-IV st. of 2 PLC. By morphology of 2 PLC there were adenocarcinoma cases in 14.3%, squamous cell carcinoma in 50.0%, large cell carcinoma in 0% (Fig. 3 and Table 4). One patient with small cell 2 PLC has lived so far.

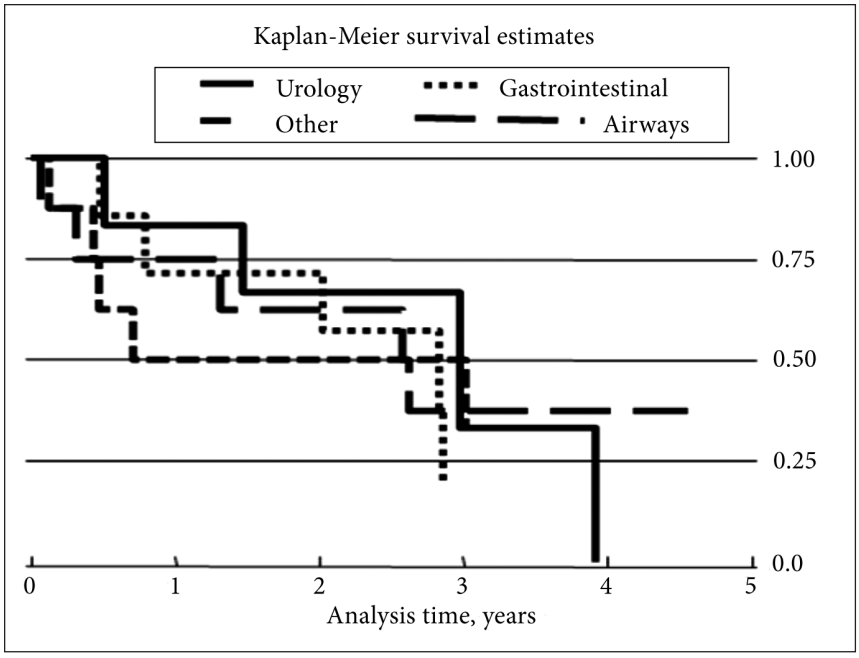

Fig. 1. Patient survival from secondary lung cancer by the first primary tumor (p = 0.9992)

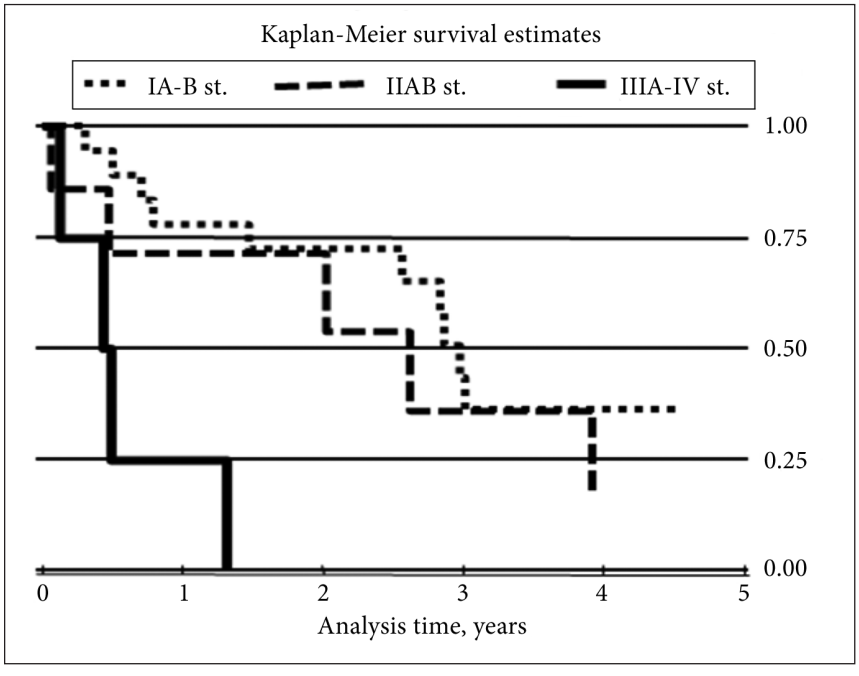

Fig. 2. Patient survival from secondary lung cancer by stage of lung cancer. Statistically significant survival difference was obtained between the patients with IA-IIB st. and IIIA-IV st. (p = 0.0013)

Table 3. Patient survival from secondary lung cancer by stages of lung cancer

Stage	Pts	Average age (±SD)	Survived years (±SD)	1-year survival, %	3-year survival, %
IA-B	19	65.44 (±8.95)	3.05 (±2.17)	77.78	33.33
IIA-B	7	69.29 (±8.81)	2.38 (±1.98)	71.43	28.57
IIIA-IV	3	61.75 (±8.02)	0.59 (±0.51)	0.00	0.00

Table 4. Patient survival from secondary lung cancer by histology type of lung cancer

Histology type of second primary lung cancer	Patient No.	Average age (±SD)	Survival years (±SD)	1-year survival, %	3-year survival, %
Adenocarcinoma	13	66.29 (±8.64)	2.21 (±1.99)	64.29	14.29
Squamous cell carcinoma	11	66.90 (±6.97)	2.59 (±2.28)	60.00	50.00
Small cell carcinoma	1	74.00 (–)	7.36 (–)	100.00	100.00
Large cell carcinoma	4	59.75 (±13.38)	2.44 (±0.77)	100.00	0.00

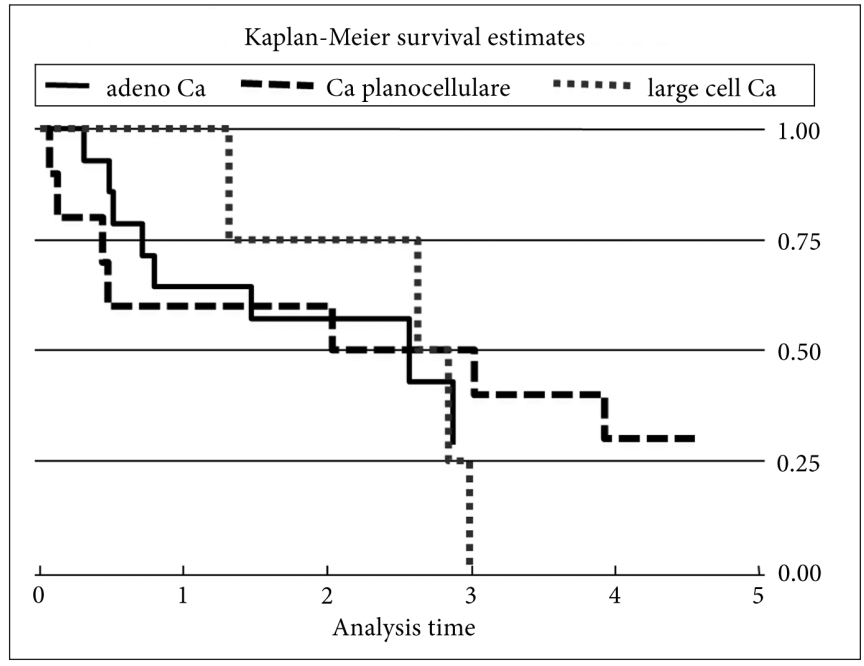

Fig. 3. Patient survival from secondary lung cancer by histology of lung cancer

DISCUSSION

We found more males (79.3%) than females (20.7%) with 2PLC in our study, like it was presented by Ikeda Y., Quadrelli S., Liu Y., Rea F. and Furaka J. (70–80% and 20–30%, respectively) (1, 3–6). Survival rates by gender in our study did not differ. It may be due to a small number of female patients because survivals of females were significantly better than males in Josef Furaka's study (6).

Our data show that patient survival rates were not statistically different according to the primary tumor site ($p > 0.5$). They correspond to common statistical data of the surgically treated lung cancer patients: we found a statistically significant survival difference between the patients with IA-IIB st. and IIIA-IV st. of 2PLC ($p = 0.0013$). The same conclusion cites Quadrelli S. (5-year survival 65.3% vs. 58.6%, log-rank $P = 0.416$) and Bae M. K. (3, 8). For patients with localized NSCLC, a history of mixed cellularity Hodgkon's lymphoma was associated with a 3-fold improved overall survival ($P = 0.006$) (13). We cannot disprove or approve these data due to a very small number of such patients in our study. Only further studies with more samples could confirm or disprove literature claims that poorer lung cancer survival prognosis worsens other primary cancer treatment outcomes (9, 10, 12). Surgery for localized pulmonary lesions is necessary because it helps to differentiate primary from metastatic tumors. The same is recommended by Nakamura T. after follow-up study of the operated stomach cancer patients (11). We had no major complications after 2PLC surgery and survival rates were not different according to the primary tumor site, therefore we offer surgical treatment of 2LPC such as the first primary (alone) lung cancer.

CONCLUSIONS

1. The site of the first primary tumor is not a significant prognostic factor for surgical outcomes of the second primary lung cancer ($p > 0.5$). 2. Statistically significant survival rates did not differ by gen-

der and histological type of 2PLC. 3. A statistically significant survival difference was obtained only between the patients with IA-IIB st. and IIIA-IV st. of 2PLC (p = 0.0013).

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PLAUČIŲ VĖŽIO KAIP ANTROS PIRMINĖS ONKOLOGINĖS LIGOS CHIRURGINIO GYDYMO REZULTATAI

Įvadas. Po sėkmingo vienos onkologinės ligos gydymo gali vystytis antra pirminė onkologinė liga. Šios retrospektyvios analizės tikslas yra įvertinti chirurginio plaučių vėžio kaip antros pirminės onkologinės ligos gydymo rezultatus ir palyginti juos pagal pirminio naviko lokalizaciją.

Tiriamoji grupė ir metodai. Vilniaus universiteto Onkologijos instituto Krūtinės chirurgijos ir onkologijos poskyryje 2005–2009 metais buvo gydyti 88 pacientai dėl plaučių vėžio kaip antros pirminės (2PPV) onkologinės ligos. Iš jų 29 (33 %) buvo operuoti: 17 pacientų (58,6 %) buvo atlikta lobektomija, 2 (6,9 %) – pulmonektomija, 1 (3,5 %) – bilobektomija ir 9 (31 %) – tipinė segmentektomija. Visiems pacientams buvo pašalinti tarpuplaučio limfmazgiai. Po operacijų 30 dienų nebuvo rimtų komplikacijų ir mirties atvejų. Histologiškai 19 pacientų (65,5 %) buvo nustatytas IA-B stadijos (st.) 2PPV, 7 (24,1 %) – IIA-B st. ir 3 (10,3 %) – IIIA-IV st. vėžys.

Vienuolikai pacientų (37,9 %) buvo nustatytas plokščialąstelinis 2PPV, 13 (44,8 %) – liaukinis, 4 (13,8 %) – didelių ląstelių ir 1 (3,5 %) – smulkialąstelinis vėžys. Šešiems pacientams (20,7 %) buvo nustatyta gerklų pirma onkologinė liga (1OS), 2 (6,9 %) – plaučių, 3 (10,3 %) – skrandžio, 4 (13,8 %) – storžarnės, 4 (13,8 %) – inkstų, 4 (13,8 %) – priešinės liaukos, 2 (6,9 %) – krūtų, 2 (6,9 %) – moteriškų lytinių organų ir 2 (6,9 %) – kraujodaros organų. Pagal pirmos onkologinės ligos lokalizaciją pacientai buvo suskirstyti į 4 grupes: kvėpavimo takų, virškinimo organų, šlapimo sistemos ir kitų organų.

Rezultatai. Vienus metus po operacijos išgyveno 69 % pacientų (60,9 % vyrų ir 27,6 % moterų), trejus metus – 27,6 % (30,4 % vyrų ir 16,7 % moterų). Pagal 1OS trejų metų išgyvenamumas urologinių pacientų buvo 37,5 %, žarnyno – 14,3 %, kvėpavimo takų – 37,5 % ir kitų lokalizacijų – 16,7 %. Pagal 2PPV stadijas: trejus metus išgyveno 33,3 % IA-B st. sirgusių pacientų ir 28,6 % IIA-B st. Nė vienas IIIA-IV st. 2PPV sirgusių ligonių neišgyveno trejus metus. Pagal 2PPV histologiją: trejus metus išgyveno 14,3 % pacientų, sirgusių liaukiniu vėžiu, ir 50,0 % – plokščialąsteliniu. Visi 4 pacientai, sirgę didelių ląstelių 2PPV, neišgyveno trejų metų. Smulkialąsteliniu 2PPV sirgęs ligonis gyvena iki šiol.

Išvados. 1. Pirmos onkologinės ligos lokalizacija nėra reikšmingas prognostinis veiksnys antro pirminio plaučių vėžio chiruginio gydymo rezultatams ($p > 0,5$). 2. Pacientų, sirgusių antra pirmine onkologine liga, išgyvenamumo rodikliai statistiškai patikimai nesiskyrė ir pagal lytį, ir pagal histologiją. 3. Statistiškai patikimas išgyvenamumo skirtumas buvo nustatytas tik tarp IA-IIB st. ir IIIA-IV st. pacientų, sirgusių antru pirminiu plaučių vėžiu ($p = 0,0013$).

Raktažodžiai: antras pirminis plaučių vėžys, chirurginis gydymas