

Demographics, Clinical Presentations and Outcomes of Cancer Patients Admitted to the Emergency Department

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Aim: The development of new treatment strategies for cancer patients resulted in an increase of cancer patient visits to emergency departments (EDs). The purpose of this study is to determine clinical characteristics, causes, and predictors of short term prognosis of cancer patient admissions to the ED.

Materials and Methods: This prospective, clinical, and observational study was carried out in an adult ED of a tertiary hospital with an annual census of 55,000. All cancer patients visiting the ED within the 6-month period were enrolled into the study and followed up at the 1st and 3rd months afterwards. Records were based on a questionnaire including the patient's main complaint, detailed demographics, and health status.

Results: During the study period, 324 visits of 245 cancer patients were recorded and evaluated. The most common complaints of ED visits were nausea, vomiting, and pain. Hospitalization rate for the 324 visits was 37.3%. Of the 245 patients, 44 (18%) died within a month, and a further 77 (31.4%) within 3 months. Presence of an active disease, performance score of 4, and procedure other than peripheral venous access were the factors predicting the 3-month mortality.

Conclusions: Effective pain and antiemetic management at outpatient oncology departments can decrease cancer patients' ED visits. ED physicians might consider certain risk factors indicating higher mortality in short term in order to plan patients' ED management.

Key Words: Cancer, Emergency, Outcome, Prognosis

Acil Servise Başvuran Kanser Hastalarının Klinik, Demografik ve Prognostik Özellikleri

Amaç: Kanser hastalarının tedavisinde yeni stratejilerin geliştirilmesi bu hastaların acil servislere artan sayıda başvurularına neden olmaktadır. Bu çalışma acil servise başvuran kanser hastalarının karakteristiklerinin belirlenmesini ve kısa dönem sağkalımı belirleyen faktörlerin araştırılmasını amaçlamaktadır.

Yöntem ve Gereç: Bu ileriye dönük gözlemsel klinik çalışma yıllık hasta sayısı 55.000 olan bir üniversite hastanesi acil servisinde yapılmıştır. Altı aylık sürede acil servise başvuran tüm kanser hastaları çalışmaya dahil edilmiş ve acil servis başvurusu sonrasında birinci ve üçüncü aylarında takip edilmişlerdir. Kayıtlar hastanın geliş şikayetlerini, detaylı demografik bilgilerini ve sağlık durumlarını içeren bir anket formu doldurularak elde edilmiştir.

Bulgular: Çalışma süresi içerisinde acil servise başvuran 245 kanser hastasının 324 başvurusu değerlendirildi. Acil servise en sık başvuru sebebi bulantı, kusma ve ağrıydı. Hastaneye yatırılma oranı 324 başvuru için % 37.3 idi. Toplam 245 hastanın 44'ü (% 18) ilk 1 ay içerisinde 77'si (% 31.4) 3 ayın sonunda hayatını kaybetti. Aktif kanser mevcudiyeti, performans skorunun 4 olması ve acil serviste periferik dama yolu dışında bir girişim uygulanmış olması 3 aylık sağkalımın anlamlı belirleyicileri olarak bulundu.

Sonuç: Kanser hastalarında etkin ağrı yönetimi ve anti emetic kullanımı hastane dışında tedavisi planlanan hastalarda acil servis başvurularını azaltabilir. Acil Servis doktorları kanser hastalarının acil servis değerlendirmelerinde kısa dönem sağkalımları ile ilgili risk faktörlerini dikkate alabilirler.

Anahtar Sözcükler: Kanser, Acil, ayaktan tedavi, prognoz

Introduction

Cancer is still a leading cause of death in the world and the second leading cause of death in Turkey following cardiovascular disease (1). The development of new treatment strategies for cancer patients has resulted in a prolonged lifespan and an increase of cancer patient visits to emergency departments (EDs). In a previously published study carried out in our emergency department, hospitalization rate of cancer patients was found to be almost twice higher than patients without cancer (2). Determining the causes for ED presentation and prognosis may demonstrate that many visits are

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preventable with appropriate outpatient measures. Additionally, specific cancer treatment may be planned and information, such as determining who requires aggressive ED management and hospitalization, may be helpful during the decision making process. Many studies in the literature address various prognosticators in patients with cancer: laboratory and clinical parameters like albumin, hemoglobin, lactate dehydrogenase, and performance status (3-4), as well as prognostic scores like those of APACHE II and SAPS II (5). However, currently there is no consensus on a standard, yet simple, predictive/prognostic model that may be useful for cancer patients. Despite the fact that there are reports of poor prognosis in cancer patients admitted to hospitals through EDs (6), we have not come across any prognostic model in the literature that has been developed for cancer patients only presented to the ED to address their short term prognosis. In this study we aimed to explore demographics and short term outcomes of cancer patients admitted to the ED.

Materials and Methods

Study Design

This study was carried out in the ED of Akdeniz University Hospital between January 31, 2003 and July 31, 2003. All adult cancer patients, whether the diagnosis was new or known, presented to the ED with a medical complaint (excluding trauma), were enrolled in the study. A questionnaire was filled for each available patient after obtaining an informed consent in writing.

Data Collection

Patients were evaluated by an attending emergency physician and an oncology fellow separately. All patients were followed up by the oncology department whether hospitalized or discharged. A telephone follow up was performed by an emergency physician at the end of the 1st and 3rd month after the patients' first ED presentation. The stage of the cancer during the ED presentation was obtained by an oncologist using patients' charts retrospectively.

The time interval of patients' presentation was also recorded in 4 different periods of a day, namely 12:00-18:00, 18:00-24:00, 24:00-08:00, and 08:00-12:00. Body temperature was measured by an ear thermometry and over 38 °C was considered as fever. ICD-10 was used for diagnostic evaluation.

Classification of cancer patients

Solid tumors were classified as "in remission", "local disease", and "metastatic disease"; hematological malignancies as "in remission" and "active disease"; and, brain tumors as "in remission" and "active disease" if there was any residue after surgical intervention. In addition, patients in remission were assigned to "inactive disease" and the others were assigned to "active disease" for the purpose of multivariate regression analyses. Patients' performance status was determined according to the Eastern Cooperative Oncology Group (ECOG) Scale (Table 1) (7).

Statistical analysis

Data were analyzed with SPSS 10.0 for Windows statistical package. To compare nominal data, Student's t-test was used. To compare the percentages, chi-square testing was used. In the logistic regression model, our dependent variables were death (survival) in 1 month and 3 months after ED admission. The parameters included in the logistic regression model were determined to be statistically significant in the univariate analysis. Respiration (shortness of breath > 20 breath/min), pulse rate (tachycardia > 100 beat/min), systolic blood pressure (>140 mmHg), diastolic blood pressure (>90 mmHg), body temperature (fever >36.5 °C) status of the disease (active disease: patients in remission; inactive disease: patients had local or metastatic disease) were dichotomized for logistic regression analyses. A P value less than 0.05 was considered as significant.

Results

Of the 24,903 patients presented to the ED during the study period, 324 presentations of 245 cancer patients were recorded and evaluated. Patient flow chart is presented in Figure 1.

Of the 245 cancer patients included in the study, 49.5% were men. Forty patients presented with hematological malignancy and 212 (86%) with solid malignancy. Eighty five patients were in remission, 83 had localized tumor, and 144 had metastatic or active disease during the ED admission. Twelve (3.7%) patients were not classified because of lack of data in their questionnaire and medical records, and there were 7 patients who were lost to follow up. In three patients, malignancy was suspected in the ED and they were

Table 1. Performance score of cancer patients (10).

	Performance score
Fully active, able to carry on all pre-disease activities without restriction	0
Restricted physically strenuous activity but ambulatory and able to carry out activities of a light or sedentary nature	1
Ambulatory, capable of a self-care but unable to carry out any work activities; up and about more than 50% of waking hours	2
Capable of only limited self-care; confined to bed or chair 50% or more of waking hours	3
Completely disabled, cannot carry on any self care; totally confined to bed or chair	4

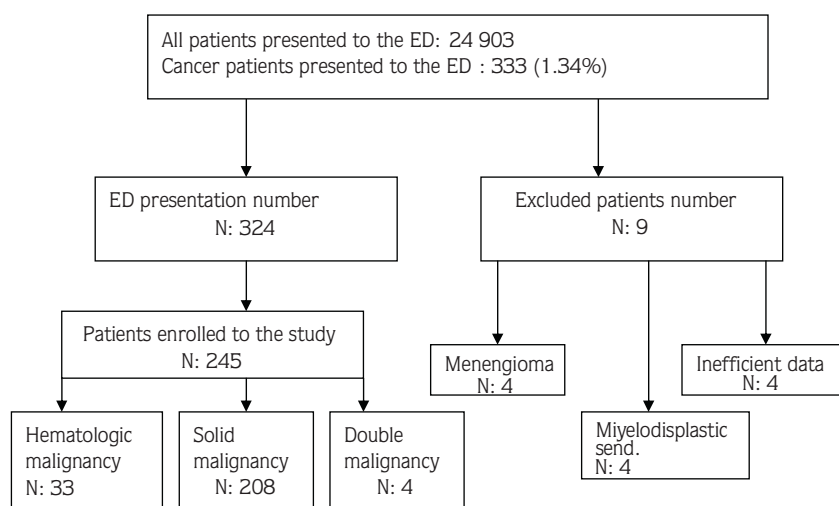


Figure 1. Patient flow chart.

confirmed later (new diagnosis). Patient characteristics were detailed in Table 2a.

The most frequent performance score was 3 with 135 patients and there were only 34 patients with a performance score of 4 (Table 2a). The most frequently presented complaints were pain (24%) followed by shortness of breath (17%) and nausea (14%) (Table 2b). Gastrointestinal, lung, and breast cancers were the most common types (Table 2c).

In the present study, 67.7% of the patients has a performance score of 4, 50% referred from another hospital, 64% dispatched by an ambulance, 33.3% underwent an intervention other than a peripheral vascular access, 27.9% had metastatic disease, and all of the patients diagnosed to have a malignancy after being admitted to the ED (new diagnosis) died at the end of the 4-week follow up.

In the multivariate analysis to establish independent predictors of 1-month mortality, tachycardia (OR:2.8, 95% CI:1.2-6.4, $P = 0.014$), performance score of 4 (OR:14, 95% CI: 2.4-82.9, $P = 0.004$), and active disease (OR:18, 95% CI:2.2-145.6, $P = 0.007$) were found significant (Table 3).

At the end of the 3rd month, the mortality rate of the patients with a performance score of 4 was 84.4%, in patients with frequent attending 31.7%, in patients brought by ambulances 80.8%, in patients underwent an invasive procedure 72.7%, in patients admitted to the hospital 46.2%, and in patients with metastasis 51.4%.

In the multivariate analyses of factors predicting the mortality within 3 months, performance score of 4 (OR: 11.8, 95% CI:2.3-60.5, $P = 0.003$), procedure except peripheral vascular access (OR: 4.9, 95% CI: 1.8-13.6, $P = 0.002$), and active disease (OR: 40.4, 95% CI: 8.1-200.9, $P = 0.000$) were found significant (Table 4).

Table 2a. Demographic data of the study population.

Variable	n	%
Age	60 ± 14.8	
Gender		
Female/Male	163/161	50.3/49.7
Cancer type		
Hematological/solid	40/284	12/88
Stage		
In remission	85	26
Local disease	83	26
Metastasis	144	44
Not classified	12	4
In the last previous month		
Radiotherapy	44	14
Chemotherapy	150	46
Surgery in the previous year	120	37
Previous alternative medicine	39	12
Taking medicine in home before admitted to the hospital	107	33
Performance score		
PS0	45	14
PS1	61	19
PS2	49	15
PS3	135	42
PS4	37	11
Followed in other hospital	37	11
Admission time		
08-12	61	19
12-18	103	32
18-24	133	41
24-08	27	8
Arrived by		
Ambulance	27	8.3
Car	297	91.6
Admission frequency		
Once	202	62
Twice	70	22
Three times	27	8
Four times	20	6
Five times	5	1
Procedural Intervention except peripheral vascular access	37	11

Table 2b. Patients' complaints.

	n	%
Pain anywhere	77	24
Shortness of breath	55	17
Nausea and vomiting	44	14
Fever	43	13
Fatigue	19	6
Diarrhea	10	3
Malaise	10	3
Abdominal distention	9	3
Syncope	8	2
Blood in the stool	7	2
Others	42	13
All (visits)	324	100

Table 2c. Localization of malignancies.

Malignancy	N	%
Gastrointestinal tract cancers	56	23
Respiratory system and thorax cancers	53	22
Breast cancer	44	18
Hematologic malignancy	33	13
Gynecologic cancers	17	7
Brain cancers	10	4
Urinary tract cancers	9	4
Head and Neck cancers	7	3
Soft tissue cancers and mezotelioma	6	2
Male genital organs cancers	5	2
Thyroid cancers	2	1
Unknown primary cancers	2	1
Melanoma	1	0.4

Discussion

In several studies it was reported that admission to hospital via the ED may be a clinically important marker of distant stage or poorer survival for gastrointestinal and lung cancers (6, 8-10). Also, in our study 3 patients newly diagnosed in the ED died in 4 weeks, verifying the very poor prognosis of these patients. On the other hand, again in gastric cancer, emergent complications may be a prognostic marker of poor outcome (11).

Table 3. Independent factors predicting 1-month mortality.

Variable	OR	95% CI	P
More than 1 presentation	0.47	0.21-1	0.053
Tachycardia	2.8	1.23-6.43	0.014
Performance score of 4	14	2.4-82.8	0.004
Active disease	18	2.2-145.6	0.007

Patients with known cancer presenting to a cancer center emergency room were more likely to die within 14, 90, or 180 days if they had evidence of recent progression of their cancer (12). Therefore, the progression of cancer and symptomatic admissions to EDs may be related, and ED admissions may be a prognostic factor of short term survival.

This study showed that emergency physicians deal with at least 2 cancer patients a day during routine clinical practice. This number highlights the importance of cancer patient care in the ED and why emergency physicians need to know how to manage a patient with cancer. The hospitalization rate is consistent with data previously published (2).

Pain, shortness of breath, and nausea-vomiting were found as the most frequently presented complaints in our study. The high prevalence of gastrointestinal and lung malignancies among the study population may explain this (1). However, high incidence of nausea and vomiting and pain can be also interpreted as a result of insufficient supportive care at outpatient clinics and this may cause more ED admissions. Probably, advanced adjunctive therapeutic approaches including effective pain management and anti-emetics at outpatient clinics may decrease ED presentations of cancer patients.

According to this study, patients with malignancy mostly present to the ED after day time. In a similar study by Swenson et al., day time was reported as the most frequent presentation time of these patients (13). This difference may be due to the national and geographic difference and the difference in health-seeking behaviors of populations. The lack of medical centers giving round the clock care to cancer patients in this region may have resulted with increased number of attendance after office hours.

Table 4. Independent factors predicting 3-month mortality.

Variable	OR	95% CI	P
Performance score 4	11.8	2.3-60.5	0.003
Procedure except PVA	4.9	1.75-13.6	0.002
Active disease	40.4	8.1-200.9	0.000

Abbreviation: PVA - peripheral vascular access

Another aspect of this study was the use of the ECOG performance score (10). This scoring system is used by oncologists to evaluate cancer patients in follow up clinics. Since the performance score does not include detailed laboratory measurements and numeric values, but depends only on judgment about the patient's daily activities, it was thought to be useful, simple, and applicable in an emergency setting. This study showed that ECOG performance score should be used for determining the prognosis of cancer patients presenting to the ED and may be useful for emergency setting as well as follow up clinics. .

The parameters predicting hospitalization and mortality would be of great interest in this study. The age and vital signs of the patients were found not to be valuable to predict hospitalization as expected. Hospitalization of the patients could be related to the existence of specific oncologic emergencies not causing any change on vital signs, such as spinal cord compression, brain metastasis, deep venous thrombosis, or mild pulmonary embolus. Stage, as expected, was found to be a statistically significant parameter to predict hospitalization and mortality.

In the multivariate analysis, poor ECOG Performance status, metastatic or active disease, and the need for invasive procedure in the ED were found highly predictive for short term mortality. These factors may help in decision making for more aggressive treatment and hospitalization. Patients with these risk factors should be evaluated with the oncology team to organize a specific treatment for cancer, if possible. In some patients, emergency admission with these high risk factors may alert the oncologist about short term prognosis. With the results of this study, new scoring systems and clinical protocols may be developed for specific patient groups.

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