Emergency admissions in palliative care may not always be necessary. Results from a descriptive study

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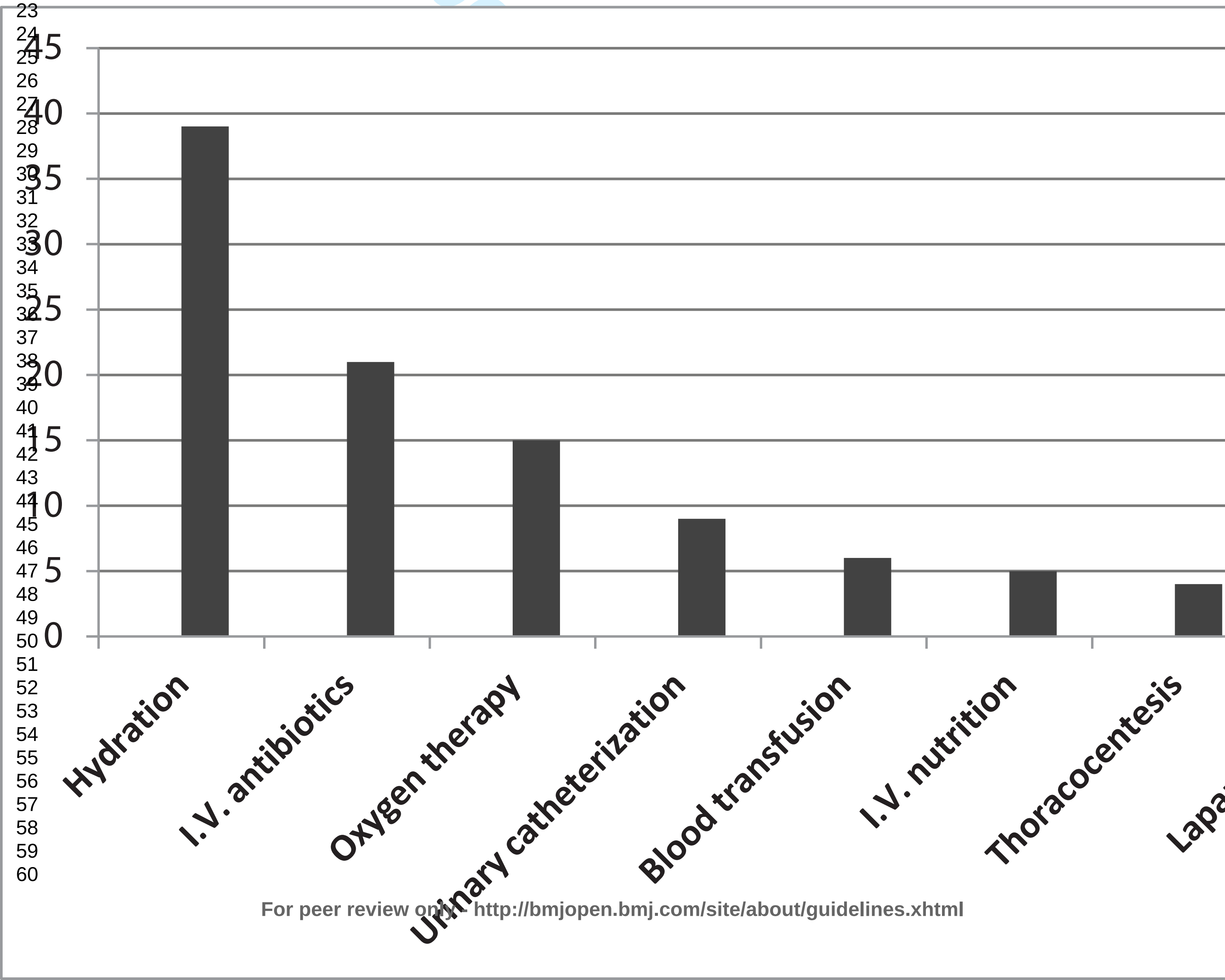
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Emergency admissions in palliative care may not always be necessary. Results from a descriptive study

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ABSTRACT

Objectives. Patients with advanced cancer are often admitted to hospital as emergency cases. This may not always be medically indicated. Study objectives were to register the reasons for the emergency admittances, to examine interventions performed during hospitalization and self-reported symptom intensity at admission and discharge, and to assess patients' opinions about the admission. **Design.** This was a descriptive, before-and-after study. Participating patients completed the Edmonton Symptom Assessment System (ESAS) twice; upon hospital admission and prior to discharge. All patients underwent a structured interview assessing their opinion about the emergency admission. Medical data was obtained from hospital records. **Setting.** The study was performed in two Norwegian acute care secondary hospitals with urban catchment areas. **Participants.** Forty-four cancer patients (M: 27/F: 17, mean age 69.7, SD: 9.2) representing 50 emergency admissions were included. **Results**. Median length of stay was 7 days (95% CI; 7.4-11.4). Median survival was 50 days (95% CI; 51-115). Ninety per cent were admitted from home, and 46% had been hospitalized less than one month earlier. Lung symptoms, nausea/vomiting, and pain were the most frequent reasons for admittance. Mean pain scores on the ESAS were reduced by 50% from admission to discharge ($p < 0.01$). Simple interventions such as hydration, bladder catheterization and oxygen therapy were most frequent. Nearly one-third would have preferred treatment at another site, given that the quality of care was similar. Home visits by the family doctor and specialized care teams were perceived by patients as important to prevent hospitalization. **Conclusion.** In most emergency admissions, relatively simple medical interventions are necessary. Specialized care teams with palliative care physicians, easier access to the family doctor and better lines of cooperation between hospitals and the primary care sector, may make it possible to perform more of these procedures at home, thereby reducing the need for emergency hospitalization.

Article Summary

Article focus

- Investigate the reasons for emergency admissions of palliative care cancer patients
- Register interventions performed in the hospital
- Examine symptom intensity before and after medical interventions by a standardized self-report tool (ESAS)

Key messages

- Palliative care emergencies not always necessary, nor strictly medically indicated
- Simple medical procedures in the home care setting may reduce the need for emergency admissions
- Increased level of competence in the primary health care sector is necessary to prevent hospitalization

Strengths and limitations of this study

Strengths

All potentially eligible patients were assessed
Registrations were done prospectively, with a thorough examination of charts after discharge / death, the latter that was also assessed retrospectively
Patients' own experiences were registered

Limitations

Small study, in two hospitals only, may reduce overall generalizability
No registration of ECOG/Karnofsky score upon admission

INTRODUCTION

Thanks to modern, multimodal therapy, survival has improved for many cancer diagnoses. Slightly less than 50% of the patients will die from their cancer[1] while the remaining half will live with the disease for shorter or longer periods of time[2]. This accentuates the need for optimal symptom management and maintenance of quality of life throughout the disease trajectory.

Admissions to the intensive care unit and number of visits to the emergency room (ER) are quality indicators in end of life care[3]. Although this may be necessary in many cases, it is not always so. A British study examined emergency admissions of cancer patients in an acute care hospital and concluded that close to 50% neither needed nor wanted to be admitted as an emergency[4]. Studies have documented that patients with incurable cancer frequently use acute care hospitals for acute problems and symptomatic treatment[5,6], particularly so older cancer patients during their last month of life[6]. A Canadian study showed that 27% of cancer patients had a visit to the ER in the last two weeks of life[7], in line with reports demonstrating increasing trends over time[5,8,9].

A closer collaboration between oncology and palliative care has been recommended[10,11]. One study reported that systematic implementation of a palliative care integration project resulted in significantly better documentation of pain, fewer visits to the ER, and fewer admissions to acute care hospitals[12]. This was consistent with a review showing that home, hospital, and inpatient specialist palliative care significantly improved symptom control, pain and anxiety, and reduced hospital admissions[13]. Similar findings were reported from an RCT in a mixed sample of terminally ill patients who received specialized in-home palliative care[14]. Another RCT, however, comparing a multi-component intervention and follow-up, found no reduction in ER visits but significantly better quality of life and mood[15].

Emergency admissions often represent stressful events for the patients and their families due to anxiety, feeling of discontinuity, and logistic problems in an emergency setting that may increase the waiting time. Having to go to the emergency room for admission may also conflict with patients' wishes. Based on our experience in palliative medicine, and our interest in continuity of care in patients with advanced disease, we have conducted a small descriptive study aiming to aid in the planning of palliative care in two Norwegian acute care local hospitals. Study aims were to register the reasons for the emergency admittances, to examine symptom intensity upon admission and discharge and to register the interventions performed during hospitalization. Patients' opinions about the emergency admission were also assessed.

MATERIAL AND METHODS

Patients

The two hospitals were Østfold Hospital Trust (SØF) and Lovisenberg Deaconal Hospital (LDS). SØF is the district general hospital for approximately 277,000 inhabitants in the south-eastern part of Norway. The hospital has specialist health care services in most medical specialities, including oncology and palliative care. LDS is located in the capital, Oslo. It serves as the general hospital for psychiatry and internal medicine including emergency admissions, in one of four city sectors with a catchment area of about 156,000 inhabitants. LDS has a specialized palliative care unit.

The Norwegian health care system is organised with university, regional and local hospitals and widespread community health care services. In the catchment areas of these two hospitals, the home care services had nurses with special training in palliative care, supplemented by experienced physicians who were available on request. Also, all palliative care patients who have had previous contact with the hospitals receive special follow-up from the hospital directly or through the hospitals' ambulant palliative care teams, as necessary. Nevertheless, unplanned hospital admittances in Norway are normally routed though the emergency department, even if the patients have an affiliation with the hospital.

A consecutive sample of cancer patients who were admitted through the emergency departments was included between October 2009 and May 2010. Inclusion criteria were a verified diagnosis of cancer in the palliative phase of disease, documented in the patient chart), anticipated survival less than 1 year and cognitive and physical capacity to complete the study as evaluated by the attending oncologist prior to inclusion, age ≥18 years, fluency in

Norwegian and provision of signed informed consent. Exclusion criteria were treatment with curative or adjuvant intent, a psychiatric diagnosis and language problems/illiteracy.

Instruments

Medical and socio-demographic data

The CRF encompassed socio-demographic variables (marital and situation, use of home care etc.), and details about the admission (date, time, reason for and organization of the admission). Medical data e.g. cancer diagnosis (ICD-10) [16], metastases, on-going or previous tumour directed treatment, and recent hospital discharges were recorded, as were medical interventions during hospitalization and details about the discharge. This information was updated during the stay and after discharge by the study nurses/physicians through double-checking of the hospitals' patient records and the electronic/written charts. Date of death was recorded retrospectively based on automatic updates in the hospital records from the Cause of Death Registry[17].

Symptom assessment

The Edmonton Symptom Assessment System (ESAS) is one of the most frequently used symptom assessment tools in palliative cancer care[18], and was developed to monitor the most common cancer symptoms with minimal patient burden[19]. A Norwegian version of the ESAS was used. The 0-10 numerical rating scale, ranging from 0 (0=*no symptom, normal/good, 10=worst possible symptom*) was used for the following symptoms; *Pain at rest, pain at movement, tiredness, nausea, shortness of breath, dry mouth (xerostomia), appetite, anxiety/uneasiness, depression/sadness* and the question *" Overall, how are you feeling today?"* (*Well-being*). Patients were asked to rate their symptoms at the present time.

Structured patient interview

A short structured interview (nine questions) was developed in order to assess the patients' perceptions about the emergency admittance. First, patients were asked to choose the two most important reasons for the emergency admittance from a list of 16 frequent symptoms/problem areas, supplemented by one open category. They were also asked about the duration of symptom development, how the admittance was organized, who they contacted to get help, who organized the admittance, and how they were transported to the hospital. Four questions were assessing if the admission was in accordance with their desires, if they would have preferred to receive treatment somewhere else, and if so where and finally if they could identify certain interventions that could have prevented the emergency admission. Free comments were encouraged.

Methods for data collection

Patients were approached shortly after admission, and informed about the study by the study nurses. If the patient consented to participate, ESAS was administered at the earliest convenience. The second ESAS was completed as close to discharge as practically possible. The structured interviews were undertaken 1-3 days after admission. These were performed by two designated specialist nurses in palliative medicine.

Ethical Considerations

The protocol was approved by the Regional Committee for Medical and Health Research Ethics, the Norwegian Social Science Data Services (NSD), the institutional review boards at the two hospitals and was conducted according to the rules of the Helsinki declaration. All participants provided written informed consent prior to study start.

Statistics

Sample size estimations and power calculations were not performed due to the descriptive nature of the study. Standard descriptive statistics were used and few sub-group comparisons were performed due to the small sample size. Each admission and its related interventions were regarded as independent events. A p-value ≤ 0.05 was considered statistically significant. The PASW 18 statistical package was used (SPSS Inc., Chicago, Il, USA).

RESULTS

Patients

A total of 44 patients (27 males, 17 females) were included, accounting for 50 emergency admissions. Median age was 66 years (53-89) and 36% of the patients were ≥70 years. Forty patients (91%) had metastatic disease. The remaining four had lung (n=2) and gastro-intestinal cancer (n=2) and were receiving palliative cancer care, due to their complex symptom burden.

One patient was still alive at the time of data analyses. Median survival for the remaining 43 patients was 50 days (range 1-500, 95% CI: 51-115) from the first day of study entry, Table 1. Five patients died while hospitalized, while median survival for the 38 patients who were discharged was 56 days (range 16-500, 95% CI: 58-128). Nine of these died within the first month. Sixteen patients lived for more than 90 days after discharge, six beyond 180 days, while two patients lived longer than the estimated life expectancy of 1 year.

Table 1. Socio-demographic and medical characteristics [1]

		N	**(%)**
Sex	Male	27	(61)
	Female	17	(39)
Marital status	Married/cohabiting	32	(73)
	Single/widowed/divorced	11	(44)
	Missing	1	(2)
Living situation	With others	32	(73)
	Alone	12	(27)
Education	Compulsory or less	17	(39)

	High school graduate	15	(34)
	College / university	11	(25)
	Missing	1	(2)
Diagnoses	Gastrointestinal	18	(41)
	Lung	11	(25)
	Urological	7	(16)
	Other[2]	8	(18)
Metastatic disease [3]	Presence of metastases	40	(91)
Site of metastases	Liver	21	(48)
	Lymph nodes	17	(39)
	Bone	13	(30)
	Lung	12	(27)
	Brain	7	(16)
Tumour-directed treatment	Ongoing upon admission	14	(32)
		Median	**(range)**
Age		67.5	(53-89)
Survival	Overall survival[4], days from first study entry	50	(1-500, 95% CI: 51-115)

[1] N = 44, the number of individual patients accounting for the 50 emergency admissions
[2] Breast (3), malignant melanoma (2), gynaecological (2), unspecified (1)
[3] Percentages exceed 100, because due to multiple sites per patients
[4] N=43, one patient was still alive at follow-up

The emergency admissions

According to the patients' charts, the single primary reasons for admittance were gastro-intestinal problems (n=15), dyspnoea (n=14) and pain (n=7) although the majority of the patients had multiple symptoms. 50% of the emergency admissions were administered by a hospital doctor, and 24% by the patient's general practitioner (GP) or a GP on call. In 45 cases (90%), patients were admitted from home, four patients came from the hospitals' out-patient clinic, and one from a nursing home. Forty-eight per cent were transported by ambulance. In seven cases, an "open return" was established as part of the patient's care plan. However, only two patients were admitted directly to the appropriate hospital unit upon admission, while the remaining had to wait in the emergency room for up to seven hours. Twenty-three patients (46%) had been discharged from hospital less than one month prior to the actual admission.

The highest number of emergencies, 18 of 50, occurred on Mondays. Overall, 19 (38%) of the admissions took place outside regular working hours, defined as 8 p.m. to 5 a.m. on weekdays. Fourteen of these occurred from Friday night through Sunday.

Median length of stay was seven days (1-35). Most discharges (64%) were to the patient's home, eight patients (18%) were discharged to a nursing home, while four were transferred to another hospital or a specialized palliative care unit. According to the admission letters and patient charts, the most frequent reasons for hospitalization were pain (n=9), nausea/vomiting (n=9), pneumonia, lung symptoms including dyspnoea (n=13) and reduced performance status (n=5).

Examinations and interventions

X-ray, CT-scans and ultra-sound examinations were performed in 66, 48 and 24% of the cases respectively, four patients underwent an MRI and seven patients had an electrocardiogram taken during their stay. Four patients went through surgical procedures; abdominal surgery (n=1), and insertion of stents (n=2) and a central venous catheter (n=1).

Several standard procedures were performed during hospitalization, with hydration (78%), antibiotics (42%), and oxygen therapy (30%) as the most frequent, Figure 1. Maximum of registered procedures per patient was twelve, while the minimum was three.

About one-third of the patients were seen by an oncologist, while more than 50% were approached by the hospital palliative team.

Figure 1. Most frequent standard procedures during hospitalization (file uploaded separately)

Pain was prominent, and pain-related procedures were performed in all but seven cases. The main reasons for admittance in these cases were dyspnoea (n=3), reduced performance status (n=2), and problems swallowing (n=2). Two-thirds used strong analgesics such as morphine, fentanyl, or oxycodon upon admission, mostly as depot tablets or patches.

The most frequent pain related interventions were changes in the analgesic regimen (n=24) such as opioid rotation, adding a drug or increasing the dosage. Two patients had an epidural catheter inserted; one of these also had a coeliacus blockage, and a spinal catheter.

Symptom assessment, ESAS scores

Both ESAS forms were completed in 76% of the cases. Missing forms were due to death (n=5), discharge earlier than planned and administrative failure (n=7).

Median number of days from admission to the first ESAS was 1 (0-3), with a median of 5 days between assessments (1-20). ESAS no. 2 was completed shortly before discharge; same day (48%) or the day before (12%).

Table 2 displays the ESAS mean scores at inclusion and discharge. Pain at rest and pain at movement was significantly reduced during the stay, with a reduction of 1.7 for both between assessments (p-values <0.01). Highest mean intensity scores at inclusion were found with tiredness (6.1), appetite (5.6) and oral dryness/xerostomia (5.1). Upon discharge, six patients reported a score above three for pain at rest, while 11 patients had a pain score exceeding three for pain at movement.

Table 2. ESAS scores at inclusion and prior to discharge[1]

	1st assessment[2]	**2nd assessment**[2]	**Difference in mean scores 1st and 2nd ESAS**	**p-value**
Symptom	**Mean (SD)**	**Mean (SD)**		
Pain at rest	3.2 (2.8)	1.5 (1.9)	1.7	<.01
Pain at movement	4.4 (3.1)	2.7 (2.7)	1.7	<.01
Tiredness	6.1 (2.5)	5.5 (2.6)	0.6	NS
Nausea	1.7 (2.5)	1.3 (2.0)	0.4	NS
Shortness of breath	3.0 (2.9)	2.8 (3.2)	0.2	NS
Oral dryness (xerostomia)	5.1 (2.7)	5.2 (2.6)	-0.1	NS
Appetite	5.6 (2.9)	5.0 (2.4)	0.6	NS
Anxiety/uneasiness	1.9 (2.5)	2.3 (2.7)	-0.4	NS
Depression/sadness	2.3 (2.7)	2.9 (3.0)	-0.6	NS
"Overall, how are you feeling today?"	4.5 (2.3)	4.2 (2.1)	0.3	NS

[1] Numerical rating scale (0-10) with higher scores implying higher symptom intensity

[2] N varies between 38 and 34, due to missing items on some of the forms

Mean ESAS scores at inclusion in the 12 cases in which the second form was not completed were compared with scores from those who completed both. No significant differences were found.

The patient interviews

Patients were asked to mention the two most bothersome symptoms leading to the hospitalization. Gastrointestinal symptoms including appetite loss (n=24), fatigue (n=19), pain (n=18), and dyspnoea (n=10) were the most frequent reasons according to the patients. In most cases (64%), patients said the symptoms had developed over several days, and this was reported by all of those who were admitted on a Monday. Six patients reported a more acute onset with symptoms developing during a few hours. Four of these patients came to the hospital outside normal working hours. Nineteen patients received regular medical care at home from the community health system, such as nursing services and practical help with household chores, or both. When asked about preference for care the majority of patients (66%) preferred hospital admission to other places in the actual situation. Nine (18%) said they would have liked to receive medical treatment at home, given that necessary resources and equipment were available.

Free comments were provided in 44 interviews. Seven patients perceived the delays in the emergency unit as tiring and unnecessary, while another seven found this acceptable. Two patients specifically stated that they would have preferred direct admission to the appropriate hospital unit, while another two had a desire to go directly to the palliative care unit. In ten interviews, patients said they felt safer at hospital than at home given the actual situation. Seven of these were 65 years or older, but only one was living alone. However, some expressed concerns about the caregiver burden imposed on their partner. The most frequently raised comment in the interviews was related to doubts whether the home care services had competence and expertise to handle the situation. Nevertheless, many patients said they would have preferred to get simple procedures such as intravenous nutrition and hydration at home. In their opinion, specialized care teams and home visits by their GP were the most important actions to prevent emergency admissions.

DISCUSSION

This small, descriptive study from two acute–care Norwegian hospitals serving local, urban areas shows that relatively simple procedures were performed in most of the emergency cases. Standard interventions such as hydration, antibiotics, and oxygen therapy were most common, corresponding well with the most frequent reasons for admission. In many cases, these procedures may well be administered in the primary health care sector.

Pain, gastro-intestinal and respiratory problems were prominent, well in line with other studies of emergency admissions[4,20,21]. These are frequent symptoms in advanced cancer patients, and may indicate disease progression. One study demonstrated a significant relationship between signs of disease progression and short term mortality (<90 and <180 days) in symptomatic cancer patients coming to the ER[21], in line with other reports[22,23]. Although the present study was too small to perform valid analyses of a possible relationship between symptoms and survival, our sample consisted of cancer patients in the palliative phase of disease, and more than 50% were dead 90 days after discharge. This suggests that standard medical procedures were indicated for most of the patients, and more advanced procedures in some cases only.

Thirty-eight per cent of the admissions were outside normal working hours, a lower proportion than reported elsewhere[20]. In most cases, patients said that symptoms had developed over time. Monday had the highest percentage of emergency admissions as found by others[20], which corresponds to a gradual onset of symptoms, as reported by all of the patients admitted on Mondays. It may also be that patients tried to avoid going in on weekends and waited until Monday before contacting the hospital or the GP.

Many common symptoms are bothersome and distressing and known to cause considerable anxiety in patients, and in relatives. Thus, it should be remembered that causes other than strict medical, somatic indications may lead to hospital admissions, e.g. reduced performance status, frailty, loneliness and psychological distress that often coexist. Some patients commented that they felt safer at hospital than at home, and that they wanted to reduce the burden imposed on their family by the disease. Causes like this may be more common in smaller hospitals serving a well-defined area compared to larger university clinics. In our opinion, maybe the most important issue raised by this study is not whether hospital admission was indicated per se, but if hospital admission as an emergency case was most appropriate for getting necessary medical care. We also believe however, that a higher level of specialist palliative care competence in the home care services and closer collaboration between these services and the hospital may reduce the need for emergency admittances.

This also relates to the fact that about 50% of the admissions were administered by a hospital doctor, twice as many as by GPs (24%). The standard pathway for hospital admissions in Norway is through the family GP, unless there is an emergency. The fact that our sample consisted of palliative care patients with an affiliation to the local hospital, may explain why the hospital doctors were so frequently contacted. It is noteworthy, however, that a home visit by a medical doctor was mentioned as the most wanted intervention that could possibly have prevented the emergency admission. Shorter hospital stays and more people living longer at home with advanced disease, represent a challenge for the primary health care sector, specifically so for the GPs[24,25] as they are crucial in the follow-up and care for patients with advanced cancer outside hospital[26]. One study found that a higher number of visits to the family doctor was inversely associated with the number of visits to the ER in patients dying from cancer[27].

In our opinion, this points to two important aspects related to palliative care; namely that it is misconstrued as end-of-life care only[10], and that it should be integrated into standard oncology upon the diagnosis of metastatic or advanced cancer. WHO emphasize that palliative care is applicable early in the course of illness[28] due to systematic approach to symptom relief, enhanced quality of life of patient and caregivers, less use of emergency care services and a timelier referral to specialized palliative care, that often takes place too late[11,20,29].

The fact that many patients with advanced cancer see acute-care providers, makes systematic follow-up less common, and means that collaborative care plans across organizational levels are not available, even if needed. Home care of patients with advanced cancer should be taken care of by specialist teams with easy access to hospital based palliative care specialists, in close collaboration with the family doctor. Pain related interventions were performed in almost all patients, and there was a significant decline in the mean pain scores (mean 1.7) on the ESAS from admission to discharge. A recent study in more than 200 patients showed that a decrease of 1.2 units in the ESAS pain score constituted a clinically relevant improvement[30]. A change in the analgesic regimen was the most frequent procedure, and it is reason to believe that this and other simple procedures could have been performed at home, if the resources in the form of necessary competence were available. This may reduce the dependency on the local hospital and reduce the number of emergency admissions.

One limitation is the lack of information about performance status and current disease status at admission, both important predictors of survival and disease progression[21]. This might have provided more valid information about the necessity of being admitted as an emergency case. The majority of patients had metastatic disease and few received tumour-directed treatment upon admission, indicating that the majority were in the late stages of disease. Additionally, lung symptoms, reported as an independent predictor of death within 90 and 180 days[21-23] were among the most frequent reasons for admission. Although some patients needed more advanced procedures (surgery, MRIs and EKGs), relatively simple procedures like hydration and change in analgesia were most common. This may be taken to indicate that an emergency hospital admission was necessary for some patients, but not for all. To perform a valid investigation of the proportion of patients needing emergency care, a larger study with thorough objective examinations and follow-up is necessary, which was beyond the scope of this descriptive study. We did not register the amount and quality of care delivered by the home care nursing services, nor the frequency of follow-up by the patients' GP. Another limitation is the small sample size and that the study was confined to two hospitals only. The first does not allow for advanced statistics and sub-group comparisons, while the second may limit the generalizability. On the other hand, there are many relatively small acute care hospitals in Norway as in many other countries, rendering the findings relevant to consider in discharge planning and palliative care follow-up. Also, the fact that all consecutive emergency cases in the actual time period were considered for inclusion is a major strength, in our opinion. Furthermore, quantitative registrations combined with interviews give a good picture of patient experiences.

The fact that close to 50% of our patients had been discharged from hospital less than one month prior to the actual admission emphasizes the need to improve the continuity of care, through a systematic follow-up and treatment plan, which are cornerstones of palliative care. This may actually have a double effect, preventing a rapid development in symptom intensity and improving the feeling of safety for patients and family, thereby reducing the need for emergency admissions.

CONCLUSION

Emergency admissions may represent stressful events for patients and relatives. This study showed that many patients needed simple procedures only. About two-thirds preferred hospital admission to other places of care, and the feeling of being safe in hospital was prominent. Higher levels of expertise, easier access to medical doctors outside hospital and better lines of cooperation between hospitals and the primary health care services may reduce need for emergency hospitalizations.

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REFERENCES

1. Kreftregisteret, Cancer Registry of Norway. Homepage: http://www.kreftregisteret.no/en/. (2011, Accessed Nov 2012)

2. Verdecchia A, Francisci S, Brenner H, et al. Recent cancer survival in Europe: a 2000-02 period analysis of EUROCARE-4 data. *Lancet Oncol* 2007;**9**:784-796.

3. Earle CC, Park ER, Lai B, et al. Identifying potential indicators of the quality of end-of-life cancer care from administrative data. *J Clin Oncol* 2003;**21**:1133-1138.

4. Yates M, Barrett A. Oncological emergency admissions to the Norfolk and Norwich University Hospital: an audit of current arrangements and patient satisfaction. *Clin Oncol (R Coll Radiol)* 2009;**3**:226-233.

5. Earle CC, Neville BA, Landrum MB, et al. Trends in the aggressiveness of cancer care near the end of life. *J Clin Oncol* 2004;**2**:315-321.

6. Huang J, Boyd C, Tyldesley S, et al. Time spent in hospital in the last six months of life in patients who died of cancer in Ontario. *J Clin Oncol* 2002;**6**:1584-1592.

7. Barbera L, Paszat L, and Chartier C. Indicators of poor quality end-of-life cancer care in Ontario. *J Palliat Care* 2006;**1**:12-17.

8. Ho TH, Barbera L, Saskin R, et al. Trends in the aggressiveness of end-of-life cancer care in the universal health care system of Ontario, Canada. *J Clin Oncol* 2011; 12: 1587-1591.

9. Earle CC, Landrum MB, Souza JM, et al. Aggressiveness of cancer care near the end of life: is it a quality-of-care issue? *J Clin Oncol* 2008; 23: 3860-3866.

10. Smith TJ, Temin S, Alesi ER, et al. American society of clinical oncology provisional clinical opinion: the integration of palliative care into standard oncology care. *J Clin Oncol* 2012;**8**:880-887.

11. Bruera E, and Hui D. Integrating supportive and palliative care in the trajectory of cancer: establishing goals and models of care. *J Clin Oncol* 2010; 25: 4013-4017.

12. Dudgeon DJ, Knott C, Eichholz M, et al. Palliative Care Integration Project (PCIP) quality improvement strategy evaluation. *J Pain Symptom Manage* 2008;**6**:573-582.

13. Higginson IJ, and Evans CJ. What is the evidence that palliative care teams improve outcomes for cancer patients and their families? *Cancer J* 2010;**5**:423-435.

14. Brumley R, Enguidanos S, Jamison P, et al. Increased satisfaction with care and lower costs: results of a randomized trial of in-home palliative care. *J Am Geriatr Soc* 2007;**7**:993-1000.

15. Bakitas M, Lyons KD, Hegel MT, et al. Effects of a palliative care intervention on clinical outcomes in patients with advanced cancer: the Project ENABLE II randomized controlled trial. *JAMA* 2009;**7**:741-749.

16. International Classification of Diseases ICD-10. Home page: http://www.who.int/classifications/icd/en/, (2010, Accessed Nov 2012).

17. Norwegian Cause of Death Registry. Home page: http://www.ssb.no/english/subjects/03/01/10/dodsarsak_en/. (2010, Accessed Nov 2012).

18. Nekolaichuk C, Watanabe S, and Beaumont C. The Edmonton Symptom Assessment System: a 15-year retrospective review of validation studies (1991-2006). *Palliat Med* 2008;**2**:111-122.

19. Bruera E, Kuehn N, Miller MJ, et al. The Edmonton Symptom Assessment System (ESAS): a simple method for the assessment of palliative care patients. *J Palliat Care* 1991;**2**:6-9.

20. Mayer DK, Travers D, Wyss A, et al. Why do patients with cancer visit emergency departments? Results of a 2008 population study in North Carolina. *J Clin Oncol* 2011;**19**:2683-2688.

21. Geraci JM, Tsang W, Valdres RV, et al. Progressive disease in patients with cancer presenting to an emergency room with acute symptoms predicts short-term mortality. *Support Care Cancer* 2006;**10**:1038-1045.

22. Escalante CP, Martin CG, Elting LS, et al. Identifying risk factors for imminent death in cancer patients with acute dyspnea. *J Pain Symptom Manage* 2000;**5**:318-325.

23. Vigano A, Dorgan M, Bruera E, et al. The relative accuracy of the clinical estimation of the duration of life for patients with end of life cancer. *Cancer* 1999;**1**:170-176.

24. Menten J, and de Lepeleire J. Emergency hospital admission for pain in palliative patients: a crucial role for general practitioners. *Eur J Gen Pract* 2006;**3**:133-134.

25. Wiese CH, Bartels UE, Ruppert D, et al. Treatment of palliative care emergencies by prehospital emergency physicians in Germany: an interview based investigation. *Palliat Med* 2009;**4**:369-373.

26. Wiese CH, Bartels UE, Marczynska K, et al. Quality of out-of-hospital palliative emergency care depends on the expertise of the emergency medical team--a prospective multi-centre analysis. *Support Care Cancer* 2009; 12: 1499-1506.

27. Burge F, Lawson B, and Johnston G. Family physician continuity of care and emergency department use in end-of-life cancer care. *Med Care* 2003;**41**:992-1001.

28. World Health Organization. Homepage http://www.who.int/cancer/palliative/definition/en/. (2011, accessed Nov 2012).

29. Daugherty CK, and Steensma DP. Overcoming obstacles to hospice care: an ethical examination of inertia and inaction. *J Clin Oncol* 2003;**21**(9 Suppl):42s-45s.

30. Bedard G, Zeng L, Zhang L, et al. Minimal Clinically Important Differences in the Edmonton Symptom Assessment System in Patients With Advanced Cancer. *J Pain*

Symptom Manage 2012. Epub ahead of print, Nov 21, doi: 10.1016/j.jpainsymman.2012.07.022.

Are emergency admissions in palliative cancer care always necessary? Results from a descriptive study

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Are emergency admissions in palliative cancer care always necessary? Results from a descriptive study

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ABSTRACT

Objectives. Patients with advanced cancer are often admitted to hospital as emergency cases. This may not always be medically indicated. Study objectives were to register the reasons for the emergency admissions, to examine interventions performed during hospitalization and self-reported symptom intensity at admission and discharge, and to assess patients' opinions about the admission.

Design. This was a descriptive, before-and-after study. Participating patients completed the Edmonton Symptom Assessment System (ESAS) twice; upon hospital admission and prior to discharge. All patients underwent a structured interview assessing their opinion about the emergency admission. Medical data was obtained from hospital records.

Setting. The study was performed in two Norwegian acute care secondary hospitals with urban catchment areas.

Participants. Forty-four cancer patients (M: 27/F: 17, mean age 69.2, SD: 9.2) representing 50 emergency admissions were included.

Results. Median length of stay was 7 days (95% CI; 7.4-11.4). Median survival was 50 days (95% CI; 51-115). Ninety per cent were admitted from home, and 46% had been hospitalized less than one month earlier. Lung and gastro-intestinal symptoms and pain were the most frequent reasons for admissions. Mean pain scores on the ESAS were reduced by 50% from admission to discharge ($p < 0.01$). Simple interventions such as hydration, bladder catheterization and oxygen therapy were most frequent. Nearly one-third would have preferred treatment at another site, provided that the quality of care was similar. Home visits by the family doctor and specialized care teams were perceived by patients as important to prevent hospitalization.

Conclusion. In most emergency admissions, relatively simple medical interventions are necessary. Specialized care teams with palliative care physicians, easier access to the family

doctor and better lines of cooperation between hospitals and the primary care sector, may make it possible to perform more of these procedures at home, thereby reducing the need for emergency admissions.

Article Summary

Article focus

- Investigate the reasons for emergency admissions of palliative care cancer patients
- Register interventions performed in the hospital
- Examine symptom intensity before and after medical interventions by a standardized self-report tool (ESAS)

Key messages

- Palliative care emergency admissions not always necessary, nor strictly medically indicated
- Simple medical procedures in the home care setting may reduce the need for emergency admissions
- Increased level of competence and more specialized palliative care skills in the primary health care sector is necessary to prevent emergency admissions

Strengths and limitations of this study

Strengths

All potentially eligible patients were assessed

Registrations were done prospectively, with a thorough examination of charts after discharge / death, the latter that was also assessed retrospectively

Patients' own experiences were registered

Limitations

Small study in two hospitals only, with a limited number of variables, may reduce overall generalizability

No registration of ECOG/Karnofsky score upon admission

INTRODUCTION

Thanks to modern, multimodal therapy, survival has improved for many cancer diagnoses. Slightly less than 50% of the patients will die from their cancer[1] while the remaining half will live with the disease for shorter or longer periods of time[2]. This accentuates the need for optimal symptom management and maintenance of quality of life throughout the disease trajectory.

Admissions to the intensive care unit and number of visits to the emergency room (ER) are quality indicators in end of life care[3]. Although this may be necessary in many cases, it is not always so. A British study examined emergency admissions of cancer patients in an acute care hospital and concluded that close to 50% neither needed nor wanted to be admitted as an emergency[4]. This is in line with a Canadian study examining administrative data on admissions, concluding that many visits to the emergency department by patients with cancer near the end of life may be avoidable[5]Studies have documented that patients with incurable cancer frequently use acute care hospitals for acute problems and symptomatic treatment[6,7,8], particularly so older cancer patients during their last month of life[7]. A study from Ontario published in 2006 [8] showed that 27% of cancer patients had a visit to the ER in the last two weeks of life, corresponding to 34% in a subsequent report (2010)[5], in line with other reports demonstrating increasing trends over time[6,9,10].

A closer collaboration between oncology and palliative care has been recommended[11,12]. One study reported that systematic implementation of a palliative care integration project resulted in significantly better documentation of pain, fewer visits to the ER, and fewer admissions to acute care hospitals[13]. This was consistent with a review showing that home, hospital, and inpatient specialist palliative care significantly improved symptom control, pain and anxiety, and reduced hospital admissions[14]. Similar findings were reported from an RCT in a mixed sample of terminally ill patients who received specialized in-home palliative care[15]. Another RCT, however, comparing a multi-component intervention and follow-up, found no reduction in ER visits but significantly better quality of life and mood[16].

Emergency admissions often represent stressful events for the patients and their families due to anxiety, feeling of discontinuity, and logistic problems in an emergency setting that may increase the waiting time. Having to go to the emergency room for admission may also conflict with patients' wishes. Based on our experience in palliative medicine, and our interest in continuity of care in patients with advanced disease, we have conducted a small descriptive study aiming to aid in the planning of palliative care in two Norwegian acute care local hospitals. Study aims were to register the reasons for the emergency admissions, to examine symptom intensity upon admission and discharge and to register the interventions performed during hospitalization. Patients' opinions about the emergency admission were also assessed.

MATERIAL AND METHODS

Patients

The two hospitals were Østfold Hospital Trust (SØF) and Lovisenberg Diakonale Hospital (LDS). SØF is the district general hospital for approximately 277,000 inhabitants in the south-eastern part of Norway. The hospital has specialist health care services in most medical specialities, including oncology and palliative care. LDS is located in the capital, Oslo. It serves as the general hospital for psychiatry and internal medicine including emergency admissions, in one of four city sectors with a catchment area of about 156,000 inhabitants. LDS has a specialized palliative care unit.

The Norwegian health care system is organised with university, regional and local hospitals and widespread community health care services. In the catchment areas of these two hospitals, the home care services had nurses with special training in palliative care, supplemented by experienced physicians who were available on request. Also, all palliative care patients who have had previous contact with the hospitals receive special follow-up from the hospital directly or through the hospitals' ambulant palliative care teams, as necessary. The update is normally adapted and updated according to changing needs. Nevertheless, unplanned hospital admissions in Norway are normally routed though the emergency department, even if the patients have a previous affiliation with the hospital. Formal advanced care planning is not routinely applied in Norway, but elements from such plans are often part of the discussion with patients and their relatives.

A consecutive sample of cancer patients who were admitted through the emergency departments was included between October 2009 and May 2010. Inclusion criteria were a verified diagnosis of cancer in the palliative phase of disease, documented in the patient chart), anticipated survival less than 1 year and cognitive and physical capacity to complete the study as evaluated by the attending oncologist prior to inclusion, age ≥18 years, fluency in Norwegian and provision of signed informed consent. Exclusion criteria were treatment with curative or adjuvant intent, a psychiatric diagnosis and language problems/illiteracy.

Instruments

Medical and socio-demographic data

The CRF encompassed socio-demographic variables (marital and living situation), use of etc.), and details about the admission (date, time, reason for and organization of the admission). One dichotomous question (Y/N) asked about the use of different home care services such as specialized palliative care, generalist home care teams, contact with community cancer nurse etc., as well as help from family/friends in the last three months. Medical data e.g. cancer diagnosis (ICD-10) [17], metastases, on-going or previous tumour directed treatment (chemotherapy, radiotherapy, biological agents, hormonal therapy), and recent hospital discharges were recorded, as were medical interventions during hospitalization and details about the discharge. This information was updated during the stay and after discharge by the study nurses/physicians through double-checking of the hospitals' patient records and the electronic/written charts. Date of death was recorded retrospectively based on automatic updates in the hospital records from the Cause of Death Registry[18].

Symptom assessment

The Edmonton Symptom Assessment System (ESAS) is one of the most frequently used symptom assessment tools in palliative cancer care[19], and was developed to monitor the most common cancer symptoms with minimal patient burden[20]. A Norwegian version of the ESAS was used. The 0-10 numerical rating scale, ranging from 0 (0=*no symptom, normal/good, 10=worst possible symptom*) was used for the following symptoms; *Pain at rest, pain at movement, tiredness, nausea, shortness of breath, dry mouth (xerostomia), appetite, anxiety/uneasiness, depression/sadness* and the question *" Overall, how are you feeling today?"* (*well-being*). Patients were asked to rate their symptoms at the present time.

Structured patient interview

A short structured interview (nine questions) was developed in order to assess the patients' perceptions about the emergency admission. First, patients were asked to give the two most important reasons for the emergency admission from a list of 16 frequent symptoms/problem areas, supplemented by one open category. They were also asked about the duration of symptom development, how the admission was organized, who they contacted to get help, who organized the admission, and how they were transported to the hospital. Four questions were assessing if the admission was in accordance with their desires, if they would have preferred to receive treatment somewhere else, and if so where; at home, in another hospital, in a nursing home or palliative care unit, and finally if they could identify certain interventions that could have prevented the emergency admission; among others extended nursing home care, specialized palliative care teams, regular visits from the family doctor. Free comments were encouraged.

Methods for data collection

Patients were approached shortly after admission, and informed about the study by the study nurses. If the patient consented to participate, ESAS was administered at the earliest convenience. The second ESAS was completed as close to discharge as practically possible. The structured interviews were undertaken 1-3 days after admission. These were performed by two designated specialist nurses in palliative medicine.

Ethical Considerations

The protocol was approved by the Regional Committee for Medical and Health Research Ethics, the Norwegian Social Science Data Services (NSD), the institutional review boards at the two hospitals and was conducted according to the rules of the Helsinki declaration. All participants provided written informed consent prior to study start.

Statistics

Sample size estimations and power calculations were not performed due to the descriptive nature of the study. Standard descriptive statistics were used and few sub-group comparisons were performed due to the small sample size. Each admission and its related interventions were regarded as independent events. A p-value ≤0.05 was considered statistically significant. The PASW 18 statistical package was used (SPSS Inc., Chicago, Il, USA).

RESULTS

Patients

A total of 44 patients (27 males, 17 females) were included, accounting for 50 emergency admissions. Median age was 66 years (53-89) and 16 (36%) of the patients were ≥70 years. Forty patients (91%) had metastatic disease. The remaining four had lung (n=2) and gastro-intestinal cancer (n=2) and were receiving palliative cancer care, due to their complex symptom burden.

One patient was still alive at the time of data analyses. Median survival for the remaining 43 patients was 50 days (range 1-500, 95% CI: 51-115) from the first day of study entry, Table 1. Five patients died while hospitalized, while median survival for the 38 patients who were discharged was 56 days (range 16-500, 95% CI: 58-128). Nine of these died within the first month. Sixteen patients lived for more than 90 days after discharge, six beyond 180 days, while two patients lived longer than the estimated life expectancy of 1 year.

Table 1. Socio-demographic and medical characteristics [1]

		N	**(%)**
Sex	Male	27	(61)
	Female	17	(39)
Marital status	Married/cohabiting	32	(73)
	Single/widowed/divorced	11	(44)
	Missing	1	(2)
Living situation	With others	32	(73)
	Alone	12	(27)

Education	Compulsory or less	17	(39)
	High school graduate	15	(34)
	College / university	11	(25)
	Missing	1	(2)
Diagnoses	Gastrointestinal	18	(41)
	Lung	11	(25)
	Urological	7	(16)
	Other[2]	8	(18)
Metastatic disease [3]	Presence of metastases	40	(91)
Site of metastases	Liver	21	(48)
	Lymph nodes	17	(39)
	Bone	13	(30)
	Lung	12	(27)
	Brain	7	(16)
Tumour-directed treatment, Ongoing upon admission	Chemotherapy	14	(32)
	Hormones	**3**	**(6)**
		Median	**(range)**
Age		66	(53-89)
Survival	Overall survival[4], days from first study entry	50	(1-500, 95% CI: 51-115)

[1] N = 44, the number of individual patients accounting for the 50 emergency admissions

[2] Breast (3), malignant melanoma (2), gynaecological (2), unspecified (1)

[3] Percentages exceed 100, because due to multiple sites per patients

[4] N=43, one patient was still alive at follow-up

The emergency admissions

Information about reason for the emergency admission, was captured from the registrations in the medical charts by the attending doctors in the emergency department. In the majority of the cases (n=36, 72%) two reasons were listed, while a single symptom/condition was given in 14 of the admissions (28%); 86 indications in total. Overall, the most frequent indications were gastro-intestinal problems such as nausea/vomiting, diarrhoea and obstipation (n=22/86, 26%), lung problems such as dyspnoea, pleural effusion, pneumonia, embolism (n=17/86, 20%), pain (n=13/86, 15%), and reduced performance status (n=8/86, 9%)..

Figure 1. Most frequent reasons for the emergency admissions (file uploaded separately)

50% (n=25) of the emergency admissions were administered by a hospital doctor, and 24% (n=12) by the patient's general practitioner (GP) or a GP on call. In 45 cases (90%), patients were admitted from home, four patients came from the hospitals' out-patient clinic, and one from a nursing home. Forty-eight per cent (n=24) were transported by ambulance. In seven cases, an "open return" was established as part of the patient's care plan. However, only two patients were admitted directly to the appropriate hospital unit upon admission, while the remaining had to wait in the emergency room for up to seven hours. Twenty-three patients (46%) had been discharged from hospital less than one month prior to the actual admission

.

The highest number of emergencies, 18 of 50, occurred on Mondays. Overall, 19 (38%) of the admissions took place outside regular working hours, defined as 8 p.m. to 5 a.m. on weekdays. Fourteen of these (74%) occurred from Friday night through Sunday.

Median length of stay was seven days (1-35). Most discharges; 28/45 (62%), were to the patient's home, eight (18%) discharges were to a nursing home, five (11%) were transferred to another hospital or a specialized palliative care unit.

Examinations and interventions

X-ray, CT-scans, ultra-sound examinations and MRIs were performed in 66 (n=33), 48 (n=24), 24% (n=12) and 8% (n=4) of the cases respectively. Six patients had none of these procedures done, three patients went through three of these, while one patient had all four done, prior to abdominal surgery. Seven patients had an electrocardiogram taken during their stay. Four patients went through surgical procedures; abdominal surgery (n=1), and insertion of stents (n=2) and a central venous catheter (n=1). None of the patients went directly to the intensive care unit (ICU) upon admission. One patient however, experienced severe complications related to dialysis during hospitalization, was admitted to the ICU after two days and subsequently died.

Several standard procedures were performed during hospitalization, with hydration (n=39, 78%), antibiotics (n=21, 42%), and oxygen therapy (n=15, 30%) as the most frequent, Figure 1. Maximum of registered procedures per patient was twelve, while the minimum was three. About one-third of the patients (n=15) were seen by an oncologist, while more than 50% (n=26) were approached by the hospital palliative team.

Figure 2. Most frequent interventions during hospitalization (file uploaded separately)

Pain was prominent, and pain-related procedures were performed in all but seven cases. The main reasons for admission in these seven cases were dyspnoea (n=3), reduced performance status (n=2), and problems swallowing (n=2). Two-thirds used strong analgesics such as morphine, fentanyl, or oxycodon upon admission, mostly as slow release tablets or patches.

The most frequent pain related interventions were changes in the analgesic regimen (n=24) such as opioid switch, adding a co-analgesic or increasing the dosage. Two patients had an epidural catheter inserted; one of these also had a coeliacus blockage, and a spinal catheter.

Symptom assessment, ESAS scores

Both ESAS forms were completed in 76% of the cases. Missing forms were due to death (n=5), discharge earlier than planned and administrative failure (n=7).

Median number of days from admission to the first ESAS was 1 (0-3), with a median of 5 days between assessments (1-20). ESAS no. 2 was completed shortly before discharge; same day (48%) or the day before (12%).

Table 2 displays the ESAS mean scores at inclusion and discharge. Pain at rest and pain at movement was significantly reduced during the stay, with a reduction of 1.7 for both between assessments (p-values <0.01). Highest mean intensity scores at inclusion were found with tiredness (6.1), appetite (5.6) and oral dryness/xerostomia (5.1). Upon discharge, six patients reported a score above three for pain at rest, while 11 patients had a pain score exceeding three for pain at movement.

Table 2. ESAS scores at inclusion and prior to discharge[1]

	1st assessment[2]	**2nd assessment**[2]	**Difference in mean scores 1st and 2nd ESAS**	**p-value**
Symptom	**Mean (SD)**	**Mean (SD)**		
Pain at rest	3.2 (2.8)	1.5 (1.9)	1.7	<.01

Pain at movement	4.4 (3.1)	2.7 (2.7)	1.7	<.01
Tiredness	6.1 (2.5)	5.5 (2.6)	0.6	NS
Nausea	1.7 (2.5)	1.3 (2.0)	0.4	NS
Shortness of breath	3.0 (2.9)	2.8 (3.2)	0.2	NS
Oral dryness (xerostomia)	5.1 (2.7)	5.2 (2.6)	-0.1	NS
Appetite	5.6 (2.9)	5.0 (2.4)	0.6	NS
Anxiety/uneasiness	1.9 (2.5)	2.3 (2.7)	-0.4	NS
Depression/sadness	2.3 (2.7)	2.9 (3.0)	-0.6	NS
"Overall, how are you feeling today?"	4.5 (2.3)	4.2 (2.1)	0.3	NS

[1] Numerical rating scale (0-10) with higher scores implying higher symptom intensity

[2] N varies between 38 and 34, due to missing items on some of the forms

Mean ESAS scores at inclusion in the 12 cases in which the second form was not completed were compared with scores from those who completed both. No significant differences were found.

The patient interviews

Patients were asked to mention the two most bothersome symptoms leading to the hospitalization. Gastrointestinal symptoms including nausea/vomiting, diarrhoea and appetite loss (n=24, 48%), fatigue (n=19, 38%), pain (n=18, 38%), and dyspnoea (n=10, 20%) were the most frequent reasons according to the patients. In most cases (n=32, 64%), patients said the symptoms had developed over several days, and this was reported by all of the 18 patients who were admitted on a Monday. Six patients (12%) reported a more acute onset with symptoms developing during a few hours. Four of these patients came to the hospital outside normal working hours. Nineteen patients (38%) received regular medical care at home from the community health system, such as nursing services and domestic assistance, or both.

When asked about preference for care the majority of patients (n=33, 66%) preferred hospital admission to other places in the actual situation. Nine (18%) said they would have liked to receive medical treatment at home, given that necessary resources and equipment were available, while four (8%) would have preferred a nursing home.

Free comments were provided in 44 interviews. Seven patients (16%) perceived the delays in the emergency unit as tiring and unnecessary, while another seven (16%) found this acceptable. Two patients (5%) specifically stated that they would have preferred direct admission to the appropriate hospital unit, while another two (5%) had a desire to go directly to the palliative care unit. In ten interviews (23%), patients said they felt safer at hospital than at home given the actual situation. Seven of these (70%) were 65 years or older, but only one was living alone. Four (10%) expressed concerns about the caregiver burden imposed on their partner. The most frequently raised comment in the interviews (n=11, 25%) was related to doubts whether the home care services had competence and expertise to handle the situation. Nevertheless, ten patients (23%) said they would have preferred to get simple procedures such as intravenous nutrition and hydration at home. In their opinion, specialized care teams and home visits by their GP were the most important actions to prevent emergency admissions.

DISCUSSION

This small, descriptive study from two acute–care Norwegian hospitals serving local, urban areas shows that relatively simple procedures were performed in most of the emergency cases. Standard interventions such as hydration, antibiotics, and oxygen therapy were most common, corresponding well with the most frequent reasons for admission. In many cases, these procedures may well be administered in the primary health care sector.

Pain, gastro-intestinal and respiratory problems were prominent, well in line with other studies of emergency admissions[4,5,21,22]. These are frequent symptoms in advanced cancer patients, and may indicate disease progression. One study demonstrated a significant relationship between signs of disease progression and short term mortality (<90 and <180 days) in symptomatic cancer patients coming to the ER[22], in line with other reports[23,24]. Although the present study was too small to perform valid analyses of a possible relationship between symptoms and survival, our sample consisted of cancer patients in the palliative phase of disease, and more than 50% were dead 90 days after discharge. This suggests that standard medical procedures were indicated for most of the patients, and more advanced procedures in some cases only.

Thirty-eight per cent of the admissions were outside normal working hours, a lower proportion than reported elsewhere[21]. In most cases, patients said that symptoms had developed over time. Monday had the highest percentage of emergency admissions as found by others[21], which corresponds to a gradual onset of symptoms, as reported by all of the patients admitted on Mondays. It may also be that patients tried to avoid going in on weekends and waited until Monday before contacting the hospital or the GP.

Many common symptoms are bothersome and distressing and known to cause considerable anxiety in patients, and in relatives. Thus, it should be remembered that causes other than strict medical, somatic indications may lead to hospital admissions, e.g. reduced performance status, frailty, loneliness and psychological distress that often coexist. Some patients commented that they felt safer at hospital than at home, and that they wanted to reduce the burden imposed on their family by the disease. Causes like this may be more common in smaller hospitals serving a well-defined area compared to larger university clinics. In our opinion, maybe the most important issue raised by this study is not whether hospital admission was indicated per se, but if hospital admission as an emergency case was most appropriate for getting necessary medical care. We also believe however, that a higher level of specialist palliative care competence in the home care services and closer collaboration between these services and the hospital may reduce the need for emergency admissions.

This also relates to the fact that about 50% of the admissions were administered by a hospital doctor, twice as many as by GPs (24%). The standard pathway for hospital admissions in Norway is through the family GP, unless there is an emergency. The fact that our sample consisted of palliative care patients with an affiliation to the local hospital, may explain why the hospital doctors were so frequently contacted. It is noteworthy however, that a home visit by a medical doctor was mentioned as the most wanted intervention that could possibly have prevented the emergency admission. Shorter hospital stays and more people living longer at home with advanced disease, represent a challenge for the primary health care sector, specifically so for the GPs[25,26] as they are crucial in the follow-up and care for patients with advanced cancer outside hospital[27]. One study found that a higher number of visits to the family doctor was inversely associated with the number of visits to the ER in patients dying from cancer[28].

In our opinion, this points to two important aspects related to palliative care; namely that it is misconstrued as end-of-life care only[11], and that it should be integrated into standard oncology upon the diagnosis of metastatic or advanced cancer. WHO emphasize that palliative care is applicable early in the course of illness[29] due to systematic approach to symptom relief, enhanced quality of life of patient and caregivers, less use of emergency care services and a timelier referral to specialized palliative care, that often takes place too late[12,21,30].

The fact that many patients with advanced cancer see acute-care providers, makes systematic follow-up less common, and means that collaborative care plans across organizational levels are not available, even if needed. Home care of patients with advanced cancer should be taken care of by specialist teams with easy access to hospital based palliative care specialists, in close collaboration with the family doctor. Pain related interventions were performed in almost all patients, and there was a significant decline in the mean pain scores (mean 1.7) on the ESAS from admission to discharge. A recent study in more than 200 patients showed that a decrease of 1.2 units in the ESAS pain score constituted a clinically relevant improvement[31]. A change in the analgesic regimen was the most frequent procedure, and it is reason to believe that this and other simple procedures could have been performed at home, if the resources in the form of necessary competence were available. This may reduce the dependency on the local hospital and reduce the number of emergency admissions.

One limitation is the lack of information about performance status and current disease status at admission, both important predictors of survival and disease progression[22]. This might have provided more valid information about the necessity of being admitted as an emergency case. The majority of patients had metastatic disease and few received tumour-directed treatment upon admission, indicating that the majority were in the late stages of disease. Additionally, lung symptoms, reported as an independent predictor of death within 90 and 180 days[22-24] were among the most frequent reasons for admission. Although some patients needed more advanced procedures (surgery, CTscans, MRIs), relatively simple procedures like hydration, antibiotics and change in analgesics were most common. This may be taken to indicate that an emergency hospital admission was necessary for some patients, but not for all. To perform a valid investigation of the "true" proportion of patients needing emergency admissions, a larger study with thorough objective examinations, and detailed registrations of all interventions and a close follow-up is necessary, which was beyond the scope of this descriptive study. This is also related to the limitation caused by the small sample size, and the fact that the study was confined to two hospitals only. The first does not allow for advanced statistics and sub-group comparisons, while the second may limit the generalizability. On the other hand, there are many relatively small acute care hospitals in Norway, serving a limited catchment area with a well-organized primary health care sector. It could be argued that more knowledge about the extent and quality of the home care nursing services, and the amount of patients' contact with the GP would have provided important information about the need for an emergency admission. This is true, but we also believe that a small study like this makes the findings relevant to consider in discharge planning and palliative care follow-up, as was our intention with the present study. Also, the fact that all consecutive emergency cases in the actual time period were considered for inclusion is a major strength, in our opinion. Furthermore, quantitative registrations combined with interviews give a better picture of the patients' experiences, than registry-based studies alone.

The fact that close to 50% of our patients had been discharged from hospital less than one month prior to the actual admission emphasizes the need to improve the continuity of care, through a systematic follow-up and treatment plan, which are cornerstones of palliative care. This may actually have a double effect, preventing a rapid development in symptom intensity and improving the feeling of safety for patients and family, thereby reducing the need for emergency admissions.

CONCLUSION

Emergency admissions may represent stressful events for patients and relatives. This study showed that many patients needed simple procedures only. About two-thirds preferred hospital admission to other places of care, and about one-fourth expressed that they felt safe in the hospital in the actual situation. Higher levels of expertise, easier access to medical doctors outside hospital and better lines of cooperation between hospitals and the primary health care services may reduce need for emergency admissions.

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None

CONTRIBUTORSHIP

Hjermstad: protocol writing, ethics applications, development of forms, study conduct, data analyses, manuscript writing
Kolflaath: original idea, protocol writing, manuscript writing
Løkken: data collectcion, protocol writing, manuscript writing
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DATA SHARING

No further data is going to be published from this study

REFERENCES

1. Kreftregisteret, Cancer Registry of Norway. Homepage: http://www.kreftregisteret.no/en/. (2011, Accessed Nov 2012)

2. Verdecchia A, Francisci S, Brenner H, et al. Recent cancer survival in Europe: a 2000-02 period analysis of EUROCARE-4 data. *Lancet Oncol* 2007;**9**:784-796.

3. Earle CC, Park ER, Lai B, et al. Identifying potential indicators of the quality of end-of-life cancer care from administrative data. *J Clin Oncol* 2003;**21**:1133-1138.

4. Yates M, Barrett A. Oncological emergency admissions to the Norfolk and Norwich University Hospital: an audit of current arrangements and patient satisfaction. *Clin Oncol (R Coll Radiol)* 2009;**3**:226-233.

5. Barbera L, Taylor C, Dudgeon D. Why do patients with cancer visit the emergency department near the end of life? *CAMJ* 2010;182(6):563-568

6.Earle CC, Neville BA, Landrum MB, et al. Trends in the aggressiveness of cancer care near the end of life. *J Clin Oncol* 2004;**2**:315-321

7.Huang J, Boyd C, Tyldesley S, et al. Time spent in hospital in the last six months of life in patients who died of cancer in Ontario. *J Clin Oncol* 2002;**6**:1584-1592.

8.Barbera L, Paszat L, and Chartier C. Indicators of poor quality end-of-life cancer care in Ontario. *J Palliat Care* 2006;**1**:12-17.

9.Ho TH, Barbera L, Saskin R, et al. Trends in the aggressiveness of end-of-life cancer care in the universal health care system of Ontario, Canada. *J Clin Oncol* 2011; 12: 1587-1591.

10. Earle CC, Landrum MB, Souza JM, et al. Aggressiveness of cancer care near the end of life: is it a quality-of-care issue? *J Clin Oncol* 2008; 23: 3860-3866.

11. Smith TJ, Temin S, Alesi ER, et al. American society of clinical oncology provisional clinical opinion: the integration of palliative care into standard oncology care. *J Clin Oncol* 2012;**8**:880-887.

12. Bruera E, and Hui D. Integrating supportive and palliative care in the trajectory of cancer: establishing goals and models of care. *J Clin Oncol* 2010; 25: 4013-4017.

13. Dudgeon DJ, Knott C, Eichholz M, et al. Palliative Care Integration Project (PCIP) quality improvement strategy evaluation. *J Pain Symptom Manage* 2008;**6**:573-582.

14. Higginson IJ, and Evans CJ. What is the evidence that palliative care teams improve outcomes for cancer patients and their families? *Cancer J* 2010;**5**:423-435.

15. Brumley R, Enguidanos S, Jamison P, et al. Increased satisfaction with care and lower costs: results of a randomized trial of in-home palliative care. *J Am Geriatr Soc* 2007;**7**:993-1000.

16. Bakitas M, Lyons KD, Hegel MT, et al. Effects of a palliative care intervention on clinical outcomes in patients with advanced cancer: the Project ENABLE II randomized controlled trial. *JAMA* 2009;**7**:741-749.

17. International Classification of Diseases ICD-10. Home page: http://www.who.int/classifications/icd/en/, (2010, Accessed Nov 2012).

18. Norwegian Cause of Death Registry. Home page: http://www.ssb.no/english/subjects/03/01/10/dodsarsak_en/. (2010, Accessed Nov 2012).

19. Nekolaichuk C, Watanabe S, and Beaumont C. The Edmonton Symptom Assessment System: a 15-year retrospective review of validation studies (1991-2006). *Palliat Med* 2008;**2**:111-122.

20. Bruera E, Kuehn N, Miller MJ, et al. The Edmonton Symptom Assessment System (ESAS): a simple method for the assessment of palliative care patients. *J Palliat Care* 1991;**2**:6-9.

21. Mayer DK, Travers D, Wyss A, et al. Why do patients with cancer visit emergency departments? Results of a 2008 population study in North Carolina. *J Clin Oncol* 2011;**19**:2683-2688.

22. Geraci JM, Tsang W, Valdres RV, et al. Progressive disease in patients with cancer presenting to an emergency room with acute symptoms predicts short-term mortality. *Support Care Cancer* 2006;**10**:1038-1045.

23. Escalante CP, Martin CG, Elting LS, et al. Identifying risk factors for imminent death in cancer patients with acute dyspnea. *J Pain Symptom Manage* 2000;**5**:318-325.

24. Vigano A, Dorgan M, Bruera E, et al. The relative accuracy of the clinical estimation of the duration of life for patients with end of life cancer. *Cancer* 1999;**1**:170-176.

25. Menten J, and de Lepeleire J. Emergency hospital admission for pain in palliative patients: a crucial role for general practitioners. *Eur J Gen Pract* 2006;**3**:133-134.

26. Wiese CH, Bartels UE, Ruppert D, et al. Treatment of palliative care emergencies by prehospital emergency physicians in Germany: an interview based investigation. *Palliat Med* 2009;**4**:369-373.

27. Wiese CH, Bartels UE, Marczynska K, et al. Quality of out-of-hospital palliative emergency care depends on the expertise of the emergency medical team--a prospective multi-centre analysis. *Support Care Cancer* 2009; 12: 1499-1506.

28. Burge F, Lawson B, and Johnston G. Family physician continuity of care and emergency department use in end-of-life cancer care. *Med Care* 2003;**41**:992-1001.

29. World Health Organization. Homepage http://www.who.int/cancer/palliative/definition/en/. (2011, accessed Nov 2012).

30. Daugherty CK, and Steensma DP. Overcoming obstacles to hospice care: an ethical examination of inertia and inaction. *J Clin Oncol* 2003;**21**(9 Suppl):42s-45s.

31. Bedard G, Zeng L, Zhang L, et al. Minimal Clinically Important Differences in the Edmonton Symptom Assessment System in Patients With Advanced Cancer. *J Pain Symptom Manage* 2012. Epub ahead of print, Nov 21, doi: 10.1016/j.jpainsymman.2012.07.022.

Are ~~E~~emergency admissions in palliative cancer care ~~may~~ are ~~not~~ always ~~be~~ necessary?~~.~~ Results from a descriptive study.

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RUNNING HEAD: Palliative care emergency admissions

KEY WORDS: Palliative care, emergency admissions, symptom management, cancer, continuity of care

ABSTRACT

Objectives. Patients with advanced cancer are often admitted to hospital as emergency cases. This may not always be medically indicated. Study objectives were to register the reasons for the emergency ~~admittances~~admissions, to examine interventions performed during hospitalization and self-reported symptom intensity at admission and discharge, and to assess patients' opinions about the admission. **Design.** This was a descriptive, before-and-after study. Participating patients completed the Edmonton Symptom Assessment System (ESAS) twice; upon hospital admission and prior to discharge. All patients underwent a structured interview assessing their opinion about the emergency admission. Medical data was obtained from hospital records. **Setting.** The study was performed in two Norwegian acute care secondary hospitals with urban catchment areas. **Participants.** Forty-four cancer patients (M: 27/F: 17, mean age 69.~~7~~2, SD: 9.2) representing 50 emergency admissions were included. **Results**. Median length of stay was 7 days (95% CI; 7.4-11.4). Median survival was 50 days (95% CI; 51-115). Ninety per cent were admitted from home, and 46% had been hospitalized less than one month earlier. Lung and gastro-intestinal symptoms and pain were the most frequent reasons for ~~admittance~~admissions. Mean pain scores on the ESAS were reduced by 50% from admission to discharge (p <0.01). Simple interventions such as hydration, bladder catheterization and oxygen therapy were most frequent. Nearly one-third would have preferred treatment at another site, ~~given~~ provided that the quality of care was similar. Home visits by the family doctor and specialized care teams were perceived by patients as important to prevent hospitalization. **Conclusion.** In most emergency admissions, relatively simple medical interventions are necessary. Specialized care teams with palliative care physicians, easier access to the family doctor and better lines of cooperation between hospitals and the primary care sector, may make it possible to perform more of these procedures at home, thereby reducing the need for emergency ~~hospitalization~~admissions.

Article Summary

Article focus

- Investigate the reasons for emergency admissions of palliative care cancer patients
- Register interventions performed in the hospital
- Examine symptom intensity before and after medical interventions by a standardized self-report tool (ESAS)

Key messages

- Palliative care emergency admissions~~ies~~ not always necessary, nor strictly medically indicated
- Simple medical procedures in the home care setting may reduce the need for emergency admissions
- Increased level of competence and more specialized palliative care skills in the primary health care sector is necessary to prevent ~~hospitalization~~ emergency admissions

Strengths and limitations of this study

Strengths

All potentially eligible patients were assessed

Registrations were done prospectively, with a thorough examination of charts after discharge / death, the latter that was also assessed retrospectively

Patients' own experiences were registered

Limitations

Small study in two hospitals only, with a limited number of variables, may reduce overall generalizability

No registration of ECOG/Karnofsky score upon admission

INTRODUCTION

Thanks to modern, multimodal therapy, survival has improved for many cancer diagnoses. Slightly less than 50% of the patients will die from their cancer[1] while the remaining half will live with the disease for shorter or longer periods of time[2]. This accentuates the need for optimal symptom management and maintenance of quality of life throughout the disease trajectory.

Admissions to the intensive care unit and number of visits to the emergency room (ER) are quality indicators in end of life care[3]. Although this may be necessary in many cases, it is not always so. A British study examined emergency admissions of cancer patients in an acute care hospital and concluded that close to 50% neither needed nor wanted to be admitted as an emergency[4]. This is in line with a Canadian study examining administrative data on admissions, concluding that many visits to the emergency department by patients with cancer near the end of life may be avoidable[5]. Studies have documented that patients with incurable cancer frequently use acute care hospitals for acute problems and symptomatic treatment[~~5,~~6,7,8], particularly so older cancer patients during their last month of life[~~6~~7]. ~~A~~ A study from Ontario published in 2006 [8]~~Canadian study~~ showed that 27% of cancer patients had a visit to the ER in the last two weeks of life, corresponding to 34% in a subsequent report (2010)[~~7~~5], in line with other reports demonstrating increasing trends over time[~~5~~6,~~8~~9,~~9~~10].

A closer collaboration between oncology and palliative care has been recommended[~~10~~11,~~11~~12]. One study reported that systematic implementation of a palliative care integration project resulted in significantly better documentation of pain, fewer visits to the ER, and fewer admissions to acute care hospitals[~~12~~13]. This was consistent with a review showing that home, hospital, and inpatient specialist palliative care significantly improved symptom control, pain and anxiety, and reduced hospital admissions[~~13~~14]. Similar findings were reported from an RCT in a mixed sample of terminally ill patients who received specialized in-home palliative care[~~14~~15]. Another RCT, however, comparing a multi-component intervention and follow-up, found no reduction in ER visits but significantly better quality of life and mood[~~15~~16].

Emergency admissions often represent stressful events for the patients and their families due to anxiety, feeling of discontinuity, and logistic problems in an emergency setting that may increase the waiting time. Having to go to the emergency room for admission may also conflict with patients' wishes. Based on our experience in palliative medicine, and our interest in continuity of care in patients with advanced disease, we have conducted a small descriptive study aiming to aid in the planning of palliative care in two Norwegian acute care local hospitals. Study aims were to register the reasons for the emergency ~~admittances~~admissions, to examine symptom intensity upon admission and discharge and to register the interventions performed during hospitalization. Patients' opinions about the emergency admission were also assessed.

MATERIAL AND METHODS

Patients

The two hospitals were Østfold Hospital Trust (SØF) and Lovisenberg ~~Deaconal~~ Diakonale Hospital (LDS). SØF is the district general hospital for approximately 277,000 inhabitants in the south-eastern part of Norway. The hospital has specialist health care services in most medical specialities, including oncology and palliative care. LDS is located in the capital, Oslo. It serves as the general hospital for psychiatry and internal medicine including emergency admissions, in one of four city sectors with a catchment area of about 156,000 inhabitants. LDS has a specialized palliative care unit.

The Norwegian health care system is organised with university, regional and local hospitals and widespread community health care services. In the catchment areas of these two hospitals, the home care services had nurses with special training in palliative care, supplemented by experienced physicians who were available on request. Also, all palliative care patients who have had previous contact with the hospitals receive special follow-up from the hospital directly or through the hospitals' ambulant palliative care teams, as necessary. The update is normally adapted and updated according to changing needs. Nevertheless, unplanned hospital ~~admittance~~admissions~~s~~ in Norway are normally routed though the emergency department, even if the patients have a previous~~n~~ affiliation with the hospital. Formal advanced care planning is not routinely applied in Norway, but elements from such plans are often part of the discussion with patients and their relatives.

A consecutive sample of cancer patients who were admitted through the emergency departments was included between October 2009 and May 2010. Inclusion criteria were a verified diagnosis of cancer in the palliative phase of disease, documented in the patient chart), anticipated survival less than 1 year and cognitive and physical capacity to complete the study as evaluated by the attending oncologist prior to inclusion, age ≥18 years, fluency in Norwegian and provision of signed informed consent. Exclusion criteria were treatment with curative or adjuvant intent, a psychiatric diagnosis and language problems/illiteracy.

Instruments

Medical and socio-demographic data

The CRF encompassed socio-demographic variables (marital and living situation), use of ~~home care~~ etc.), and details about the admission (date, time, reason for and organization of the admission). One dichotomous question (Y/N) asked about the use of different home care services such as specialized palliative care, generalist home care teams, contact with community cancer nurse etc., as well as help from family/friends in the last three months. Medical data e.g. cancer diagnosis (ICD-10) [~~16~~17], metastases, on-going or previous tumour directed treatment (chemotherapy, radiotherapy, biological agents, hormonal therapy), and recent hospital discharges were recorded, as were medical interventions during hospitalization and details about the discharge. This information was updated during the stay and after discharge by the study nurses/physicians through double-checking of the hospitals' patient records and the electronic/written charts. Date of death was recorded retrospectively based on automatic updates in the hospital records from the Cause of Death Registry[~~17~~18].

Symptom assessment

The Edmonton Symptom Assessment System (ESAS) is one of the most frequently used symptom assessment tools in palliative cancer care[~~18~~19], and was developed to monitor the most common cancer symptoms with minimal patient burden[~~19~~20]. A Norwegian version of the ESAS was used. The 0-10 numerical rating scale, ranging from 0 (0=*no symptom, normal/good, 10=worst possible symptom*) was used for the following symptoms; *Pain at rest, pain at movement, tiredness, nausea, shortness of breath, dry mouth (xerostomia), appetite, anxiety/uneasiness, depression/sadness* and the question *" Overall, how are you feeling today?"* (*well-being*). Patients were asked to rate their symptoms at the present time.

Structured patient interview

A short structured interview (nine questions) was developed in order to assess the patients' perceptions about the emergency ~~admittance~~admission. First, patients were asked to ~~choose~~ give the two most important reasons for the emergency admission~~admittance~~ from a list of 16 frequent symptoms/problem areas, supplemented by one open category. They were also asked about the duration of symptom development, how the admission~~admittance~~ was organized, who they contacted to get help, who organized the admission~~admittance~~, and how they were transported to the hospital. Four questions were assessing if the admission was in accordance with their desires, if they would have preferred to receive treatment somewhere else, and if so where; at home, in another hospital, in a nursing home or palliative care unit, and finally if they could identify certain interventions that could have prevented the emergency admission;

among others ~~more~~extended nursing home care, specialized palliative care teams, regular visits from the family doctor. Free comments were encouraged.

Methods for data collection

Patients were approached shortly after admission, and informed about the study by the study nurses. If the patient consented to participate, ESAS was administered at the earliest convenience. The second ESAS was completed as close to discharge as practically possible. The structured interviews were undertaken 1-3 days after admission. These were performed by two designated specialist nurses in palliative medicine.

Ethical Considerations

The protocol was approved by the Regional Committee for Medical and Health Research Ethics, the Norwegian Social Science Data Services (NSD), the institutional review boards at the two hospitals and was conducted according to the rules of the Helsinki declaration. All participants provided written informed consent prior to study start.

Statistics

Sample size estimations and power calculations were not performed due to the descriptive nature of the study. Standard descriptive statistics were used and few sub-group comparisons were performed due to the small sample size. Each admission and its related interventions were regarded as independent events. A p-value ≤ 0.05 was considered statistically significant. The PASW 18 statistical package was used (SPSS Inc., Chicago, Il, USA).

RESULTS

Patients

A total of 44 patients (27 males, 17 females) were included, accounting for 50 emergency admissions. Median age was 66 years (53-89) and 16 (36%) of the patients were ≥70 years. Forty patients (91%) had metastatic disease. The remaining four had lung (n=2) and gastro-intestinal cancer (n=2) and were receiving palliative cancer care, due to their complex symptom burden.

One patient was still alive at the time of data analyses. Median survival for the remaining 43 patients was 50 days (range 1-500, 95% CI: 51-115) from the first day of study entry, Table 1. Five patients died while hospitalized, while median survival for the 38 patients who were discharged was 56 days (range 16-500, 95% CI: 58-128). Nine of these died within the first month. Sixteen patients lived for more than 90 days after discharge, six beyond 180 days, while two patients lived longer than the estimated life expectancy of 1 year.

Table 1. Socio-demographic and medical characteristics [1]

		N	**(%)**
Sex	Male	27	(61)
	Female	17	(39)
Marital status	Married/cohabiting	32	(73)
	Single/widowed/divorced	11	(44)
	Missing	1	(2)
Living situation	With others	32	(73)
	Alone	12	(27)

Education	Compulsory or less	17	(39)
	High school graduate	15	(34)
	College / university	11	(25)
	Missing	1	(2)
Diagnoses	Gastrointestinal	18	(41)
	Lung	11	(25)
	Urological	7	(16)
	Other[2]	8	(18)
Metastatic disease [3]	Presence of metastases	40	(91)
Site of metastases	Liver	21	(48)
	Lymph nodes	17	(39)
	Bone	13	(30)
	Lung	12	(27)
	Brain	7	(16)
Tumour-directed treatment, Ongoing upon admission	~~Ongoing upon admission~~ Chemotherapy	14	(32)
	Hormones	**3**	**(6)**
		Median	**(range)**
Age		66~~67.5~~	(53-89)
Survival	Overall survival[4], days from first study entry	50	(1-500, 95% CI: 51-115)

[1] N = 44, the number of individual patients accounting for the 50 emergency admissions

[2] Breast (3), malignant melanoma (2), gynaecological (2), unspecified (1)

[3] Percentages exceed 100, because due to multiple sites per patients

[4] N=43, one patient was still alive at follow-up

The emergency admissions

Information about reason for the emergency admission, was ~~that was~~ captured from the ~~registered~~registrations in the medical charts by the attending doctors in the ~~seeing the patients in the~~ emergency department. ~~The~~In the majority of the ~~patient~~cases (n=36, 72%) ~~had~~ two reasons were listed, while a single symptom/condition was given ~~for~~in 14 of the admissions ~~patients only~~ (28%); 86 indications in total. Overall, t~~T~~he most frequent ~~reasons~~indications ~~for admittance~~ were gastro-intestinal problems such as nausea/vomiting, diarrhoea and obstipation (n=22~~15~~/86, 26%), lung problems such as dyspnoea, pleural effusion, pneumonia, embolism (n=17/86, 20%),~~ and~~ pain (n=13/86, 15%), and reduced performance status (n=8/86, 9%).~~ The majority of the patients (NN/%) had multiple symptoms~~.

Figure 1. Most frequent reasons for the emergency admissions (file uploaded separately)

50% (n=25) of the emergency admissions were administered by a hospital doctor, and 24% (n=12) by the patient's general practitioner (GP) or a GP on call. In 45 cases (90%), patients were admitted from home, four patients came from the hospitals' out-patient clinic, and one from a nursing home. Forty-eight per cent (n=24) were transported by ambulance. In seven cases, an "open return" was established as part of the patient's care plan. However, only two patients were admitted directly to the appropriate hospital unit upon admission, while the remaining had to wait in the emergency room for up to seven hours. Twenty-three patients (46%) had been discharged from hospital less than one month prior to the actual admission

~~admission letters accompanying the patients when admitted, and completed by the doctors who were responsible for the emergency admissions, the most frequently given reason for hospitalization were pain (n=9), nausea/vomiting (n=9), pneumonia, dyspnoea and other lung symptoms (n=13) and reduced performance status (n=5). This corresponded reasonably well~~

~~with the information recorded in the charts in the emergency department, when reviewed by the study coordinators; According to the patients' charts, the single primary reasons for admittance were gastro-intestinal problems such as nausea/vomiting, diarrhoea and obstipation (n=15), dyspnoea (n=14) and pain (n=7). although tThe majority of the patients (NN/%) had multiple symptoms. 50% (n=25) of the emergency admissions were administered by a hospital doctor, and 24% (n=12) by the patient's general practitioner (GP) or a GP on call. In 45 cases (90%), patients were admitted from home, four patients came from the hospitals' out-patient clinic, and one from a nursing home. Forty-eight per cent (n=24) were transported by ambulance. In seven cases, an "open return" was established as part of the patient's care plan. However, only two patients were admitted directly to the appropriate hospital unit upon admission, while the remaining had to wait in the emergency room for up to seven hours. Twenty-three patients (46%) had been discharged from hospital less than one month prior to the actual admission~~.

The highest number of emergencies, 18 of 50, occurred on Mondays. Overall, 19 (38%) of the admissions took place outside regular working hours, defined as 8 p.m. to 5 a.m. on weekdays. Fourteen of these (74%) occurred from Friday night through Sunday.

Median length of stay was seven days (1-35). Most discharges; 28/45 (~~64~~62%), were to the patient's home, eight ~~patients~~ (18%) discharges –were to a nursing home, ~~while four~~ five (11%) were transferred to another hospital or a specialized palliative care unit. ~~According to the admission letters and patient charts, the most frequent reasons for hospitalization were pain (n=9), nausea/vomiting (n=9), pneumonia, lung symptoms including dyspnoea (n=13) and reduced performance status (n=5).~~

Examinations and interventions

X-ray, CT-scans, ~~and~~ ultra-sound examinations and MRIs were performed in 66 (n=33), 48 (n=24), ~~and~~ 24% (n=12) and 8% (n=4) of the cases respectively. Six patients had none of these procedures done, three patients went through three of these, while one patient had all four done, prior to abdominal surgery. Seven patients had an electrocardiogram taken during their stay. Four patients went through surgical procedures; abdominal surgery (n=1), and insertion of stents (n=2) and a central venous catheter (n=1). None of the patients went directly to the intensive care unit (ICU) upon admission. One patient however, experienced severe complications related to dialysis during hospitalization, was admitted to the ICU after two days and subsequently died.

Several standard procedures were performed during hospitalization, with hydration (n=39, 78%), antibiotics (n=21, 42%), and oxygen therapy (n=15, 30%) as the most frequent, Figure 1. Maximum of registered procedures per patient was twelve, while the minimum was three. About one-third of the patients (n=15) were seen by an oncologist, while more than 50% (n=26) were approached by the hospital palliative team.

Figure ~~1~~2. Most frequent ~~standard procedures~~interventions during hospitalization (file uploaded separately)

Pain was prominent, and pain-related procedures were performed in all but seven cases. The main reasons for ~~admittance~~ admission in these seven cases were dyspnoea (n=3), reduced performance status (n=2), and problems swallowing (n=2). Two-thirds used strong analgesics such as morphine, fentanyl, or oxycodon upon admission, mostly as ~~depot tablets~~slow release tablets or patches.

The most frequent pain related interventions were changes in the analgesic regimen (n=24) such as opioid ~~rotation~~switch, adding a ~~drug~~ co-analgesic or increasing the dosage. Two patients had an epidural catheter inserted; one of these also had a coeliacus blockage, and a spinal catheter.

Symptom assessment, ESAS scores

Both ESAS forms were completed in 76% of the cases. Missing forms were due to death (n=5), discharge earlier than planned and administrative failure (n=7).

Median number of days from admission to the first ESAS was 1 (0-3), with a median of 5 days between assessments (1-20). ESAS no. 2 was completed shortly before discharge; same day (48%) or the day before (12%).

Table 2 displays the ESAS mean scores at inclusion and discharge. Pain at rest and pain at movement was significantly reduced during the stay, with a reduction of 1.7 for both between assessments (p-values <0.01). Highest mean intensity scores at inclusion were found with tiredness (6.1), appetite (5.6) and oral dryness/xerostomia (5.1). Upon discharge, six patients reported a score above three for pain at rest, while 11 patients had a pain score exceeding three for pain at movement.

Table 2. ESAS scores at inclusion and prior to discharge[1]

	1st assessment[2]	2nd assessment[2]	Difference in mean scores 1st and 2nd ESAS	p-value
Symptom	**Mean (SD)**	**Mean (SD)**		
Pain at rest	3.2 (2.8)	1.5 (1.9)	1.7	<.01
Pain at movement	4.4 (3.1)	2.7 (2.7)	1.7	<.01
Tiredness	6.1 (2.5)	5.5 (2.6)	0.6	NS
Nausea	1.7 (2.5)	1.3 (2.0)	0.4	NS

Shortness of breath	3.0 (2.9)	2.8 (3.2)	0.2	NS
Oral dryness (xerostomia)	5.1 (2.7)	5.2 (2.6)	-0.1	NS
Appetite	5.6 (2.9)	5.0 (2.4)	0.6	NS
Anxiety/uneasiness	1.9 (2.5)	2.3 (2.7)	-0.4	NS
Depression/sadness	2.3 (2.7)	2.9 (3.0)	-0.6	NS
“Overall, how are you feeling today?”	4.5 (2.3)	4.2 (2.1)	0.3	NS

[1] Numerical rating scale (0-10) with higher scores implying higher symptom intensity

[2] N varies between 38 and 34, due to missing items on some of the forms

Mean ESAS scores at inclusion in the 12 cases in which the second form was not completed were compared with scores from those who completed both. No significant differences were found.

The patient interviews

Patients were asked to mention the two most bothersome symptoms leading to the hospitalization. Gastrointestinal symptoms including nausea/vomiting, diarrhoea and appetite loss (n=24, 48%), fatigue (n=19, 38%), pain (n=18, 38%), and dyspnoea (n=10, 20%) were the most frequent reasons according to the patients. In most cases (n=32, 64%), patients said the symptoms had developed over several days, and this was reported by all of the 18 patients ~~ose~~ who were admitted on a Monday. Six patients (12%) reported a more acute onset with symptoms developing during a few hours. Four of these patients came to the hospital outside normal working hours. Nineteen patients (38%) received regular medical care at home from the community health system, such as nursing services and ~~practical help with household chores~~domestic assistance, or both. When asked about preference for care the majority of patients (n=33, 66%) preferred hospital admission to other places in the actual situation. Nine (18%) said they would have liked to receive medical treatment at home, given that necessary resources and equipment were available, while four (8%) would have preferred a nursing home.

Free comments were provided in 44 interviews. Seven patients (16%) perceived the delays in the emergency unit as tiring and unnecessary, while another seven (16%) found this acceptable. Two patients (5%) specifically stated that they would have preferred direct admission to the appropriate hospital unit, while another two (5%) had a desire to go directly to the palliative care unit. In ten interviews (23%), patients said they felt safer at hospital than at home given the actual situation. Seven of these (70%) were 65 years or older, but only one was living alone. ~~However, some~~Four (10%) expressed concerns about the caregiver burden imposed on their partner. The most frequently raised comment in the interviews (n=11, 25%) was related to doubts whether the home care services had competence and expertise to handle the situation.

Nevertheless, ~~many~~ ten patients (23%) said they would have preferred to get simple procedures such as intravenous nutrition and hydration at home. In their opinion, specialized care teams and home visits by their GP were the most important actions to prevent emergency admissions.

DISCUSSION

This small, descriptive study from two acute–care Norwegian hospitals serving local, urban areas shows that relatively simple procedures were performed in most of the emergency cases. Standard interventions such as hydration, antibiotics, and oxygen therapy were most common, corresponding well with the most frequent reasons for admission. In many cases, these procedures may well be administered in the primary health care sector.

Pain, gastro-intestinal and respiratory problems were prominent, well in line with other studies of emergency admissions[4,5,~~20~~21,~~21~~22]. These are frequent symptoms in advanced cancer patients, and may indicate disease progression. One study demonstrated a significant relationship between signs of disease progression and short term mortality (<90 and <180 days) in symptomatic cancer patients coming to the ER[~~21~~22], in line with other reports[~~22~~23,~~23~~24]. Although the present study was too small to perform valid analyses of a possible relationship between symptoms and survival, our sample consisted of cancer patients in the palliative phase of disease, and more than 50% were dead 90 days after discharge. This suggests that standard medical procedures were indicated for most of the patients, and more advanced procedures in some cases only.

Thirty-eight per cent of the admissions were outside normal working hours, a lower proportion than reported elsewhere[~~20~~21]. In most cases, patients said that symptoms had developed over time. Monday had the highest percentage of emergency admissions as found by others[~~20~~21], which corresponds to a gradual onset of symptoms, as reported by all of the patients admitted on Mondays. It may also be that patients tried to avoid going in on weekends and waited until Monday before contacting the hospital or the GP.

Many common symptoms are bothersome and distressing and known to cause considerable anxiety in patients, and in relatives. Thus, it should be remembered that causes other than strict medical, somatic indications may lead to hospital admissions, e.g. reduced performance status, frailty, loneliness and psychological distress that often coexist. Some patients commented that they felt safer at hospital than at home, and that they wanted to reduce the burden imposed on their family by the disease. Causes like this may be more common in smaller hospitals serving a well-defined area compared to larger university clinics. In our opinion, maybe the most important issue raised by this study is not whether hospital admission was indicated per se, but if hospital admission as an emergency case was most appropriate for getting necessary medical care. We also believe however, that a higher level of specialist palliative care competence in the home care services and closer collaboration between these services and the hospital may reduce the need for emergency ~~admittances~~admissions.

This also relates to the fact that about 50% of the admissions were administered by a hospital doctor, twice as many as by GPs (24%). The standard pathway for hospital admissions in Norway is through the family GP, unless there is an emergency. The fact that our sample consisted of palliative care patients with an affiliation to the local hospital, may explain why the hospital doctors were so frequently contacted. It is noteworthy~~,~~ however, that a home visit by a medical doctor was mentioned as the most wanted intervention that could possibly have prevented the emergency admission. Shorter hospital stays and more people living longer at home with advanced disease, represent a challenge for the primary health care sector, specifically so for the GPs[~~24~~25,~~25~~26] as they are crucial in the follow-up and care for patients with advanced cancer outside hospital[~~26~~27]. One study found that a higher number of visits to the family doctor was inversely associated with the number of visits to the ER in patients dying from cancer[~~27~~28].

In our opinion, this points to two important aspects related to palliative care; namely that it is misconstrued as end-of-life care only[~~10~~11], and that it should be integrated into standard oncology upon the diagnosis of metastatic or advanced cancer. WHO emphasize that palliative care is applicable early in the course of illness[~~28~~29] due to systematic approach to symptom relief, enhanced quality of life of patient and caregivers, less use of emergency care services and a timelier referral to specialized palliative care, that often takes place too late[~~11~~12,~~20~~21,~~29~~30].

The fact that many patients with advanced cancer see acute-care providers, makes systematic follow-up less common, and means that collaborative care plans across organizational levels are not available, even if needed. Home care of patients with advanced cancer should be taken care of by specialist teams with easy access to hospital based palliative care specialists, in close collaboration with the family doctor. Pain related interventions were performed in almost all patients, and there was a significant decline in the mean pain scores (mean 1.7) on the ESAS from admission to discharge. A recent study in more than 200 patients showed that a decrease of 1.2 units in the ESAS pain score constituted a clinically relevant improvement[~~30~~31]. A change in the analgesic regimen was the most frequent procedure, and it is reason to believe that this and other simple procedures could have been performed at home, if the resources in the form of necessary competence were available. This may reduce the dependency on the local hospital and reduce the number of emergency admissions.

One limitation is the lack of information about performance status and current disease status at admission, both important predictors of survival and disease progression[~~21~~22]. This might have provided more valid information about the necessity of being admitted as an emergency case. The majority of patients had metastatic disease and few received tumour-directed treatment upon admission, indicating that the majority were in the late stages of disease. Additionally, lung symptoms, reported as an independent predictor of death within 90 and 180 days[~~21~~22-~~23~~24] were among the most frequent reasons for admission. Although some patients needed more advanced procedures (surgery, CTscans, MRIs~~ and EKGs~~), relatively simple procedures like hydration, antibiotics and change in analgesic~~s~~a were most common.

This may be taken to indicate that an emergency hospital admission was necessary for some patients, but not for all. To perform a valid investigation of the "true" proportion of patients needing emergency ~~care~~admissions, a larger study with thorough objective examinations, and detailed registrations of all interventions and a close follow-up is necessary, which was beyond the scope of this descriptive study. This is also related to the ~~Another~~ limitation ~~is caused by~~ the small sample size, and the fact that the study was confined to two hospitals only. The first does not allow for advanced statistics and sub-group comparisons, while the second may limit the generalizability. On the other hand, there are many relatively small acute care hospitals in Norway ~~as in many other countries~~, serving a limited catchment area with a well-organized primary health care sector. It could be argued that more knowledge about the extent and quality of the home care nursing services, and the amount of patients' contact with the GP would have provided important information about the need for an emergency admission. This is true, but we also believe that a small study like this makes the ~~rendering the~~ findings relevant to consider in discharge planning and palliative care follow-up, as was our intention with the present study. Also, the fact that all consecutive emergency cases in the actual time period were considered for inclusion is a major strength, in our opinion. Furthermore, quantitative registrations combined with interviews give a ~~good~~ better picture of the patients' experiences, than registry-based studies alone.

The fact that close to 50% of our patients had been discharged from hospital less than one month prior to the actual admission emphasizes the need to improve the continuity of care, through a systematic follow-up and treatment plan, which are cornerstones of palliative care. This may actually have a double effect, preventing a rapid development in symptom intensity and improving the feeling of safety for patients and family, thereby reducing the need for emergency admissions.

CONCLUSION

Emergency admissions may represent stressful events for patients and relatives. This study showed that many patients needed simple procedures only. About two-thirds preferred hospital admission to other places of care, and about one-fourth expressed that they felt ~~the feeling of being~~ safe in the hospital ~~was prominent~~in the actual situation. Higher levels of expertise, easier access to medical doctors outside hospital and better lines of cooperation between hospitals and the primary health care services may reduce need for emergency ~~hospitalizations~~admissions.

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REFERENCES

1. Kreftregisteret, Cancer Registry of Norway. Homepage: http://www.kreftregisteret.no/en/. (2011, Accessed Nov 2012)

2. Verdecchia A, Francisci S, Brenner H, et al. Recent cancer survival in Europe: a 2000-02 period analysis of EUROCARE-4 data. *Lancet Oncol* 2007;**9**:784-796.

3. Earle CC, Park ER, Lai B, et al. Identifying potential indicators of the quality of end-of-life cancer care from administrative data. *J Clin Oncol* 2003;**21**:1133-1138.

4. Yates M, Barrett A. Oncological emergency admissions to the Norfolk and Norwich University Hospital: an audit of current arrangements and patient satisfaction. *Clin Oncol (R Coll Radiol)* 2009;**3**:226-233.

5. Barbera L, Taylor C, Dudgeon D. Why do patients with cancer visit the emergency department near the end of life? *CAMJ* 2010;182(6):563-568

~~5.~~6. Earle CC, Neville BA, Landrum MB, et al. Trends in the aggressiveness of cancer care near the end of life. *J Clin Oncol* 2004;**2**:315-321

~~6.~~7. Huang J, Boyd C, Tyldesley S, et al. Time spent in hospital in the last six months of life in patients who died of cancer in Ontario. *J Clin Oncol* 2002;**6**:1584-1592.

~~7.~~8. Barbera L, Paszat L, and Chartier C. Indicators of poor quality end-of-life cancer care in Ontario. *J Palliat Care* 2006;**1**:12-17.

~~8.~~9. Ho TH, Barbera L, Saskin R, et al. Trends in the aggressiveness of end-of-life cancer care in the universal health care system of Ontario, Canada. *J Clin Oncol* 2011; 12: 1587-1591.

~~9.~~10. Earle CC, Landrum MB, Souza JM, et al. Aggressiveness of cancer care near the end of life: is it a quality-of-care issue? *J Clin Oncol* 2008; 23: 3860-3866.

~~10.~~11. Smith TJ, Temin S, Alesi ER, et al. American society of clinical oncology provisional clinical opinion: the integration of palliative care into standard oncology care. *J Clin Oncol* 2012;**8**:880-887.

~~11.~~12. Bruera E, and Hui D. Integrating supportive and palliative care in the trajectory of cancer: establishing goals and models of care. *J Clin Oncol* 2010; 25: 4013-4017.

~~12.~~13. Dudgeon DJ, Knott C, Eichholz M, et al. Palliative Care Integration Project (PCIP) quality improvement strategy evaluation. *J Pain Symptom Manage* 2008;**6**:573-582.

~~13.~~14. Higginson IJ, and Evans CJ. What is the evidence that palliative care teams improve outcomes for cancer patients and their families? *Cancer J* 2010;**5**:423-435.

~~14.~~15. Brumley R, Enguidanos S, Jamison P, et al. Increased satisfaction with care and lower costs: results of a randomized trial of in-home palliative care. *J Am Geriatr Soc* 2007;**7**:993-1000.

~~15.~~16. Bakitas M, Lyons KD, Hegel MT, et al. Effects of a palliative care intervention on clinical outcomes in patients with advanced cancer: the Project ENABLE II randomized controlled trial. *JAMA* 2009;**7**:741-749.

~~16.~~17. International Classification of Diseases ICD-10. Home page: http://www.who.int/classifications/icd/en/, (2010, Accessed Nov 2012).

~~17.~~18. Norwegian Cause of Death Registry. Home page: http://www.ssb.no/english/subjects/03/01/10/dodsarsak_en/. (2010, Accessed Nov 2012).

~~18.~~19. Nekolaichuk C, Watanabe S, and Beaumont C. The Edmonton Symptom Assessment System: a 15-year retrospective review of validation studies (1991-2006). *Palliat Med* 2008;**2**:111-122.

~~19.~~20. Bruera E, Kuehn N, Miller MJ, et al. The Edmonton Symptom Assessment System (ESAS): a simple method for the assessment of palliative care patients. *J Palliat Care* 1991;**2**:6-9.

~~20.~~21. Mayer DK, Travers D, Wyss A, et al. Why do patients with cancer visit emergency departments? Results of a 2008 population study in North Carolina. *J Clin Oncol* 2011;**19**:2683-2688.

~~21.~~22. Geraci JM, Tsang W, Valdres RV, et al. Progressive disease in patients with cancer presenting to an emergency room with acute symptoms predicts short-term mortality. *Support Care Cancer* 2006;**10**:1038-1045.

~~22.~~23. Escalante CP, Martin CG, Elting LS, et al. Identifying risk factors for imminent death in cancer patients with acute dyspnea. *J Pain Symptom Manage* 2000;**5**:318-325.

~~23.~~24. Vigano A, Dorgan M, Bruera E, et al. The relative accuracy of the clinical estimation of the duration of life for patients with end of life cancer. *Cancer* 1999;**1**:170-176.

~~24.~~25. Menten J, and de Lepeleire J. Emergency hospital admission for pain in palliative patients: a crucial role for general practitioners. *Eur J Gen Pract* 2006;**3**:133-134.

~~25.~~26. Wiese CH, Bartels UE, Ruppert D, et al. Treatment of palliative care emergencies by prehospital emergency physicians in Germany: an interview based investigation. *Palliat Med* 2009;**4**:369-373.

~~26.~~27. Wiese CH, Bartels UE, Marczynska K, et al. Quality of out-of-hospital palliative emergency care depends on the expertise of the emergency medical team--a prospective multi-centre analysis. *Support Care Cancer* 2009; 12: 1499-1506.

~~27.~~28. Burge F, Lawson B, and Johnston G. Family physician continuity of care and emergency department use in end-of-life cancer care. *Med Care* 2003;**41**:992-1001.

~~28.~~29. World Health Organization. Homepage http://www.who.int/cancer/palliative/definition/en/. (2011, accessed Nov 2012).

~~29.~~30. Daugherty CK, and Steensma DP. Overcoming obstacles to hospice care: an ethical examination of inertia and inaction. *J Clin Oncol* 2003;**21**(9 Suppl):42s-45s.

~~30.~~31. Bedard G, Zeng L, Zhang L, et al. Minimal Clinically Important Differences in the Edmonton Symptom Assessment System in Patients With Advanced Cancer. *J Pain Symptom Manage* 2012. Epub ahead of print, Nov 21, doi: 10.1016/j.jpainsymman.2012.07.022.

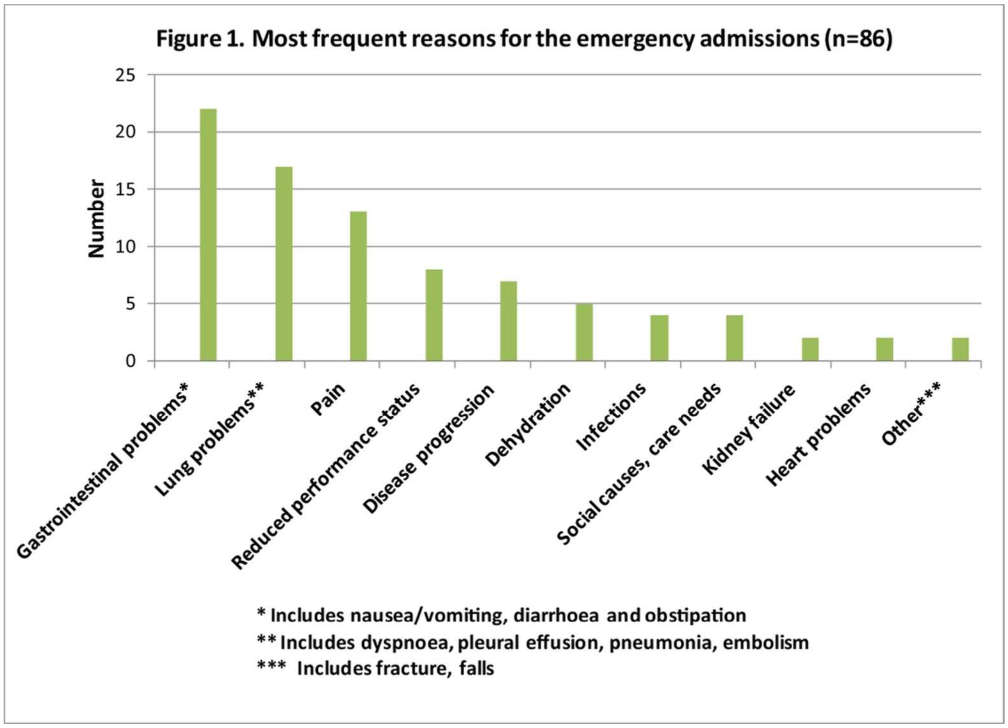

Figure 1. Most frequent reasons for the emergency admissions (n=86)

* Includes nausea/vomiting, diarrhoea and obstipation

** Includes dyspnoea, pleural effusion, pneumonia, embolism

*** Includes fracture, falls

124x90mm (300 x 300 DPI)

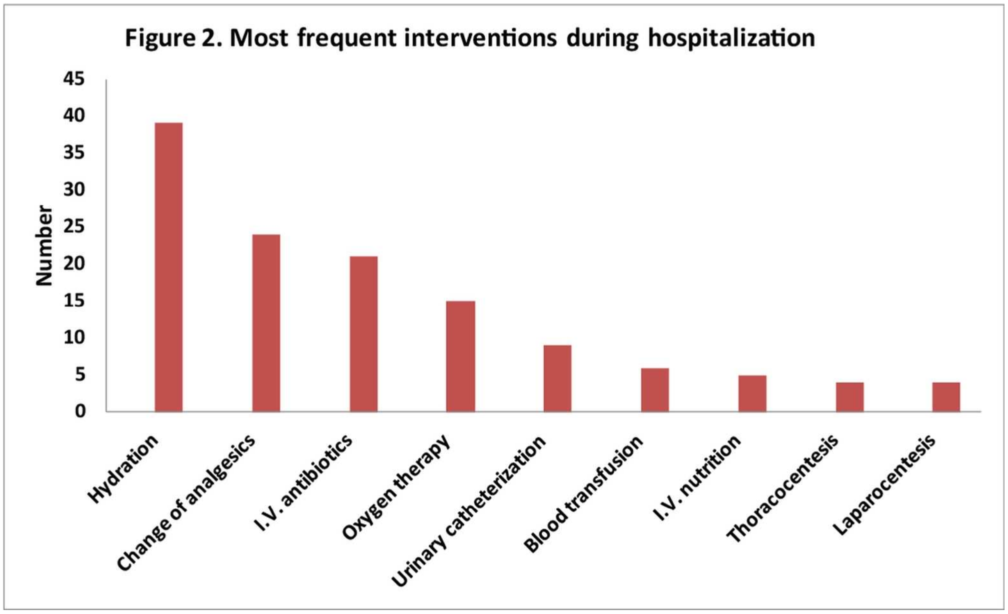

Figure 2. Most frequent interventions during hospitalization

148x90mm (300 x 300 DPI)

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	**Recommendation**
Title and abstract	1 **X**	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2 **X**	Explain the scientific background and rationale for the investigation being reported
Objectives	3 **X**	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4 **X**	Present key elements of study design early in the paper
Setting	5 **X**	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6 **X**	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants
Variables	7 **X**	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8* **X**	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9 **X**	Describe any efforts to address potential sources of bias
Study size	10 **X**	Explain how the study size was arrived at
Quantitative variables	11 **X**	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12 **X**	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13* **X**	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14* **X**	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15* **X**	Report numbers of outcome events or summary measures
Main results	16 **X**	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17 **X**	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

Discussion		
Key results	18 **X**	Summarise key results with reference to study objectives
Limitations	19 **X**	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20 **X**	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21 **X**	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22 **X**	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.