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Original Research Article

Efficacy of Pleurodesis with Low Dose Talc in Malign Pleural Effusions

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ABSTRACT

Introduction: Malignant pleural effusion is the appearance of cancer cells in the pleural space with pleural invasion or metastasis. Pleurodesis is a commonly used treatment modality in the treatment of recurrent malignant pleural effusions. The most commonly used agent for pleurodesis is sterile talc. The aim of this study was to investigate the efficacy of low dose (2 grams) talc in patients at risk for pleurodesis.
Materials & Methods: Fifty patients with malignant pleural effusion were treated with 2-g talc pleurodesis. The cases were 20 males and 30 females. Patients Grouped into four groups as breast, gastrointestinal-renal (stomach, colon, renal), lung (lung ca, mesothelioma) and gynecological malignancies (endometrium, over ca).
Results: Twenty-one patients (42%) developed pleural effusion and 29 patients (58%) did not develop recurrence. 12 patients had only chest pain and 2 patients developed transient respiratory distress due to the procedure. No mortality related to the procedure was observed in any of the patients.
Conclusion: Pleurodesis with low dose talc success rate is very similar to the success rate of pleurodesis with high dose talc. Therefore, pleurodesis with low dose talc should be preferred especially in patients at risk and general impairment.
Keywords: low dose, talk, pleurodesis.

INTRODUCTION

Malignant pleural effusion (MPE) is the appearance of tumor cells in the pleural space resulting in pleural invasion or metastasis of malignant lesions. The most common cause is lung cancer, as well as malignant mesothelioma and breast cancer. [(1)] MPE causes atelectasis, infection, dyspnea and respiratory failure. Therefore, the pleural fluid should be drained. The most commonly used method for drainage is recurrent thoracentesis. [(2)] This method provides a rapid improvement in symptoms, but pleural effusions recur within a short time. [(3)] The most effective and easy method to prevent recurrence of MPE is pleurodesis. [(4)] Pleurodesis is a sclerosing agent applied to the pleural cavity through thoracotomy, thoracoscopy or tube thoracostomy to create pleural adhesions. Sterile talc is usually used for pleurodesis. The aim of this study was to investigate the efficacy of low dose (2 grams) talc in patients at risk for pleurodesis.

MATERIALS AND METHODS

Fifty patients who underwent pleurodesis for malignant pleural effusion were included in this study. All cases for pleurodesis; the solution obtained by adding 2 gr of talc and 10cc of local anesthetic in 50 cc of saline was given to the pleural

space via tube thoracostomy. Then the tube was clamped for two hours. Various movements were made to the patient in order to distribute the delivered fluid in the thorax cavity. Finally, the clamp was opened to allow liquid drainage.

The demographic characteristics of the patients were evaluated. Malignant pleural effusions were grouped according to the primary malignancy in the etiology. Groups formed; group I; breast cancer, group II; lung cancer, group III; gastrointestinal malignancies, group IV; gynecologic malignant. The recurrence rates of pleurodesis patients were evaluated. The recurrence rate was determined according to whether there was pleural effusion in the amount of thoracentesis in the chest radiographs taken 30 days after the procedure.

Statistical Analysis

Statistical analyses were performed with SPSS 19.0 software (SPSS Inc., Chicago, IL, USA). Pearson Chi square test and logistic regression analysis were used in the analysis of the data. P value of less than 0.05 was considered statistically significant for all tests.

RESULTS

The cases consisted of 20 (40%) males and 30 (60%) females. There was no statistically significant difference between groups in terms of female and male distribution (p=0.06). The average age at the study was 59.68±10.94 years. The average age of men was 64.95±12.61 years and the average age of women was 56.17±9.82 years. No statistically significant difference was found between age distribution of males and females (p=0.08).

After pleurodesis, pleural effusion developed again in 21 (42%) of the patients while 29 patients (58%) did not develop recurrence. The mean age of the patients with recurrent disease was 59.90±10.57 years, while the mean age of patients without recurrent pleural effusion was 60.24±12.65 years. There was no statistically significant difference in age distribution between group with recurrence and without recurrence (p=0.695). Pleural effusion was present 35(70%) cases in the right hemithorax and 15 (30%) cases in the left hemithorax before the pleurodesis (Table 2).

Pleural effusion developed in 21 cases which pleurodesis was unsuccessful, 14 (67.7%) cases developed in the right hemithorax and 7 cases (33.3%) developed in the left side. There was no statistically significant difference between the development of recurrence and the side (p = 0.900) (Table 1).

Table 1: Association of demographic characteristics and side of pleural effusion with recurrence

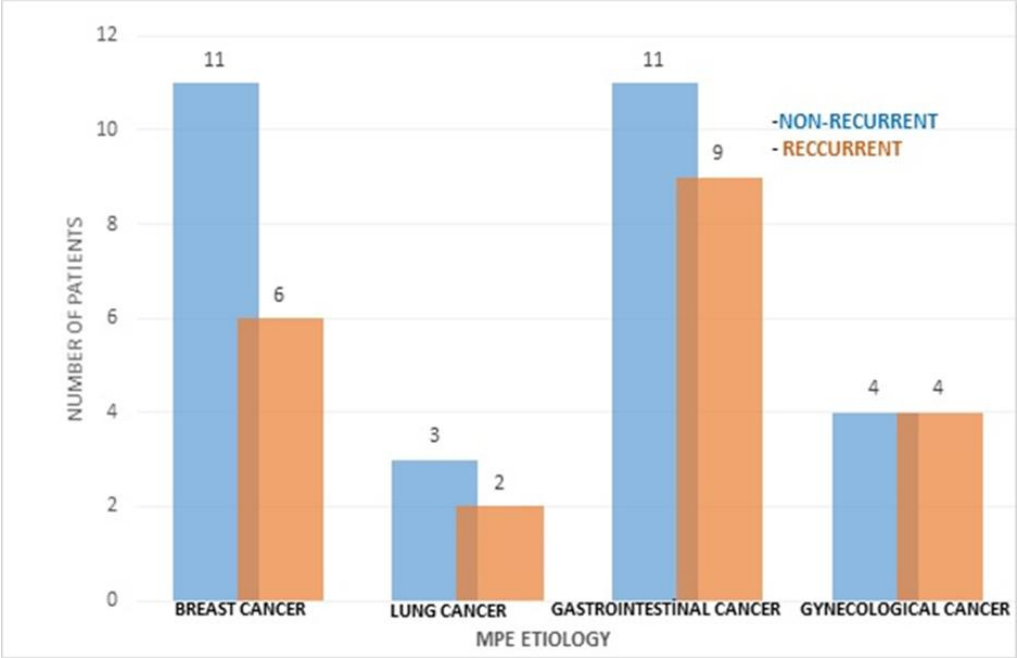
Parameter		Recurrent pleural effusion n (%) N=21	Non-recurrent pleural effusion n (%) N=29	Total cases n (%) N=50	*p-value*
Sex	Male	8 (38.1)	12(41.4)	20(40)	0.576
	Female	13 (61.9)	17(58.6)	30(60)	
Age		59.90 ± 10.57	60.24 ± 12.65	59.68 ± 10.94.	0.695
Side	Right	14 (67.7)	21(72.4)	35(70)	0.900
	Left	7 (33.3)	8(27.6)	15(30)	

Note: p-value <0.05 statistically significant.

Table 2: Logistics Regression: Risk factors for recurrent pleural effusions.

Risk factors	P value	Odds ratio	95% C.I
Age	0.233	0.46	0.13-1.64
Gender	0.767	1.37	0.17-10.76
Side	0.711	0.78	0.21-2.91
Breast cancer	0.177	1.99	0.73-5.39
Lung cancer	0.297	1.044	0.963-1.133
Gastrointestinal cancer	0.847	1.318	0.08-21.69
Gynecologic cancer	0.783	0.996	0.972-1.022

Note; CI – confidence interval, *p-value <0.05 statistically significant.



Graphic 1: Recurrent malign pleural effusions after pleurodesis

There was no statistically significant difference between pleural effusion etiology groups in terms of recurrences (p = 0.921) (Graphic 1).

There were 12 (24%) cases of chest pain and 2 (4%) cases of transient respiratory distress as complications related to pleurodesis.

DISCUSSION

Pleural effusion is an abnormal amount of fluid accumulation in the pleural space. There are two main categories as transudate and exudate. The fluid in the transudative type is similar to the physiological fluid in the pleural space. Fluids in the form of transudates do not require drainage unless the pleural space covers a very large area. Congestive heart failure is one of the examples of transudative pleural effusions. Exudative pleural effusion fluid may contain proteins, blood, and inflammatory cells. Malignant pleural effusions are examples of these types of effusions. Malignant pleural effusions (MPE) in malignant patients are the cause of poor survival and poor prognosis. After MPE in patients with lung cancer is 3 months for median survival, and approximately 12 months for breast cancer cases. [(5,6)] Approximately 15% of patients with lung cancer come with MPE at the time of initial admission. [(7)] Symptomatic MPE should be treated to improve the quality of life. In current guidelines, pleurodesis treatment is recommended in patients with symptomatic MPE whose overall condition is good. [(8)] Ploredez process can be done chemically and mechanically. The chemical pleurodesis is the most commonly used method. The chemical pleurodesis causes a common aseptic inflammation on the pleural surfaces, causing the two pleurae to adhesion together. [(8)] The success of the chemical pleurodesis depends on the closeness of distance between the visceral and parietal pleural surfaces. For this reason, air or fluid in the pleural space is drained before the pleurodesis. The ideal agent for chemical pleurodesis is talc. Apart from talk, the most commonly used agents are tetracycline, doxycycline and bleomycin. Recently, iodopovidone has also been used as a chemical pleurodesis agent.

Talk is an ideal agent for pleurodesis because of its ease of use, high efficacy, safe and easy access. [(9)] Moreover, induction of apoptosis of tumor cells talc pleurodesis is the primary choice in the treatment of MPE. [(10)] Pleural mesothelial cells are the

most important role in pleurodesis. In high tumor burden cases, normal mesothelial cells are rarely seen, leading to reduced pleural response and pleurodesis failure. Therefore, timing of pleurodesis is very important. [(11)] MPE'da plörodezin zamanlamasına ilişkin ortak bir görüş bulunmamaktadır. Lee et al. [(12)] studies reported that pleurodesis was performed in 8% of cases in the first attack, in 54% after at least one symptomatic attack and in 28% after at least two symptomatic episodes, but no difference in pleurodesis success between the groups. There is no consensus on the diameter of the thoracic catheters used for pleurodesis. Parulekar et al. [(13)] reported that there was no significant difference between the groups in terms of recurrence after pleurodesis, when compared with small-diameter thoracic tubes and large-diameter thoracic tubes. It is necessary to prevent irritation and pain caused by Talc fluid for an ideal talc pleurodesis procedure. Intrapleural lidocaine application is the most common method used to prevent pain.

After the application of the talc, the chest drain tube should be clamped and the patient should be allowed to rotate for 1-2 hours. Thanks to the rotation movement, the talc is better distributed in the chest cavity. Then the clamp should be opened and the remaining pleural fluid drained. If pain or fever occurs during application, paracetamol may be used. The use of steroids and NSAIDs reduces the success rate of pleurodesis because it inhibits the inflammatory effect of talc. Drainage should be less than 150cc for the removal of chest tube after pleurodesis.

Major complications of Talc pleurodesis include fever, chest pain re-expansion fever, and acute respiratory distress syndrome (ARDS). [(14)] In some studies it is suggested that ARDS is related to particle size of talc. In particular, talc with particles smaller than 10 micrometers can easily trigger an inflammatory response and increase the risk of ARDS. In animal studies, systemic absorption was observed in pleurodesis with small particle size (less than 5-10 microns) talc and no change in pleurodesis success was observed. [(15)] The UK national guidelines recommend putting 4-5 grams of sterile talc in 50ml 0.9% sodium chloride. Kolschmann et al. [(4)] showed that ARDS correlated with the amount of sterile talc used in pleurodesis. Bilateral pleurodesis and talc injections after pleural abrasion or multiple-biopsy should be avoided to reduce the total amount of talc absorption. [(14)] In our study, ARDS was never observed. As complications, 12 cases of chest pain and 2 cases of respiratory distress were observed.

Pleural effusion that requires thoracentesis 30 days after the pleurodesis should not be observed in order for pleurodesis to be successful. The success of the procedure is usually determined by radiographs taken 20-30 days later. MPE control with pleurodesis is not 100%. Dresler [(16)] reported that talc pleurodesis was applied in 482 cases and the success rate was 75% in the first month and 50% in the sixth month. In our study, pleurodesis success rate was 58%.

CONCLUSION

As a result, pleurodesis with low dose talc success rate is very similar to the success rate of pleurodesis with high dose talc. Therefore, pleurodesis with low dose talc should be preferred especially in patients at risk and general impairment.

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