Study of the Relationship between Malignant Pleural Effusion and Common Causing Tumors

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Abstract

Introduction:

Malignant pleural effusion is one of the most important causes of pleural effusion. It can sometimes be difficult to diagnose a malignant effusion due to the uncertainties of biopsy determination of a pleural result. The aim of this study was to evaluate the clinical features of malignant pleural effusion.

Methods:

A retrospective study on patients with malignant pleural effusion at Al-Mujtahid Hospital and Ibn Al-Nafis from December 2021 to June 2022.

Results:

Of the 188 patients, admitted with a story, 40.4% were adult patients, adults, adults, adults, and girls. The mean age of the patients was 56 years. Mount infected by 51.1%. And 12.8% had the right-sided patients with 57.4%, and the left-sided patients had the disease. Tumor effusions were treated 63%, pleurisy 13%, and chest blasting 24.1%. Effusion analysis of 91.5% exudate pattern, 8.5% transudate pattern, presence of malignant cells at 10.6%. The demographic dialogue of patients and adjacent factors was associated with both effusion and primary tumor. (P < 0.05).

Conclusion:

The results of this study indicate that there are issues related to pleural effusion. Programs should aim at using modern methods of diagnosing and treating malignant pleural effusion as it has an important role in determining the prognosis.

Introduction

Malignant pleural effusions (95%) are almost exclusively caused by metastases in the pleural cavity and two thirds (70-77%) are histologically classified as adenocarcinomas. [1]

Effusion appears as the first sign of disease in two thirds of cases, half of these causes are lung cancer, and patients with leukemia and ovarian cancer present MPE as the first presentation, and tend to have a better prognosis compared to those who develop MPE in the early stage. [2]

The longest period of time between cancer diagnosis and formation of MPE has been reported in British Columbia, however, regardless of time of formation, MPE is generally a poor prognostic marker. [2]
MPE is often the first sign of cancer. The presence of MPE in advanced cancer is associated with a poor prognosis. [3]

In general, observational studies show that the mortality rate in patients with MPE is higher than in those with metastatic cancer without MPE. [4]

MPE is characteristic of advanced or metastatic malignancies with a poor prognosis, ranging from a median of three months to 12 months depending on the patient's situation and tumor factors. [5]

Tumor subtype has an important impact on survival. For example, lung and gastrointestinal cancers have the worst survival prognosis, with overall survival ranging from two to three months. On the other hand, patients with Malignant mesothelioma and leukemia have an overall survival approaching 1 year. [6]

This study aims to study cases of malignant pleural effusion among tumor patients at Al-Mujtahid and Ibn Al-Nafis Hospital in Damascus.

Methods

A retrospective study was conducted in which the hospital's approval was obtained to view patients' data from December 2021 to June 2022. Samples were collected from patients' records in the Department of Internal Thoracic and Thoracic Surgery in the hospital. The questionnaire was also created in an automated electronic Google form. Then the data was archived using Microsoft Excel 2019. The study included 188 patients admitted to the Department of Interior and Thoracic Surgery who were diagnosed with malignant pleural effusion at Al-Mujtahid and Ibn Al-Nafis Hospital in Damascus. Below we review some characteristics of the sample according to demographic variables, characteristics of malignant pleural effusion, and factors that measure prognosis in patients.

Results

Socio-demographic characteristics:

Out of the 188 patients admitted with a history of pleural effusion and tumor, 40.4% of the patients were male and 59.6% were female. The average age of the patients was 56 years. Of them, 34% are under 50 years old and 66% are 50 years old and over. And 91.5% of married couples. And 66% of the patients were smokers and 95.7% of them were cigarette smokers, at an average of 28.5 bags per year.

Medical history of patients with tumors:

The majority of patients had lung cancer (51.1 percent), ovarian cancer 26.4%, and breast cancer 23.4%. 78.7% had no tumor metastases, compared to 12.8% had pleural metastases, 3.9% had lung metastases, and 3.9% had liver metastases. 88.9% of patients received chemotherapy, 35.6% surgical treatment, and 17.8% radiotherapy. 40.4% of patients were diagnosed with a primary tumor within the past year, while 19.1% of patients were diagnosed with a tumor in the effusion.
**Pathological history of neoplastic effusion:**

Most of the patients with neoplastic effusion were recent, that is, it was detected for the first time, 55.3%, and in contrast, the effusion was recurrent at 44.7%. The effusion was right-sided 57.4%, left-sided 23.4%, and bilateral 19.1%. Tumor effusions were treated by pleurisy 63%, pleuronectids 13%, and chest blasting 24.1%. The analysis of the effusion showed exudate 91.5%, transudate 8.5%, and the presence of malignant cells at 10.6%.

**Patient outcome:**

Death occurred in 29.8% of patients, while improvement occurred in 70.2% of patients with malignant effusion.

**Study of the relationship between prognosis and tumor effusion characteristics:**

When studying the relationship between the prognosis and the characteristics of tumor effusion, the results showed a statistically significant relationship between them.

The condition improved in patients with malignant pleural effusion on the right side 63.6% significantly compared to the effusion on the left side 15.2%, and bilateral effusion 21.2%. (P<0.001)

The treatment of pleurisy was also significantly associated with an improvement in the incidence of malignant pleural effusion in 28.6% of patients. (P<0.001)

**Discussion**

The study revealed cases of malignant pleural effusion in tumor patients at Al-Mujtahid Hospital and Ibn Al-Nafis Hospital in Damascus.

In our study, malignant pleural effusion was more common in females compared to males, and this contradicts the study (Zai and colleagues, Malaysia)64, where malignant pleural effusions were more common in male patients. Which he interpreted as being related to the history of chronic smoking in the male patient [7]. The results of our study may explain the noticeable increase in the smoking rate of females in society during the Syrian crisis [8].

And 82.2% of patients with malignant pleural effusion were heavy smokers or former heavy smokers. This is similar to the results of our study, where 66% of patients were smokers. [7] Excessive smoking is the main reason for the high prevalence of this disease. [7]

It is clear that the incidence of malignant pleural effusion is significantly higher in patients over 50 years of age, as death in our study was significantly associated with both advanced age. This is similar to the study conducted in Malaysia. [8, 10]
The results of our study also showed that malignant pleural effusion was more common on the right side by 57.4%, in contrast to the Malaysian study where malignant pleural effusion was more common on the left side. [8] Despite the presence of a correlation between the warning and the location of the pleural effusion. The reason for the effusion to be placed elsewhere remains unknown.

In our study the majority had the nature of malignant pleural effusion of the type of exudates, which is similar to the study in Malaysia according to Light criteria. [8] The analysis of pleural fluid in our study showed positive neoplastic cells in 10.6% of patients. However, 64.4% in the Malaysian study and 48.8% in the Chinese study of all patients with malignant pleural effusion showed 64,66 tumor cell positivity. This percentage is considered high for the diagnosis of neoplastic pleural effusion, but it was difficult to determine the exact tissue type of these cells. This finding supports previous reports that 50% of cell tests on pleural fluid are positive for malignancy in patients already known to have cancer.

In about 50% of lung cancers, and 60% of all cancers combined, the malignant nature of the pleural effusion can be confirmed cytologically. The outcome of a positive tumor diagnosis is higher for thyroid cancer and lower for mesothelioma, squamous cell carcinoma, lymphoma and sarcoma. A sample of 20–60 ml of the effusion fluid should be sent for cytological examination. The method used must be confirmed in advance by contacting the cytopathology laboratory. [11, 12]

51.1% of patients in our study were diagnosed with lung cancer, and adenocarcinoma was the most common histological type. In the Malaysian study, the histological pattern of most patients diagnosed with cancer was determined by large cell carcinoma, and it is considered to be of bronchial carcinoma. [12]

For laboratory analyzes, no increase in the number of white blood cells was observed, and this was similar to the previous study. However, lymphocytes were significantly elevated in most patients. Blood cell counts in the pleural effusion can help narrow the field of differential diagnosis. An elevated concentration of neutrophils is often seen in acute conditions, such as parapulmonary effusion, empyema, and effusion due to pulmonary embolism. On the other hand, the predominant lymphoid profile is most common in tuberculosis, long-standing pleural effusion, congestive heart failure or malignancy. However, blood cell counts in the pleural fluid alone do not allow an exact identification of the cause of the effusion. [12]

In this study, we provide an overview of the cases of malignant pleural effusion including diagnosis and treatment options. The first step should be to complete a comprehensive medical evaluation with an appropriate diagnostic test. Thoracentesis is a vital and required diagnostic step to distinguish between a tumor and a neoplastic effusion. Additional methods of tissue sampling should be considered if the initial cytology analysis is undiagnosed. And with gene-directed therapies, new treatments are being considered for these patients. [12]

Declarations
Ethics approval and consent to participate

This study was approved by the Institutional Review Board (IRB) at Syrian Private University. Written consent was obtained from all participants. Participation in the study was voluntary and participants were assured that there would be no victimization of anyone who did not want to participate or who decided to withdraw after giving consent.

Consent for publication:

Not applicable.

Availability of data and materials:

All data related to this paper’s conclusion are available and stored by the authors. All data are available from the corresponding author on reasonable request.

Competing interests:

None of the authors have any competing interests. The authors alone are responsible for the content and writing of the article. No conflict of interest is declared.

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