Original Article

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Clinical Characteristics of Patients with Cancer in Older Ages of 85 Years and Over

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Abstract

Aim: With the aging global population, cancer in very elderly individuals has become an increasingly relevant clinical concern. In this study, we aimed to analyze the clinical characteristics and management approaches of patients aged 85 years and older who were diagnosed with solid tumors.

Methods: This retrospective descriptive study included patients aged ≥85 years who were diagnosed with solid malignancies between January 2010 and December 2022 in a tertiary oncology center. Medical records were reviewed to collect data on demographics, presenting symptoms, comorbidities, cancer types, diagnostic methods, treatment decisions, and smoking status. Statistical analyses were performed using descriptive methods, with results expressed as means ± standard deviations. A p-value of <0.05 was considered statistically significant.

Results: The mean age of 150 patients was 89.53±2.68 years and 58% were male. The most common complaint was palpable mass/lesion (31%). Comorbidities were present in 75% of the patients. The most common cancer diagnoses were skin (30%), lung (13%) and bladder (11%) cancers. At the time of diagnosis, in the staging, positron emission tomography-computed tomography was used most frequently (43%). 27% of the patients were smokers. Surgical and hormonal treatments were primarily administered because of advancing age and co-morbidities, but the best supportive treatment was the first decision in 43% of the patients.

Conclusion: This study highlights the distribution of malignancy types, comorbidities, diagnostic trends, and treatment challenges in patients aged 85 and above, underlining the need for individualized approaches in this growing patient population.

Keywords: Geriatric oncology, very elderly patients, solid tumors, comorbidities, treatment decision, supportive care

Introduction

As the global population continues to age, the incidence of cancer in older adults is rising significantly (1). Age is one of the most important risk factors for developing cancer due to cumulative exposure to carcinogens and age-related decline in DNA repair mechanisms (2). Elderly individuals constitute a heterogeneous group not only physiologically, but also psychologically, socially, economically, and culturally (3). Consequently, cancer management in this age group presents complex challenges, including polypharmacy, comorbidities, and variability in functional status (4).

While there are numerous studies investigating cancer in elderly populations, the literature specifically focusing on patients aged 85 years and above is scarce (5). Individuals in this age bracket, often referred to as the "oldest old," are underrepresented in clinical trials, leading to gaps in evidence-based recommendations for their treatment (6). Moreover, diagnostic and therapeutic decisions for these patients are frequently influenced by clinical intuition, comorbidities, or perceived frailty, rather than standardized protocols (7-11).

We hypothesized that patients aged 85 years and older with solid tumors would present with distinct demographic, clinical, and diagnostic characteristics

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compared to younger cohorts of the elderly population and that treatment decisions would be heavily influenced by age-related factors such as comorbidity and functional limitations. The aim of this study was to analyze the demographic and clinical features, staging practices, and treatment decisions in patients aged 85 and above with solid tumors. This study will contribute to the limited literature in this area and may help guide individualized treatment strategies for this growing patient population.

Materials and Methods

Compliance with Ethical Standards

This study was approved by the Non-Interventional Clinical Research Ethics Committee of the Aydin Adnan Menderes University Faculty of Medicine (date: 22.02.2018, approval no.: 1342). The study was conducted in accordance with the principles of the Declaration of Helsinki. As the study was retrospective, informed consent was not required.

Study Design and Population

This retrospective descriptive study included patients aged ≥85 years who were diagnosed with solid malignancies and followed up at the oncology department of a tertiary care center between January 1, 2015, and December 31, 2020.

Patients aged 85 years and older with a histopathologically confirmed diagnosis of a solid tumor and complete medical records were included in the study. Patients were excluded if they had hematologic malignancies, lacked histopathological confirmation of their cancer diagnosis, or had incomplete or missing clinical data.

The variables assessed in this study included demographic characteristics such as age, sex, and socio-economic status; clinical characteristics such as the type and location of the primary tumor, histological subtype, disease stage at diagnosis, and presenting symptoms; and medical background variables, including comorbidities, smoking history, and family history of cancer. Additionally, data on diagnostic imaging methods used during staging [e.g., positron emission tomography-computed tomography (PET-CT), CT, magnetic resonance imaging], treatment modalities (e.g., surgery, chemotherapy, hormonal therapy, best supportive care), and the intended purpose of treatment (curative, palliative, or supportive) were collected and analyzed.

Statistical Analysis

The distribution of variables was assessed using the Kolmogorov-Smirnov test. Since most variables did not follow a normal distribution, data were expressed as median (minimum-maximum). Non-parametric tests were used accordingly. The Mann-Whitney U test was applied for comparisons between gender groups. Categorical variables were analyzed using the chi-square or Fisher's exact test as appropriate. Statistical analyses were conducted using SPSS version 22.0 (IBM Corp., Armonk, NY, USA), and a p-value of <0.05 was considered statistically significant.

Results

A total of 150 patients aged 85 years and older with histologically confirmed solid tumors were included in the study. While a full overview of clinical and demographic characteristics is presented in Tables 1 and 2, the results below focus on statistically significant findings.

Comorbidities and lifestyle factors demonstrated notable gender-based differences. Chronic obstructive pulmonary disease (COPD) was significantly more common among male patients (36%) than females (8%) (p=0.013). Similarly, smoking history was markedly higher in men, with 44% of males reporting a history of smoking versus only 3% of females (p=0.009). These patterns may partially explain the gender disparity observed in certain cancer types.

At the time of diagnosis, presenting symptoms also differed significantly between sexes (p=0.044). While palpable mass or lesion was the most common complaint among women (41%), urinary tract infection was the leading symptom in men (25%), suggesting possible sex-related diagnostic pathways (Table 1). Skin cancer was the

Table 1. Demographic and clinicopathological characteristics of the patients as well as comparison of these variables in terms of gender

Variables	All patients	Female	Male	p value[α]
n (%)	150	63 (42)	87 (58)	
Age (year); Median (minimum-maximum)	89 (85-99)	87 (85-96)	86 (85-99)	0.393
Comorbidities				
Hypertension	99 (66)	48 (76)	51 (59)	0.013
Heart failure	39 (26)	15 (24)	24 (28)	
COPD	36 (24)	5 (8)	31 (36)	
Diabetes mellitus	19 (13)	6 (10)	13 (9)	
Chronic renal failure	4 (3)	0	4 (15)	
Other comorbidities*	10 (7)	5 (8)	5 (6)	
Status of comorbidity				
Present	113 (75)	54 (86)	59 (68)	0.059
Absent	37 (25)	9 (14)	28 (32)	
Smoking habits				
Present	40 (27)	2 (3)	38 (44)	0.009
Absent	110 (73)	61 (97)	49 (56)	
Cancer history in family				
Present	32 (21)	12 (19)	20 (23)	0.561
Absent	118 (79)	51 (81)	67 (77)	

Table 1. Continued

Variables	All patients	Female	Male	p value[α]
Presentation				
Palpable mass/lesion	47 (31)	26 (41)	21 (24)	0.044
Urinary tract infection	26 (17)	4 (6)	22 (25)	
Pain	24 (16)	14 (22)	10 (12)	
Shortness of breath	19 (13)	5 (8)	14 (16)	
Fatigue	18 (12)	8 (13)	9 (10)	
Constipation	6 (4)	2 (3)	4 (5)	
Dysphagia	5 (3)	1 (2)	4 (5)	
Other symptoms**	9 (6)	5 (8)	4 (5)	
Primary tumor localization				
Skin	45 (30)	24 (38)	21 (24)	0.041
Lung	19 (13)	3 (5)	16 (18)	
Bladder	17 (11)	4 (6)	13 (15)	
Colorectum	14 (9)	9 (14)	5 (6)	
Prostate[β]	11 (7)	-	-	
Liver	9 (6)	1 (2)	8 (9)	
Head-and-neck	7 (5)	3 (4)	4 (4)	
Breast	4 (3)	4 (6)	0	
Others***	24 (16)	15 (24)	9 (10)	
Disease status at time of diagnosis				
Metastatic	76 (51)	26 (41)	50 (58)	0.294
Non-metastatic	74 (49)	37 (59)	37 (42)	
Treatment modalities				
BSC	65 (43)	26 (41)	39 (45)	0.112
Surgery	54 (36)	29 (46)	29 (33)	
RT	19 (13)	9 (14)	10 (12)	
Endocrine treatment	13 (7)	3 (5)	10 (12)	
TACE or RFA	4 (3)	1 (2)	3 (3)	
Targeted treatment	2 (1)	0	2 (2)	
Chemotherapy	2 (1)	0	2 (2)	
Purpose of the cancer treatment				
BSC	65 (43)	26 (41)	39 (45)	0.054
Palliative	45 (30)	11 (18)	34 (39)	
Curative	40 (27)	26 (41)	14 (16)	

[α]The distribution of the data was determined by the Kolmogorov-Smirnov test, and it was determined that the data were not equally distributed for all variables. Non-parametric Mann-Whitney U test was used to compare groups. The Kolmogorov-Smirnov test was used for group comparisons for data with <5 patients. A p-value less than 0.05 was considered statistically significant. It is indicated on the table in bold font.
[β]It was not included in the comparison analysis because it was gender specific
*Thyroid diseases, dementia, rheumatoid arthritis, chronic liver disease
**Palpitation (1), headache (1), balance disorder (1), abdominal discomfort (2), dry cough (2), hemoptysis (2)
***Stomach (3), pancreas (2), biliary tract (3), gallbladder (4), thyroid (7), glioblastoma multiforme (1), endometrium (2), cervix (2)
COPD: Chronic obstructive pulmonary disease, BSC: Best supportive care, RT: Radiation treatment, TACE: Transarterial chemoembolization; RFA: Radiofrequency ablation

Table 2. Comparison of some characteristics in cancer types in terms of gender

Variables	All patients (n=150)	Female (n=63)	Male (n=58)	p-value[α]
Skin cancer				
n	45	24	21	
Histological type; n (%)				
SqCC	25 (56)	15 (63)	10 (48)	0.024
BCC	13 (29)	4 (17)	9 (43)	
MM	2 (4)	2 (7)	0	
Others*	5 (11)	3 (13)	2 (9)	
Lung cancer				
n	19	3	16	
Histological type; n (%)				
SCLC	3 (16)	0	3 (19)	0.019
Adeno	6 (32)	2 (67)	4 (25)	
SqCC	9 (47)	1 (33)	8 (50)	
LCLNE	1 (5)	0	1 (4)	
Presence of smoking; n (%)				
Present	14 (74)	1 (33)	13 (81)	0.006
Absent	5 (26)	2 (67)	3 (19)	
Colorectal cancer				
n	14	9	5	
Location of the primary tumor; n (%)				
Colon	10 (71)	8 (89)	2 (40)	0.099
Rectum	4 (29)	1 (11)	3 (60)	
Presence of smoking; n (%)				
Present	4 (29)	1 (22)	3 (60)	0.104
Absent	10 (71)	8 (89)	2 (40)	
Bladder cancer				
n	17	4	13	
Histological type; n (%)				
PUC	14 (82)	2 (50)	12 (92)	0.034
SCC	1 (6)	1 (25)	0	
Adeno	1 (6)	1 (25)	0	
MM	1 (6)	0	1 (8)	
Presence of smoking; n (%)				
Present	7 (41)	0	7 (54)	0.215
Absent	10 (59)	4 (100)	6 (46)	

*Baso-squamous cell carcinoma (2), Meckel cell carcinoma (1), Lentigo maligna melanoma (1), undifferentiated carcinoma (1)
[α]The distribution of the data was determined by the Kolmogorov-Smirnov test, and it was determined that the data were not equally distributed for all variables. Nonparametric Mann-Whitney U test was used to compare groups. The Kolmogorov-Smirnov test was used for group comparisons for data with <5 patients. A p-value less than 0.05 was considered statistically significant. It is indicated on the table in bold font
SqCC: Squamous cell carcinoma, BCC: Basal cell carcinoma, MM: Malignant melanoma, SCLC: Small-cell lung cancer, Adeno: Adenocarcinoma, LCLNE: Large-cell lung neuroendocrine tumor, SCC: Small cell carcinoma, PUC: Papillary high-grade urothelial carcinoma

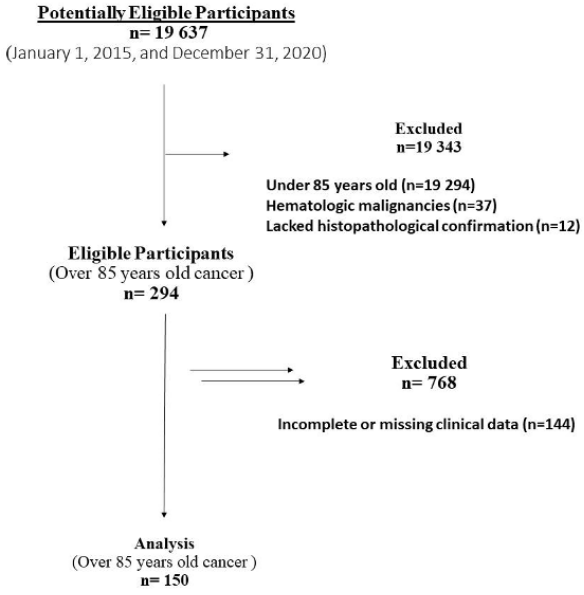

Figure 1. Flowchart of the study

most frequent solid malignancy overall, and its histological subtypes varied significantly between sexes (p=0.024). Squamous cell carcinoma was more common in women (63%), whereas basal cell carcinoma predominated in men (43%) (Table 2). This disparity may reflect differences in lifetime sun exposure or occupational risk factors.

Lung cancer was significantly more common in male patients (18% vs. 5%, p=0.013) and was strongly associated with smoking history. Among lung cancer cases, 81% of men had a history of smoking compared to 33% of women (p=0.006). Non-small cell lung cancer was the predominant subtype.

In addition, bladder cancer was diagnosed more frequently in men than in women (15% vs. 6%, p=0.034). Urothelial carcinoma was the most common histological type observed in these cases (Table 2).

Other findings, including age distribution, family history of cancer, and overall treatment patterns, did not demonstrate statistically significant differences and are provided for reference in Tables 1 and 2.

Discussion

This study provides one of the few detailed overviews of clinical characteristics, gender-related patterns, and treatment approaches in patients aged 85 years and older with solid tumors. Given the increasing proportion of this "oldest old" group in the population, a more profound understanding of their cancer profiles is of growing clinical importance.

Our findings revealed significant gender-based differences in comorbidities and cancer risk factors. The notably higher prevalence of COPD and smoking history in men aligns with global epidemiologic trends but also underscores the importance of obtaining detailed behavioral and environmental exposure histories even in advanced age (12,13). These factors appear to directly influence cancer distribution, particularly the increased rates of lung and bladder cancers among men in our cohort (14,15).

One of the more novel findings in our study was the significant gender difference in initial presenting symptoms. The predominance of palpable masses in women and urinary tract infections in men may reflect both anatomical differences and diagnostic pathways shaped by prior comorbidities or healthcare access. This observation suggests that clinicians should maintain a high index of suspicion when evaluating non-specific symptoms in elderly patients, as classical "red flag" signs may be absent (16).

The histological variation in skin cancers between genders-squamous cell carcinoma being more common in women and basal cell carcinoma in men-could be related to differing patterns of sun exposure, occupational background, or immune senescence. The relatively high prevalence of skin cancer overall may also be linked to geographic and climatic factors, as the majority of patients in our study resided in the Aegean region, which has high year-round UV exposure (17,18).

An unexpected finding was the widespread use of PET-CT for staging, even among patients for whom no active treatment was eventually administered. While this might suggest an overuse of imaging in certain settings, it may also reflect defensive medical practice or institutional policy (19,20). This raises important questions about the appropriateness and cost-effectiveness of advanced imaging in this age group, particularly when treatment is unlikely to be pursued. Future studies should explore how oncologists make diagnostic decisions in very elderly populations and whether clinical tools or geriatric assessments might improve decision-making (20-24).

The low rate of chemotherapy use in our sample was not surprising, as many patients were managed with either surgical or hormonal or best supportive care approaches (25-30). This reflects both patient-related factors (e.g., frailty, comorbidities) and physician-related considerations (e.g., hesitancy to use cytotoxic treatments in elderly patients) (25-27). Importantly, our study emphasizes that treatment decisions in this age group are often not based solely on cancer stage or histology but rather on broader geriatric and ethical considerations.

From a clinical standpoint, our findings suggest that cancer care in patients aged 85 and over must go beyond disease-specific algorithms and incorporate individualized assessments that balance benefit, harm, and patient preference. In particular, the presence of comorbidities

and the nature of presenting symptoms should inform not just treatment but also the extent of diagnostic workup.

Study Limitations

This study has several limitations. First, its retrospective design may have led to incomplete or biased data collection. Second, the heterogeneity of cancer types and the relatively small sample size limited the ability to perform subgroup or survival analyses. Furthermore, data on performance status, frailty scores, or geriatric assessment tools were not available, which might have provided more profound insight into treatment decisions. Despite these limitations, this study provides valuable real-world evidence on cancer characteristics, gender-specific differences, and treatment patterns in patients aged 85 years and older. It contributes to the limited data available on this unique and vulnerable population and may help guide more personalized and age-sensitive oncological care strategies.

Conclusion

This study highlights the clinical complexity of managing patients aged 85 years and older with solid tumors. Significant gender-based differences were observed in comorbidities, cancer types, and lifestyle factors such as smoking. The high prevalence of skin and lung cancers, as well as the reliance on supportive care, underscores the importance of individualized treatment planning. Additionally, the frequent use of advanced imaging even in patients who are not receiving active treatment points to evolving diagnostic trends in geriatric oncology.

As the proportion of very elderly patients continues to grow, our findings emphasize the need for more inclusive research and the development of tailored guidelines that go beyond chronological age and consider biological age, comorbid conditions, and patient preferences.

In conclusion, this study adds important real-world evidence about the diversity and complexity of cancer presentation and management in the oldest age. By highlighting gender-specific differences, imaging trends, and treatment patterns, it underscores the need for geriatric-specific oncology frameworks. As the elderly population continues to expand, so too does the urgency to develop nuanced, evidence-based strategies tailored to their unique needs.

Ethics

Ethics Committee Approval: This study was approved by the Non-Interventional Clinical Research Ethics Committee of the Aydin Adnan Menderes University Faculty of Medicine (date: 10.07.2018, approval no.: 1342).

Informed Consent: As the study was retrospective, informed consent was not required.

Footnotes

Authorship Contributions

Surgical and Medical Practices: E.K., O.T., S.B., Concept: O.T., S.B., Design: O.T., S.B., Data Collection or Processing: E.K., O.T., Analysis or Interpretation: E.K., O.T., S.B., Literature Search: E.K., O.T., Writing: M.F.D.

Conflict of Interest: No conflicts of interest were declared by the authors.

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