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PROFESSIONAL PAPER

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LUNG CANCER AND PULMONARY THROMBOEMBOLISM

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ABSTRACT

Introduction: Malignant diseases including lung cancer are the risk for development of pulmonary thromboembolism (PTE). **Objective:** To show the number of PTE in patients with lung cancer treated in Clinic for pulmonary diseases and TB "Podhrastovi" in three-year period: from 2012-2014. **Material and methods:** This is the retrospective study in which we present the number of various types of lung cancer treated in three-year period, number and per cent of PTE in different types of lung carcinoma, number and per cent of PTE of all diagnosed PTE in lung carcinoma according to the type of carcinoma. **Results:** In three-year period (from 2012 to 2014) 1609 patients with lung cancer were treated in Clinic for pulmonary diseases and TB "Podhrastovi" Clinical Centre of Sarajevo University. 42 patients: 25 men middle-aged 64.4 years and 17 women middle-aged 66.7 or 2.61% of all patients with lung cancer had diagnosed PTE. That was the 16.7% of all patients with PTE treated in Clinic "Podhrastovi" in that three-year period. Of all 42 patients with lung cancer and diagnosed PTE 3 patients (7.14%) had planocellular cancer, 4 patients (9.53%) had squamocellular cancer, 9 (21.43%) had adenocarcinoma, 1 (2.38%) had NSCLC, 3 (7.14%) had microcellular cancer, 1 (2.38%) had neuroendocrine cancer, 2 (4.76%) had large cell-macrocellular and 19 (45.24%) had histological non-differentiated lung carcinoma. **Conclusion:** Malignant diseases, including lung cancer, are the risk factor for development of PTE. It is important to consider the including anticoagulant prophylaxis in these patients and so to slow down the course of diseases in these patients.

Key words: lung cancer, pulmonary thromboembolism.

1. INTRODUCTION

Variable risk and etiologic factors have been demonstrated to play a role in the development of PTE (1-4). Cancer is one of the important risk factors for PTE; in cancer patients PTE occurs 2-4 times more frequently than in patients without cancer (4, 5). Several mechanisms may contribute to the development of PTE in cancer patients (6) such as immobilization, surgery, down-regulation of anticoagulants, and up-regulation of pro-coagulant proteins (7, 8), endothelial damage caused by chemotherapy or stimulation of endothelial cells to produce pro-coagulant materials (9), inflammation due to necrosis or release of acute-phase reactants and hemodynamic disorders such as stasis (10). Lung cancer is the most common malignancy coexisting in patients with PTE (11). Mechanisms and risk factors for lung cancer patients for developing PTE are unclear (3). It is believed that use of specific chemotherapeutic drugs in combination with novel target drugs such as antiangiogenic agents and elevated pre-chemotherapy platelet counts can cause PTE (3). Also tissue factor (TF) the initiator of the clotting cascade may be over expressed in lung carcinoma cells (3). Active TF-

bearing micro particles which may originate from tumor cells have been found in the circulation of cancer patients and may provide a link between cancer and thrombosis (3). Some authors emphasized those risk factors for development of PTE in lung cancer patients: adenocarcinoma, metastatic disease, pneumectomy, chemotherapy especially anti-VEGF target drugs, high serum hemoglobin (1-3).

2. OBJECTIVE

To show the number of PTE in patients with lung cancer treated in Clinic for pulmonary diseases and TB "Podhrastovi" in three-year period: from 2012-2014 year according to the histological type of lung cancer.

3. MATERIAL AND METHODS

This is the retrospective study in which we present the number of various types of lung cancer treated in three-year period, number and per cent of PTE in different types of lung carcinoma, number and per cent of PTE of all diagnosed PTE in lung cancer according to the histological type of carcinoma.

4. RESULTS

In three-year period (from 2012 to 2014) 1609 patients with lung cancer were treated in Clinic for pulmonary diseases and TB "Podhrastovi" Clinical centre of Sarajevo University. 42 patients: 25 men middle-aged 64.4 years and 17 women middle-aged 66.7 or 2.61% had diagnosed PTE. That was the 16.7% of all patients with PTE treated in Clinic "Podhrastovi" in that three-year period. PTE developed in all patients within one year of the diagnosis of lung cancer. Of all 42 patients with lung cancer and PTE 2 patients were in IIB, 5 patients were in IIIA, 15 patients in IIIB and 20 patients were in IV stage of lung cancer when PTE was diagnosed. All patients with lung cancer and PTE received chemotherapy according to the protocol for that type of lung cancer and no one of them had been previously surgically treated.

Results are shown on Figures 1, 2, 3, 4.

Figure 1. Number of patients with different type of lung cancer treated in Clinic. Legend. 1=planocellulare carcinoma, 2=squomocellular carcinoma, 3=adenocarcinoma, 4=NSCLC (non-small cellular lung carcinoma), 5=microcellular carcinoma, 6=mesothelioma, 7=neuroendocrine carcinoma, 8= large cell-macrocellular carcinoma, 9=anaplastic carcinoma, 10=pleomorfic carcinoma, 11=mediastinal carcinoma, 12=characinoid, 13=non-differentiated histological type of lung carcinoma, 14=lymphangitis carcinomatosa

Of 1609 lung cancer patients there were 280 planocellular carcinoma, 247 squamocellular carcinoma, 403 adenocarcinoma, 86 NSCLC (non-small cellular lung carcinoma), 222 microcellular carcinoma, 7 mesothelioma, 30 neuroendocrine carcinoma, 15 large cell-macrocellular carcinoma, 2 anaplastic carcinoma, 8 pleomorfic carcinoma, 7 mediastinal carcinoma, 8 characinoid, 284 non-differentiated histological type of lung carcinoma, 10 pulmonary lymphangitis carcinomatosa because or earlier breast carcinoma.

Figure 2. Type of lung carcinoma treated in Clinic Podhrastovi in three-year period expressed as per cent of all patients with lung carcinoma

Of 1609 lung cancer patients there were 17.4% planocellular carcinoma, 15.35% squamocellular carcinoma, 25.05% adenocarcinoma, 5.34% NSCLC (non-small cellular lung carcinoma), 13.80% microcellular carcinoma, 0.44% mesothelioma, 1.86% neuroendocrine carcinoma, 0.93% large cell-macrocellular carcinoma, 0.12% anaplastic carcinoma, 0.50% pleomorfic carcinoma, 0.44% mediastinal carcinoma, 0.50% characinoid, 17.65% non-differentiated histological type of lung carcinoma and, 0.62% pulmonary lymphangitis carcinomatosa because or earlier breast carcinoma.

Figure 3. Number and per cent of patients with PTE in all patients with different

3 patients with planocellular carcinoma or 1.07% of all patients with that type of cancer had PTE, 4 patients with squamocellular carcinoma or 1.62% had PTE, 9 patients with adenocarcinoma or 2.23% had PTE, 1 patient with NSCLC (non-small cellular lung carcinoma) or 1.16% had PTE, 3 patients with microcellular carcinoma or 1.35% had PTE, 1 patient with neuroendocrine carcinoma or 3.33% had PTE, 2 patients with large cell-macrocellular carcinoma or 13.33% had PTE, 19 patients with non-differentiated histological type of lung carcinoma or 6.69% of all patients with that type of cancer had PTE.

Figure 4. Number and per cent of all 42 diagnosed PTE according to the type of lung

Of all 42 patients with lung cancer and diagnosed PTE 3 patients (7.14%) had planocellular carcinoma, 4 patients (9.53%) had squamocellular carcinoma, 9 (21.43%) had adenocarcinoma, 1 (2.38%) had NSCLC, 3 (7.14%) had microcellular carcinoma, 1 (2.38%) had neuroendocrine carcinoma, 2 (4.76%) had large cell-macrocellular carcinoma and 19 (45.24%) had non-differentiated lung carcinoma.

5. DISCUSSION

PTE often occur in malignant diseases. Especially PTE occurs in patients with ovarian, brain and pancreatic carci-

onoma when adjusted for prevalence of these tumors (11). A case controlled study (13) recently showed that patients with hematologic malignances had the highest risk for PTE, followed by patients with lung and gastrointestinal cancers. Advances in computed tomography (CT) enhanced the detection of unsuspected PTE (14, 15, 16). Despite all these facts, the clinical features and prognosis of patients with lung cancer and PTE have rarely been reported (6). In some studies that dealt with these issue (1, 2, 3, 6, 9) adenocarcinoma was the most common histological type and most patients had advanced stage disease (IIIB/IV). In our study the most common histological type of lung cancer with PTE was non –differentiated histological type of lung cancer- 19 patients or 45, 24%. It may be because these patients came to hospital with so advanced disease that they could not be subjected to bronchoscopy because of bad clinical condition and other comorbidities such as cardiologic diseases, advanced stage of COPD, heart failure or respiratory insufficiency etc. but the diagnosis was established by radiological methods such as computed tomography(CT) or MRI ; or material obtained by bronchoscopy was full of necrosis so it was impossible for pathologist to give accurate type of malignant cells . Most of our patients were in advanced stage of diseases (IIIB or IV stage) such as was in the other studies (1- 3). In one study (2) authors show that incidence of PTE in patients with lung cancer is 40-100 cases in 1000 patients vs. 1-2 cases in general population. In our study 2.61% of patients with lung cancer had diagnosed PTE which presents about 26 cases of PTE in 1000 patients with lung cancer. We supposed that number would be greater if we had done CT in patients with unsuspected PTE. Their bad clinical condition we ascribed to their basic illness and its progression. In few studies (1-3) authors found that PTE develops within 12 months of the diagnosis of lung cancer that we confirmed in our study. Patients with lung cancer and PTE present 16. 7% of all patients with PTE treated in Clinic “Podhrastovi “in studied three-year period (2012.-2014.). In one study (1) median survival from the diagnosis of PTE in patients with lung cancer was 3, 5 months but authors did not find the difference with a group of patients with lung cancer without PTE. In both groups the most common cause of death was lung cancer progression (76, 9%-80, 3%) or chemotherapy –related septic shock (16, 7% - 19, 2%) (1). In our study we did not compare median survival between patients with lung cancer with and without PTE.

6. CONCLUSION

Malignant diseases, including lung cancer, are the great risk factor for development of PTE. PTE is one of the various complications of lung cancer that may suggest being the factor which accelerate the bad course of that illness. It is important to consider the including anticoagulant prophylaxis in these patients

and so to slow down the course of diseases in these patients.

CONFLICT OF INTEREST: NONE DECLARED.

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