

***MALIGNANT PLEURAL EFFUSION IN DIFFERENT TYPES
OF LUNG CANCER***

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- Statistical research in Europe has showed of all cancers diagnosed in men 21% is accounted for lung cancer with a 29% in the total mortality from cancer, and in women is the third cause of death from cancer with 12.5%;

- 52.5 / 100,000 patients in the European Union - 45.8 / 100 000 in RMacedonia

- In the U.S. 2005-2009 (SEER) with stage IV are diagnosed 56% of patients, with 5 year survival of only 3.7%;

Saeed M, Dilip O, Yalda A, Andrea C, and Edwin B. The 7th lung cancer TNM classification and staging system: Review of the changes and implications. World J Radiol. 2012 April 28; 4(4): 128–134

| Old- sixth edition- descriptor | New seventh edition- descriptor | N0 | N1 | N2 | N3 |
|--|---------------------------------|-----------|-----------|-----------|-----------|
| T1 (≤ 2 cm) | T1a | I A | II A | III A | III B |
| T1 (> 2-3 cm) | T1b | I A | II A | III A | III B |
| T2 (≤ 5 cm) | T2a | I B | II A | III A | III B |
| T2 (> 5-7 cm) | T2b | II A | II B | III A | III B |
| T2 (> 7 cm) | T3 | II B | III A | III A | III B |
| T3 (invasion) | T3 | II B | III A | III A | III B |
| T4 (same lobe nodule) | T3 | II B | III A | III A | III B |
| T4 (extension) | T4 | III A | III A | III B | III B |
| M1 (ipsilateral non primary lobe nodule) | T4 | III A | III A | III B | III B |
| T4 (pleural effusion) | M1a | IV | IV | IV | IV |
| M1 (contralateral lung nodule) | M1a | IV | IV | IV | IV |
| M1 (distant metastases) | M1b | IV | IV | IV | IV |

- Lung cancer, breast cancer and lymphoma causes 75% of metastatic pleural effusions, but many series of studies have shown that lung cancer is the predominant cause of malignant pleural effusion;

Characteristics of malignant pleural effusion

- Studies show 44% - 70% of exsudative pleural effusions are due to malignant process;
- Malignant pleural effusion covers 40% of chronic pleural effusions;
- Leading cause of recurrent pleural effusion;

Pathogenesis

- Study (Sherno and Sahn) - analysis of carcinomatous involvement of the pleura in 96 patients showed that any disruption to the integrity of the lymphatic system between the parietal pleura and mediastinal lymph nodes can lead to the formation of malignant pleural effusion

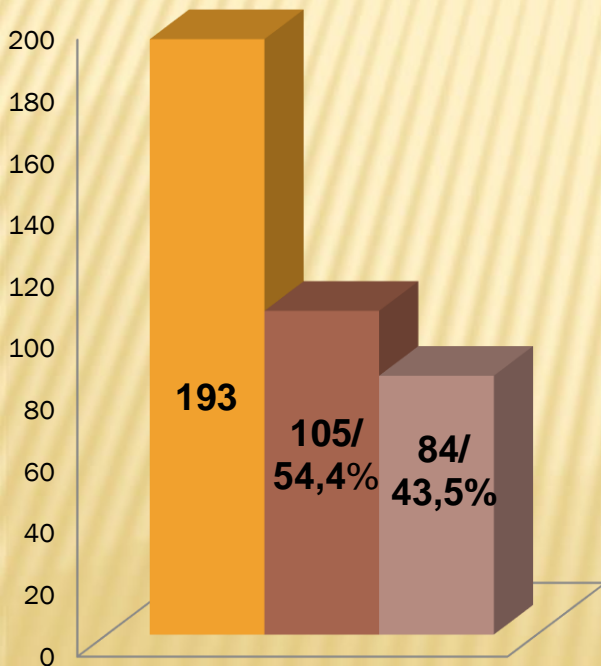
Survival

- Average survival time of patients with malignant pleural effusions is 3-12 months, with the shortest survival time was observed in pleural effusions from primary lung cancer

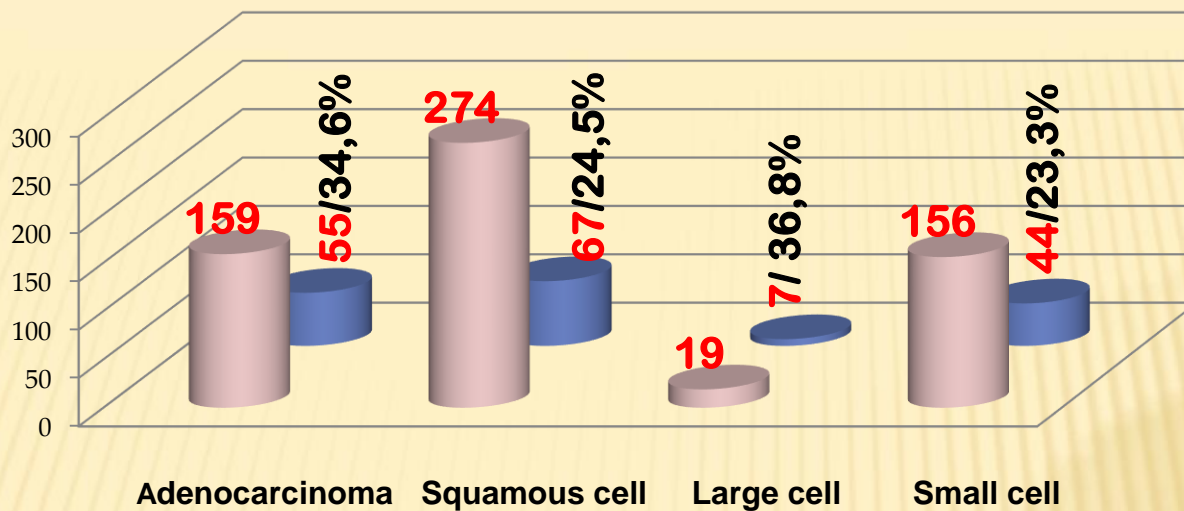
- For the purpose of the study were processed data from 800 patients between 35 -75 years old with proven primary lung cancer from 2010 to 2013;
- Pleural effusions associated with lung cancer from the total number of cases of lung cancer;
- Pleural effusion in specific histopathological types of lung cancer;
- Development of pleural effusion in certain histopathological types of lung cancer in relation to:
 - *localization of the cancer in the lungs*
 - *time of occurrence of pleural effusion*
 - *size of pleural effusion*
 - *persistence, progress and withdrawal of pleural effusion in the course of the disease;*
 - *average time of progression and median withdrawal of the pleural effusion*

Results

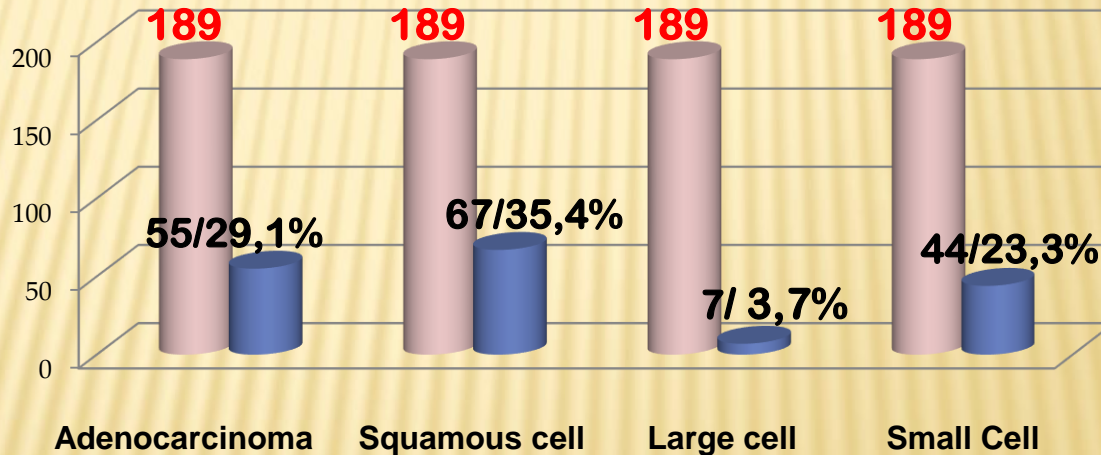
- Primary lung cancer appeared in the right lung in 380 (56.8%) patients which was 13.6% more than in the left (280 ,43.2%), ($p = 0,00$)
- Squamous cell type of cancer was the most common histological type (39.9%) which is 16.7% more than adenocarcinomas (23.2%) and the Large cell lung cancer is the rarest histopathological type (2.8%).
- Malignant pleural effusion associated with primary lung cancer appeared in 193 patients (193/686, **28.1%**)



- Difference of 10.9% between right and left lung was statistically significant (χ^2 - test = 4,57, $p = 0,033$);
- Lung cancer has been shown to have a greater tendency to affect the right lung, but lung cancer in the **left lung has a greater tendency to develop malignant pleural effusion;**

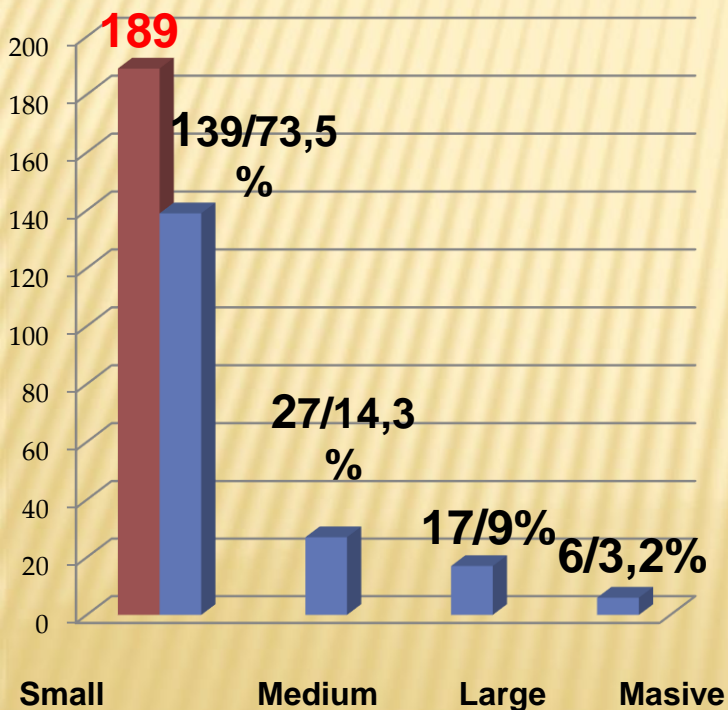


•The processing of the data showed that **each histological type of lung cancer** has the same probability to develop pleural effusion during the disease ($p = 0,094$, $p = 0,378$, $p = 0,893$)



- Effusions from **squamous cell** cancer are with 12.1% more than from small cell
- Small cell carcinoma in a third of cases (25.6%) in the right lung and in a quarter of cases in the left lung (31.1%) manifested by pleural effusion, or **23.3%** of patients develop pleural effusion

- 97.9% of cases pleural effusion were at the site of the primary tumor regardless of the histological type and localization;
- Only adenocarcinoma and small cell carcinoma developed Bilateral pleural effusion (2.1% of cases)
- *The size of malignant pleural effusion associated with primary lung cancer can vary from small to massive. Some studies have shown that 15% of patients with malignant pleural effusions are relatively asymptomatic and have pleural effusion less than 500ml;*



- The processing of the data showed that primary lung cancer in the course of the disease is mostly present in **small** pleural effusion 73.5% (139/189), and at least with **massive** pleural effusion 3.2% (6/189)

- Processing of the data showed that **each histopathological type** of lung cancer has the same probability to develop a small, medium, big or massive pleural effusion;
- Adenocarcinoma in 63.6% is presented with a small pleural effusion, and **massive effusion did not develop** ($p = 0,00$);
- **Adenocarcinoma** most likely is to develop **big** effusion with 5.7% more than squamous cell cancer, 3.7% more than the small cell and 2.2% more Large cell cancer;
- Squamous cell type of cancer with a small pleural effusion is presented in 83.6% (56/67) of cases, while between the number of mid-sized, large and massive effusion no statistically significant difference ($p = 0,466$);
- **Massive** pleural effusion is not developed in **Large cell** carcinoma, but Large cell cancer in right lung presents with effusion only in localization of cancer in middle lobe;
- Small cell carcinoma has the same probability for developing the effusion of any size

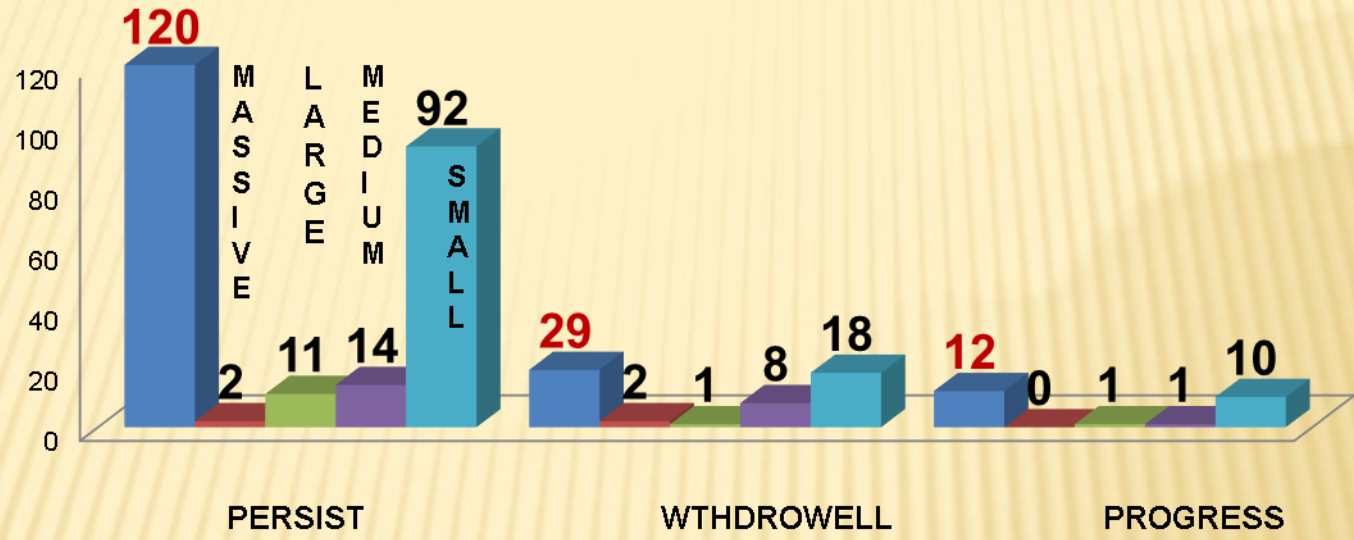
- Malignant pleural effusions develop as a result of advanced-stage malignant disease and like its initial presentation, during the course of disease or as the first manifestation of relapse;
- * Study in France showed that pleural effusion was the first sign of malignant disease in 41% of 209 patients, with 42% lung cancer as a primary cause;
- ** In the course of the disease in patients with primary lung cancer 50% of patients will have associated malignant pleural effusion

*Cafarotti S et al: *Malignant pleural effusion. J Thorac Cardiovasc Surg* 2011; 141:683-687

** Loddenkemper VA, Astoul LP, et al. *Management og malignant pleural effusion. Eur Respir J* 2001;18:402-419

- The most common presentation of a pleural effusion is initial presentation, but it is usually **small** effusion;
- Most likely to develop massive pleural effusion is **initially**;
- Initially 56.1% more than after completed cancer treatment (10.1%);
- Pleural effusion doesn't develop during radiotherapy and during surgery;
- During and after chemotherapy pleural effusion develops for 4.7% more than after radiotherapy;
- During the treatment of lung cancer effusion develops in approximately 5%, and massive effusion does not develop, but the bigger risk is that after radiotherapy can develop effusion of any size

- 11.1% of pleural effusions in primary lung carcinoma showed recurrence after treatment of the primary disease or of the effusion, which effusions remain to persist;



- Malignant pleural effusions during the treatment of the lung cancer are more likely to persist (65%);
- Pleural effusion will progress in 6,5%;
- Small pleural effusion is most likely to progress;
- Large pleural effusion is most likely to withdrowell;