

Impact of the Regional Palliative Care Pathway on Emergency Room Visits and Hospitalizations

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Abstract. *Background/Aim:* To explore the effect of palliative care (PC) pathway including home care and end-of-life care beds in the community hospitals supported by a PC unit in the secondary hospital on ER visits and hospitalizations. *Patients and Methods:* Patients with advanced cancer and no further oncologic therapies who visited the ER of the Hyvinkää hospital before (2009) and after (2015) the establishment of the PC pathway were evaluated. *Results:* A total of 112 patients visited the ER in both years, but revisits decreased from 59% to 38% ($p < 0.01$). The most common symptoms necessitating the visit were pain (20%) and dyspnoea (14%). The proportion of patients admitted to a secondary hospital were 56% and 45% ($p = 0.016$) and to community hospitals 12% and 28% ($p < 0.001$) in 2009 and 2015, respectively. *Conclusion:* Organizing a PC pathway for cancer patients together with primary and secondary care decreases revisits to ER and admissions to secondary hospitals.

For cancer patients at their end of life (EOL) a visit to the emergency room (ER) is often distressing and exhausting. Even though some patients do have urgent medical problems that demand an ER visit, approximately 20-50% of these ER visits are potentially avoidable (1-3). An Australian study found that in metropolitan areas 80% of all EOL patients present to an ER and 41% of cancer decedents have more than two revisits in

their last year of life (4). There is little data regarding the emergency medical needs of cancer patients at the EOL (5-8).

An increased number of ER visits is characteristic for patients who have insufficient arrangements for palliative care (PC), and these visits are an indicator of poor quality of care for patients with cancer at the end of their life (7, 9). In contrast, patients receiving in-home PC are less likely to visit the ER or to be admitted to the hospital than those receiving standard care (10, 11). Well-organized palliative home care leads to a lower proportion of patients revisiting the ER (12).

The implications of prior data is that the accessibility of inpatient PC units reduces hospital admissions in patients with advanced cancer at their EOL (13), but also that the PC pathway needs to be structured (14). The care should be comprehensively organized from the secondary hospital to the patient's home in a way that the patient and the family as well as all the health care providers know who is responsible for the patient's care and where to obtain help if needed. Consequently, the service needs of the patients at the EOL should be addressed outside both the ER and the secondary (or tertiary) hospital.

To meet the increasing need for PC, a PC pathway was established in 2011 arranged by the primary care with support from a PC unit in the secondary hospital in the hospital district of Hyvinkää, Finland. The aim of this study was to explore the effect of the PC pathway on ER visits and admissions to secondary hospitals in cancer patients receiving PC.

Patients and Methods

Study design. This was a retrospective registry-based cohort study before and after the establishment of the PC pathway and the PC unit in the hospital district of Hyvinkää.

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Table I. Patient characteristics.

Year of visit	2009	2015
Number of patients	112	112
Median age in years, (Range)	72 (40-96)	67 (20-94)
Females (%)	51 (46%)	55 (49%)
Cancer type; n (%)		
Gastrointestinal cancers	22 (20%)	28 (25%)
Lung cancer	24 (21%)	18 (16%)
Brain tumors	6 (5%)	14 (13%)
Gynecologic cancer	6 (5%)	13 (12%)
Pancreatic cancer	13 (12%)	6 (5%)
Prostate cancer	13 (12%)	3 (3%)
Breast cancer	5 (4%)	8 (7%)
Bladder cancer	8 (7%)	0 (0%)
Other*	15 (13%)	22 (20%)

*All subgroups in other cancers were less than 3% of total.

Cohort selection. All the consecutive patients over 18 years of age, who had incurable advanced cancer without further life-prolonging oncologic therapies who had visited the emergency room (ER) of the secondary hospital of Hyvinkää between January 1st–December 31st, in 2009 and in 2015 were included in this study. The time periods represent the time before and after the establishment and implementation of the PC pathway in 2011. Approval for the study was obtained from the Hospital District of Hyvinkää and permission was given to access the patient database. According to the Finnish regulations, approval of the ethics committee was unnecessary for this register-based study.

Study setting. The hospital district of Hyvinkää covers six member communities with a total population of approx. 200,000 inhabitants. The Hyvinkää secondary hospital is the only secondary care hospital in the area and the ER is in operation 24 h every day of the year. The six communities provide primary health care including community hospitals with wards directed by general practitioners (GPs) and own home care units.

In 2011, a PC pathway was established in the hospital district. The pathway included palliative home care teams and EOL beds in the community hospitals. All the communities named a GP and a nurse responsible for coordinating and arranging the PC for the patients. Cancer patients being in need for PC were referred to these GPs by oncologists or palliative care specialists in the secondary hospital. Patients with incurable cancer and a decision made by an oncologist to withhold or withdraw anti-cancer treatments and to focus on symptom centered PC were included in the PC pathway.

According to the care pathway the patients had a palliative home care team responsible of the PC at home, if this was desired, and a planned ward in a community hospital for EOL care, where patients could be admitted from the ER or straight from their home according to their own wish at any time. In addition, a PC outpatient unit was established at the secondary hospital of Hyvinkää. This included one part time physician with special competency in palliative medicine and a nurse. The PC unit coordinated the PC pathway and provided consultation services for the communities and Hyvinkää secondary hospital. A document describing the PC pathway was written in 2011

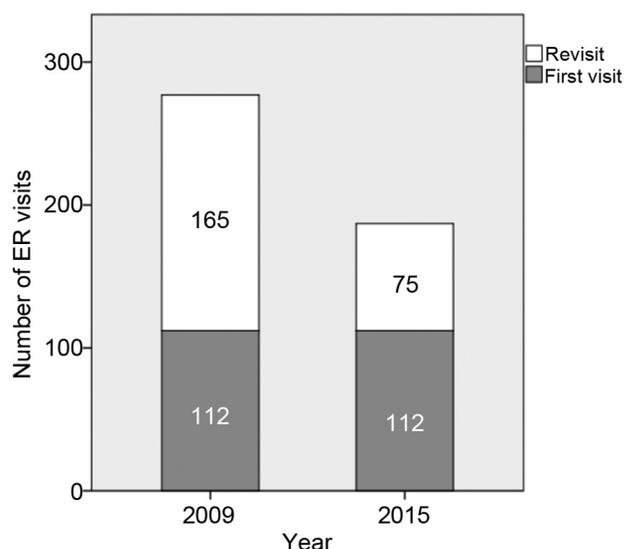


Figure 1. Distribution of emergency room visits in years 2009 and 2015.

by the working group and subsequently updated annually. This description included contact information for the PC unit, referral practices to community PC services, and guidelines for the symptom management and psychosocial support in PC.

Data collection. Patients were identified from the ER discharge records by ICD-10 codes for cancer or unknown tumors (C00-D48). All the electronic medical records of the patients were searched. The data obtained included: demographic characteristics, diagnoses, symptoms, and survival of the patients, the number and reasons for ER visits and data concerning whether the patient was discharged home or referred to a secondary or community hospital ward from the ER. Only patients without further oncologic therapies were included in the study. Whether the patients visiting the ER in 2015 were linked to the PC pathway prior to their first visit was assessed as well.

Statistical analysis. Descriptive statistics such as proportions, medians, and inter-quartile ranges were used to describe the cohort. Comparisons of the patient groups between the study years were performed by Pearson Chi-Square test for categorical variables and by Mann-Whitney *U*-test for continuous variables as those were non-normally distributed on a visual estimation. The statistical analyses were performed with SPSS 24 software (SPSS Inc., Chicago, IL, USA). A risk level of 5% was used for type 1 errors in all the analyses.

Results

In both study years, 112 patients with advanced cancer and a palliative goal for their treatment visited the emergency room (ER) of the Hyvinkää secondary hospital. The patient characteristics are presented in Table I. The median age of all the patients was 69 years (range=20-96 years) and 46%

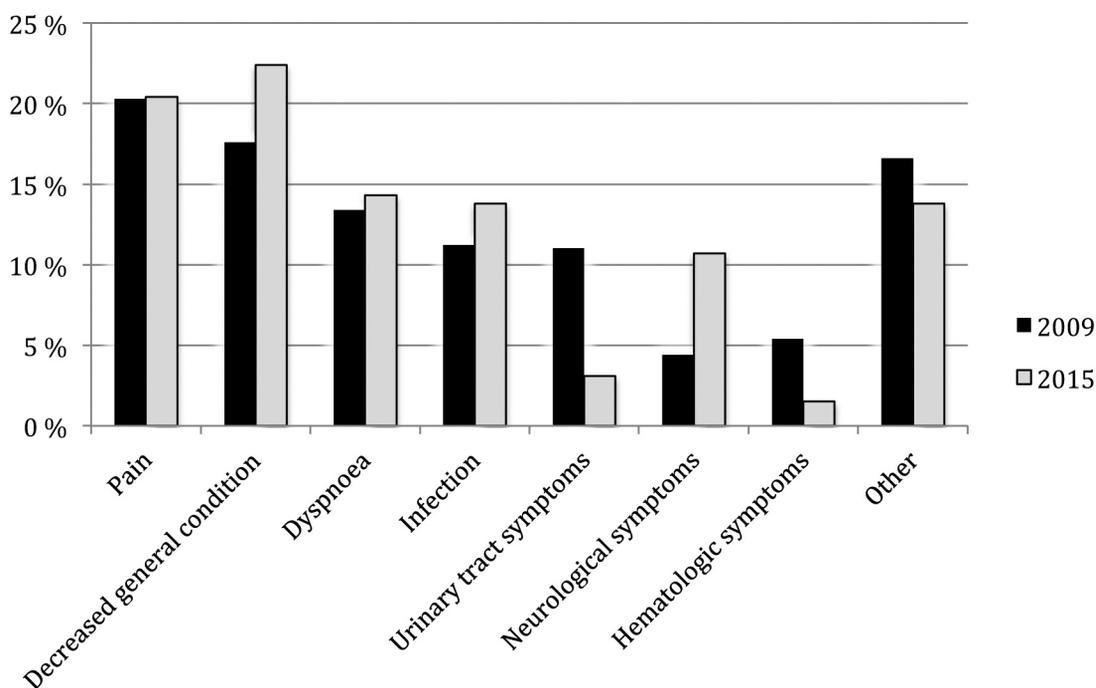


Figure 2. Indications for visiting the emergency room in years 2009 and 2015.

of them were women; the age or sex of the patients did not significantly differ between the years. The number of patients with urologic cancer declined and the number of patients with gynecologic cancers and brain tumors increased from 2009 to 2015. The median survival time after the first visit to the ER was 54 and 32 days in 2009 and 2015, respectively. In 2015, 39 (33%) of the patients visiting the ER had previously been linked to the PC pathway.

Visits to the emergency room. The total number of patients visiting the ER did not differ between the year 2009 and 2015 (112 patients in both years), but the total number of visits to the ER was higher in 2009 (n=277) than in 2015 (n=187). Distribution of the visits is depicted in Figure 1. Sixty-six (59%) and 42 (38%) of the patients revisited the ER in 2009 and 2015 ($p<0.01$), respectively. Among the patients visiting ER after the first visit, the median numbers of revisits were 2 (IQR=1-4) and 1 (IQR=1-3) in 2009 and 2015, respectively ($p<0.001$). In 2015, no significant difference in the proportion of patients revisiting the ER was found between the patients with (33%) and without (40%) linkage to the PC pathway. Patients came to the ER from home and primary care facilities in 87% and 13% of the cases, respectively.

The reasons for visiting the ER are presented in Figure 2. The most common reasons for an ER visit for all patients in both years were pain (20%), decreased general condition

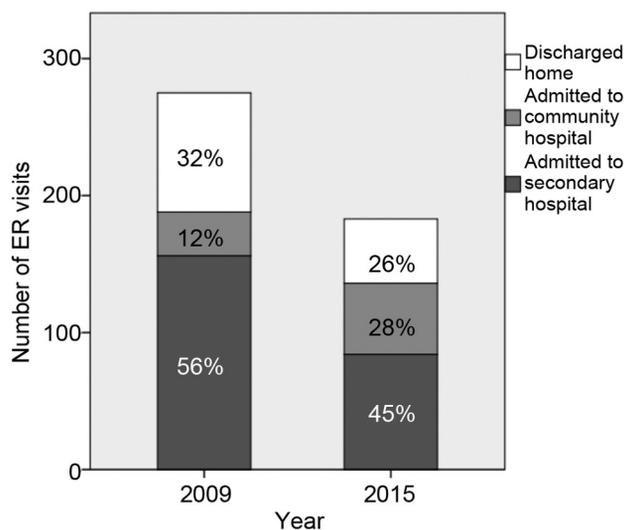


Figure 3. Proportions of the emergency room visits leading to patients being discharged home or admitted to a community or secondary hospital.

(indistinct fatigue and unspecified neuropsychiatric symptoms) (19%) and dyspnoea (14%). Visits due to urinary tract symptoms showed the largest decrease and those due to neurological symptoms the highest increase between the study years.

Hospitalizations after visiting the emergency room. The proportions of visits to the ER that led to the patient being discharged home or to admission to a hospital are shown in Figure 3. The proportion of patients needing admission to a secondary hospital decreased from 56% to 45% between the study years ($p=0.016$), while admission to a community hospital increased from 12% to 28% ($p<0.001$). The difference in the proportion of patients discharged home between the study years was not statistically significant ($p=0.17$). In 2015, 33% and 54% of the patients with and without linkage to the PC pathway were hospitalized in a secondary hospital after the ER visit, respectively ($p<0.01$).

Discussion

In this retrospective study, admissions to a secondary hospital decreased among cancer patients in PC. This was achieved by organizing a PC pathway with beds for EOL care and palliative home care teams in the communities and the establishment of a consultative PC unit. Although this reorganization of PC did not change the total number of patients visiting ER, the number of revisits to an ER significantly decreased. Our study shows that even modest improvement in the PC services in the community could have a significant impact on resource use in ERs and secondary hospitals.

Our results enhance the growing evidence indicating that improved in-home and community-based PC may decrease the number of ER visits and hospital use (10, 11, 15). In order to deliver these services for the patient, the need for PC must be recognized and the care pathway organized. Consequently, we suggest that the establishment of a PC unit and a PC pathway facilitated the change in the use of services in the secondary as well as the primary care. The fact that the secondary care admissions were lower in patients linked to the PC pathway supports this hypothesis. The results are in line with a previous Finnish study where a visit to a PC outpatient clinic correlated well with an improved connection to primary care PC providers (5).

It was somewhat surprising that the number of EOL cancer patients visiting the ER remained unchanged in the study years, as the number of ER visits is interpreted as a sign of poor quality PC services (9). Some of the earlier studies indicate that providing PC services to cancer patients and to the elderly decreases the likelihood of ER visits and hospital admittance (7, 16) although this is not substantiated by all studies (17). Bakitas *et al.* (18) showed that nurse-led PC services did not affect the number of ER admissions, but increased the quality of life. Studies by McNaughton and by Westfall imply that consultative or referral-based PC services do not affect the number of ER visits (19, 20). In the pathway in our study, the PC services were available based on patients' needs with no threshold. However, there was a lack of PC services during out-of-office hours. The primary

care physician was available for consultations only during office hours and nurses mainly from 7 am to 10 pm. Two prior studies indicated that patients visit the ER when community PC services are not available, *e.g.*, outside office hours (21, 22). Accordingly, access to PC services during out-of-office hours including nurses' home visits and physicians' consultation services for the patients receiving EOL care at home could reduce the ER visits (2, 3). Even though we did not record the time of the ER visit, we suggest that the insufficient access to PC services outside office hours might partly explain the unchanged number of patients visiting the ER between the study years. However, it must be kept in mind, that in some cases ER visits and hospitalizations to a secondary care hospital may be reasonable and necessary on an individual level (1, 2).

Even though the total amount of EOL cancer patients visiting the ER remained the same, the number of revisits clearly declined between the study years. We suggest that the main reason for the decrease in revisits was the better arrangement of PC for the patients after the initial ER visit through the planned pathway in 2015. However, the shorter survival time after the first contact to ER in 2015 compared to 2009 may be a confounding factor in this result. In 2015, only 33% of the patients were linked to the PC pathway prior to the ER visit. Although we only found insignificant difference between the PC pathway-linked and non-linked patients revisiting the ER, our interpretation is that an increased knowledge of the reorganization of PC led to an increased use of the PC services following the ER visit of EOL patients, thus preventing further revisits. At the same time, the number of patients hospitalized in the community hospitals increased in 2015 in comparison with the numbers in secondary care hospital wards, which also supports this hypothesis.

In line with the previous studies, pain, impaired general condition and dyspnea were the most common reasons to visit the ER (1, 3, 5, 7, 20, 23-25). It is noteworthy, however, that even after the implementation of the PC pathway, at least one fifth of the patients visited the ER because of pain or decreased general condition. This may imply that some of the patients still lacked a clear medical pathway or the competency of the communities to provide PC was insufficient. In a Norwegian study by Hjerstad *et al.* (25), the palliative interventions provided in the ER were rather simple *e.g.* catheterization or oxygen therapy. These might have been managed at home but may warrant specialized PC competencies and PC teams. In our study, pain and deterioration of the general condition of patients with advanced cancer, like an inability to cope at home, were probably due to the progress of the disease, which should be predictable and, as such, could be managed without the need for ER admission in the majority of cases. However, the teams in the PC pathway were not specialized, but communal nurses and GPs, who might have had

insufficient competency to offer advanced PC at home in some cases. This is a major issue from the health care system's point of view as patients dying of cancer make important and well-founded demands on the total resources of the hospital sector, and any reduction in the utilization of hospital services is beneficial from a socioeconomic perspective (26). In addition to the value the organization of PC brings, it also increases the educational demands at each level of health care.

The limitations of this study include those that are inherent in all retrospective studies. This was a small-scale single-center study, although quite comprehensive since it included all ER visits in the catchment area of one secondary hospital. Further, we were not able to control all the factors which might have changed between the study years and that occurred simultaneously with the implementation of the PC pathway and this could have had an influence on our results.

Conclusion

Revisits to ER and admissions to a secondary care hospital may decrease for cancer patients on PC by arranging a PC pathway combining primary care services and a consultative PC unit in secondary health care. This pathway may be formed even with modest investments and costs by reorganizing available services and arranging referral and consultation practices. However, to further improve the PC services outside ERs and hospitals, 24-hour specialized palliative homecare teams are probably needed and their efficacy should be further investigated.

Conflicts of Interest

The Authors report no conflicts of interest in relation to this study.

Authors' Contributions

J. Lehto, O. Haltia, and T. Saarto participated in the designing of the study. J. Lehto and O. Haltia collected the data and performed the statistical analysis. O. Haltia and O. Hirvonen drafted the manuscript. All the Authors participated in writing and revising the manuscript including the table and figures. All the Authors read and approved the final manuscript.

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