

Analysis of cancer patients admitted to intensive care unit

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ABSTRACT

OBJECTIVE: The present study is an analysis of cancer patients who received follow-up treatment for either cancer-related complications or treatment-associated side effects while hospitalized in the intensive care unit (ICU).

METHODS: Records of cancer patients treated at Dr. Lütfi Kırdar Kartal Training and Research Hospital ICU between January 1, 2011 and December 31, 2012 were retrospectively reviewed. Demographic data and type of cancer were recorded in prepared forms and subsequently analyzed.

RESULTS: Among 2240 ICU patients treated and hospitalized between January 1, 2011 and December 31, 2012, 482 cancer patients were identified and included in the study. Percentage of cancer patients in ICU was 23.9%. Male to female ratio was determined to be 1.55. First 3 most common cancers found were colorectal (19.7%), lung (15.7%), and stomach cancers (11.6%). Mortality rate of cancer patients hospitalized in ICU was 46.6%. Larynx, lung, urinary bladder, skin, rectosigmoid, hematological, and kidney cancer were more prevalent in male patients, whereas esophageal cancer was seen in more female patients than male patients. Incidence of stomach, brain, and pancreatic cancers, as well as unclassified tumors, was found to be unrelated to gender.

CONCLUSION: Rectosigmoid cancer was most common type of cancer observed in our ICU. Esophageal cancer was observed in more females than males, while larynx cancer was more frequently present in males.

Keywords: Cancer; intensive care unit; malignancy.

Cancer is a group of malignant diseases and develops as result of uncontrolled growth and proliferation of cells that were altered as result of factors in locoregional or remote site [1]. Cancer classification is made according to tissues or organ of origin. Signs, symptoms, and management of ma-

lignancies vary with type of cancer. Most frequently seen cancer types stem from the lung, breast, gastrointestinal system, and reproductive system [2].

Though cancer demonstrates differences according to cancer type, patient age and gender, and geographic region, estimated overall incidence in popu-



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lation is between 85–350/100.000 [3]. Number of cancer cases, and hence, cancer-related morbidity and mortality rates, are expected to increase in years to come, depending on population growth [4, 5]. Growing number of patients is being treated in intensive care unit (ICU) for cancer-related complications or adverse effects of treatment [6]. A number of studies have reported higher mortality rate in patients with prolonged stay in ICU, especially among those who develop leukopenia or require mechanical ventilation [7, 8].

Based on 2003 data of American Cancer Society, most frequently seen type of cancer in men is prostate cancer, followed by lung, colorectal, and bladder cancer in decreasing order of frequency. In women, breast cancer is most common, followed by lung, colorectal, and uterine cancers [9].

In this study, data of cancer patients hospitalized in general ICU were analyzed to determine most frequently seen cancer types and to examine cancer-gender relationship, demographic characteristics, and percentage of patients hospitalized in ICU with cancer.

MATERIALS AND METHODS

After receiving approval from the Kartal Dr. Lütfi Kırdar Training and Research Hospital (KLK-TRH) ethics committee, hospital files of patients in ICU of KLKTRH between January 1, 2011 and December 31, 2012 were retrospectively reviewed. From among these patients, details of age, gender, type of cancer, presence of any metastasis or concomitant disease of 482 patients were recorded on prepared forms and analyzed. Patients hospitalized more than once were counted only once.

Statistical analysis

Statistical analysis of study data was performed using SPSS software (version 13.0; IBM Corp., Armonk, NY, USA). Fold changes were used to investigate correlations between gender and presence of cancer. Malignancies with fold change of ≥ 2 were associated with male gender, while those with fold change of between 0.5 and 2.00 were evaluated as unrelated to gender.

TABLE 1. Cancer patients in intensive care unit

	n	%
Male	293	
Female	189	
Age (mean \pm SD)	59.9 \pm 15.06	
Metastasis		
Present	87	18.0
Absent	395	82.0
Concomitant disease		
Present	176	36.5
Absent	306	63.5
Surgical procedure		
Yes	285	59.1
No	197	31.9
Cardiopulmonary resuscitation		
Present	17	3.5
None	465	96.5
Recurring admission to intensive care unit		
2 admissions	35	
3 admissions	6	
4 admissions	1	
5 admissions	1	

SD: Standard deviation.

RESULTS

From total of 2240 patients, 482 (23.9%) cases with cancer (male: n=293, 60.8%; female: n=189, 39.2%; male:female ratio: 1.55) were hospitalized and treated in ICU between January 1, 2011 and December 31, 2012. Cancer patients were aged between 3 and 93 years, with mean age of 59.9 \pm 15.06 years (Table 1).

Patients were categorized as ≥ 70 (n=138; 28.6%) or < 70 (n=344; 71.4%) years of age. Age distribution graph demonstrated accumulation of cancer patients within age interval of 40 to 80 years, and majority in age bracket of 60 to 69 years (Figure 1).

Indication for ICU hospitalization of cancer patients was most often respiratory distress or deterioration of general state of health. Patients were also admitted to ICU for closer monitoring, metastatic

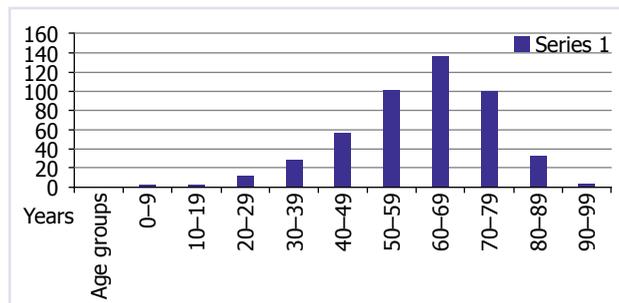


FIGURE 1. Patient age groups.

complications, adverse effects of oncological therapy, and advanced life support after cardiopulmonary resuscitation (CPR).

Rectosigmoid cancer (19.7%) was most prevalent type of cancer seen among cancer patients hospitalized in ICU, followed by lung (15.7%), and gastric (11.6 %) cancers (Figure 2).

Among a total of 482 cancer patients hospitalized in intensive care unit, 225 died while in hospital, and 257 cases were transferred to relevant clinic after treatment in ICU. Mortality rate was 46.6%. Forty-three patients who were transferred were subsequently re-admitted to ICU between 2 and 5 times (Table 1). Total number of ICU hospitalizations for 482 patients was 536.

In the present study, 87 (18.0%) patients were observed to have metastasis or comorbidity ($n=176$; 36.5%), and 285 (59.1%) patients consulted to ICU following surgical intervention. CPR was performed on 17 (3.5%) patients who were admitted to ICU for advanced life support (Table 1). Sixteen of those patients died; mortality rate for CPR patients was calculated at 94.1%.

Based on fold changes, lung, rectosigmoid, hematological, bladder, and cutaneous malignancies were associated with male gender, while esophageal cancer was seen in more female patients than male patients. Stomach, brain, and pancreatic cancers, as well as unclassified tumors, were not found to be correlated with gender. In our analysis, laryngeal cancer was malignancy with highest (15.00) fold change (Table 2). Gender-related malignancies, such as gynecological, breast, and prostatic cancers were not included in this analysis.

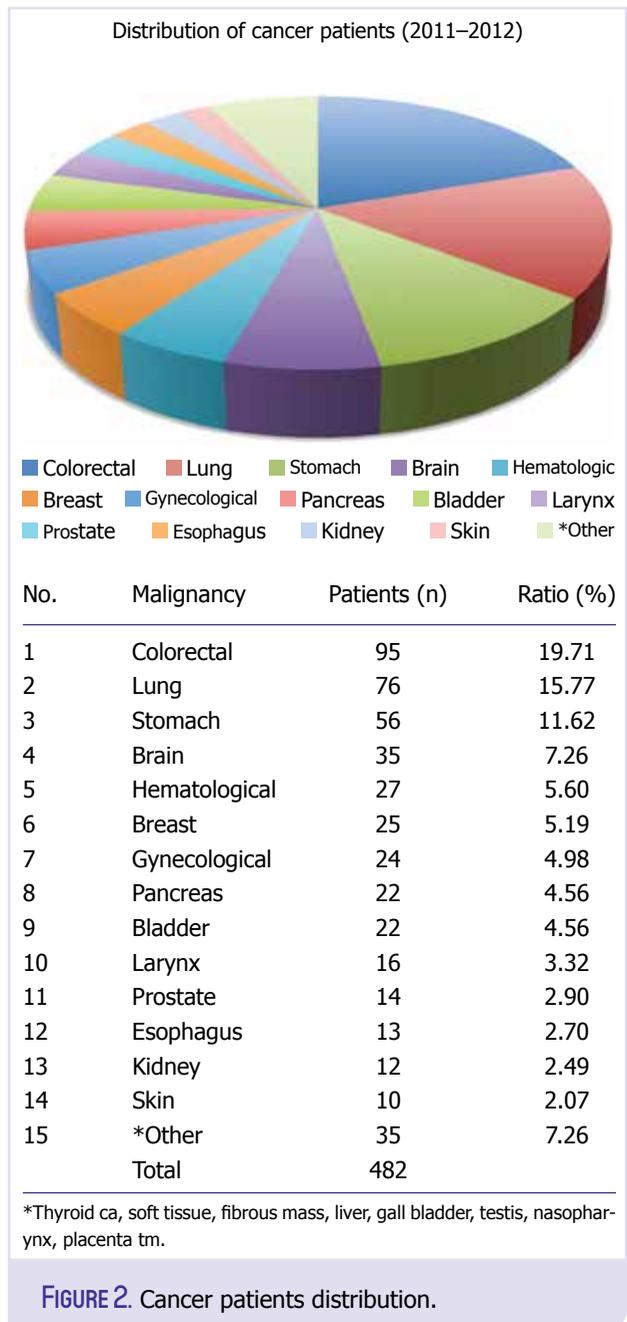


FIGURE 2. Cancer patients distribution.

DISCUSSION

Cancer is still a leading health problem worldwide, and cancer patients constitute substantial number of ICU patients. These patients are generally in the terminal phase of their disease, and they are hospitalized in ICU most often due to respiratory distress, deterioration of general health, complications related to metastasis, adverse effects of oncological treatment, and close postoperative monitoring.

TABLE 2. Relationship between gender and malignancy

Site of malignancy	Male (n)	Female (n)	Fold changes
Lung	61	15	4.07
Rectosigmoid	64	31	2.06
Stomach	33	23	1.43
Brain	19	16	1.19
Blood (hematological)	18	9	2.00
Pancreas	12	10	1.20
Bladder	17	5	3.40
Larynx	15	1	15.00
Esophagus	4	9	0.44
Kidney	8	4	2.00
Skin	7	3	2.33
Unclassified tumors	21	14	1.50
Total	279	140	

Gender-related cancers, such as prostate, breast, and gynecological malignancies were not included in this analysis.

Based on 2008 data of the Ministry of Health, in Turkey, lung cancer was most frequent type of cancer seen in men, followed by prostate, bladder, and colorectal cancers. In women, most frequently observed cancer type was breast cancer, followed by thyroid, colorectal, and uterine cancers [10].

In a study of cancer patients of the medical oncology clinic of Van Yuzuncu Yil University Faculty of Medicine between 2001 and 2004 conducted by Alici et al., most frequently seen was gastric cancer, followed by esophageal, breast colorectal, and lung cancers. In women, breast cancer was most common, followed by gastric cancer, while in men, gastric cancer was predominant, followed by esophageal cancer [11]. Tow et al. performed a retrospective study based on registries of oncology department and reported gastrointestinal, lung, and breast cancers as most frequently seen cancer types [12]. These studies evaluated patients hospitalized in services; however, our study analyzed cancer patients hospitalized in ICU, and most frequently observed were colorectal, followed by lung and gastric cancers. Among both male and female patients, most often seen was colorectal cancer (male: 22.94%; female:

22.14%). Lung cancer (21.86%) was second among men, while in women, next most often seen was gastric cancer (16.43%). These findings on cancer patients hospitalized in ICU are consistent with data of the Ministry of Health as well as other studies.

A multicenter study was performed by Taccone et al. with the aim of evaluating characteristics and outcomes of cancer patients hospitalized in European ICUs. From total of 3147 ICU patients, they reported 473 (15%) patients with malignancy and male:female ratio among them of 1.27 [13]. Alici et al. determined male:female ratio of 1.19 (male: 861; female: 723) [11]. In our study we observed that 23.9% of hospitalized ICU patients were cancer patients and male:female ratio of 1.55 (male: 293; female: 189). In parallel with higher frequency of cancer among male patients, dominance of male gender among cancer patients admitted to our intensive care units is remarkable. Our study also revealed that percentage of cancer patients hospitalized in ICU is significant and should not be underestimated.

Alici et al. reported that among their study participants, 151 (9.53%) were cancer patients aged ≥ 70 years, and 1433 (90.46%) cases were aged < 70 years [11]. In our study, 140 (29.04%), cancer patients were aged ≥ 70 years, while 342 (70.95%) patients were younger than 70. These rates suggest that cancer is now detected and treated at an earlier age thanks to development of new diagnostic tools and treatment alternatives.

Laryngeal cancers are most often seen among people aged 45 to 75 years, and male:female ratio is 10:1 [14]. In present study, 15 of 16 patients with laryngeal cancer were male, which is consistent with epidemiological data, and also explains high fold change in laryngeal cancer.

Limitation of this study is single-centered design. It was also blinded to stage, histological type, and other characteristics of cancer cases. Status and ultrastructure of hospital and whether or not cancer center focuses on certain types of cancer will also affect results. Regarding retrospective nature of our study, selection bias may be present.

Conclusion

In conclusion, cancer is most often observed in older people, and cancer patients generally stay in ICU longer than other, younger patients. Slow improvement in their state of health, and in many cases, advanced age, requires additional workforce. We think that palliative approaches for many advanced cancer patients hospitalized in ICU, rather than interventional therapies, will increase patient satisfaction as well as be more efficient use of ICU resources. Multicenter, long-term studies should be conducted to further delineate demographic characteristics of cancer patients in ICU.

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