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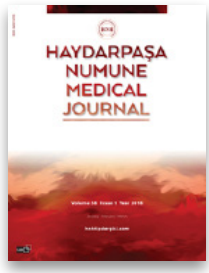

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ORIGINAL ARTICLE

Changes in Survival According to Epidemiological and Histological Features of Pleural Mesothelioma Cases Followed in the Oncology Outpatient Clinic

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Abstract

Introduction: Malignant pleural mesothelioma (MPM) is an extremely aggressive malignant tumor of the pleura and its survival is poor. We aimed to determine possible epidemiological and histological features that may affect survival, and to form treatment models according to these features.

Methods: We retrospectively reviewed of pathologically confirmed MPM cases followed up in the oncology outpatient clinic. The data of patient's sociodemographic characteristics, Eastern Cooperative Oncology Group performance status, tumor cell type, lymph node involvement, disease stage, treatment modalities, chemotherapy and, response to treatment, metastasis site, comorbidities, used supportive treatments and their effects on survival were analyzed.

Results: A total of 38 mesothelioma patients, 26.3% (n=10) female and 73.7% (n=28) male, with a mean age of 60.21±8.99 (38–76) years were included. Of the cases 31.6% (n=12) survived and 68.4% (n=26) died. A significant difference was found between TNM stages regarding mortality ($p<0.05$). When the significant findings were examined, while Stage 1A was high in the survived patients, mortality was higher in Stage IB, IIIB, and Stage IV cases. No significant correlation was found between T and N staging and mortality ($p>0.05$). M stage, on the other hand, showed a significant difference in terms of mortality, and mortality was high in M1. The survival of the patients who received surgery+KT+ radiation therapy (Trimodal Treatment) was longer than the others.

Discussion and Conclusion: According to our findings, the mean survival was longer compared to the literature, and survival was longer in the patients who received trimodal treatment. Having a family history of cancer in half of the cases was also interesting.

Keywords: Malignant pleural mesothelioma; Survival; Trimodal treatment.

Malignant mesothelioma is a primary malignant tumor of the mesothelial lining originating from mesothelial cells. Approximately 85% of all mesotheliomas originate from the pleura, 15% from the peritoneum, and the rest (<1%) from the pericardium or tunica vaginalis[1]. Malignant pleural mesothelioma (MPM) is a fatal tumor that occurs due to asbestos or erionite exposure[2-5]. In the United States, diffuse pleural mesothelioma affects 3,000 patients each year and its annual incidence is 1 in 100,000[1]. In our country, it is estimated that approximately 1,000 new cases of MPM develop annually[2]. Since MPM has a quite aggressive behavior and is rarely seen, studies are being conducted to investigate prognostic factors and new treatment regimens. Therefore, the records of mesothelioma patients who were followed up at the Health Sciences University Süreyyapaşa Chest Diseases and Thoracic Surgery Training

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and Research Hospital Oncology Polyclinic between 2015 and 2019 were retrospectively reviewed.

Materials and Methods

The study included a retrospective evaluation of the data of pathologically confirmed MPM patients who were admitted to the oncology outpatient clinic between 2015 and 2019, including surgery, chemotherapy, radiotherapy, a combination of these treatments, or supportive treatment.

The data of the medical oncology outpatient clinic were analyzed in terms of age, gender, smoking, cancer history, place of residence, Eastern cooperative oncology group (ECOG) performance status, tumor cell type, lymph node involvement, stage of the disease, treatment modalities, chemotherapy and radiotherapy follow-up period, response to treatment, site of metastasis, comorbidities, supportive therapies used, and survival were analyzed.

Patients were staged according to the TNM staging system recommended by the International Mesothelioma Interest Group (IMIG) based on pathological and clinical findings, including imaging studies[1,2,6]. Imaging studies included Thorax CT or MRI, and bone scintigraphy or PET-CT when indicated.

The study was initiated after the approval of the Ethics Committee with the decision number Süreyyapaşa E.A.H. EK 116.2017.R-317.

Statistical Analysis

Number cruncher statistical system 2007 Statistical Software (Utah, USA) program was used for statistical analysis. While evaluating the study data, Kolmogorov Smirnov test and box plot graphs were used for the conformity of the data to the normal distribution, as well as descriptive statistical methods (mean, standard deviation, median, frequency, ratio). For the evaluation of nonnormally distributed variables, the Mann–Whitney U-test was used according to mortality. Pearson Chi-Square test, Fisher's exact test and Fisher–Freeman Halton test were used to compare qualitative data. Kaplan–Meier survival analysis and Log rank test were used for survival analysis. Significance was evaluated at the $p<0.05$ level.

Results

The study was conducted in the oncology outpatient clinic of Süreyyapaşa Chest Diseases and Thoracic Surgery Training and Research Hospital between 2015 and 2019. The study was carried out with a total of 38 mesothelioma patients, 26.3% (n=10) female and 73.7% (n=28) male. The mean age of the patients was 60.21±8.99 (38–76) years (Table 1).

Table 1. Distributions of descriptive characteristics

Descriptive charactersitics	n (%)
Age (years)	
Min–Max (Median)	38–76 (60)
Mean±SD	60.21±8.99
Gender	
Female	10 (26.3)
Male	28 (73.7)
Height (cm)	
Min–Max (Median)	146–181 (162.5)
Mean±SD	162.74±9.65
Weight (kg)	
Min–Max (Median)	40–105 (71.5)
Mean±SD	74.05±14.43
BMI (kg/m^2)	
Min–Max (Median)	18.8–40.2 (27.4)
Mean±SD	27.99±5.37
Place of residence	
Village	1 (2.6)
Town	5 (13.2)
City	32 (84.2)
Duration of residencein the country (years)	
Min–Max (Median)	1–69 (30)
Mean±SD	36.37±16.34
Duration of residence in the final place (years)	
Min–Max (Median)	5–69 (36.5)
Mean±SD	37.37±16.34
Employment status	
Employed	22 (57.9)
Unemployed	16 (42.1)
Smoking	
No	13 (34.2)
Yes	3 (7.9)
Stopped	22 (57.9)
Number of cigarettes (package/year) (n=25)	
Min–Max (Median)	5–104 (30)
Mean±SD	37.96±23.67
Comorbidities	
No	15 (39.5)
Yes	23 (60.5)
•Comorbidities (n=23)	
Hypertension	12 (52.2)
Diabetes	5 (21.7)
CAD	5 (21.7)
COPD	5 (21.7)
Other	6 (26.1)
Familial history of cancer in	
No	19 (50.0)
Yes	19 (50.0)
Outcome	
Alive	12 (31.6)
Exitus	26 (68.4)
Duration of follow-up (months)	
Min–Max (Median)	0.5–87.1 (13.6)
Mean±SD	19.13±18.53

There are cases with more than one comorbidities.

The mean height was 162.74±9.65 (146–181) cm, mean weight was 74.05±14.43 (40–105) kg, and mean BMI was 27.99±5.37 (18.8–40.2) kg/m^2. Regarding the place of residence, 2.6% (n=1) of the cases were in the village, 13.2% (n=5) lived in the town and 84.2% (n=32) lived in the city. The duration of residence in the country varied between 1 and 69 years, with an average of 36.37±16.34 years and the duration of living in the last place of residence varied between 5 and 69 years, with an average of 37.37±16.34 years. The employment rate of the cases was found to be 57.9% (n=22). It was observed that 34.2% (n=13) did not smoke, 7.9% (n=3) smoked, and 57.9% (n=22) quit. Smokers and ex-smokers preferred filtered cigarettes. The mean amount of smoking was 37.96±23.67 (5–104) packs per year. A concomitant disease was present in 60.5% of the cases (n=23). When the diseases were examined, there was 52.2% (n=12) hypertension, 21.7% (n=5) diabetes, 21.7% (n=5) CAD, 21.7% (n=5) COPD, and 26.1% (n=6) other diseases were observed. The rate of cases with a family history of cancer was 50.0% (n=19). It was observed that lung ca, breast ca, leukemia, skin ca, pancreatic ca, prostate ca, etc. cancer types were present in mothers, fathers, siblings, uncles, aunts, and children of these cases. It has been seen that there are types of cancer. When the final outcome was evaluated, it was found that 31.6% (n=12) of the cases survived and 68.4% (n=26) died. Follow-up periods ranged from 0.5 to 87.1 months, with a mean follow-up period of 19.13±18.53 months (Table 2).

Epithelioid mesothelioma was found in 86.9% (n=33) of the cases, sarcomatoid mesothelioma in 7.9% (n=3), and mixed type mesothelioma in 5.2% (n=2). TNM stage was as follows: 15.8% (n=6) IA, 26.3% (n=10) IB, 5.3% (n=2) II, 2.6% (n=1) IIIA, 28.9% (n=11) IIIB and 21.1% (n=8) IV. Regarding the T stage, 26.3% (n=10) was in T1, 15.8% (n=6) T2, 36.8% (n=14) T3 and 21.1% (n=8) was in the T4 stage. When the N phase was examined, 47.4% (n=18) were N0, 28.9% (n=11) N1 and 23.7% (n=9) N2. Regarding metastasis, 78.9% (n=30) of the cases were M0 and 21.1% (n=8) of them were M1. CT was used in all cases (n=38), scintigraphy in 5.3% (n=2), MR in 10.5% (n=4) and PET in 97.4% (n=37) for staging. According to their ECOG performance scores, 63.2% (n=24) of the cases were active, 21.0% (n=8) had difficulty in doing physical activities, 13.2% (n=5) could do daily activities and 2%, 6 of them (n=1) had limited daily activities. In 63.2% (n=24) of the cases, no weight change was observed after the disease; 26.3% (n=10) lost weight, 10.5% (n=4) gained weight. Metastasis rate was found to be 42.1% (n=16). Metastases were found in the brain in 6.3% (n=1), bone in 12.5% (n=2), adrenal region in 12.5% (n=2), and in other regions in 75.0% (n=12) (Table 3).

Table 2. Distributions of disease characteristics

Disease features	n (%)
Pathological diagnosis	
Epiteloid mesothelioma	33 (86.9)
Sarkomatoid mesothelioma	3 (7.9)
Mixt type mesothelioma	2 (5.2)
TNM stage	
IA	6 (15.8)
IB	10 (26.3)
II	2 (5.3)
IIIA	1 (2.6)
IIIB	11 (28.9)
IV	8 (21.1)
T stage	
T1	10 (26.3)
T2	6 (15.8)
T3	14 (36.8)
T4	8 (21.1)
N stage	
N0	18 (47.4)
N1	11 (28.9)
N2	9 (23.7)
M stage	
M0	30 (78.9)
M1	8 (21.1)
Methods used for staging	
CT	38 (100)
Sintigraphy	2 (5.3)
MR	4 (10.5)
PET	37 (97.4)
ECOG performance score	
Active	24 (63.2)
Hard physical activity	8 (21.0)
Can do daily physical activity	5 (13.2)
Limited daily physical activity	1 (2.6)
Weightchangesduetodisease	
No change	24 (63.2)
Lost weight	10 (26.3)
Gained weight	4 (10.5)
Metasthasis	
No	22 (57.9)
Yes	16 (42.1)
Metasthasissite (n=16)	
Brain	1 (6.3)
Bone	2 (12.5)
Surrenal	2 (12.5)
Other	12 (75.0)

Multiple locations were chosen; ECOG: Eastern cooperative oncology group.

Table 3. Distribution of treatment-related characteristics

Treatment characteristics	n (%)
Number of treatments	
One type of treatment	14 (36.8)
Two types of treatments	10 (26.4)
Three types of treatments	14 (36.8)
Types of treatments	
CT+RT+Surgery	14 (36.8)
CT+RT	6 (15.8)
CT+Surgery	4 (10.5)
CT	6 (15.8)
RT	1 (2.6)
Surgery	5 (13.2)
Other	2 (5.3)
Palliative RT	
No	13 (34.2)
Yes	25 (65.8)

One type of treatment was given to 36.8% (n=14) of the cases, two types of treatment to 26.4% (n=10) and three types of treatment (CT+ radiation therapy [RT] + surgery) to 36.8% (n=14) (Fig. 1).

When the types of treatment were examined, 36.8% (n=14) had CT+RT+Surgery, 15.8% (n=6) CT+RT, 10.5% (n=4) CT+Surgery, 15.8% (n=6) CT, 2.6% (n=1) RT, 13.2% (n=5) surgery and 5.3% (n=2) other treatments were given. The rate of cases who received palliative RT treatment was 65.8% (n=25) (Fig. 2 and Table 4).

The number of cures in the first sequence of CT treatment ranged from 1 to 6, with an average of 5.13±1.33, duration of treatment varied between 0.1 and 12.2 months, with an average of 3.69±2.04 months. In the second sequence of CT treatment, the number of cures changed between 1 and 6 with a mean of 3.77±2.09, and the treatment durations ranged from 0.01 to 6.5 months, with an average of 3.12±1.76 months. In the third sequence of CT treatment, the number of cures changed between 2 and 6 with a mean of 4.14±1.46, and the duration of treatment varied between 0.9 and 6.8 months, with an average of 3.45±1.77 months. In the 4th sequence of CT treatment, the number of cures was between 2 and 4, with a mean of 3.00±11.41, and the duration of treatment varied between 0.7 and 1.4 months, with an average of 1.05±0.49 months. The number of cures of a case who received 5 sequences of CT treatment was 5 and the treatment lasted for 4.87 months.

Table 4. Distribution of features of chemotherapy treatment

	n	Min–Max (Median)	Mean±SD
1st sequence			
Number of CT cures	30	1–6 (6)	5.13±1.33
CT duration (months)	30	0.1–12.2 (3.7)	3.69±2.04
2nd sequence			
Number of CT cures	13	1–6 (4)	3.77±2.09
CT duration (months)	13	0.01–6.5 (2.8)	3.12±1.76
3rd sequence			
Number of CT cures	7	2–6 (4)	4.14±1.46
CT duration (months)	7	0.9–6.8 (3.2)	3.45±1.77
4th sequence			
Number of CT cures	2	2–4 (3)	3.00±1.41
CT duration (months)	2	0.7–1.4 (1.1)	1.05±0.49
5th sequence			
Number of CT cures	1	5–5 (5)	5.00±0
CT duration (months)	1	4.9–4.9 (4.9)	4.87±0
Total			
Number of sequences	38	0–5 (1)	1.39±1.20
Number of CT cures	38	0–21 (6)	6.39±5.78

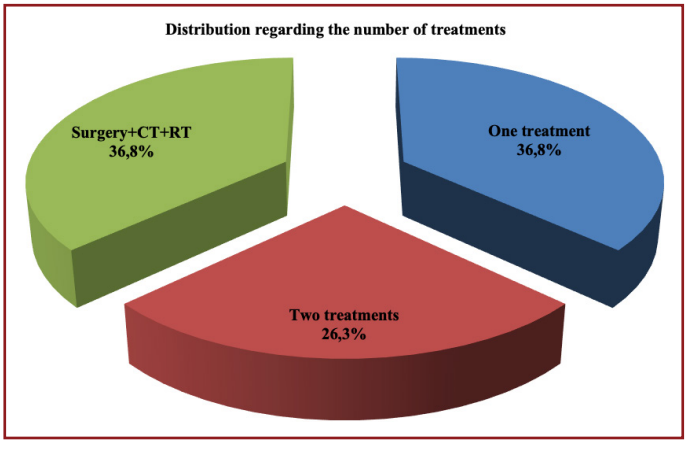

Figure 1. Distribution of the number of treatments.

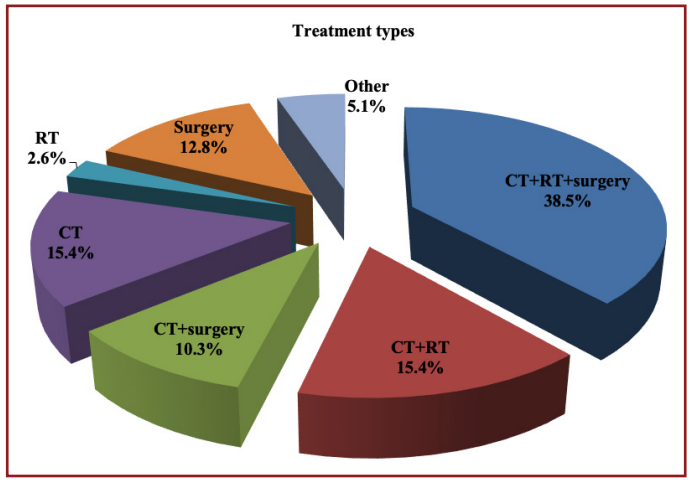

Figure 2. Distribution of treatment types.

The total sequences varied between 0 and 5, with a mean of 1.39±1.20. The total number of cures varied between 0 and 21, with a mean of 6.39±5.78 (Table 5).

There was pain in 73.7% (n=28) of the cases. When the medication for pain management was examined, NSAI use was observed in all cases; morphine was used in 14.2%, other analgesics in 7.1%, tramadol in 17.9% and fentanyl in 53.6%. Bisphosphonate and antidepressant use was reported in 5.3% (n=2) of the cases. In addition, 26.3% (n=10) of cases used oral nutrition products for enteral nutrition, and all of the cases applied this diet because of cachexia. Parenteral nutrition is reported in 10.5% (n=4) cases, and 3 of them changed to parenteral nutrition because of cachexia and 1 for ileus. Appetite-stimulating drug use was reported in 23.7% (n=9), and Megestrol acetate was used for this aim. There were 7.9% (n=3) cases in which blood and blood products were used, all of which were erythrocyte products. Dyspnea treatment was given to 34.2% (n=13) cases; 30.8% were given oxygen; 7.7% NIMV, 23.1% nebulizer; 38.5% bronchodilator, and 69.2% thoracentesis (Table 6).

Table 5. Distributions of other treatment methods used

Other treatments	n (%)
Pain status	
Yes	10 (26.3)
No	28 (73.7)
•Drug use for pain (n=28)	
NSAID	28 (100)
Morphin	4 (14.3)
Other analgesics	2 (7.1)
Tramadol	5 (17.9)
Phentanyl	15 (53.6)
Biphosphonate use	
No	36 (94.7)
Yes	2 (5.3)
Antidepressant use	
No	36 (94.7)
Yes	2 (5.3)
Enteral nutrition status	
No	28 (73.7)
Yes	10 (26.3)
Parenteral nutrition status	
No	34 (89.5)
Yes	4 (10.5)
Appetite-stimulating drug use	
No	29 (76.3)
Yes	9 (23.7)
Use of blood or blood products	
No	35 (92.1)
Yes	3 (7.9)
Treatment for dyspnea	
No	25 (65.8)
Yes	13 (34.2)
•Treatments used for dyspnea (n=13)	
Oxygen	4 (30.8)
NIMV	1 (7.7)
Nebulizer	3 (23.1)
Bronchodilator	5 (38.5)
Torasynthesis	9 (69.2)
Pleuredesis	4 (30.8)

Multiple choices have been made.

There was no significant difference between the age, gender, and BMI distributions of the cases regarding mortality (p>0.05). Distribution of places of residence, duration of living in the country, and duration of living in the last place of residence also do not have a significant difference in terms of mortality (p>0.05). Employment status, smoking, concomitant disease, and family history of cancer also did not differ significantly according to mortality (p>0.05) (Table 7).

A significant difference was found between TNM staging in terms of mortality (p<0.05). When the significant findings were examined, while Stage 1A was high in the alive ones, mortality was high in Stage IB, IIIB, and Stage IV cases. No significant correlation was found between T stage and N staging and mortality (p>0.05). M stage, on the other hand, showed a significant difference in terms of mortality, and mortality was high in M1. The number of treatments, types of treatment, and total CT cures did not differ significantly according to mortality (p>0.05). While 12 cases survived (31.6%) out of 38 cases, 26 deaths were observed. The mean survival was 28.64±5.54 months. The 1-year (12-month) cumulative survival rate was 68.1% with a standard error of 8%. The 2-year survival rate was 31.9%, with a standard error of 8.4%. At the end of 3 years, these rates decrease to 23.9% and 8% (Fig. 3 and Table 8).

In cases receiving only one treatment, 4 cases survived (28.6%), 10 deaths were observed, and the mean survival was 14,055±4.78 months. Median survival was 8.867±3.82 months. In cases receiving two treatments, 2 cases survived (20%), 8 deaths were observed, and the mean survival was 16.400±3.67 months. Median survival was 12.80±2.11 months. In cases who received surgery + CT + RT, 6 cases (42.9%) survived, 8 deaths were observed, and the mean survival was 43.631±10.41 months. Median

Table 6. Mortality evaluation regarding descriptive characteristics

	Alive (n=12)	Died (n=26)	p
Age (years)			
Min-Max (Median)	38–72 (60)	47–76 (60.5)	[a]0.203
Mean±SD	56.50±10.40	61.92±7.90	
Gender; n (%)			
Female	4 (40.0)	6 (60.0)	[b]0.694
Male	8 (28.6)	20 (71.4)	
BMI (kg/m^2)			
Min–Max (Median)	20.2–35.9 (30.4)	18.8–40.2 (26.4)	[a]0.490
Mean±SD	28.76±5.32	27.64±5.45	
Place of residence; n (%)			
Village	0 (0)	1 (100)	[c]1.000
Town	2 (40.0)	3 (60.0)	
City	10 (31.3)	22 (68.8)	
Duration of residence in the country (year)			
Min–Max (Median)	1–66 (28.5)	20–69 (35)	[a]0.175
Mean±SD	31.67±18.88	38.54±14.93	
Duration of residence in the last place (year)			
Min–Max (Median)	5–66 (43)	11–69 (33.5)	[a]0.520
Mean±SD	38.33±17.35	36.92±16.19	
Employment status; n (%)			
Employed	6 (27.3)	16 (72.7)	[b]0.725
Unemployed	6 (37.5)	10 (62.5)	
Smoking; n (%)			
No	5 (38.5)	8 (61.5)	[c]0.866
Yes	1 (33.3)	2 (66.7)	
Stopped	6 (27.3)	16 (72.7)	
Concomittant disease; n (%)			
No	7 (46.7)	8 (53.3)	[b]0.157
Yes	5 (21.7)	18 (78.3)	
Familial history of cancer; n (%)			
No	4 (21.1)	15 (78.9)	[d]0.163
Yes	8 (42.1)	11 (57.9)	

[a]Mann–Whitney U Test, [b]Fisher's Exact Test, [c]Fisher-Freeman-Halton Test, [d]Pearson Chi-Square Test.

survival was 24.00±13.12 months. When the survival rates regarding the treatments were evaluated with the Log rank test, there was a statistically significant difference between the survival rates (p=0.013; p<0.05). The survival of the patients who received surgery + CT + RT is longer than the others (Fig. 4).

Discussion

In our study, we found that the average life expectancy was longer compared to the literature. The most important of the possible reasons for this is that our hospital is one of the most experienced centers in the field of chest diseases and thoracic surgery throughout the country, and the thoracic surgery, chest diseases, palliative care unit, medical oncology departments work in a fast and coordinated manner within our hospital, and therefore, treatment for possible complications and support are provided. In addition, with the help of the palliative care unit in our hospital, planned treatments can be applied without loss of time, with maximum support treatments. Of the patients, 26.3% (n=10) were female, 73.7% (n=28) were male, and the mean age was 60.21±8.99 (38–76) years.

The average annual risk of mesothelioma for the whole world has been reported as 1.3/100,000 person-years for men and 0.2/100,000 person-years for women independent of asbestos exposure. The higher incidence in men is due

Table 7. Evaluation of mortality regarding the disease and treatment characteristics

	Alive (n=12)	Died (n=26)	p
TNM stage; n (%)			
IA	5 (83.3)	1 (16.7)	[c]0.012*
IB	2 (20.0)	8 (80.0)	
II	1 (50.0)	1 (50.0)	
IIIA	0 (0)	1 (100)	
IIIB	4 (36.4)	7 (63.6)	
IV	0 (0)	8 (100)	
T stage; n (%)			
T1	5 (50.0)	5 (50.0)	[c]0.494
T2	2 (33.3)	4 (66.7)	
T3	3 (21.4)	11 (78.6)	
T4	2 (25.0)	6 (75.0)	
N stage; n (%)			
N0	8 (44.4)	10 (55.6)	[c]0.262
N1	3 (27.3)	8 (72.7)	
N2	1 (11.1)	8 (88.9)	
M stage; n (%)			
M0	12 (40.0)	18 (60.0)	[b]0.039*
M1	0 (0)	8 (100)	
Number of treatments; n (%)			
One type of treatment	4 (28.6)	10 (71.4)	[c]0.561
Two types of treatment	2 (20.0)	8 (80.0)	
Three types of treatment (KT+RT+Surgery)	6 (42.9)	8 (57.1)	
Types of treatments; n (%)			
CT+RT+Surgery	6 (42.9)	8 (57.1)	[c]0.100
CT+RT	ss	4 (66.7)	
CT+ Surgery	0 (0)	4 (100)	
CT	0 (0)	6 (100)	
RT	1 (100)	0 (0)	
Surgery	3 (60.0)	2 (40.0)	
Other	0 (0)	2 (100)	
Total number of CT cures			
Min–Max (Median)	0–18 (6)	0–21 (5)	[a]0.515
Median±SD	7.67±6.92	5.81±5.22	

[a]Mann Whitney U-test, [b]Fisher's Exact test, [c]fisher Freeman Halton test*p<0.05.

Table 8. Survival analysis regarding the number of treatments

Treatment	n	Died	Alive	Survival rate (%)	The mean duration of survival
One tratment	14	10	4	28.6	14.055±4.78
Two treatments	10	8	2	20.0	16.400±3.67
Surgery+CT+RT	14	8	6	42.9	43.631±10.41

Kaplan-Meier analysis.

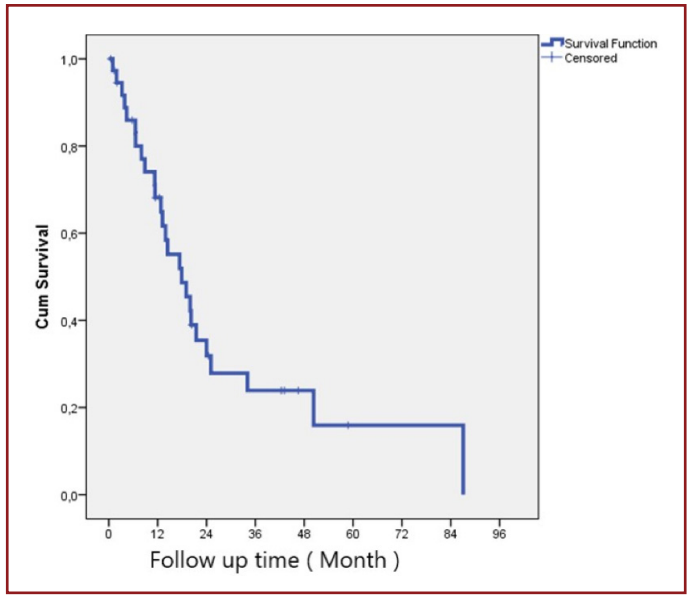

Figure 3. Survival graphic in all cases.

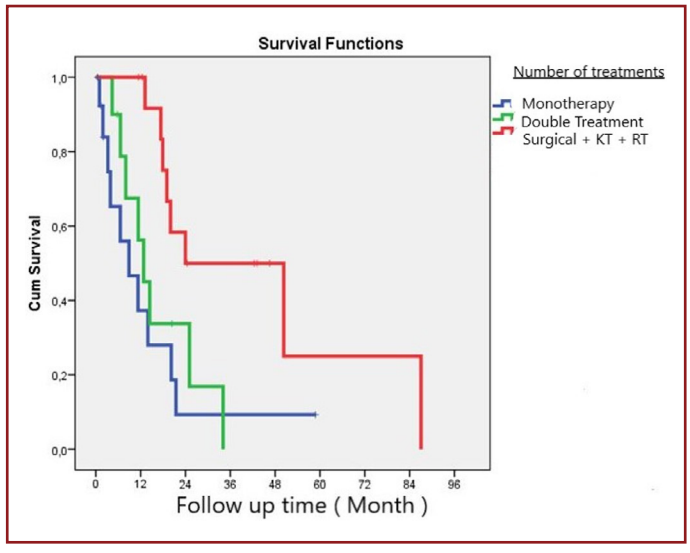

Figure 4. Survival graphic regarding the number of treatments.

to job-related causes[7,8]. In our study, gender ratios were found to be consistent with the literature. Furthermore, in the study by Adams et al.[9] with large series, the mean age was found to be 60 years, in parallel with our findings. The rate of cases with a family history of cancer was found to be 50.0% (n=19). In the relatives of these cases, lung ca, breast ca, leukemia, skin ca, pancreatic ca, prostate ca, etc. types of cancer had been found. Genetic factors may also play a role in MPM. There are rare families with mutations in the BRCA1-related protein-1 (BAP1) gene, moreover, survival was prolonged in patients with BAP1 mutation[10,11]. In our study, genetic factors could not be evaluated, but it is remarkable that a family history of cancer was found at a rate of 50%.

Histological subtypes of mesothelioma include epithelioid (most common), sarcomatoid, and biphasic (mixed), including epithelioid and sarcomatoid[1]. Patients with epithelioid histology have better outcomes than those with mixed or sarcomatoid histology, so the determination of histology is essential to guide treatment. Similar to the literature, epithelioid mesothelioma was found in 86.9% (n=33) of our cases, sarcomatoid mesothelioma in 7.9% (n=3), and mixed type mesothelioma in 5.2% (n=2). Comparison of the prognosis could not be made due to the low number of other types.

Mesothelioma is a cancer that occurs with environmental or occupational exposure, therefore, epidemiological features of the disease such as gender and age distribution, latent duration, duration and dose of contact, and threshold value are closely related to the features of contact[2]. According to the data of the Türkiye Asbestos Control Strategic Plan studies, it is predicted that 336,000 people in Türkiye have been in contact with asbestos in rural areas for at least 20 years, and approximately 88,000 people still continue to have contact in rural areas[12]. In our study, the distribution of the places of residence of the patients, the duration of living in the country and the duration of living in the last place of residence do not differ significantly according to mortality. Studies in which the place of residence and occupational questioning are performed in more detail will shed light on new developments about the disease.

The National comprehensive cancer network Guidelines recommend that patients with MPM should be managed by a multidisciplinary team experienced in MPM[1]. Treatment options for these patients include surgery, RT, and/or systemic therapy. Palliative treatment and especially pain control are important in patients with advanced stages and poor performance status. Palliative treatments used in patients are observed in Table 5. As a matter of fact, most of the patients have advanced disease at the time of admission, and surgery is not recommended for these patients. In patients with medically operable MPM, trimodality therapy using chemotherapy, surgery, and hemithoracic RT was evaluated. In studies performed on trimodality, it has been found that survival increased more[13-18]. In our study, in accordance with the literature, in patients who received Surgery + CT + RT, 6 (42.9%) cases were alive and 8 deaths were observed. The mean survival was 43.631±10.41 months and the median survival was 24.00±13.12 months. These data are statistically quite significant. Surgical treatment in MPM treatment should be used in patients with Stage I-III A who are medically operable cases in combined modality treatment[19]. Chemotherapy, on the other hand, can be applied in inoperable patients who cannot undergo surgery as primary treatment, neo-adjuvant chemotherapy, and adjuvant chemotherapy. Radiotherapy applications in MPM can be named as adjuvant or neo-adjuvant applications in multimodal treatment, palliative applications and prophylactic applications. Palliative radiotherapy should be considered, especially in patients with painful chest wall infiltrations or nodules. It is known that palliative radiotherapy provides effective pain control in more than half of mesothelioma patients[2].

When the latest condition was evaluated, it was found that 31.6% (n=12) of the cases survived and 68.4% (n=26) died. Follow-up times ranged from 0.5 to 87.1 months, with a mean follow-up of 19.13±18.53 months. The prognosis of MPM is generally not good. In large case series, life expectancy is between 6 and 17 months, with an average of 12 months or less. MPM is a disease with high morbidity and mortality and does not respond well to standard treatment methods. Median survival is about 1 year. On the other hand, new treatment options provide better but moderate palliation and tumor response, and relatively long survival[1,20]. Many factors determining prognosis have been identified in the literature. The early tumor stage is one of the most important factors affecting survival in MPM. The majority of patients present as stage III according to the IMIG system[2]. In our study, a significant difference was found between TNM staging regarding mortality ($p<0.05$). When the significant findings were evaluated, while Stage IA was high in the survived cases, mortality was found to be high in Stage IB, IIIB, and Stage IV cases.

In the study of Gül et al.,[21] the factors predicting a better prognosis were younger age (<50 years), having surgery, having received radiotherapy or combined chemotherapy and radiotherapy, and finally receiving trimodality treatment. Furthermore, in a recent study reviewing current data from our country, young and female gender, epithelial type, early stage, and receiving CT or multimodal treatment determined longer survival[22]. Employment status, smoking, concomitant disease status, and family history of cancer also did not cause a significant difference regarding mortality.

Conclusion

According to our findings, in which the mean survival was found to be longer compared to the literature, it was determined that survival was longer in the patients who received trimodal treatment. Having a family history of can-

cer in half of the cases was also found to be interesting, and new studies are needed on this subject. The main limitation of our study is the small number of patients in order to perform subgroup analyzes and the inability to perform genetic analyzes.

Ethics Committee Approval: The study was initiated after the approval of the Ethics Committee with the decision number Süreyyapaşa E.A.H. EK 116.2017.R-317.

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Conflict of Interest: None declared.

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