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Managing malignant pleural effusions: A single center's experience

Anil Gokce, Suleyman Anil Akboga

Ankara City Hospital, University of Health Sciences, Department of Thoracic Surgery, Ankara Turkey

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Abstract

Occurring among the most common findings in cases of metastatic disease, malignant pleural effusion (MPE) is identified in up to 15% of patients with cancer. This research was undertaken to provide an overview of advances in the treatment of MPE in recent years. A total of 186 patients with MPE were evaluated retrospectively after having consulted or been hospitalized in our hospital between March 2019 and December 2021. The evaluated data included gender, age, cause of effusion, treatment method, length of hospital stay, and complications. Lung cancer was in first place, affecting 64 of the patients treated for MPE. In this cohort, 142 patients had received a cytological diagnosis. These patients underwent pleurodesis with talc after tube thoracostomy. A definitive diagnosis could not be determined from the cytological samples of 44 patients. VATS was performed diagnostically and then pleurodesis was performed with postoperative talc. The complication rate was 13%. The mortality rate was 5%. Recurrence was observed in 37 patients during the 2-month follow-up period after the procedure. The optimal treatment of MPE remains uncertain, and treatment decisions require the cooperation of many medical departments. Nowadays, less invasive approaches are preferred in managing cases of pleural effusion. This treatment approach protects patients from the risks of more invasive interventions and reduces treatment costs.

Keywords: Malignant pleural effusion, tube thoracostomy, pleurodesis, VATS

Introduction

Malignant pleural effusion (MPE) is a type of effusion entailing the involvement of malignant cells [1]. It is often observed in cases of metastatic disease, occurring in up to 15% of cancer cases [2,3]. Patients with lung cancer are most likely to present with MPE, with decreasing rates of prevalence among cases of breast cancer, lymphoma, gynecological cancers, and malignant mesothelioma, respectively. After receiving a diagnosis of MPE, the patient has expected overall survival of approximately 4-14 months. The most common symptoms in these cases include cough, dyspnea, and chest pain [2]. Recognizing the importance of MPE in cancer treatment, the American Thoracic Society, European Respiratory Society, Society of Thoracic Radiology, and Society of Thoracic Surgeons recently collaborated to produce updated guidelines for managing MPE cases [4,5].

The treatment of MPE is palliative; symptom relief should be the focus of any treatment plan. Therefore, it is important to avoid subjecting patients to repetitive invasive procedures. Researchers recently confirmed that doing so facilitates the outcomes of fewer pleural procedures in the future, decreased likelihood of pneumothorax, and a decreased need for emergency room services compared to repeat thoracentesis [6]. Thus, avoiding hospitalization and preventing complications are recommended [7]. Comorbidities, recurrent MPE, trapped lung or loculations, tumor characteristics, cancer type, and patient preferences should all be considered [8].

Recent studies have allowed for a generalization of traditional treatment approaches to MPE [9,10], leading, in turn, to updates to the relevant clinical practice guidelines [11]. The present research was undertaken to provide an overview of the evidence for advances in the treatment of MPE cases in recent years.

Material and Methods

Ethics committee approval was obtained for our study (Number: E1-22-2334, Date: 26.01.2022). A total of 186 patients with MPE who had consulted or been hospitalized in our hospital between March 2019 and December 2021 were evaluated retrospectively.

*Corresponding Author: Anil Gokce, Ankara City Hospital, University of Health Sciences, Department of Thoracic Surgery, Ankara Turkey
E-mail: anil66gokce@hotmail.com

In this process, data on gender, age, cause of effusion, treatment method, length of hospital stay, and any complications were reviewed. Tube thoracostomy and talc pleurodesis with tube thoracostomy were applied as the treatment method. The patients were evaluated in terms of complications such as infection, bleeding, ARDS, dyspnea, wound infection, and pneumonia, which are the most common complications in thoracic surgery. No additional surgical intervention was required for the stated complications. Complications were controlled and treated with medical and conservative methods. Patients with malignant effusion who underwent surgical intervention by us were included in the study. Only patients who underwent thoracentesis and were followed up were not included in the study. Patients with transudate as a result of thoracentesis were not included in the study. All individuals enrolled in the study were called for control appointments 10 days after discharge and were followed for 2 months. The current pandemic period did not have any effect on patient selection and treatment applied to patients. Standard pandemic procedures were applied.

Results

This retrospective research evaluated a total of 186 patients with MPE who consulted or were hospitalized in our hospital between March 2019 and December 2021. From among this total of 186 patients, 102 were men, 84 were women, and the mean age of all patients was 62.8 years. Lung cancer was in first place, affecting

64 of these patients who had been treated for MPE. The patient population also included 27 patients with breast cancer, 20 with ovarian cancer, 18 with gastric cancer, 16 with pancreatic cancer, 13 with mesothelioma, 11 with colon cancer, 9 with sarcoma, and 8 with other cancer types (Table 1). Eighty-one patients did not have any symptoms, 69 patients had chest pain, and 36 patients had dyspnea. In our study group, 142 patients had a cytological diagnosis. These patients underwent pleurodesis with talc after tube thoracostomy. A definitive diagnosis could not be determined from the cytological samples of 44 patients (Table 2). VATS was performed diagnostically in this patient group and sampling was made from the pleura. Then pleurodesis was performed with postoperative talc. The mean tube thoracostomy stay was 7.3. The most common tumor histopathology in our study group was adenocarcinoma with 57 patients. The most common complications after the procedure were wound infection in 9 patients, pneumonia in 7 patients, arrhythmia in 5 patients, and expansion defect in 4 patients. The complication rate was 13%. During the 2-month follow-up period, 11 patients died. The mortality rate was 5%. Recurrence was observed in 37 patients over the course of the 2 months of post-procedure follow-up. When the patients who relapsed were examined, significant correlations were not identified between types of disease and tumor histopathology in terms of causing recurrence ($p: 0.154$). Recurrent tube thoracostomy and pleurodesis were performed for 24 patients with recurrence. Re-intervention was not considered for 13 patients.

Table 1. Epidemiological characteristics of our study group data

	Number of Totally Patients	N (Patients)
	Male	102 (%54)
	Female	84(%46)
Malignant Pleural Effusion Type	1-Lung Cancer	64(%35)
	2-Breast Cancer	27 (%15)
	3-Ovarian Cancer	20 (%11)
	4-Gastric Cancer	18(%9)
	5-Pancreatic Cancer	16(%8)
	6-Mesothelioma	13(%7)
	7-Colon Cancer	11(%6)
	8-Sarcoma	9(%5)
	9-Others	8(%4)
Symptoms	1-No Symptom	81 (%43)
	2-Chest Pain	69(%37)
	3-Shortness of Breath	36(%20)

Table 2. Prognostic evaluation of study group data

	Number of Totally Patients	N (Patients)
	Tube Thoracostomy + Pleurodesis	142(%76)
	VATS Pleural Biopsy + Pleurodesis	44(%24)
Complications (Complication Rate %13)	Wound Enfection	9(%5)
	Pneumonia	7(%3.5)
	Arrhythmia	5(%2.5)
	Expansion Defect	4(%2)
Mortality (Mortality Rate %5)	Mortality	11(%5)
	No-Mortality	175(%95)

Discussion

In clinical practice, the diagnosis of MPE is made by detecting the presence of malignant cells within pleural biopsy or fluid samples [3]. While virtually all malignant diseases may involve the presence of MPE, it is most often seen in cases of lung carcinoma, which account for roughly 33% of all presentations of MPE, and it is also more common in the male patient population [12]. Most patients with MPE present with clear symptoms, the most typical of which is shortness of breath, reported by more than half of all patients with MPE. That is followed in turn by coughing and chest pains [13,14]. In our study group, lung cancer was found to be the most numerically frequent cause of MPE, which is consistent with the literature, and the number of male patients was significantly higher than female patients. Unlike the literature, the most common symptom was chest pain in our study.

In the course of treating patients with MPE, the primary aim is relief of the symptoms with accompanying improvement in the quality of life, the latter of which is generally evaluated based on consideration of variables including the patient's life expectancy, performance status measures, and the response of the primary tumor considering the tumor type [15]. The most commonly used method of treatment is pleurodesis, applied with the aim of triggering an inflammatory response capable of ensuring the occurrence of adhesion of the bilayers of the pleura, in turn preventing the possibility of further pleural fluid accumulation. This approach has been shown to successfully treat the presence of dyspnea, increase the survival rate [16], and reduce the length of or need for hospital stay [17]. However, various considerations require attention in applying this treatment strategy, such as the sclerosing agent, the sizes of the chest tubes that will be placed, and the administration of nonsteroidal anti-inflammatory agents as analgesic therapy. Even though a consensus has not yet been reached about the most optimal agent for use in the application of chemical pleurodesis, talc is applied most often due to its advantages of effectiveness and affordability [17]. Pleurodesis with talc was applied for all of our study group and a success rate of 80% was achieved in the early period. This result supports that talc pleurodesis is an effective treatment as shown in the literature.

In our study group, pleurodesis was applied for the majority of patients after tube thoracostomy. Tube thoracostomy with pleurodesis is useful and may be performed with local anesthesia. However, previous research has demonstrated that VATS pleurodesis applied in the treatment of cases of MPE can facilitate shorter chest tube insertion times and postoperative hospital stays [18]. Application of the VATS approach allows for complete draining of the fluid. Because it provides a better rate of pleural surface reaction, there are publications stating that the VATS approach provides more effective treatment overall [19-21]. At the same time, it yields more diagnostic information for clinicians. In contrast, in a reported case series and in our study, it was found that the diagnostic power of pleural effusion cytology was only 45-80% for cases of pleural effusions [18]. In our study group, VATS pleural biopsy was applied for patients with undiagnosed effusion, consistent with the literature. Applying the VATS approach allows for the chest cavity to be directly visualized and facilitates direct biopsies of hard-to-reach areas [22].

Significant differences in prognosis were not observed in our

patient population in terms of the histology of primary tumors. A previous study in the literature evaluated early mortality with a similar study methodology and longer survival in breast cancer [23]. In another previous work [24], patients with ovarian cancer were found to have median survival of 18 months while those with breast cancer had median survival of only 15 months. Additionally, Pilling et al. [25] observed better survival for breast cancer and malignant pleural mesothelioma compared with other primary cancers, although this was not statistically significant. Upon comparing the present findings to the data available in the literature, we concluded that the low number of patients and short patient follow-up period were effective in the differences in our study results.

The most important limitations of the article are that the study is retrospective, single-centered and covers a certain time period.

Conclusion

The optimal treatment approach for cases of MPE remains uncertain and these patients necessitate interdisciplinary strategies with the cooperation of many medical departments. Nowadays, less invasive approaches are preferred in managing MPE. This treatment approach protects patients from the risks of more invasive interventions and reduces treatment costs.

Data obtained in the treatment of symptomatic cases of MPE confirm talc pleurodesis and pleural catheter to be effective in relieving fluid buildup and symptoms. However, more research is necessary to perform pleurodesis with less invasive treatment techniques or to manage MPE cases to apply a personalized treatment approach for each patient.

Conflict of interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical approval

Ethics committee approval was obtained for our study (Number: E1-22-2334, Date: 26.01.2022).

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