

Outcomes of Patients Placed in an Emergency Department Observation Unit of a Comprehensive Cancer Center

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QUESTION ASKED: What are the clinical characteristics and the outcomes of patients who are placed in the emergency department (ED) observation unit of a dedicated cancer hospital?

SUMMARY ANSWER: The median length of stay in the ED observation unit was 23 hours, with cancer-related pain being the main reason for observation in more than one quarter of the visits. The ED return rate for unscheduled visits at 72 hours was 1.9%, and the 14- and 30-day mortality rates were significantly higher for patients who were admitted than for those who were discharged (14 days: 1.7% v 0.3%, $P < .001$; 30 days: 5.9% v 1.8%, $P < .001$).

WHAT WE DID: We conducted a retrospective observational study and analyzed the characteristics, clinical presentation, and outcomes (ie, length of stay, disposition from the observation unit, ED return within 72 hours after discharge from the observation unit, and mortality outcomes at 14 and 30 days) of patients who were placed in the ED observation unit of our dedicated cancer hospital.

WHAT WE FOUND: The median length of stay for the 2,461 visits to our ED observation unit during the study period was 23 hours, with an admission rate of 30.4%. The ED return rate within 72 hours and the 14- and 30-day mortality rates were 1.9%, 0.7%, and 3.0%, respectively.

BIAS, CONFOUNDING FACTOR(S): This study was conducted in a tertiary cancer center. Thus, because of our unique setting, our results may not be generalized to other health care organizations given that our data and our medical practice may not reflect those of other noncancer institutions.

REAL-LIFE IMPLICATIONS: Observation in cancer has the potential to avoid admissions and reserve inpatient hospital resources for patients who can receive the most benefit without compromising care, as it has been shown to do in noncancer populations. Our data suggest that placing patients with cancer in a type 2 observation unit is safe and efficient, as evidenced by our low ED return rates within 72 hours, the low 14- and 30-day mortality rates, and the 69.6% discharge within a 24-hour rate for these patients.

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abstract

PURPOSE Emergency department observation units (EDOUs) have been shown to decrease length of stay and improve cost effectiveness. Yet, compared with noncancer patients, patients with cancer are placed in EDOUs less often. In this study, we aimed to describe patients who were placed in a cancer center's EDOU to discern their clinical characteristics and outcomes.

METHODS We performed a retrospective observational study that included all patients age 18 years and older who presented to our emergency department (ED) and were placed in the EDOU between March 1, 2019, and February 29, 2020. The patients' electronic medical records were queried for demographics, comorbidities, diagnosis at the time of placement in the EDOU, length of stay, disposition from the EDOU, ED return within 72 hours after discharge from the EDOU, and mortality outcomes at 14 and 30 days.

RESULTS A total of 2,461 visits were eligible for analysis. Cancer-related pain was the main reason for observation in more than one quarter of the visits. The median length of stay in the EDOU was approximately 23 hours, and 69.6% of the patients were discharged. The ED return rate for unscheduled visits at 72 hours was 1.9%. The 14- and 30-day mortality rates were significantly higher for patients who were admitted than for those who were discharged (14 days: 1.7% v 0.3%, $P < .001$; 30 days: 5.9% v 1.8%, $P < .001$).

CONCLUSION Our data suggest that placing patients with cancer in EDOUs is safe, reduces admissions, and reserves hospital resources for patients who can receive the most benefit without compromising care.

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INTRODUCTION

Background

Emergency department observation units (EDOUs) have been shown to increase patient satisfaction, reduce length of stay, and improve emergency department (ED) throughput efficiency and cost effectiveness¹ while providing high-quality, efficient care for patients with certain common complaints who may require short-term stays for further testing or treatment.²

Observation care prevents inappropriate short-stay admissions, keeps the institution compliant with Centers of Medicare & Medicaid Services regulation, and avoids ED boarding.³ Avoiding full inpatient admission for patients who improve quickly and use less resources decreases costs. Combined ED observation and fee-for-service payments are comparable with the bundled diagnosis-related group reimbursement

for full admission for these types of patients, and the newly freed inpatient beds can be allotted to patients who are likely to have a larger diagnosis-related group reimbursement.

Observation units can be classified into four different types, ranging from dedicated and protocol-driven (type 1) to unstructured, in which observation care is discretionary (type 4).⁴ Furthermore, type 1 observation units have been extensively studied and have been shown to reduce patient length of stay and decrease likelihood of subsequent hospitalizations compared with inpatient hospitalization or other forms of observation.⁴ About 12% of patients with short-stay admissions nationwide in 2010 were eligible to be observed in type 1 units. Extrapolating from reported cost savings data by type 1 units over inpatient care, which range between 27% and 42%, the potential annual savings to the US health system was between

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\$5.5 and \$8.5 billion US dollars (USD), likely due to inherently shorter length of stays per patient and the aforementioned savings due to reduced staffing, equipment, and space needs.⁴ If the two thirds of US hospitals without observation units adopted any form of observation (not only type 1), the potential average cost saving is about \$4.6 million USD per hospital and \$3.1 billion USD for the entire health care system according to a 2012 systematic review and simulation model.³

Importance

Higher hospitalization rates are observed in patients with cancer after being evaluated in the ED when compared with the general population.⁵ Moreover, patients with cancer who are admitted to the hospital through the ED tend to be more ill than those who are admitted through other avenues.^{6,7} Given the increased rate of hospitalization and the wide-ranging outcomes in this population, it is important to better understand which of these patients can successfully be placed in a specialized observation unit.

The use of observation units among patients with active cancer has not been well described and is poorly understood. Cancer-related admissions are more expensive than are non-cancer-related admissions (\$22,100 v \$13,800 USD); therefore, appropriate placement is of utmost importance.⁸ Two previous studies at individual cancer centers showed that observation units resulted in reduced admission rates among patients with cancer, and about one third of these patients eventually needed full admission.^{9,10} However, these studies did not evaluate comorbidities, medical complexity, or short-term mortality rates of observation in patients with cancer. Furthermore, a 2017 study showed that patients with cancer on Medicare are placed in observation units at lower rates than are their cancer-free counterparts.¹¹

Our EDOU Setting

The EDOU at our hospital is a designated medical unit in which adult patients with cancer can be placed when there is a medical necessity for ongoing short-term treatment, assessment, and reassessment before an ED provider decides to admit or discharge the patient. Our EDOU is considered a hybrid between a type 1 unit and a type 2 unit because limited protocols have been developed and most patients' care is directed by the EDOU providers. The unit is functional 24 hours a day, 7 days a week, and is staffed by an emergency physician and advanced practice providers. Most patients in the observation unit originate from the ED; however, some patients come directly from clinics or procedure areas. By reviewing the cases before placement, case managers determine whether the patients are suitable for observation placement and ensure that the patients are placed under the appropriate level of care. Generally, EDOU placement is a viable option for patients with a medical necessity for a short (less than two-night-long) hospital stay (ie, the two-midnight rule). In our institution,

case managers use the Milliman Care Guidelines (MCG) for non-Medicare beneficiaries and consider both the MCG and the two-midnight rule for Medicare beneficiaries to recommend appropriate levels of care.¹² Because the MCG might contradict the two-midnight rule, we educated our ED providers to base their final admission decisions for Medicare beneficiaries on both the medical necessity of a presumed length of stay of one midnight or more and the MCG criteria.^{13,14} Appropriate reimbursable observation placement requires a clinical assessment before placement under observation. This assessment could be performed in an ED or in the clinic.

Observation patients placed outside of our EDOU are placed in observation on a regular floor. They could be discharged or admitted as an inpatient if there is a medical necessity for a hospital stay longer than one night. We developed a few observation algorithms, but because most patients with cancer present with multiple complaints and complex medical problems, most of the observation care we provide is discretionary and directed by a variety of specialists, classifying our observation unit more appropriately as a type 2 observation unit.

Goals of This Investigation

The purpose of this study was to discern the clinical characteristics of patients who were placed in our EDOU, their diagnosis at time of admission to the EDOU, their length of EDOU stay, the percentage of these patients who were converted to full admission, their ED recidivism rates within 72 hours, and their 14- and 30-day mortality outcomes.

METHODS

Patient Population and Study Setting

This retrospective observational study included all adult patients 18 years or older who presented to the ED of our dedicated cancer hospital between March 1, 2019, and February 29, 2020, and were placed in the EDOU. Although our institution specializes in cancer, patients without cancer are not excluded from our ED and EDOU. Thus, both patients with and without cancer are included in this study. Pediatric patients (18 years or younger) were excluded, as these patients are typically admitted to the pediatrics service directly and forego EDOU placement. Patients who were sent for observation outside of the EDOU as a request from their primary oncologist or service were excluded. The majority of these excluded patients were patients with leukemia for whom the leukemia service in our institution requests that patients with leukemia be placed on observation under their service since the conditions of them are more complex and many of these patients are on study protocols. For patients with multiple visits during the study period, only the first visit was analyzed. The primary outcome of interest was disposition from the observation unit. The secondary outcomes of interest were ED return within 72 hours and 14- and 30-day mortality rates.

Data Collection and Analysis

We abstracted study data by querying the electronic medical record for patient demographics, comorbidities, treatment history, diagnosis at the time of placement in the EDOU, reason for observation, length of stay, disposition from the EDOU, ED return within 72 hours after discharge from the EDOU, and 14- and 30-day mortality outcomes. The reason for observation was assigned on the basis of the primary indication, as stated by the initiating physician. Patients undergoing active chemotherapy and radiotherapy were defined as patients who received chemotherapy or radiotherapy within 30 days before hospitalization, and patients undergoing active immunotherapy were defined as patients who received immunotherapy within the past year. Because side effects of immunotherapy can occur months after the last immunotherapy dose,¹⁵ we choose one year as the threshold for immunotherapy. For patients with multiple cancer types, the most active cancer was considered to be the primary cancer. Hypertension, diabetes, renal failure, heart failure, chronic obstructive pulmonary disease, and myocardial infarction were chosen for abstraction, as these are some of the most commonly cited comorbidities in the literature for patients with cancer.^{16,17}

Descriptive statistics were used to summarize the socio-demographic characteristics of the study population. Continuous variables were reported as medians and interquartile ranges or means and standard deviations, and categorical variables were analyzed as counts and percentages. Clinical characteristics and 14- and 30-day mortality rates were compared between discharged and admitted patients.

All statistical analyses were performed using R software (version 3.6.2, The R Foundation).¹⁸ The institutional review board of MD Anderson approved this study and granted waivers of informed consent.

RESULTS

Patient Characteristics

Of the 28,358 visits to our center’s ED during the study period, 3,334 visits (11.8%) resulted in patients being placed under observation; 2,461 (85.7%) unique first visits were eligible for analysis once the exclusion criteria were applied (Fig 1). The majority (2,372 [96.4%]) of the included patients had at least one cancer type. The median patient age was 63 years, and the majority of patients (67.4%) were White and/or Caucasian. Breast, lung, and colorectal cancers were the most frequent cancer types observed (Table 1), and 89 patients (3.6%) had more than one cancer type. Most patients (72.6%) had an urgent acuity level (level 3) on the Emergency Severity Index (ESI).

Presentation and Outcomes

Pain due to neoplastic disease was reported as the main reason for observation in 25.8% of the visits (Table 1).

Other frequent reasons were electrolyte and/or metabolic disturbance (20.7%), cardiac problems (9.4%), infection (9.2%), GI symptoms (7.8%), anemia (5.3%), and pulmonary problems (4.9%). Of the patients with cancer who presented to the EDOU, 55.2% were undergoing active cancer treatment. Only 32.7%, 26.9%, and 13.9% of the visits were for patients who were receiving active chemotherapy, radiotherapy, or immunotherapy, respectively. Hypertension, diabetes, and renal failure were the main patient comorbidities. The median length of stay was 23 hours, with an admission rate of 30.4%. The 14- and 30-day mortality rates were 0.7% and 3.0%, respectively. Forty-seven patients (1.9%) from the whole cohort (including 46 [2.7%] from the ones who got discharged) had returned to the ED within 72 hours of their initial visit (Table 2). Of these, seven patients had scheduled return visits for neutropenic fever follow-up. Comparing the percentage of patients who returned to the ED within 72 hours of their visit after ED discharge without observation during the same study period with those discharged from observation, we found the former group had a significantly higher return rate (8.2% [812 of 9,886 patients] and 2.7% [46 of 1,713 patients], respectively, $P < .001$). Appendix Table A1 (online only) shows patient management and outcomes, excluding noncancer patients.

Demographics were not significantly different among patients who were admitted versus those who were discharged, but significant differences were observed in these patients’ comorbidities, cancer types, and mortality outcomes (Table 3). Compared with patients who were discharged, patients who were admitted had significantly higher rates of hypertension (53.9% v 46.0%; $P < .001$), diabetes (28.6% v 23.6%; $P = .010$), heart failure (11.5% v 6.8%; $P < .001$), chronic obstructive pulmonary disease (10.2% v 6.0%; $P < .001$), and renal failure (29.0%

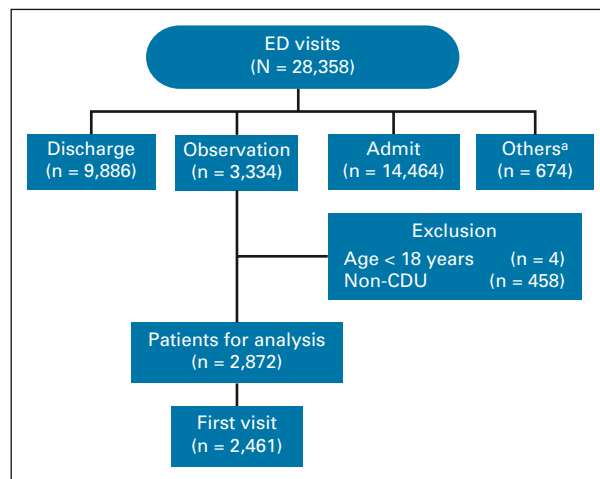


FIG 1. Flowchart of patient selection and exclusion criteria. ^aIncluding expired and transferred patients and patients who left against medical advice. CDU, clinical decision unit; ED, emergency department.

TABLE 1. Demographics, Clinical Characteristics, and Presentation Among Patients Admitted to the Emergency Department Observation Unit

Characteristic	No. (%)
Total visits	2,461
Age, median (IQR), years	63 (53-72)
Sex	
Female	1,377 (56.0)
Male	1,084 (44.0)
Race and/or ethnicity	
Non-Hispanic White and/or Caucasian	1,659 (67.4)
Black and/or African American	381 (15.5)
Hispanic and/or Latino	224 (9.1)
Asian	129 (5.2)
Others	68 (2.8)
Primary cancer type	
Breast	306 (12.4)
Lung	202 (8.2)
Colorectal	189 (7.7)
Lymphoma	166 (6.7)
Head and neck	150 (6.1)
Endometrial and cervical	124 (5.0)
Sarcoma	123 (5.0)
Pancreas	112 (4.6)
Male genital	108 (4.4)
Gastroesophageal	98 (4.0)
Kidney	95 (3.9)
Multiple myeloma	84 (3.4)
Hepatobiliary	84 (3.4)
Ovary and fallopian tube	74 (3.0)
Urinary bladder and ureter	64 (2.6)
Melanoma	60 (2.4)
Thyroid	52 (2.1)
Brain and spinal cord	45 (1.8)
Skin	34 (1.4)
Leukemia	30 (1.2)
Neuroendocrine tumors	21 (0.9)
Small intestine	15 (0.6)
Others	133 (5.4)
Noncancer	92 (3.7)
Secondary cancer	
No	2,372 (96.4)
Yes	89 (3.6)
Reason for observation	
Pain due to neoplastic disease	596 (25.8)
Electrolyte and/or metabolic disturbance	478 (20.7)

(continued in next column)

TABLE 1. Demographics, Clinical Characteristics, and Presentation Among Patients Admitted to the Emergency Department Observation Unit (continued)

Characteristic	No. (%)
Cardiac	216 (9.4)
Infection	212 (9.2)
GI symptoms	181 (7.8)
Anemia	123 (5.3)
Pulmonary	113 (4.9)
Bleeding	94 (4.1)
Supportive care	80 (3.5)
Neurologic	71 (3.1)
Procedure	36 (1.6)
Cord compression	18 (0.8)
CT preparation	15 (0.6)
Thromboembolic events	16 (0.7)
Headache	7 (0.3)
Other	52 (2.3)
Acuity	
Emergent	436 (17.7)
Urgent	1,786 (72.6)
Less urgent	12 (0.5)
Indeterminate	227 (9.2)
Treatment	
Chemotherapy within 30 days	
No	1,657 (67.3)
Yes	804 (32.7)
Radiotherapy within 30 days	
No	1,800 (73.1)
Yes	661 (26.9)
Immunotherapy within 1 year	
No	2,118 (86.1)
Yes	343 (13.9)
Comorbidities	
Hypertension	1,191 (48.4)
Diabetes	619 (25.2)
Renal failure	543 (22.1)
Heart failure	203 (8.2)
COPD	178 (7.2)
Myocardial infarction	163 (6.6)

Abbreviations: COPD, chronic obstructive pulmonary disease; CT, computed tomography; IQR, interquartile range.

v 19.0%; $P < .001$). The 14- and 30-day mortality rates were also significantly higher for patients who were admitted than for those who were discharged (14 days, 1.7% v 0.3%, $P < .001$; 30 days, 5.9% v 1.8%, $P < .001$). Other significant differences associated with disposition from the

TABLE 2. Management and Outcomes of Patients Admitted to the Emergency Department Observation Unit

Outcome	No. (%)
Median length of stay (IQR), hours	23 (17-39)
Disposition	
Admission	748 (30.4)
Discharge	1,713 (69.6)
Consultations requested	
No	1,528 (62.1)
Yes	933 (37.9)
ED revisit within 72 hours	
No	2,414 (98.1)
Yes	47 (1.9)
Death within 14 days	
No	2,443 (99.3)
Yes	18 (0.7)
Death within 30 days	
No	2,387 (97.0)
Yes	74 (3.0)

Abbreviations: ED, emergency department; IQR, interquartile range.

EDOU were chemotherapy within 30 days (discharged patients, 34.5% v admitted patients, 28.5%; $P = .004$) and consultations requested during the EDOU stay (discharged patients, 29.7% v admitted patients, 56.8%; $P < .001$). Similar results were observed once noncancer patients were excluded (Appendix Table A2, online only).

DISCUSSION

Four different settings can be described for observation care units. Type 1 observation care is usually protocol-driven and has a dedicated location in the hospital. Type 2 observation care has a dedicated location in the hospital, but the care is more discretionary and directed by a variety of specialists.⁴ The care in type 1 and type 2 units is usually provided by ED providers. Type 3 observation care is protocol-driven, but a type 3 observation unit does not have a dedicated location. Type 4 observation care is discretionary, and the patient could be in any bed on any floor in the hospital. Type 1 and type 2 observation units are more favorable because the care is delivered in a controlled environment by a specific service in charge. Type 1 observation care carries the highest evidence for a favorable outcome.⁴

Since the establishment of the EDOU pilot at our institution in 2012, the number of patients with cancer placed in the EDOU has consistently and rapidly increased. From 2012 to 2014, about 30 patients per month were placed on observation, almost 1.5% of our monthly ED census at the time.⁹ Over our current 1-year study period, approximately 10% of the patients presenting to the ED were placed in the

EDOU, which is also much higher than the 2% previously reported in general observation units.^{19,20} As most patients presenting to our ED are patients with cancer,⁵ our finding was more consistent with the 9% observation rate shown in a 2015 study that studied patients with cancer.¹⁰

Patients with cancer presenting to the ED are believed to have more comorbidities and medical conditions, requiring complex decision making and management that ultimately leads to higher hospitalization rates than those for patients without cancer.⁵ Because patients with cancer are often older and more medically complex, they often require more time and resources than are available in an ED; thus, the EDOU should be considered for these patients.²¹

Our patients were older and had more comorbidities than did conventional patients in EDOUs,^{19,20} yet we believe that observation medicine can be a viable alternative in patients with cancer. A recent study of a national geriatric patient cohort showed that observation status was becoming more accepted in older adults, even at the cost of higher admission rates from observation units than the traditional ideal 20% admission rate.^{22,23} Although cancer status was not taken into consideration in this study, it is reasonable to assume that the same principle applies to the subgroup of geriatric patients with cancer. In fact, our EDOU patients were admitted 30.4% of the time, which is similar to the findings of existing reports on patients with cancer and older adults.^{10,24,25} Despite the available data for older adults, a 2017 study matching Medicare patients with cancer to control patients without cancer found that patients with cancer were placed on observation status at lower rates than were their counterparts without cancer. Additionally, patients who are older than 75 years, have a higher comorbidity score, and have been hospitalized previously are even less likely to be placed on observation status.¹¹

Our institution uses an adapted version of the ESI classification process.²⁶ In our center, the ESI includes consideration of systolic blood pressure and temperature to better differentiate high-risk scenarios commonly seen in patients with cancer. Furthermore, Adler et al²⁷ showed that the ESI is predictive of ED disposition in patients with cancer. Most of our patients had an urgent acuity level on ESI classification.

The median length of stay in the EDOU was approximately 23 hours, and only 46 patients (2.7%) who were discharged from the EDOU returned to the ED within 72 hours after discharge. Interestingly, this was significantly lower than the 72-hour return rate (8.2%) for the patients who were discharged directly from the ED during the same study period. Although the study was not designed to compare these groups, this finding may highlight another potential benefit of the observation unit in the management of patients with cancer, which may potentially lead to lower short-term revisits if some discharged ED patients are

TABLE 3. Clinical Characteristics and Outcomes of Patients Who Were Admitted to the Emergency Department Observation Unit Stratified by Disposition (observation followed by discharged v observation followed by admission)

Variable	Disposition		P
	Discharge	Admission	
Total	1,713	748	
Age, median (IQR), years	63 (53-72)	64 (53-72)	.341
Sex			.112
Female	977 (57.0)	400 (53.5)	
Male	736 (43.0)	348 (46.5)	
Race and/or ethnicity			.805
White and/or Caucasian	1,143 (66.7)	516 (69.0)	
Black and/or African American	267 (15.6)	114 (15.2)	
Hispanic and/or Latino	162 (9.5)	62 (8.3)	
Asian	93 (5.4)	36 (4.8)	
Others	48 (2.8)	20 (2.7)	
Primary cancer type			.003
Breast	213 (12.4)	93 (12.4)	
Colorectal	136 (7.9)	53 (7.1)	
Lung	132 (7.7)	70 (9.4)	
Lymphoma	117 (6.8)	49 (6.6)	
Head and neck	110 (6.4)	40 (5.3)	
Endometrial and cervical	80 (4.7)	44 (5.9)	
Male genital	78 (4.6)	30 (4.0)	
Pancreas	77 (4.5)	35 (4.7)	
Sarcoma	76 (4.4)	47 (6.3)	
Kidney	64 (3.7)	31 (4.1)	
Ovarian and fallopian tube	62 (3.6)	12 (1.6)	
Gastroesophageal	61 (3.6)	37 (4.9)	
Hepatobiliary	59 (3.4)	25 (3.3)	
Multiple myeloma	55 (3.2)	29 (3.9)	
Urinary bladder and ureter	47 (2.7)	17 (2.3)	
Melanoma	45 (2.6)	15 (2.0)	
Thyroid	34 (2.0)	18 (2.4)	
Brain and spinal cord	30 (1.8)	15 (2.0)	
Leukemia	23 (1.3)	7 (0.9)	
Skin	20 (1.2)	14 (1.9)	
Small intestine	9 (0.5)	6 (0.8)	
Neuroendocrine tumors	14 (0.8)	7 (0.9)	
Others	87 (5.1)	46 (6.1)	
Noncancer	84 (4.9)	8 (1.1)	
Acuity			< .001
Emergent	304 (17.7)	132 (17.6)	

(continued in next column)

TABLE 3. Clinical Characteristics and Outcomes of Patients Who Were Admitted to the Emergency Department Observation Unit Stratified by Disposition (observation followed by discharged v observation followed by admission) (continued)

Variable	Disposition		P
	Discharge	Admission	
Urgent	1,306 (76.2)	480 (64.2)	
Less urgent	11 (0.6)	1 (0.1)	
Indeterminate	92 (5.4)	135 (18.0)	
Chemotherapy within 30 days			.004
No	1,122 (65.5)	535 (71.5)	
Yes	591 (34.5)	213 (28.5)	
Radiotherapy within 30 days			.464
No	1,245 (72.7)	555 (74.2)	
Yes	468 (27.3)	193 (25.8)	
Immunotherapy within 1 year			.875
No	1,476 (86.2)	642 (85.8)	
Yes	237 (13.8)	106 (14.2)	
Hypertension			< .001
No	925 (54.0)	345 (46.1)	
Yes	788 (46.0)	403 (53.9)	
Heart failure			< .001
No	1,596 (93.2)	662 (88.5)	
Yes	117 (6.8)	86 (11.5)	
Myocardial infarction			.161
No	1,608 (93.9)	690 (92.2)	
Yes	105 (6.1)	58 (7.8)	
COPD			< .001
No	1,611 (94.0)	672 (89.8)	
Yes	102 (6.0)	76 (10.2)	
Diabetes			.010
No	1,308 (76.4)	534 (71.4)	
Yes	405 (23.6)	214 (28.6)	
Renal failure			< .001
No	1,387 (81.0)	531 (71.0)	
Yes	326 (19.0)	217 (29.0)	
Length of stay (IQR), hours	24 (18-39)	23 (16-39)	.036
Consultations requested			< .001
No	1,205 (70.3)	323 (43.2)	
Yes	508 (29.7)	425 (56.8)	
ED revisit within 72 hours			< .001
No	1,667 (97.3)	747 (99.9)	
Yes	46 (2.7)	1 (0.1)	
Death within 14 days			< .001

(continued on following page)

TABLE 3. Clinical Characteristics and Outcomes of Patients Who Were Admitted to the Emergency Department Observation Unit Stratified by Disposition (observation followed by discharged v observation followed by admission) (continued)

Variable	Disposition		P
	Discharge	Admission	
No	1,708 (99.7)	735 (98.3)	
Yes	5 (0.3)	13 (1.7)	
Death within 30 days			< .001
No	1,683 (98.2)	704 (94.1)	
Yes	30 (1.8)	44 (5.9)	

Abbreviations: COPD, chronic obstructive pulmonary disease; ED, emergency department; IQR, interquartile range.

placed in the EDOU instead. Of the 46 patients who returned, seven had scheduled neutropenic fever follow-up appointments, per our institutional neutropenic fever pathway.

Within 14 days of placement in the EDOU, 18 patients (0.7%) had died, and within 30 days, 74 patients (3.0%) had died. However, most of these patients were admitted to the hospital instead of being discharged from the EDOU (1.7% v 0.3% at 14 days; 5.9% v 1.8% at 30 days). We believe that this novel finding is a surrogate for the safety of the decision-making process in addition to ED revisit rates.

Interestingly, we found that the patients who received chemotherapy within 30 days before admission to the EDOU were more likely to be discharged than were those who did not. No association was seen with radiotherapy or immunotherapy. Although we did not specifically examine the characteristics of this patient subgroup, we speculate that this difference was due to chemotherapy side effects generally being more transient than radiotherapy or immunotherapy side effects and also more quickly treatable.

Comorbidities that were statistically significantly associated with admission over discharge from the EDOU were hypertension, heart failure, chronic obstructive pulmonary disease, diabetes, and renal failure. A previous study found that increased comorbidities in patients with cancer were predictive of admission over observation status from the ED. Unlike our study, it did not specifically look at whether cancer observation patients with comorbidities were more likely to be admitted compared with those without comorbidities after the period of observation.¹¹ Comorbidities are associated with decreased long-term survival duration in patients with cancer because of alteration in cancer treatment, increase in treatment toxicity, and increased adverse drug interactions.^{28,29} Therefore, comorbidities can translate into longer hospital stays.^{30,31} Several studies have shown that comorbidities contribute not only to the length of stay but also to in-hospital mortality.³² Still this does not mean that some patients with cancer and comorbidities cannot be safely placed on observation. More research is needed to see how the presence of

comorbidities in patients with cancer should steer observation placement decision making.

Cancer-associated pain was the main reason for placement in the EDOU, with nearly 26% of our patients having this as the primary diagnosis. Patients with cancer frequently visit the ED for cancer-related pain. However, management of cancer-related pain continues to be challenging for ED clinicians, and many patients leave with continued pain.³³ For this reason, the EDOU should be considered for patients with cancer whose pain complaints are not fully addressed in the ED. Pain management is one of the most common reasons for EDOU placement, not only in our cohort but also as previously reported.³⁴ Adequately addressing pain will lead to not only decreased mortality but also decreased risk of 30-day hospital readmission and increased patient satisfaction.³³

Patients admitted to the hospital from the EDOU had more consultation requests during their observation stay than did those who were discharged, likely because of the complexity of their medical problems. This highlights that these patients were sicker, requiring further hospital care. Whether the need for consultation should be a predictive factor for deciding observation initiation for patients with cancer is also something that should be further explored.

Our study has several important limitations. First, this was a retrospective chart review in a single cancer-specific hospital. Second, the variables collected were limited to what was available from the ED encounter. At our institution, the ED clinicians typically do not document staging or performance status. This is typically documented by the oncologist and may no longer be accurate by the time the patient arrives in the ED. Third, our results may not be the most generalizable. Most patients with leukemia were placed on observation under the leukemia service and not the EDOU. Therefore, they were not included in our study. Additionally, we included 92 patients without a cancer diagnosis, which could affect how these results are applied to the cancer population. However, because of the lack of currently published observation data for patients with cancer, we believe that our findings may affect the number of patients with cancer placed on observation status. Fourth, we limited our study to six comorbidities (diabetes mellitus, heart failure, hypertension, renal failure, chronic obstructive pulmonary disease, and myocardial infarction). Other comorbidities that were not accounted for could have contributed to the increased rate of admissions in our patients. Similarly, we limited the chemotherapy- and radiotherapy-related data collection to 30 days and immunotherapy-related data collection to 1 year before the EDOU visit. Despite these time constraints, we believe that our data are representative of our patients since major acute side effects related to chemotherapy and radiation treatment are usually seen within 30 days of such therapy. Finally, the knowledge of the clinicians in the EDOU of a cancer center might differ from that of general emergency

medicine practitioners. Previously, we have shown that the majority (93.4%) of the patients seen by the physicians in the ED at MD Anderson Cancer Center consists primarily of patients with cancer.⁵ The extensive experience in cancer care that this ED's physicians have may differ from the experience of a general emergency physician or provider, potentially leading to better performance on the metrics measured at the ED studied versus a general ED. We acknowledge that this study was conducted in a tertiary cancer center. Thus, because of our unique setting, our results may not be generalized to other health care organizations given that our data and our medical practice may not reflect those of other noncancer institutions.

In conclusion, our data suggest that placing patients with cancer in a type 2 observation unit is safe, as evidenced by our low ED return rates within 72 hours and low 14- and 30-day mortality rates, although a higher percentage of these patients were admitted than were patients in the general observation units. Even so, observation in cancer has the potential to avoid admissions and reserve inpatient hospital resources for patients who can receive the most benefit without compromising care, as it has been shown to do in noncancer populations. Further study is needed to elucidate predictive factors that may further maximize efficiency of observation status by reducing observation to admission rates.

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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REFERENCES

- Daly S, Campbell DA, Cameron PA: Short-stay units and observation medicine: A systematic review. *Med J Aust* 178:559-563, 2003
- Baugh CW, Venkatesh AK, Bohan JS: Emergency department observation units: A clinical and financial benefit for hospitals. *Health Care Manage Rev* 36:28-37, 2011
- Baugh CW, Venkatesh AK, Hilton JA, et al: Making greater use of dedicated hospital observation units for many short-stay patients could save \$3.1 billion a year. *Health Aff (Millwood)* 31:2314-2323, 2012
- Ross MA, Hockenberry JM, Mutter R, et al: Protocol-driven emergency department observation units offer savings, shorter stays, and reduced admissions. *Health Aff (Millwood)* 32:2149-2156, 2013
- Yang Z, Yang R, Kwak MJ, et al: Oncologic emergencies in a cancer center emergency department and in general emergency departments countywide and nationwide. *PLoS One* 13:e0191658, 2018
- El Majzoub I, Qdaisat A, Chaftari PS, et al: Association of emergency department admission and early inpatient palliative care consultation with hospital mortality in a comprehensive cancer center. *Support Care Cancer* 27:2649-2655, 2019
- Elsayem AF, Merriman KW, Gonzalez CE, et al: Presenting symptoms in the emergency department as predictors of intensive care unit admissions and hospital mortality in a comprehensive cancer center. *JCO Oncol Pract* 12:e554-e563, 2016
- Roemer M: Cancer-Related Hospitalizations for Adults, 2017: Statistical Brief #270. in *Healthcare Cost and Utilization Project (HCUP) Statistical Briefs*. Rockville, MD, Agency for Healthcare Research and Quality, 2006
- HaIm J: Utilizing TQM and CQI principles in establishing a type 1 observation unit in a comprehensive cancer center. *J Clin Oncol* 32, 2014 (suppl; abstr 96)
- Lipitz-Snyderman A, Klotz A, Atoria CL, et al: Impact of observation status on hospital use for patients with cancer. *JCO Oncol Pract* 11:73-77, 2015
- Lipitz-Snyderman A, Klotz A, Gennarelli RL, et al: A population-based assessment of emergency department observation status for older adults with cancer. *J Natl Compr Canc Netw* 15:1234-1239, 2017
- MCG Health: <https://www.mcg.com>
- Locke C, Sheehy AM, Deuschendorf A, et al: Changes to inpatient versus outpatient hospitalization: Medicare's 2-midnight rule. *J Hosp Med* 10:194-201, 2015
- Sheehy AM, Caponi B, Gangireddy S, et al: Observation and inpatient status: Clinical impact of the 2-midnight rule. *J Hosp Med* 9:203-209, 2014
- Yeung SJ, Qdaisat A, Chaftari P, et al: Diagnosis and management of immune-related adverse effects of immune checkpoint therapy in the emergency department. *J Am Coll Emerg Physicians Open* 1:1637-1659, 2020
- Edwards BK, Noone AM, Mariotto AB, et al: Annual report to the nation on the status of cancer, 1975-2010, featuring prevalence of comorbidity and impact on survival among persons with lung, colorectal, breast, or prostate cancer. *Cancer* 120:1290-1314, 2014
- Williams GR, Deal AM, Lund JL, et al: Patient-reported comorbidity and survival in older adults with cancer. *Oncologist* 23:433-439, 2018

18. The R Foundation: <http://www.r-project.org>
 19. Venkatesh AK, Geisler BP, Gibson Chambers JJ, et al: Use of observation care in US emergency departments, 2001 to 2008. *PLoS One* 6:e24326, 2011
 20. Wiler JL, Ross MA, Ginde AA: National study of emergency department observation services. *Acad Emerg Med* 18:959-965, 2011
 21. Hustey FM: Geriatric observation medicine, in: Mace SE (ed): *Observation Medicine: Principles and Protocols*. Cambridge, United Kingdom, Cambridge University Press, 2017, pp 304-308
 22. Komindr A, Baugh CW, Grossman SA, et al: Key operational characteristics in emergency department observation units: A comparative study between sites in the United States and Asia. *Int J Emerg Med* 7:6, 2014
 23. Ross MA, Granovsky M: History, principles, and policies of observation medicine. *Emerg Med Clin North Am* 35:503-518, 2017
 24. Mace SE: Care of special populations in an observation unit: Pediatrics and geriatrics. *Emerg Med Clin North Am* 35:685-699, 2017
 25. Southerland LT, Hunold KM, Carpenter CR, et al: A national dataset analysis of older adults in emergency department observation units. *Am J Emerg Med* 37:1686-1690, 2019
 26. Gilboy N, Tanabe P, Travers D, et al: *Emergency Severity Index: A Triage Tool for Emergency Department Care*. Rockville, MD, Agency for Healthcare Research and Quality, 2012
 27. Adler D, Abar B, Durham DD, et al: Validation of the Emergency Severity Index (version 4) for the triage of adult emergency department patients with active cancer. *J Emerg Med* 57:354-361, 2019
 28. Sogaard M, Thomsen RW, Bossen KS, et al: The impact of comorbidity on cancer survival: A review. *Clin Epidemiol* 5:3-29, 2013
 29. Sarfati D, Koczwara B, Jackson C: The impact of comorbidity on cancer and its treatment. *CA Cancer J Clin* 66:337-350, 2016
 30. Adjei Boakye E, Johnston KJ, Moulin TA, et al: Factors associated with head and neck cancer hospitalization cost and length of stay—A national study. *Am J Clin Oncol* 42:172-178, 2019
 31. Bennedsen ALB, Eriksen JR, Gogenur I: Prolonged hospital stay and readmission rate in an enhanced recovery after surgery cohort undergoing colorectal cancer surgery. *Colorectal Dis* 20:1097-1108, 2018
 32. Shayne M, Culakova E, Poniewierski MS, et al: Risk factors for in-hospital mortality and prolonged length of stay in older patients with solid tumor malignancies. *J Geriatr Oncol* 4:310-318, 2013
 33. Coyne CJ, Reyes-Gibby CC, Durham DD, et al: Cancer pain management in the emergency department: A multicenter prospective observational trial of the comprehensive oncologic emergencies research network (CONCERN). *Support Care Cancer* 29:4543-4553, 2021
 34. Scott NL, Miner JR: Pain management, including musculoskeletal and low back pain, in: Mace SE (ed): *Observation Medicine: Principles and Protocols*. Cambridge, United Kingdom, Cambridge University Press, 2017, pp 312-317
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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

Outcomes of Patients Placed in an Emergency Department Observation Unit of a Comprehensive Cancer Center

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APPENDIX

TABLE A1. Management and Outcomes of Cancer Patients Admitted to the Emergency Department Observation Unit

Outcome	No. (%)
Length of stay (IQR), hours	24 (18-40)
Disposition	
Admission	895 (32.3)
Discharge	1,880 (67.7)
Consultations requested	
No	1,673 (60.3)
Yes	1,102 (39.7)
ED revisit within 72 hours	
No	2,721 (98.1)
Yes	54 (1.9)
Death within 14 days	
No	2,743 (98.8)
Yes	32 (1.2)
Death within 30 days	
No	2,669 (96.2)
Yes	106 (3.8)

Abbreviations: ED, emergency department; IQR, interquartile range.

TABLE A2. Clinical Characteristics and Outcomes of Cancer Patients Who Were Admitted to the Emergency Department Observation Unit Stratified by Disposition

Variable	Disposition		P
	Discharge	Admission	
Total	1,880	895	
Age, median (IQR), years	63 (53-72)	63 (52-71)	.525
Sex			.146
Female	1,092 (58.1)	493 (55.1)	
Male	788 (41.9)	402 (44.9)	
Race and/or ethnicity			.606
White and/or Caucasian	1,240 (66.0)	590 (65.9)	
Black and/or African American	301 (16.0)	151 (16.9)	
Hispanic and/or Latino	186 (9.9)	75 (8.4)	
Asian	99 (5.3)	47 (5.3)	
Others	54 (2.9)	32 (3.6)	
Primary cancer type			.187
Brain and spinal cord	36 (1.9)	16 (1.8)	
Breast	243 (12.9)	110 (12.3)	
Colorectal	152 (8.1)	69 (7.7)	
Endometrial and cervical	100 (5.3)	54 (6.0)	
Gastroesophageal	69 (3.7)	43 (4.8)	
Head and neck	123 (6.5)	50 (5.6)	
Hepatobiliary	65 (3.5)	27 (3.0)	
Kidney	67 (3.6)	38 (4.2)	
Leukemia	29 (1.5)	9 (1.0)	
Lung	149 (7.9)	78 (8.7)	
Lymphoma	133 (7.1)	61 (6.8)	
Male genital	86 (4.6)	37 (4.1)	
Mesothelioma	50 (2.7)	15 (1.7)	
Multiple myeloma	67 (3.6)	36 (4.0)	
Neuroendocrine tumors	17 (0.9)	11 (1.2)	
Other GI	101 (5.4)	57 (6.4)	
Other gynecologic	81 (4.3)	18 (2.0)	
Others	89 (4.7)	41 (4.6)	
Ovarian and fallopian tube	92 (4.9)	59 (6.6)	
Pancreatic	21 (1.1)	16 (1.8)	
Sarcoma	9 (0.5)	7 (0.8)	
Small intestine	42 (2.2)	21 (2.3)	
Thyroid	59 (3.1)	22 (2.5)	
Chemotherapy within 30 days			< .001
No	1,210 (64.4)	641 (71.6)	
Yes	670 (35.6)	254 (28.4)	

(continued in next column)

TABLE A2. Clinical Characteristics and Outcomes of Cancer Patients Who Were Admitted to the Emergency Department Observation Unit Stratified by Disposition (continued)

Variable	Disposition		P
	Discharge	Admission	
Radiotherapy within 30 days			.456
No	1,319 (70.2)	641 (71.6)	
Yes	561 (29.8)	254 (28.4)	
Immunotherapy within 1 year			.793
No	1,603 (85.3)	759 (84.8)	
Yes	277 (14.7)	136 (15.2)	
Hypertension			.014
No	982 (52.2)	422 (47.2)	
Yes	898 (47.8)	473 (52.8)	
Heart failure			.001
No	1,733 (92.2)	791 (88.4)	
Yes	147 (7.8)	104 (11.6)	
Myocardial infarction			.099
No	1,764 (93.8)	824 (92.1)	
Yes	116 (6.2)	71 (7.9)	
COPD			< .001
No	1,761 (93.7)	803 (89.7)	
Yes	119 (6.3)	92 (10.3)	
Diabetes			.042
No	1,408 (74.9)	637 (71.2)	
Yes	472 (25.1)	258 (28.8)	
Renal failure			< .001
No	1,490 (79.3)	638 (71.3)	
Yes	390 (20.7)	257 (28.7)	
Length of stay (IQR), hours	24 (18, 40)	23 (17, 40)	.101
Consultations requested			< .001
No	1,306 (69.5)	367 (41.0)	
Yes	574 (30.5)	528 (59.0)	
ED revisit within 72 hours			< .001
No	1,826 (97.1)	895 (100.0)	
Yes	54 (2.9)	0 (0.0)	
Death within 14 days			< .001
No	1,871 (99.5)	872 (97.4)	
Yes	9 (0.5)	23 (2.6)	
Death within 30 days			< .001
No	1,839 (97.8)	830 (92.7)	
Yes	41 (2.2)	65 (7.3)	

Abbreviations: COPD, chronic obstructive pulmonary disease; ED, emergency department; IQR, interquartile range.