

Evaluation of the Quality of Life in Patients with Pleurodesis

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ABSTRACT

Objective: Malignant pleural effusions (MPEs) cause a decrease in the quality of life and are the most important cause of anxiety in this group of patients. Currently, it is aimed not only to eliminate the diseases but also to increase the quality of life of individuals. The aim of the present study was to determine the effect of pleurodesis on the quality of life of patients with MPE.

Methods: Twenty-four patients who underwent pleurodesis were prospectively included in the study. Talc pleurodesis was performed to the patients by tube thoracostomy. The 36-Item Short Form Survey (SF-36) quality of life scale was applied to the patients during their hospitalization and on day 11 of discharge. Data were analyzed statistically.

Results: Female patients comprised 70.8% (n=17) of the cases. The mean age of the patients was 54.29±13.84 years. Fifty percent (n=12) of the cases were applied pleurodesis due to pleura metastasis of breast cancer, whereas 29.2% (n=7) due to lung cancer and the rest (20.8%, n=5) due to ovarian carcinomas, respectively. As a result of the comparison of the responses of the patients to the SF-36 quality of life results before and after the procedure, pleurodesis provided significantly positive results on all parameters (p<0.05) except for only mental health (p=0.20).

Conclusion: The main reason for impairment in mental health is that patients have advanced cancers. We believe that the explanation of that is if pleurodesis does not change the stage of cancer. However, the presence of significant contribution of the treatment on all of the other parameters is an indication of how important pleurodesis is. Our study also provided hints that young patients can benefit more from pleurodesis. We think that the patient's cachexia status due to primary disease has no effect on the quality of life that pleurodesis provided. We believe that pleurodesis should be performed in all patients with MPE, if possible.

INTRODUCTION

Pleural effusion is caused by deterioration of the absorption balance of the secretion in the pleural space. Lung and breast cancers are the most common malignant causes. Patients explain dyspnea as difficulty in breathing, increased weight on the chest, hunger for air, or gasping for breath.^[1] In addition to dyspnea, recurrent thoracenteses often deteriorate the general condition of the patients who are in the terminal period by disrupting the protein, electrolyte, and fluid balance.^[2-4]

Pleurodesis is the process of eliminating pleural space to prevent the recurrence of pleural effusion or pneumothorax. Owing to its success in palliative treatment, patients with malignant pleural effusion (MPE) are the most frequently used.^[5]

MPEs lead to a decrease in the quality of life and the most important cause of anxiety in this group of patients.^[6] In patients with MPE, in addition to dyspnea, problems, such as severe deterioration of physical and social functions and fatigue, are added. For these reasons, many experience psychosocial problems, such as addiction and social isolation for caregivers, inability to perform activities of daily living, difficulty in applying the treatment, and uncertainty.^[7]

Today's improved medicine aims not only to eliminate diseases but also to increase the quality of life of individuals. For this reason, increasing efforts are being made to measure well-being and quality of life. Measuring quality of life provides significant gains in the development of therapeutic process by monitoring the patient's reactions to the disease and following the efficacy of medical treatment.

^[8] The World Health Organization stated that there is a

close relationship between the definition of health and quality of life by indicating “Healthy is not only the absence of disease or disability but also physical, mental and social well-being.”

In clinical practice, it has been reported that pleurodesis should be performed to improve the quality of life in patients with MPE with severe dyspnea. The aim of the present study was to determine the effect of pleurodesis on the quality of life of patients diagnosed with MPE.

MATERIALS AND METHODS

Our research was designed as a prospective and observational study. The study was conducted on patients with MPE who were applied pleurodesis between February 2018 and February 2019 in our clinic. The study was approved by our university’s non-Interventional clinical research ethics committee (decision no. 42, dated 06/02/2019). Informed consent was obtained from all of the patients.

Inclusion criteria of the study are listed below.

Patients

- who underwent pleurodesis in our clinic between February 2018 and February 2019
- with MPE
- not receiving immunosuppressive or anti-inflammatory treatment
- aged 18–75 years
- who underwent pleurodesis through tube thoracostomy

Patients with no expansion of the lung on X-ray were excluded from the study.

The patients were admitted to the thoracic surgery clinic. A thoracic tube of 28 F thickness was placed into the pleural cavity for drainage of the fluids where the anterior axillary line and the fifth intercostal space intersected within the corresponding hemithorax (the right or left hemithorax where the effusion was present), and the total drainage of the fluid was ensured. On the next morning, chest X-ray was seen, and the lung had been completely expansive. Thereafter, the volume of pleural fluid draining at 08:30 am was monitored daily. When drainage volume decreased to 100 ml/day, pleurodesis was performed with talc powder prepared in the form of 4 g of sterile vial and consisting of large particulates without asbestos.

The dry talcum powder for pleurodesis treatment was diluted with 100 ml of isotonic NaCl as homogeneous as possible. Ten milliliters prilocaine (Priloc 2% 20 mL; Vem ilaç, Istanbul, Turkey) and 10 ml bupivacaine (Marcaine 0.5% 20 mL; AstraZeneca, Istanbul, Turkey) were added to the component. The component was then drawn into two 50 ml syringes. It was given to the pleural space through tube thoracostomy directly, and tube thoracostomy was clamped to prevent the component going outside from the pleural space. For 4 h, the patient changed his/her po-

sition (at 15-minute intervals) to spread the component into the thorax. At the end of this period, the clamp of tube thoracostomy was opened, and the component was drained. Control chest X-ray was seen at 08:30 am on the next day. After verification that there is no fluid accumulation in the thorax with chest X-ray, tube thoracostomy was terminated, and the patient was discharged on the same day.

Patients’ demographic data were recorded by applying the introductory information form during hospitalization. According to this form, 11-point open-ended questions about gender, age, height, body weight, marital status, education level, presence of other chronic disease, use of tobacco products, alcohol, or other addictive substances, and histopathological diagnosis of the primary tumor were asked, and the form has to be filled out. On day 11 of discharge, the 36-Item Short Form Survey (SF-36) quality of life scale was applied again to the patients who presented to the outpatient clinic. As the score of each item in SF-36 increases, the health-related quality of life is indicated to increase. The quality of life can be evaluated according to each subdimension or globally with the scale. The scores range from 0 to 100. A score of 100 points indicates good health status, whereas a score of 0 points indicates poor health status.^[9]

Statistical analysis

Data were evaluated using the IBM SPSS Statistics 25.0 statistical package program (released 2017, IBM SPSS Statistics for Windows, version 25.0; IBM Corp., Armonk, NY, USA). Number of units (n), percentage (%), mean±standard deviation (Mean±SD), minimum (min) and maximum (max) values, median (M), and 25th percentile (C1) and 75th percentile (C3) values were presented as descriptive statistics. Internal consistencies related to the SF-36 quality of life subscales were indicated by Cronbach’s alpha coefficient. Normal distribution of numerical variables was evaluated by Shapiro–Wilk normality test and Q–Q graphs. The differences of psychological health subscale of SF-36 scale between before and after the procedure were evaluated by dependent sample t test for it has provided the normal distribution assumption. For the other subscales in which the differences were not normally distributed, pre- and post-procedure scores were compared using Wilcoxon test. Comparison of the scores of pre- and post-procedure subdimensions for the independent variables (e.g., gender, marital status, education level, other chronic diseases, and histopathological diagnosis of primary tumor) in the introductory information form was performed by two-way analysis of variance for repeated measurements from general linear models. Multiple comparisons were evaluated by the Bonferroni test. The relationship between age or body mass index (BMI) and SF-36 scale subdimensions was examined by Spearman correlation analysis. A p value <0.05 was considered statistically significant.

RESULTS

A total of 33 patients underwent pleurodesis during the evaluation period in our clinic. Four of the patients were excluded from the study due to the use of drugs (one due to steroid treatment and three due to non-steroidal anti-inflammatory drugs for non-relieved pain). Five patients were excluded from the research because their pleurodesis was performed using video-assisted thoracoscopic surgery. Finally, the study was conducted on 24 patients.

The mean age of the patients was 54.29 ± 13.84 years. The body weights of the cases were between 44 and 85 kg, and the mean BMI was 21.69 ± 3.71 kg/m². Female patients were 70.8% (n=17) of the cases.

Half of the patients (n=12) were applied pleurodesis due to pleura metastasis of breast cancer, whereas 29.2% (n=7) due to lung cancer and the rest (20.8%, n=5) due to ovarian carcinomas, respectively. Information on the

demographic and clinical data of the cases is detailed in Tables 1 and 2.

The comparison of the results obtained from responses before and after the procedure in the SF-36 quality of life scale is shown in Table 3. With respect to these analyses, pleurodesis provided significantly positive results on all parameters ($p < 0.05$), except for only mental health ($p = 0.20$).

Correlation and significance values between the patients' age or BMI values and each of the criteria of the SF-36 quality of life scale are shown in Table 4. Accordingly, while age did not significantly differ before pleurodesis ($p > 0.05$), it was significantly different after pleurodesis ($p < 0.05$) with respect to energy-vitality, mental health, and general health perception. Age was also positively correlated with respect to mental health before the procedure and negatively correlated with social functioning ($r < 0.05$). However, there was no correlation between any criteria and age after the procedure ($r > 0.05$). BMI did not show any significant correlation with any criteria of the scale neither before pleurodesis nor after pleurodesis ($p \geq 0.05$). In addition, it did not correlate with any criteria ($r \geq 0.05$), except for the negative correlation of the cases in the pre-pleurodesis period ($r = -0.04$).

Table 1. Demographic characteristics of the patients

| | Mean±SD | Min-Max |
|--------------------------------------|-------------|-------------|
| Age (years) | 54.29±13.84 | 41–84 |
| Height (cm) | 164.21±9.15 | 150–184 |
| Body weight (kg) | 58.42±10.45 | 44–85 |
| Body mass index (kg/m ²) | 21.69±3.71 | 17.36–31.11 |

SD: Standard deviation; Min: Minimum; Max: Maximum.

Table 2. Demographic and clinical characteristics of the patients

| | n | % |
|------------------------------------|----|------|
| Gender | | |
| Female | 17 | 70.8 |
| Male | 7 | 29.2 |
| Education | | |
| Primary school | 6 | 25 |
| High school | 15 | 62.5 |
| Bachelor's degree | 3 | 12.5 |
| Chronic diseases | | |
| Hypertension | 6 | 25 |
| Diabetes mellitus | 1 | 4.2 |
| Hypertension and diabetes mellitus | 4 | 16.7 |
| Tobacco product use story | | |
| Have | 10 | 41.7 |
| No | 14 | 58.3 |
| Alcohol use story | | |
| Have | 1 | 4.2 |
| No | 23 | 95.8 |
| Primary tumor diagnosis | | |
| Lung | 7 | 29.2 |
| Reast | 12 | 50.0 |
| Ovarian | 5 | 20.8 |

Table 3. Comparison of SF-36 quality of life questionnaire results between before and after pleurodesis

| n=24 | Mean±SD | Min-Max | p |
|---------------------------|--------------|-------------|-------|
| Physical function | | | |
| BP | 15.00±13.022 | 0.00–35.00 | 0.001 |
| AP | 45.00±25.41 | 0.00–75.00 | |
| Physical role difficulty | | | |
| BP | 0.00±0.00 | 0.00–0.00 | 0.000 |
| AP | 50.00±42.35 | 0.00–100.00 | |
| Emotional role strength | | | |
| BP | 45.83±29.18 | 0.00–66.67 | 0.000 |
| AP | 83.33±34.05 | 0.00–100.00 | |
| Energy – vitality | | | |
| BP | 23.75±10.45 | 10.00–40.00 | 0.011 |
| AP | 57.50±12.77 | 30.00–75.00 | |
| Mental health | | | |
| BP | 50.00±7.37 | 36.00–60.00 | 0.200 |
| AP | 69.50±16.21 | 48.00–92.00 | |
| Social functionality | | | |
| BP | 20.31±14.19 | 0.00–37.50 | 0.000 |
| AP | 57.81±16.82 | 25.00–75.00 | |
| Pain | | | |
| BP | 16.56±8.37 | 0.00–22.50 | 0.015 |
| AP | 54.06±6.25 | 45.00–65.00 | |
| General health perception | | | |
| BP | 35.42±13.02 | 15.00–75.00 | 0.008 |
| AP | 55.63±17.77 | 31.00–80.00 | |

BP: Before pleurodesis; AP: After pleurodesis; SD: Standard deviation; Min: Minimum; Max: Maximum.

Table 4. Comparison between age or BMI parameters and SF-36 survey subgroup scores before and after pleurodesis

| | Age | | BMI | |
|---------------------------|-------|-------|-------|------|
| | r | p | r | p |
| Physical function | | | | |
| BP | -0.36 | 0.08 | -0.33 | 0.12 |
| AP | -0.15 | 0.48 | -0.16 | 0.46 |
| Physical role difficulty | | | | |
| BP | – | – | – | – |
| AP | -0.32 | 0.13 | -0.33 | 0.12 |
| Emotional role strength | | | | |
| BP | 0.10 | 0.63 | -0.10 | 0.66 |
| AP | -0.25 | 0.23 | -0.24 | 0.27 |
| Energy–vitality | | | | |
| BP | -0.31 | 0.14 | -0.14 | 0.51 |
| AP | -0.50 | 0.01 | -0.33 | 0.12 |
| Mental health | | | | |
| BP | 0.01 | 0.96 | 0.05 | 0.83 |
| AP | -0.42 | 0.04 | -0.38 | 0.07 |
| Social functionality | | | | |
| BP | -0.03 | 0.87 | -0.04 | 0.84 |
| AP | -0.34 | 0.10 | -0.33 | 0.12 |
| Pain | | | | |
| BP | 0.25 | 0.24 | 0.24 | 0.26 |
| AP | -0.37 | 0.08 | -0.41 | 0.05 |
| General health perception | | | | |
| BP | -0.20 | 0.34 | -0.19 | 0.39 |
| AP | -0.58 | 0.003 | -0.36 | 0.08 |

BP: Before pleurodesis; AP: After pleurodesis; BMI: Body mass index.

DISCUSSION

Pleurodesis is based on the introduction of certain chemical substances between the two pleural sheets and the formation of adhesions between the two sheets by inflammation of substances. Thus, there will be no gap left for the occurrence of pleural effusion. This situation provides a permanent palliative benefit to the patient for whom pleural effusion accumulates because of cancer and foreseen to recur even if it is emptied.

Since major surgical procedures, such as thoracotomy, will bring unnecessary load to the patient for applying the substances between the two pleural sheets, minimally invasive methods are used as much as possible. In addition to direct drug administration with video-assisted thoracoscopic surgery, substances can also be applied via a tube thoracostomy with only local anesthesia without performing systemic anesthesia. There is no significant difference emphasized between the two methods in the literature. In our clinical practice, pleurodesis with thoracoscopic surgery was only performed when additional surgery, such as pleural thickening or biopsy is required. Since there is no significant difference between the two methods,

surgery requiring general anesthesia was not performed for only applying pleurodesis. In our study, only patients who underwent pleurodesis via tube thoracostomy were included.

There are various substances used in pleurodesis to create inflammation in the pleura, such as sterile talc, tetracycline, and bleomycin. However, with a success rate of 80%–90%, the most effective agent has been shown to be sterile talc. For this reason, in our routine practice, sterile talc was used for this purpose.

The amount of sterile talc required for pleurodesis is reported to be in the range of 2–5 g. To prevent respiratory failure in the alveolocapillary membrane because of the absorption of sterile talc into the lung parenchyma, pleurodesis with sterile talc that is obtained by performing sterilization on cosmetic talcum powder, was not applied. In our clinic, a talc powder prepared in the form of 4 g of sterile vial and consisting of large particulates without asbestos was used. Since large particles of talc are present in this preparation, the absorption of particles from the lung parenchyma and the complications reported thereon are virtually absent.

It is important that the patient does not use steroid or non-steroidal anti-inflammatory drugs for up to a week after the procedure. If possible, these drugs should be discontinued for 1 week prior to the procedure. Therefore, patients that used immunosuppressive or anti-inflammatory drugs were excluded from the study so that this risk factor could not affect our results.

Considering that the mean age of the cases we evaluated is 54.29 ± 13.84 years, it can be said that our cases consisted of a slightly younger population. However, it should be noted that an 84-year-old patient was also considered. Considering that 50% of our patients are patients with breast carcinoma, it is not surprising that 70.8% of the cases are women.

In the literature, it is stated that the most common cause of MPE is the lung, and the second is breast cancer. However, patients with breast carcinoma were in the first place in our cases. We think that the answer of why lung cancer was not first in our cases is addictions, such as consumption of alcohol or tobacco products, to have been less than half of the cases.

The SF-36 quality of life scale is an individual assessment scale developed by Ware in 1987 to be used in clinical practice and research, evaluation of health policies, and general population surveys.^[9] The reliability and validity of the scale in Turkey has been performed by Koçyiğit et al. in 1999.^[10] The scale consists of 36 items, which measure eight dimensions.^[11] We also tried to evaluate the changes in the pleurodesis-related quality of life of our patients by comparing the values of the SF-36 scale between before and after the procedure.

With respect to the comparison of the responses of the patients to the SF-36 quality of life scale results between before and after the procedure, pleurodesis provided

significantly positive results on all parameters ($p<0.05$), except for mental health ($p=0.20$). The main reason for impairment in mental health is that these patients have advanced cancers. We believe that the explanation of that is if pleurodesis does not change the stage of cancer. However, the presence of significant contribution of the treatment on all of the other parameters is an indication of how important pleurodesis is.

In the results of correlation analysis between SF-36 scale criteria and age, it was observed that there was no significant difference with regard to energy–vitality, mental health, and general health perception before pleurodesis. However, there was a significant difference after pleurodesis. This situation provides hints that young patients can benefit more from pleurodesis. However, studies with larger series and age ranges are needed to confirm the validity of this data.

Furthermore, while age was positively correlated with mental health before the procedure ($r<0.05$), no correlation was demonstrated after the procedure ($r>0.05$). According to our study results, it can be concluded that older patients can mentally maintain themselves better before the procedure. However, the results are similar in all patients after the procedure. We believe that this may be a conclusion for a positive effect of pleurodesis on younger patients.

According to BMI, the results of the scale did not show any significant result or correlation. Therefore, we think that the patient's cachexia status due to primary disease has no effect on the quality of life that pleurodesis provided.

The main limitation of our study is the limited number of cases. To obtain better results, multicenter large-scale studies are needed. In addition, it will be useful to conduct survival analyses other than that on the quality of life in further studies.

In our prospective observational study, we tried to evaluate the results of pleurodesis on the quality of life of patients by means of the SF-36 quality of life scale. The study has demonstrated that pleurodesis positively affects all of the quality of life parameters except for only mental health. Our correlation analysis revealed that especially younger patients had more benefits with pleurodesis. The same analysis also revealed that BMI, i.e., the patient's disease-related cachexia, had no effect on the outcome. We believe that pleurodesis should be performed in all patients with MPE, if possible.

Ethics Committee Approval

İzmir Katip Çelebi University's non-Interventional clin-

ical research ethics committee (decision no. 42, dated 06/02/2019).

Peer-review

Internally peer-reviewed.

Authorship Contributions

Concept: H.E., H.D.C.; Design: H.E.; Data collection &/or processing: H.D.C.; Analysis and/or interpretation: H.E.; Literature search: H.E., H.D.C.; Writing: H.E.; Critical review: H.E.

Conflict of Interest

None declared.

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Plörodez İşlemi Yapılan Hastalarda Yaşam Kalitesinin Değerlendirilmesi

Amaç: Malign plevral efüzyonlar kişinin yaşam kalitesinin düşmesine sebep olur ve bu grup hastalardaki en önemli anksiyete nedenidir. Günümüzde sadece hastalıkların ortadan kaldırılması değil, kişilerin yaşam kalitelerinin artırılmaları da hedeflenmektedir. Bu çalışma, malign plevral efüzyon tanısı almış hastalara yapılan plörodez işleminin hastaların yaşam kalitesi üzerinde etkilerini belirlemek amacıyla planlandı.

Gereç ve Yöntem: Kliniğimizde plörodez işlemi uygulanan 24 olgu ileriye dönük olarak çalışmaya dahil edildi. Hastalara tüp torakostomi aracılığı ile talk plörodez işlemi uygulandı. Hastalara yatışları esnasında ve taburculuğunun 11. gününde SF-36 yaşam kalitesi ölçeği uygulandı. Elde edilen veriler istatistiksel olarak incelendi.

Bulgular: Hastaların %70.8'i (n=17) kadın olguları. Ortalama yaş 54.29 ± 13.84 yılı. %50 (n=12) olguya meme, %29.2 olguya (n=7) akciğer ve geri kalanlarına (n=5, %20.8) over karsinomlarının plevra metastazları nedeniyle plörodez uygulanmıştı. Olguların işlem öncesi ve sonrası SF-36 yaşam kalitesi ölçek sonuçlarına verdikleri yanıtların karşılaştırılması sonucunda, plörodez hastaların yalnızca ruhsal sağlıkları üzerinde istatistiksel olarak anlamlı sonuç vermemiş olup (p=0.20) geri kalan bütün parametreler üzerinde anlamlı ve olumlu sonuçlar sağlamıştır (p<0.05).

Sonuç: Ruhsal sağlıkta bozulma ilgili asıl sebep hastanın ileri evre kanser hastası olmasıdır. Plörodez işleminin kanserin evresini değiştirmemesi sebebiyle ruhsal sağlıktaki bozulma üzerine etkili olmadığını düşünmekteyiz. Ancak diğer parametrelerin tümü üzerine anlamlı katkılarının olması işlemin ne kadar önemli olduğunu göstergesidir. Çalışmamız ayrıca, genç yaştaki hastaların plörodezden daha fazla yararlanabileceği konusunda ipuçları vermiştir. Primer hastalığa bağlı olarak hastanın kaşeksi durumunun ise plörodezin sağlayacağı yaşam kalitesi üzerine etkisi olmadığını düşünmekteyiz. Sonuç olarak malign plevral efüzyonu olan tüm hastalarda eğer mümkün ise plörodez işleminin uygulanmasının gerekli olduğuna inanmaktayız.

Anahtar Sözcükler: Plevral efüzyon malign; plörodez, yaşam kalitesi.