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Demographic and clinical characteristics of cancer patients presenting to the emergency department: A single-center experience

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Abstract

Cancer is a major public health issue with a high mortality rate globally. Owing to advancements in diagnostic and treatment strategies, the survival rate of cancer patients has increased. This has also led to an increase in the frequency of emergency service use in cancer patients. Here, we retrospectively extracted and analyzed the data of patients who presented at the emergency department of Ondokuz Mayıs University's Faculty of Medicine as outpatients or via emergency services and then required oncology consultation between January 1, 2018, and January 1, 2019. Specifically, we analyzed their demographic characteristics and clinical data, including reasons for admission, cancer stage and performance status at admission, and emergency department stay length. In total, 542 visits by 376 patients (mean age, 60.8 ± 12.8 years; 162 women, 214 men) were recorded during the study period. The most common cancer types were breast cancer in women (30.9%) and lung cancer in men (33.2%). The most common reason for admission was signs of infection, whereas the most common diagnosis was neutropenic fever (17.3%). Furthermore, 223 (59.3%) visits resulted in hospitalization. Finally, 63.1% of the patients stayed in the emergency department for <24 h. The current results may aid in developing strategies for reducing workload and costs and improving service quality for cancer patients in emergency departments.

Keywords: cancer, medical oncology, emergency department, sociodemographic data

1. Introduction

Cancer is a leading health issue in both developed and developing countries. Advancements in diagnostics and therapeutics have led to increased life expectancy; as such, the number of patients diagnosed as having cancer has also increased (1). In Turkey, cancer is the second most common cause of death, preceded by cardiovascular diseases (2).

Cancer is a chronic disease, and patients with cancer may present to the emergency department for various reasons at the time of new cancer diagnosis, during cancer treatment, or during the palliative period. The aforementioned reasons may include mechanical effects of cancer (e.g., pain, bleeding, or compression), side effects of cancer treatment (e.g., hematological or metabolic issues or infections), or conditions or symptoms unrelated to their cancer (3, 4). At the time of new cancer diagnosis and during cancer treatment, the alleviation of oncologic emergencies is crucial; by contrast, during the palliative period, the focus is not only on symptom alleviation but also on the improvement of quality of life (5).

Cancer management requires a multidisciplinary approach, which may be designed for worldwide application and modified based on the requirements of each country. Under the Cancer Control Program, cancer registry data are used to determine the frequency of cancer occurrence, underlying causes, preventable etiologies, and appropriate screening programs for early diagnosis (6).

In this study, we investigated the demographic and clinical characteristics of cancer patients who presented to our emergency department. The current results may facilitate the development of appropriate cancer management strategies.

2. Material and Methods

This retrospective study was approved by Ondokuz Mayıs University's Non-Interventional Ethics Committee. We included the data of ≥18-year-old patients histopathologically diagnosed as having cancer, who presented to the emergency department of Ondokuz Mayıs University's Faculty of Medicine—a regional hospital in Samsun, Turkey—and required oncology consultation between January 1, 2018, and January 1, 2019. The demographic and clinical characteristics of the patients were extracted from their medical records and the hospital's electronic health records. The demographic characteristics included age, sex, and residence status, whereas the clinical characteristics included current pathological diagnoses, treatments received at the time of admission, reasons for admission, preliminary diagnosis after initial evaluation at the emergency department, interventions received, performance status at the time of admission, length of emergency department stay, metastasis status, laboratory results, and outcome of the emergency department visit.

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SPSS (version 21.0; SPSS, Chicago, IL, USA) was used for statistical analysis. Continuous variables are expressed as means ± standard deviations (SDs) or medians (minima–maxima), whereas categorical data are expressed as numbers and percentages. The normal distribution of variables was evaluated using the Kolmogorov–Smirnov test. Here, normally distributed variables are expressed as means ± SDs, whereas those that do not follow normal distribution are expressed as medians (minima–maxima). Independent group comparisons of non-normally distributed continuous variables were performed using the Mann–Whitney U test. Finally, all categorical data were evaluated using the Pearson chi-square test. A p-value of <0.05 was considered to indicate statistical significance.

3. Results

In total, 542 eligible emergency department visits were recorded during the study period; 376 of these visits were by unique patients who had presented to the emergency department as outpatients or through emergency services and then required oncology consultation.

Of these 376 patients, 43.1% were female and 56.9% were male, their demographic data, number of visits, and patient characteristics were examined (Table 1). Among women, the most common cancer was breast cancer (30.9%), followed by ovarian cancer (14.2%) and colorectal cancer (11.7%). By contrast, among men, it was lung cancer (33.2%), followed by stomach cancer (12.1%) and colorectal cancer (11.2%) (Table 2). At the time of emergency department admission, 70.5% of the patients had stage 4 cancer. As the stage advanced, the rate of repeated admissions remained similar (Table 3).

We next analyzed the Eastern Cooperative Oncology Group (ECOG) performance status scale scores at emergency department admission. The results indicated that most patients had an ECOG score of 2 or 3 ($p < 0.001$). Moreover, in those with an ECOG score of 4, the recurrent admission rate was only 1%.

The most common complaint during admission was fever or complaints suggesting infection (28.4%), whereas the most common diagnosis was neutropenic fever (17.3%). The length of emergency department stay was <24 h in most cases (63.1%). The most common intervention (50.2%) was multifaceted palliative support therapy, comprising fluid, electrolyte, and nutritional support (Table 4 and Table 5).

Table 1. Patient characteristics

	Patients with at least one application (376)	
	Number (n)	Percentage (%)
Gender		
Female	162	43.1
Male	214	56.9
Age		
20-30	9	2.4
30-40	18	4.8
40-50	34	9
50-60	103	27.4
60-70	112	29.8
>70	100	26.6
Cities of Residence		
Samsun	270	71.8
Ordu	39	10.4
Amasya	23	6.1
Sinop	21	5.6
Other	23	6.1
Living Area		
Rural District	193	51.6
City Center	183	48.7
Number of ED visit		
1	274	72.9
2	66	17.9
3 or more	36	9.2
Monitoring Center		
OMÜ	296	78.7
External Center	52	13.8
New Diagnosis	27	7.2
Unmonitored	1	0.3

Table 2. Distribution of cancer types by gender in patients admitted to the emergency department

Tumor location	376 Patient		Female		Male	
	n	%	n	%	n	%
Lung	86	22.5	15	9.3	71	33.2
Breast	52	13.8	50	30.9	2	0.9
Colon/Rectum	43	11.4	19	11.7	24	11.2
Stomach	39	10.4	13	8	26	12.1
Pancreas	24	6.4	9	5.6	15	7
Overian	23	6.1	23	14.2	0	0

Prostate	14	3.7	0	0	14	6.5
Kidney	13	3.5	4	2.5	9	4.2
Gallbladder/choledoch	11	2.9	4	2.5	7	3.3
Brain/spinal cord	11	2.9	5	3.1	6	2.8
Liver	8	2.1	0	0	8	3.7
Bladder	8	2.1	2	1.2	6	2.8
Other	44	11.7	18	11.1	26	9.8
Total	376	100	162	100	214	100

Table 3. Distribution of cancer patients' emergency visits according to tumor stages

		Total Patient (376)		One-Time Applicants (274)		Repeated Applicants (102)	
		n	%	n	%	n	%
State	1	4	1.1	2	50	2	50
	2	26	6.9	19	73.1	7	26.9
	3	44	11.7	31	70.5	13	29.5
	4	265	70.5	190	71.7	75	28.3
	Unknown	37	9.8	32	86.5	5	13.5
	Total	376	100	274	72.9	102	27.1

Table 4. Characteristics of emergency department admissions

Emergency Admission Complaints	Number (n)	Percentage (%)
Fever-Infection	154	28.4
General Condition Deterioration	69	12.7
Weakness Anorexia Oral Intake Reduction	68	12.5
Shortness of Breath	60	11.1
Nausea Vomiting Diarrhea	58	10.7
Pain	50	9.2
Neurological Causes	26	4.8
Bleeding	17	3.1
Other	40	7.4
Emergency Diagnosis	**Number (n)**	**Percentage (%)**
Neutropenic fever	94	17.3
Pneumonia	68	12.7
Drug side effect	57	10.5
Anemia/Thrombocytopenia	43	7.9
Mass effect	35	6.5
Pleural effusion	33	6.1
Acute abdomen/ Ileus	25	4.6
Electrolyte disturbance	25	4.6
Other	162	29.8

Table 5. Interventions performed. length of stay, and outcomes of emergency department visits.

Emergency Interventions		
Palliative supportive therapy	272	50.2
Antibiotic therapy	183	33.8
Blood transfusion	40	7.4
Interventional procedures*	27	5
Surgery	7	1.3
Paracentesis	6	1.1
Other	7	1.2
Length of Stay In the Emergency Department	**Number (n)**	**Percantage (%)**
Less than 24 hours	342	63.1
24-48 hours	111	20.5
48-72 hours	33	6.1
More than 72 hours	46	8.5
Not Determined	10	1.8
Outcome of emergency department visit (for each visit)		
Admission to medical oncology service	316	58.3
Discharge from emergency department	122	22.5
Death in emergency department	12	2.7
Other**	92	16.9

*Interventional Treatment Operations (pleural drainage, chest tube insertion, central catheterization) ** Non-oncological medical service hospitalization, transfer to intensive care unit, situations where the patient refuses hospitalization

Finally, anemia and thrombocytopenia were the most prominent findings in the laboratory tests among all 542 visits. In particular, grade-1, -2, and -3 anemia was noted in 33.9%, 29.3%, and 15.7% of the visits, respectively. Moreover, the platelet count was <150,000/mm3 at 43.7% of the visits, and thrombocytopenia of grade 3 or higher was noted at 12.7% of the visits.

4. Discussion

The increasing cancer survival rate is expected to result in an increase in the number of patient visits to cancer clinics, emergency departments, and palliative care centers. Samsun, a densely populated province in the Middle Black Sea region of Turkey, provides significant health services to its neighboring provinces. Therefore, understanding the relationship between patients and emergency services is important for healthcare management in this region.

Sex affects the pathophysiology, clinical symptoms, and treatment outcomes of cancer (7). An Ege University study reported that of the 34,134 patients with cancer, 56.6% were male and 43.4% were female (8); this result is corroborated by our findings: 56.9% male and 43.1% female. Increased life expectancy has resulted in an increase in the number of advanced-age cancer cases not only in Turkey but also worldwide: approximately half of all cancer cases occur in individuals aged ≥65 years (9). Bozdemir et al. reported that the average age of cancer patients presenting to their emergency department was 60 ±14.8 years (10). Similarly, 56.4% of our patients were aged ≥60 years when they presented to our emergency department.

Patients with cancer present to the emergency department for reasons directly or indirectly related to cancer (3). Mualloğlu et al. observed that 45.5% of 408 patients who visited the emergency department had at least two visits (average number of emergency department visits per patient = 2.08). This situation was attributable to the emergency services being more easily accessible than outpatient services, as well as to disease progression (11). In our study, of all 542 visits, 268 examined were repeat visits; the reasons for this included the palliative care needs of advanced-stage patients and easy access to the emergency department.

In one study, most cancer patients who presented to the emergency department had cancers of the respiratory system (including the lungs; 26%), followed by those of the gastrointestinal system (26%) and the genitourinary system (17%) (12). In the current study, most (22.9%) of the patients with cancer were diagnosed as having lung cancer, followed by breast cancer (13.8%) and colorectal cancer (11.4%). Moreover, the most common cancer was breast cancer among female patients (30.9%) and lung cancer among male patients (33.2%).

In patients with cancer, the need for emergency services may increase with the advancement of the cancer stage. In a Turkish study, 72.9% of cancer patients who visited the emergency department had advanced-stage cancer; however, none of them had in situ carcinoma (13). In their 2014 review, Lash et al. observed that patients with cancer at the T2a stage or lower below had more emergency department admissions than those with cancer at the T3 stage or higher (14). In the current study, of all 376 patients, 309 had stage 3 or 4 cancer. Moreover, of all 542 emergency department visits, 71.8% were for distant metastasis. As such, most of our patients with cancer had advanced-stage or metastatic disease—consistent with the previous results.

The ECOG Performance Status Scale score is widely used to assess the performance status of patients with cancer (15). In a Turkish study of 245 patients with cancer (with 324 emergency visits), most presented an ECOG score of 3 (10). In the current study, the ECOG score was available for 468 emergency department visits; at 33.3% and 29.5% of these visits, the ECOG scores were 2 and 3, respectively. Moreover, these scores were noted in patients with recurrent visits.

Patients with cancer may present to an emergency department for reasons that may or may not be related to cancer prognosis or treatment. A Canadian study demonstrated that among patients with cancer, the most common reasons for visiting the emergency department were nausea, fatigue, and shortness of breath (16). In contrast, a US study reported that pain, breathing difficulties, and gastrointestinal complaints were the most common reasons (17). In the current study, the most common reason was symptoms suggesting infection (e.g., fever, chills, and shaking), followed by weakness, loss of appetite, reduction in oral intake, and general health deterioration. In a few cases, these reasons included pain, bleeding, neurological symptoms, and non–cancer-related symptoms. Moreover, the most common diagnoses were neutropenic fever, pneumonia, cancer-treatment–related conditions, anemia, and thrombocytopenia. For these diagnoses, the most commonly used interventions included palliative or supportive therapy, oral or intravenous antibiotic use, and blood transfusion.

Swenson et al. reported that 55%, 10%, 6%, and 30% of 71 emergency department visits led to admission to the oncology unit, the oncology intensive care unit, the surgical unit, and other medical units, respectively (4). In the current study, the length of emergency department stay was <24 h in 63.1% of all visits. Moreover, of all visits, 59.3% led to the oncology department admission, 19.9% to discharge from the emergency department, 9% to non–cancer-related hospitalization, and 4.3% to intensive care unit admission. However, 1.9% of the visits resulted in death.

Anemia is commonly seen in patients with cancer over the course of their disease and as a side effect of their cancer treatment (18). In our study, 45% of the patients demonstrated anemia, and 15.7% of these patients had severe anemia. Thrombocytopenia is another hematologic disorder commonly seen among patients with cancer caused by systemic chemotherapy in most cases (19, 20). Among all our patients, 43.7% had thrombocytopenia; in particular, 12.7% had severe thrombocytopenia.

In conclusion, patients with cancer require effective disease management in terms of aspects such as diagnostics, therapeutics, and follow-up. In Turkey, additional comprehensive studies on the cancer burden on emergency departments and oncology services are required. Their results may aid healthcare professionals in designing and developing their future cancer treatment strategies and practices.

Conflict of interest

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript.

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Authors' contributions

Concept: M.U., T.A., Design: M.U., T.A., Data Collection or Processing: M.U., T.A., Analysis or Interpretation: M.U., T.A., Literature Search: M.U., T.A., Writing: M.U., T.A.

Ethical Statement

Approval was obtained from Ondokuz Mayıs University Clinical Research Ethics Committee, the study started. The ethics committee decision date is 27/02/2020 and the number of ethical committee decisions is 2020/93.

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