Support Care Cancer (2013) 21:397–404
DOI 10.1007/s00520-012-1524-6

ORIGINAL ARTICLE

Unplanned presentations of cancer outpatients: a retrospective cohort study

G. Aprile · F. E. Pisa · A. Follador · L. Foltran · F. De Pauli · M. Mazzer · S. Lutrino · C. S. Sacco · M. Mansutti · G. Fasola

Received: 14 February 2012 / Accepted: 4 June 2012 / Published online: 22 June 2012

Abstract
Purpose As a result of the growing cancer incidence and the increasing trend towards chemotherapy treatment, a higher number of cancer outpatients ask for unplanned visits. This study aimed to describe the nature and magnitude of this phenomenon and to identify risk factors for repeated unplanned presentations and hospital admission.
Methods Unplanned consultations (2,811) of 1,431 cancer patients who accessed our acute oncology clinic over a 2-year period were reviewed. Demographics, clinical variables and reason(s) for presentation were all recorded. Recurrent event survival analysis was used to evaluate the relation of potential predictors to the two outcome events repeated presentations and hospitalization. A stratified Cox proportional hazard model was used.
Results Of 1,431 patients, 625 (43 %) received chemotherapy during the 90 days before the unplanned visit. Pain (27.7 %), fatigue (17.6 %), dyspnoea (13.8 %), fever (11.5 %) and gastrointestinal problems (31 %) were reported frequently. The time interval since the last chemotherapy was significantly related to the rate of repeated presentation. Two hundred and nine patients (7 %) were hospitalized after an unplanned presentation. Number of symptoms and selected toxicities, along with distance from the hospital, were all predictors for hospitalization.
Conclusions The management of unscheduled presentations of cancer outpatients is becoming crucial to avoid inappropriate selection for hospital admission and interferences with the ordinary work plan, improving quality of oncology services.

Keywords Unplanned presentations · Outpatient · Cancer chemotherapy · Toxicity

G. Aprile · A. Follador · L. Foltran · M. Mazzer · S. Lutrino · C. S. Sacco · M. Mansutti · G. Fasola
Department of Oncology, University Hospital "S. Maria della Misericordia",
Udine, Italy

F. E. Pisa
Institute of Hygiene and Clinical Epidemiology, University Hospital "S. Maria della Misericordia",
Udine, Italy

F. De Pauli
Department of Oncology, Hospital "San Antonio",
San Daniele del Friuli,
Udine, Italy

G. Aprile (✉)
Dipartimento di Oncologia, Azienda Ospedaliero-Universitaria "S. Maria della Misericordia",
Piazzale S. Maria della Misericordia 15,
33100 Udine, Italy
e-mail: aprile.giuseppe@aoud.sanita.fvg.it

Introduction

As a result of the rising cancer incidence and improved survival rates, prevalence of cancer is steadily growing in many ageing European countries [1]. In Italy, in recent years, there have been over 250,000 newly diagnosed cancer cases annually, and over 600,000 patients are currently receiving an anti-cancer treatment [2]. Both the growing number of patients and the increasing trend towards chemotherapy treatment in the outpatient setting have significant implications, such as the higher number of unplanned presentations to the hospital [3], particularly to emergency departments [4, 5]. The unplanned presentation has a blurred definition in the available literature [3]. However, in this paper, we will define as unplanned a presentation that is not scheduled and occurs due to the appearance of acute

symptoms, treatment-related toxicities or any other patients' need.

This mounting figure is becoming critical for a number of reasons. First of all, it is clinically relevant. Notwithstanding the improvement in cancer therapies, treatment-related toxicities may present simultaneously [6, 7] or overlap with cancer symptoms, becoming even more distressing and deeply impacting on patients' quality of life [8]. Moreover, 'minor' toxicities such as dysgeusia [9] or skin toxicity [10] may also negatively impact on patients' well-being.

Secondly, managing treatment-induced toxicities or cancer-related symptoms may be time consuming and costly [11–13]. Educating cancer patients in recognizing, attenuating or self-treating minor side effects or cancer symptoms [14] may be cost saving and reduce unnecessary hospital admissions. Finally, unplanned presentations may interfere with scheduled activities, causing delays and inconvenience for all patients.

The issue of managing unplanned presentations is not new for other chronic disorders [15]. In cancer medicine, the advantages of managing both drug-induced toxicities [16] and palliative care [17, 18] in the outpatient setting have already been reported. However, to date, too little research has focused on this field.

In 2006, we activated an acute oncology clinic for unplanned presentations of cancer patients at the Medical Oncology Department of our University Hospital; the clinic is open Monday through Friday from 8 am to 8 pm and is attended by medical oncology specialists. Here, we report on the first 2 years of activity; specifically, we provide an overview of (1) demographics and clinical characteristics of patients who accessed the clinic, (2) the reasons for presentation, and (3) an assessment of risk factors for repeated presentations and hospital admission as a result of the unplanned presentation.

Patients and methods

We retrospectively reviewed the unplanned presentations to the Department of Oncology, University Hospital, Udine, northeastern Italy, over a 2-year period (October 1, 2006–September 30, 2008).

Our University Hospital serves a population of 400,000; approximately 1,600 new cancer cases are seen yearly. In the study cohort, most patients had received chemotherapy. However, they were considered on treatment only if the last chemotherapy had been delivered within 90 days before the unplanned presentation, because of the minimal chance that a previous treatment may have caused an unplanned presentation that occurred after 3 months.

Demographics (age, sex, residence) and clinical variables (primary cancer site, comorbidities, type of chemo regimen, treatment setting) were all recorded together with reason(s) for presentation, laboratory values, and outcome of the visit. Data were retrieved from electronic medical charts, handled in a pseudo-anonymized format and registered on a ad hoc constructed Excel database. The study was approved by the Investigational Review Board, to ensure adherence to institutional research policies and procedures related to human subjects.

Statistical analysis

Descriptive statistical analyses were performed to summarize patient characteristics, unplanned presentations features and outcomes. The outcome events considered are repeated presentations and hospitalization.

Categorical or dichotomous variables, including month, weekday and cause(s) for the presentation, gender of patients and type of tumour were expressed as percentage. Mean and standard deviation were calculated for continuous variables, including age and time between the last chemotherapy and the unplanned presentation. Also, continuous variables were all classified in mutually exclusive categories. Distance as the crow flies between the hospital and the patient's home was also considered; the values of quartiles of this distance were used as cutoff points, i.e., 25th percentile was 1 km (distance that defines an area approximately encompassing patients who live in town), 50th percentile was 12 km (encompassing approximately patients who live in the suburbs) and the 75th percentile was 22 km (encompassing approximately patients who live outside of the town area). Patients were classified in five mutually exclusive categories based on the interval between the last chemotherapy session and the unplanned presentation (>90 days or chemo-naive patients; 31–90 days; 16–30 days; 8–15 days; <8 days). The number of causes for presentation was categorized as follows: 1, 2, 3, and >3.

Recurrent event survival analysis was used to evaluate the relation of potential predictors to the two outcome events, specifically repeated presentations and hospitalization, that may potentially occur more than once during the follow-up time for a given subject.

An episode of repeated unplanned presentation was defined as a new unplanned presentation occurring ≤30 days after the previous one. The hospitalization as a result of the presentation was defined as any hospital admission occurring within 24 h from the presentation.

A stratified Cox proportional hazard model was used, with a conditional 1 approach [19]. This model takes into account the actual times of the events from study entry; the events are considered of the same type, and their order is considered relevant.

Robust estimation was used to adjust the variances of the estimated regression coefficients for the correlation of observation on the same subject.

The covariates assessed in the models as potential predictors were age, gender, number of reasons for attending, type of cause, interval between the last chemotherapy and the unplanned presentation, chemotherapy status, distance between the hospital and the patient's home and tumour type. A full model including all the potential risk factors or explanatory variables was fitted. Not significant variables ($P>0.05$) and/or variables that do not modify the coefficients for the other covariates were then removed to obtain a reduced and implemented model. Time-dependent variables and interaction terms, including interaction between tumour type and each of the other variables, were tested for inclusion in the final models. The analysis was conducted with SAS© software (SAS Institute Inc., Cary, NC, USA); the Proc PHREG procedure was used for recurrent event survival analysis.

Results

There were 2,811 unplanned presentations to our acute oncology clinic during the 2-year study period, corresponding to 1,431 patients. Of these patients, 625 out of 1,431 (43 %) had received chemotherapy during the previous 3 months. The analysis firstly described the unplanned presentations and then focused on the patients to depict their characteristics and identify useful predictors for repeated unplanned presentations or hospitalization. A graphic outline of the results is presented in Fig. 1.

Description of the unplanned presentations

The characteristics of the 2,811 unplanned presentations are summarized in Table 1. The overall number of unplanned visits had no seasonal or monthly variations in frequency. Nevertheless, we registered a slight increase in the number of presentation on Mondays, probably linked to the concomitant weekend closure of the dedicated ward and the limited opening hours of the general practices. Interestingly, 55 % of the presentations were self-referrals; while the rest were suggested by patients' general practitioner or required by the emergency doctor. Around 50 % of the unplanned presentations were due to more than one cause, and a fifth of them were prompted by three or more symptoms.

Pain, fatigue, dyspnoea, fever and gastrointestinal toxicities were all reported frequently. However, about one out of five (21.6 %) unplanned presentations were due to the patients' "need to talk with the treating physician" to be reassured or to comment on a minor problem. Overall, 209 presentations (7 %) ended up with hospitalization.

Patient characteristics

A total of 1,431 patients accessed the dedicated ward over the study period. Patient characteristics are reported in Table 2. Patients with breast cancer ($N=478$, 33 %), gastrointestinal cancers ($N=397$, 28 %) or lung cancer ($N=258$, 18 %) represented about 80 % of the population. Median age at presentation was 63 years (SD, 4.3), the female/male ratio was 1.34, and most of the patients were aged 60 to 79, consistent with the age distribution for cancer patients in our region [20]. Notably, 43 % of the patients had at least two unplanned presentations during the study period as shown in Table 2. Number and type of symptoms at the time of the first unplanned presentation are depicted in Table 2, with a breakdown by major cancer types. Frequently reported symptoms were pain (27.7 %), fatigue (17.6 %),

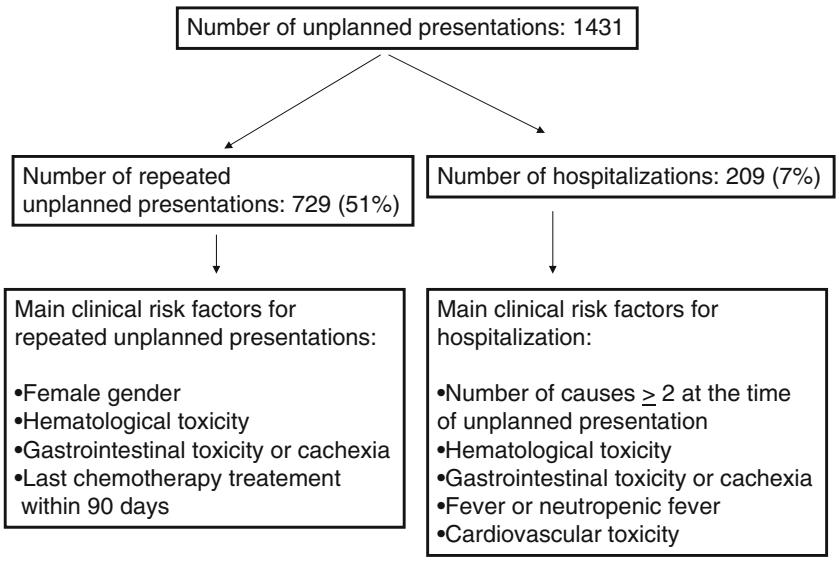

Fig. 1 Graphic outline of the results of 2-year activity of the acute clinic for unplanned presentations

Table 1 Frequency of unplanned presentations according to selected covariates

		Unplanned visits (N=2,811)	
		N	%
Year	2006	278	9.89
	2007	1,276	45.39
	2008	1,257	44.72
Month	January	229	8.15
	February	203	7.22
	March	219	7.79
	April	241	8.57
	May	256	9.11
	June	257	9.14
	July	290	10.32
	August	268	9.53
	September	239	8.50
	October	224	7.97
	November	189	6.72
	December	196	6.97
Weekday	Monday	695	24.72
	Tuesday	491	17.47
	Wednesday	537	19.10
	Thursday	506	18.00
	Friday	582	20.70
Number of causes for the unplanned presentation			
1		1,405	49.98
2		793	28.21
3		406	14.44
>3		207	7.36
Reasons for the unplanned presentation			
Pain		866	30.81
Asthenia or fatigue		647	23.02
Need to talk with a doctor		608	21.63
Dyspnoea		468	16.65
Fever or neutropenic fever		388	13.80
Nausea/vomiting		372	13.23
Gastrointestinal toxicity/cachexia		354	12.59
Skin toxicity		329	11.70
Haematological toxicity		313	11.13
Neurological toxicity		265	9.43
Pleural effusion or ascites		204	7.26
Cardiovascular disturbance		162	5.76
Stomatitis or mucositis		148	5.27
Diarrhoea		140	4.98
Urinary or gynecological disturbance		111	3.95
Presentations of patients receiving chemotherapy[a]		1,558	55.43
Presentations resulted in hospitalization		209	7.43

[a] Patients receiving chemotherapy are defined as patients administered at least one antineoplastic agent during the 90 days before the unplanned presentation

dyspnoea (13.8 %), fever with neutropenia (11.5 %) and gastrointestinal problems (31 %).

We also assessed the correlation between unplanned presentations and the distance between the patient's home and the hospital. The patients who lived the closest to the hospital (30 %) were more likely to present to the acute clinic (P<0.05), with no significant differences across different cancer types (data not shown).

Risk factors for repeated unplanned presentations

Seven hundred and twenty-nine patients (51 %) had repeated unplanned presentations. The correlation between likelihood of repeated presentations and demographic or clinical parameters was assessed in a multivariate analysis (Table 3). Women showed a 29 % higher rate than men (P=0.035), and patients with "other tumours", a rate significantly 62 % higher compared to patients with gastrointestinal tumours (P=0.04), whereas no significant excess was seen for patients with breast and lung cancers.

Compared to patients without the specific symptom, patients with haematological toxicity or with pleural effusion experienced a rate of repeated visit 54 and 31 % higher, respectively. Conversely, patients experiencing fatigue had less likelihood to have another unplanned presentation within 30 days, probably because of the self-limiting nature of this toxicity.

The rate of repeated visits was higher for patients on chemotherapy compared to patients who were not. The time interval since the last chemotherapy is significantly related to the rate of repeated visit. Specifically, we noted an 81, 75 and 49 % increase for those who received chemotherapy 31–90, 16–30 or 8–15 days before, respectively. Oppositely, patients receiving chemotherapy within the same week showed a 25 % decrease in the rate for repeated visit rate. Distance from the hospital was another predictor for repeated visit. Patients living in town attended more frequently, with a repeated visit(s) rate 32 % higher than patients with a distance from the hospital of more than 22 km.

Risk factors for hospitalization following an unplanned presentation

Two hundred and nine patients were hospitalized after an unplanned presentation (hospitalization rate, 7 %); median hospital stay was 5 days (range, 2–25), with a median estimated daily cost of about 450 euros.

Demographic and clinical parameters were evaluated as risk factors for hospitalization following an unplanned presentation (Table 4). The rate of hospitalization increased with the increasing number of causes for the unplanned visit. Compared to patients with one cause for the visit, patients presenting with two causes experience a 78 % higher rate

Table 2 Distribution of the patients according to the cancer type and selected variables related to sociodemographic, pathological and health status at the first unplanned presentation

		Breast cancer		Lung cancer		GI cancer		Other malignancy		Total	
		N=478 *N*	33.40 %	*N*=258 *N*	18.03 %	*N*=397 *N*	27.74 %	*N*=298 *N*	20.82 %	*N*=1431 *N*	100 %
a											
Gender	Female	470	98.3	92	35.66	155	39.04	102	34.23	819	57.23
Age (years): mean±std dev		58.8	±12.3	64.8	±25.1	65.9	±16.5	63.6	±21.3	62.9	±4.3
Age category (years)	20–29	5	1.05	1	0.39	1	0.25	5	1.68	12	0.84
	30–39	21	4.39	2	0.78	4	1.01	14	4.70	41	2.87
	40–49	100	20.92	18	6.98	23	5.79	26	8.72	167	11.67
	50–59	119	24.90	46	17.83	67	16.88	44	14.77	276	19.29
	60–69	137	28.66	99	38.37	150	37.78	98	32.89	484	33.82
	70–79	72	15.06	81	31.40	124	31.23	86	28.86	363	25.37
	80 or more	24	5.02	11	4.26	28	7.05	25	8.39	88	6.15
Number of visits	1	285	59.62	143	55.43	213	53.65	176	59.06	817	57.09
	2–3	141	29.50	82	31.78	118	29.72	87	29.19	428	29.91
	>3	52	10.88	33	12.79	66	16.62	35	11.74	186	13.00
Number of causes	1	325	67.99	121	46.9	221	55.67	171	57.38	838	58.56
	2	94	19.67	81	31.4	103	25.94	78	26.17	356	24.88
	3	38	7.95	33	12.79	52	13.10	29	9.74	152	10.62
	>3	21	4.39	23	8.91	21	5.29	20	6.71	85	5.94
b											
Type of cause at cohort entry											
Pain		110	23.01	79	30.62	117	29.47	90	30.20	396	27.67
Asthenia or fatigue		52	10.88	57	22.09	85	21.41	58	19.46	252	17.61
Dyspnoea		42	8.79	85	32.95	32	8.06	39	13.09	198	13.84
Skin		112	23.43	29	11.24	26	6.55	21	7.05	188	13.14
Nausea/vomiting		41	8.58	32	12.40	63	15.87	34	11.41	170	11.88
Fever or neutropenic fever		44	9..21	40	15.50	43	10.83	38	12.75	165	11.53
Gastrointestinal/cachexia		20	4.18	25	9.69	68	17.13	26	8.72	139	9.71
Neurological		36	7.53	31	12.02	23	5.79	26	8.72	116	8.11
Haematological toxicity		36	7.53	28	10.85	25	6.30	22	7.38	111	7.76
Stomatitis or mucositis		30	6.28	8	3.10	18	4.53	17	5.70	73	5.10
Pleural effusion or ascites		13	2.72	7	2.71	27	6.80	21	7.05	68	4.75
Diarrhoea		19	3.97	12	4.65	22	5.54	10	3.36	63	4.40
Cardiovascular		18	3.77	16	6.20	16	4.03	12	4.03	62	4.33
Time from last treatment to unplanned presentation (patients on chemotherapy only) (days)											
0 to 7										234	16.35
8 to 15										204	14.26
16 to 30										123	8.60
31 to 90										64	4.47

(P=0.007), with three causes a more than twice higher rate and with four or more, a nearly three times increase in rate (both these P values <0.0001). The presence of specific causes for attending significantly increased the rate of hospitalization. Compared to patients not presenting with the individual cause, the rate of hospitalization was 80 % higher in patients who presented with gastrointestinal toxicity or cachexia, 78 % higher in patients with cardiovascular symptoms, 59 % higher in patients with haematological toxicity, and 38 % higher in patients with fever or neutropenic fever.

Patients who lived within 1 km from the hospital experience a hospitalization rate significantly 73 % higher than patients

Table 3 Relative hazard (RH) and 95 % confidence interval (95 % CI) of repeated unplanned presentation according to relevant covariates

		P Chi sq	RH[c]	95 % CI	
Age		0.052	0.99	0.98	1.00
Gender	Men[a]	–	1	–	–
	Women	0.008	1.29	1.07	1.55
Tumour	GI[a]	–	1	–	–
	Other	0.043	1.62	1.01	2.59
	Lung	0.407	0.86	0.60	1.22
	Breast	0.684	0.95	0.75	1.21
Type of causes[b]					
Haematological toxicity		<0.001	1.54	1.24	1.91
Pleural effusion or ascites		0.01	1.32	1.07	1.63
Asthenia or fatigue		0.018	0.84	0.73	0.97
Gastrointestinal toxicity or cachexia		0.026	1.20	1.02	1.42
Last chemotherapy received before the visit					
>90 days before or no chemotherapy[a]		–	1	–	–
31 to 90 days before		0.018	1.81	1.10	2.97
16 to 30 days before		0.003	1.74	1.20	2.55
8 to 15 days before		0.016	1.49	1.07	2.05
0 to 7 days before		0.076	0.75	0.54	1.03
Distance between patient residence and the hospital					
>22 km[a]		–	1	–	–
≤1 km		0.025	1.32	1.03	1.69
>1 to ≤12 km		0.788	1.04	0.80	1.35
>12 to ≤22 km		0.205	1.21	0.90	1.64

[a]Reference category

[b]Reference category is absence of the individual symptom

[c]The final model included the following variables: age, gender, type of tumour, presence of asthenia or fatigue, gastrointestinal toxicity, pleural effusion or ascitis, haematological toxicity, time since the last chemotherapy, distance between patient residence and the hospital, the interaction term between tumour type and time since last chemotherapy (P=0.01), the interaction term between tumour type and presence of gastrointestinal toxicity (P=0.026)

who lived more than 22 km from the hospital. As pointed out in Table 4, patients presenting with skin toxicity or those who simply need to talk with an oncologist had less likelihood to be hospitalized (RH, 0.45 and 0.14, respectively).

Table 4 RH and 95 % confidence interval (95 % CI) of hospitalization following unplanned presentation according to relevant covariates

	P Chi Sq	RH[b]	95 % CI	
Number of causes for the visit				
1[a]	–	1	–	–
2	0.007	1.78	1.16	2.72
3	<0.0001	2.64	1.65	4.24
>3	<0.0001	2.97	1.76	5.02
Type of causes				
Gastrointestinal toxicity or cachexia	0.001	1.80	1.25	2.59
Cardiovascular toxicity	0.008	1.78	1.16	2.73
Haematological toxicity	0.035	1.59	1.03	2.44
Fever or neutropenic fever	0.067	1.38	0.98	1.95
Dyspnoea	0.216	0.62	0.29	1.32
Skin toxicity	0.011	0.45	0.24	0.83
Need to talk with a doctor	<.0001	0.14	0.06	0.37
n causes,[a] respiratory	0.029	1.43	1.04	1.97
Distance between the hospital and the residence of patients				
4=>22 km[a]	–	1	–	–
1=≤1 km	0.012	1.73	1.13	2.64
2=>1 to ≤12 km	0.494	1.17	0.74	1.84
3=>12 to ≤22 km	0.708	1.10	0.67	1.82

[a]Reference category

[b]The final model included the following variables: number of causes, need to talk with a doctor, dyspnoea, gastrointestinal toxicity or cachexia, skin toxicity, cardiovascular toxicity, fever or neutropenic fever, and interaction term between respiratory symptoms and number of causes (P=0.029)

Discussion

The prevalence of cancer patients is expected to rise over the next decades, leading to further pressures on the healthcare systems worldwide [21]. At the same time, most cancer patients are treated in an outpatient setting, and it will become crucial to understand and address the unmet needs of this population [3]. Our study focuses on how to manage the growing number of unplanned presentations in medical oncology and emphasises the need for continuous service improvement. Indeed, the possibility to forecast and counteract unexpected events is part of the strategy encompassed in the cancer patients' care management. The results of our analyses confirm the magnitude of the phenomenon and the need to plan the management of unscheduled presentations. This is particularly important for outpatients on chemotherapy, when the burden of treatment-related toxicities may overlap with disease-induced symptoms or psychological suffering.

More than 50 % of presentations were due to patients receiving chemotherapy. Although other authors had extended to 6 months from the last treatment the time to consider a patient on chemotherapy [3], we choose to shorten that time to 90 days, to identify the more acute toxicity and treatment-related adverse events. The results seem to support this choice since almost 90 % of the patients who were on chemotherapy (561 out of 625) presented for their first unplanned visit within 30 days from last treatment. A similar figure (80 %) was otherwise reported [3].

Most of the patients (approximately 85 %) were treated outside of a clinical trial, giving a picture of what may occur to the average cancer outpatient, since outcomes and toxicities of patients enrolled in randomized, controlled trials may not always reflect the clinical practice [22, 23].

Not surprisingly, the most frequent reasons for visiting were pain, fatigue, dyspnoea, fever and gastrointestinal toxicities. Particularly, pain [24] and fatigue [25] are often reported in those being treated in the outpatient setting. Also, 21.6 % of the unplanned presentations were due to the patients' desire to talk with the treating physician for reassurance, information or other minor problems. The need for better communication is recognized as one of the unmet needs in cancer outpatients [26] and one of the factors that influence patients' satisfaction and quality of life [27]. This unmet need could be interpreted as a warning and highlights the need for improvement in the patient–physician relationship.

The rate of hospital admission was 7 %, with a median length of stay of 5 days. Recently, Hassett et al. [28] reported a similar hospitalization rate and median hospital stay in over 2,000 cancer outpatients.

We sought to identify risk factors for repeated visits or in-hospital admission, as other authors have described previously [29]. Number of symptoms at presentations and selected toxicities, along with distance from the hospital, may be useful to individuate patients at higher risk for hospital admission.

There are some limitations of the study. First of all, it is monocentric, and it reflects the situation existing in a large oncology department of a central public hospital. Secondly, the possibility of a dedicated ward for unplanned visits is limited to teaching hospitals; this new type of committed ward may anticipate a growing trend, but it is not widely available at present. Furthermore, the existence of a dedicated ward may increase the demand for unplanned visits over-representing this cohort. However, we should also emphasise some strengths. This is the first European report dedicated to the management of unplanned presentations of cancer patients impacting the ordinary work plan of many oncology departments. Not only being able to recognize the phenomenon, but also to describe and analyse these trends, will give medical oncologists the appropriate tools for early intervention. For example, patients may benefit a more detailed education on how to deal with minor toxicities, and a better patient–physician communication may eventually avoid useless hospital admissions. The potential to integrate quality measurements and improvements into daily clinical practice is likely to become increasingly important in the future. Additionally, the awareness of the unplanned presentation may be useful when negotiating with health care providers and politicians.

Acknowledgments We acknowledge and deeply thank Mrs. Paola Costantini, Mrs. Manuela De Apollonia and Mrs. Raffaela Donato for their generous assistance with study coordination, and all the other nurses at the Department of Medical Oncology, University Hospital, Udine, Italy, who contributed to data collection. This study was in part presented as oral communication at the 2011 MASCC Annual Meeting, Athens, Greece.

Conflict of interest None declared.

References

1. Berrino F, De Angelis R, Sant M et al (2007) Survival for eight major cancers and all cancers combined for European adults diagnosed in 1995-99: results of the EUROCARE-4 study. Lancet Oncol 8:773–783
2. De Angelis R, Grande E, Inghelmann R et al (2007) Cancer prevalence estimates in Italy from 1970 to 2010. Tumori 93:392–397
3. McKenzie H, Hayes L, White K et al (2011) Chemotherapy outpatients' unplanned presentations to hospital: a retrospective study. Support Care Cancer 19:963–969
4. Mayer DK, Travers D, Wyss A, Leak A, Waller A (2011) Why do patients with cancer visit emergency departments? Results of a 2008 population study in North Carolina. J Clin Oncol 29:2683–2688
5. Diaz-Couselo FA, O'Connor JM, Nervo A et al (2004) Nonscheduled consultation in oncologic patients. How many of them are true emergencies? An observational prospective study. Support Care Cancer 12:274–277

6. Aprile G, Ramoni M, Keefe D, Sonis S (2009) Links between regimen-related toxicities in patients being treated for colorectal cancer. Curr Opin Support Palliat Care 3:50–54
7. Cheung WJ, Le LW, Zimmermann C (2009) Symptom clusters in patients with advanced cancers. Support Care Cancer 17:1223–1230
8. Bang SM, Park SH, Kang HG et al (2005) Changes in quality of life during palliative chemotherapy for solid cancer. Support Care Cancer 13:515–521
9. Hovan AJ, Williams PM, Stevenson-Moore P et al (2010) A systematic review of dysgeusia induced by cancer therapies. Support Care Cancer 18:1081–1087
10. Pinto C, Barone CA, Girolomoni G et al (2011) Management of skin toxicity associated with cetuximab treatment in combination with chemotherapy or radiotherapy. Oncologist 16:228–238
11. Bennett CL, Calhoun EA (2007) Evaluating the total costs of chemotherapy-induced febrile neutropenia: results from a pilot study with community oncology cancer patients. Oncologist 12:478–483
12. Calhoun EA, Chang CH, Welshman EE, Fishman DA, Lurain JR, Bennett CL (2001) Evaluating the total costs of chemotherapy-induced toxicity: results from a pilot study with ovarian cancer patients. Oncologist 6:441–445
13. Hassett MJ, O'Malley AJ, Pakes JR, Newhouse JP, Earle CC (2006) Frequency and cost of chemotherapy-related serious adverse effects in a population sample of women with breast cancer. J Natl Cancer Inst 98:1108–1117
14. Wagner-Johnston ND, Carson KA, Grossman SA (2010) High outpatient pain intensity scores predict impending hospital admissions in patients with cancer. J Pain Symptom Manage 39:180–185
15. Hernandez C, Jansa M, Vidal M et al (2009) The burden of chronic disorders on hospital admissions prompts the need for new modalities of care: a cross-sectional analysis in a tertiary hospital. QJM 102:193–202
16. Elting LS, Lu C, Escalante CP et al (2008) Outcomes and cost of outpatient or inpatient management of 712 patients with febrile neutropenia. J Clin Oncol 26:606–611
17. Whitmer KM, Pruemer JS, Nahleh ZA, Jazieh AR (2006) Symptom management needs of oncology outpatients. J Palliat Med 9:628–630
18. Farncombe ML (1994) Ambulatory supportive care for the cancer patient. Curr Opin Oncol 6:335–339
19. Prentice RL, Williams BJ, Peterson AV (1981) On the regression analysis of multivariate failure time data. Biometrika 68:373–379
20. Serraino D, Bidoli E, De Paoli A, De Dottori M, Zucchetto A, Zanier L (2009) Cancer in Friuli Venezia Giulia. Incidence, survival and prevalence: 1995-2005. Registro tumori del Friuli Venezia Giulia. Litho Stampa, Udine
21. Smith BD, Smith GL, Hurria A, Hortobagyi GN, Buchholz TA (2009) Future of cancer incidence in the United States: burdens upon an aging, changing nation. J Clin Oncol 27:2758–2765
22. Peppercorn JM, Weeks JC, Cook EF, Joffe S (2004) Comparison of outcomes in cancer patients treated within and outside clinical trials: conceptual framework and structured review. Lancet 363:263–270
23. Ioannidis JP, Lau J (2001) Completeness of safety reporting in randomized trials: an evaluation of 7 medical areas. JAMA 285:437–443
24. Goudas LC, Bloch R, Gialeli-Goudas M, Lau J, Carr DB (2005) The epidemiology of cancer pain. Cancer Invest 23:182–190
25. Storey DJ, Waters RA, Hibberd CJ et al (2007) Clinically relevant fatigue in cancer outpatients: the Edinburgh Cancer Centre symptom study. Ann Oncol 18:1861–1869
26. Morrison V, Henderson BJ, Zinovieff F et al (2011) Common, important, and unmet needs of cancer outpatients. Eur J Oncol Nurs 2011. doi:10.1016/j.ejon.2011.04.004
27. Kleeberg UR, Tews JT, Ruprecht T, Hoing M, Kuhlmann A, Runge C (2005) Patient satisfaction and quality of life in cancer outpatients: results of the PASQOC study. Support Care Cancer 13:303–310
28. Hassett MJ, Rao SR, Brozovic S et al (2011) Chemotherapy-related hospitalization among community cancer center patients. Oncologist 16:378–387
29. Uramoto H, Iwashige A, Kagami S, Tsukada J (2007) Prediction of emergency hospitalization of outpatients receiving cancer chemotherapy. Anticancer Res 27:1133–1136