

Analgesic Use in Home Hospice Cancer Patients

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Background. Pain control in hospice patients in the home may be compromised by concerns about overuse of analgesics, particularly narcotics.

Methods. A retrospective chart audit of analgesic type and amount was performed on the medical records of 100 cancer patients receiving hospice care in the home. Different types and amounts of analgesics were converted to a common standard, an oral morphine equivalent (OME) relative to 1 mg of oral morphine sulfate. Descriptive statistics were used to characterize patient analgesic use during the entire course of hospice care and the last 5 days of life. Associations between analgesic use and select patient characteristics (age, sex, cancer site, metastases, and pain intensity at admission) were explored.

Results. Ninety-one percent of the sample had used an-

algesics at some time during hospice care. The proportion of patients using analgesics increased as death approached. The mean and median daily analgesic use over the entire period were 114 and 82 OMEs and during the last 5 days 140 and 84 OMEs, respectively. The range of mean daily analgesic use was between 10 and 735 OMEs.

Conclusions. Individual variability in analgesic use was demonstrated. Not all patients required analgesics, and among those who did there was remarkable variation in the amount used. Large and even enormous doses of analgesics may sometimes be required to control cancer pain.

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Achieving pain control in cancer patients may be compromised by concerns about overuse of analgesics, particularly narcotics. Numerous articles have proposed treatment protocols for prescribing analgesics in terminal cancer patients. There have been few studies, however, that describe the amount of analgesics used in hospice cancer patients.¹⁻⁵ The hospice is a setting in the home or in the hospital where the terminally ill patient receives care. Hospice philosophy promotes palliative and supportive care of terminally ill patients and their families, using a multidisciplinary team of medical, spiritual, psychological, and social support.⁶ One of the principal skills of pain management in terminal cancer patients is the effective use of analgesics. By using a scheduled, preven-

tive approach and the correct calibration of analgesic medications, optimal pain control can be achieved.⁷

The purpose of this investigation was to describe the amount of analgesics used in home-based hospice care where the emphasis is on achieving effective pain control. We studied analgesic use in terminal home hospice cancer patients and explored the associations between the amount of analgesics used and select patient characteristics.

Methods

This retrospective study involved the review of the patient charts of a sample of 100 white adults who met the selection criteria and who, before their deaths, had been admitted to West Towns Visiting Nursing Services' Hospice between April 1988 and January 1990. The sample size selected was considered sufficient to obtain a description of analgesic use. The Hospice manages a home-based, Medicare-approved program serving the western suburbs of Chicago. The hospice program maintains an average daily census of 15 patients and has admitted more than 1200 patients between 1983 and 1991. The average length of hospice care in the home is 13 days.

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Patients were selected who met the following criteria: had been admitted to home hospice care, had been diagnosed as having cancer, died at home, had not been hospitalized at any time after admission into the hospice program, had remained in hospice care for 7 to 32 days, and had been over the age of 25 years. In a retrospective chart audit, three physicians abstracted demographic and medical data including patient self-report of pain intensity at admission. Self-report of pain had been documented by a home health nurse and recorded on an intake questionnaire using a scale of pain intensity (rating of 0 = no pain; 5 = extreme pain). Analgesic use was quantified from the daily nursing notes, which provided the type, route, and amount of analgesic used by the patient in a 24-hour period. We assumed that analgesics recorded by the nurse had actually been consumed by the patient.

Because of the variety of opiate and nonopiate analgesics, comparison of analgesic use required that each day's medication be converted to a standard unit of measurement. The procedure employed by Goldberg et al¹ was used to estimate a daily oral morphine equivalent (OME) dose in milligrams for each patient. Different types and amounts of analgesics were converted to this common standard relative to 1 mg of oral morphine sulfate. In the conversion of a dose of parenteral morphine to an equivalent dose of oral morphine, the conversion ratio is dependent on the clinical setting. The initial equivalency ratio of oral morphine to parenteral morphine in acute pain management is 6 to 1.⁸ However, 2 to 3 mg of oral morphine are equivalent to 1 mg of parenteral morphine in the pharmacodynamic steady state achieved in chronic pain management.^{5,8} Since the intravenous morphine in our study was used over a period of days, the proper equivalencies of oral morphine would be those for the steady state. Accordingly, the oral to intravenous morphine equivalency ratio was set at 2.5 mg to 1 mg. The use of adjuvant medication such as anxiolytics, antiemetics, antidepressants, anticonvulsants, and steroids were not assigned analgesic equivalents. Although they may modify a patient's level of pain, there are no accepted conversion factors for these medications, and therefore they could not be included in the comparison.

Length of hospice care in the home ranged from 7 to 32 days. All results are presented with reference to full days prior to death; the day of admission and day of death were not counted because neither was a complete 24 hours. The study period was from the first full day of hospice care up to and including 30 full days before death. Mean analgesic use in OMEs was calculated for each patient by summing the daily analgesic use in OMEs

for the entire period and dividing the total by the number of days when analgesics were used.

A sample mean was obtained by summing patients' individual mean analgesic use in OMEs and dividing by the number of patients who used analgesics. Separate sample means were estimated for the 30-day study period and for the last 5 days of life.

Analyses of categorical variables were performed using the chi-square statistic with two-tailed .05 probability for statistical significance. When appropriate, two-tailed Fisher's exact test was computed. Sample analgesic use expressed as OMEs was described using the following descriptive statistics: mean and standard deviation, and median. Spearman rank correlation coefficients were computed to determine the association between patient self-report of pain intensity at admission and patient mean consumption of OMEs during the 30-day study period and during the last 5 days of life. Because the OME values were not normally distributed, nonparametric statistical tests were used, specifically the median two-sample test, median one-way analysis of variance, and Kruskal-Wallis test. All of the data were tabulated and analyzed with SAS statistical software.⁹ A random sample of 10 patient charts was examined to evaluate the reliability of the chart audit process of analgesic use. The correlation coefficient indicating reliability was .90 ($P < .05$).

One half of the patients had a length of stay in the home between 6 and 12 days (8% with 5 days and 42% with 13 to 30 days). Men were more likely to be married (73% vs 43%, $P < .004$) and have their spouse as the primary caregiver (68% vs 29%, $P < .0002$). The most frequent cancer sites for women were lung (23%), breast (20%), and colon/rectal (21%). For men they were lung (23%), colon/rectal (16%) and prostate/bladder (11%). Other cancers for men and women were oral, esophageal, stomach, and skin, lymphomas, and cancer of the brain.

Results

Fifty-six of the 100 patients were women. The mean age for the sample was 69 years (SD = 10.6 years), with no difference in age distribution between men and women. The age and sex distributions of the sample were similar to the overall hospice patient population with cancer diagnoses (data not shown). A total of 68 physicians admitted and participated in the care of the 100 patients. Of the 68 physicians, 26 were oncologists, and the remainder were primary care physicians.

Analgesic use, route of administration, and type are described in Table 1. Ninety-one percent used analgesics at some time during the study period. The nine patients

Table 1. Analgesic Use, Route, and Type for 100 Home Hospice Patients

Analgesic	No. of Patients
None	9
Intravenous	6
Oral*	85
Oral morphine sulfate (short-acting)	5
Oral morphine sulfate (long-acting)	39
Hydromorphone	9
Methadone	1
Levorphanol	3
Meperidine	1
Hydrocodone	5
Codeine	22
Propoxyphene	2
Acetaminophen	22
Nonsteroidal antiinflammatory drugs	10

*The mean number of different oral analgesics used for the 85 patients was 1.4 (119/85).

who did not use analgesics were not significantly different from the larger group in age, sex, cancer site, or presence of metastases. In addition to the nine who never used analgesics, two other patients did not use analgesics during the last 5 days of life.

The proportion of hospice patients using pain medications increased as death approached. The percentage of patients using analgesics increased from 68% to 85% from day 22 to the day before death. The mean proportion of patients using analgesics for the 30 days was 77%.

There was wide variation in analgesic use among the 91 patients who used analgesics during the study period. One half of the patients used less than 82 OMEs. Eighty-two mg of oral morphine is approximately equal to five tablets of 325 mg of acetaminophen with 30 mg of codeine. The mean analgesic use for one quarter of the patient sample was below 48 OMEs, and for another quarter, above 134. The highest daily mean analgesic use for a patient was 735 OMEs and the lowest was 10 (a 74 to 1 ratio). The sample mean for the 91 patients during the study period was 114 OMEs per day. There were no significant differences in mean daily analgesic use between men and women or among the three age groups (median two-sample test and Kruskal-Wallis one-way analysis of variance) over the 30 days.

Because all patients were in hospice care for at least 5 days before death, analgesic use during the last 5 days of life was examined separately. This analysis included only 89 of the 100 patients (as indicated above, nine did not use analgesics at any time and two other patients did not use analgesics during the last 5 days of life). The mean and median analgesic use during the last 5 days were 140 and 84 OMEs, respectively (Table 2).

Table 2. Daily Analgesic Use During the Last 5 Days of Life in Oral Morphine Equivalents (OME) by Sex, Age, Cancer Site, and Metastatic Disease, for 89 Hospice Patients

Characteristic	No. of Patients	Oral Morphine Equivalents	
		Median (mg)	Mean (Standard Deviation) (mg)
All patients	89	84	140 (225)
Sex			
Women	50	86	144 (231)
Men	39	82	136 (220)
Age* (y)			
<65	28	73	140 (252)
65-74	34	116	182 (276)
≥75	27	78	89 (60)
Cancer site†			
Kidney	6	144	135 (58)
Colon/Rectal	18	134	135 (79)
Prostate/Bladder	5	112	380 (567)
Breast	10	73	225 (484)
Lung	20	68	105 (101)
Pancreas	9	82	71 (28)
Blood	6	54	71 (53)
Other	15	70	130 (130)
Metastatic disease‡			
Yes			
Including bone	38	86	150 (258)
Excluding bone	25	60	87 (62)
Site unknown	12	151	121 (71)
No	6	42	109 (164)
Unknown	8	101	271 (458)

*Differences in analgesic use by age were ≥75 vs 65-74 ($P < .017$), or vs <65 ($P < .039$).

†Differences as a group, between patients with kidney or colon/rectal cancer vs breast, lung, pancreas, and blood cancer ($P < .024$).

‡Patients with metastatic disease including bone metastases vs metastases excluding bone metastases ($P < .024$), and vs patients with no metastases ($P < .081$); patients with metastases excluding bone metastases vs patients with no metastases ($P < .080$).

Differences in patients' analgesic use during the last 5 days of life were next examined with respect to sex, age, cancer site, and metastases. Patients over 74 years of age used significantly less analgesics during the last 5 days. Patients with colon/rectal or kidney cancer or patients with metastases used significantly more analgesics during this period. We were able to examine patient self-report of pain intensity (rating of 0 = no pain to 5 = extreme pain) for almost all patients (eight of the nine who did not receive any analgesics, and 87 of the 91 who did receive analgesics). The eight patients who did not use analgesics at any time reported having no pain at admission 100% of the time, compared with patients who did use analgesics (18/87) who reported having no pain only 21% of the time ($P < .0001$). For the 87 patients, the self-report of pain intensity was significantly correlated with the amount of analgesics used during the entire stay

and during the last 5 days of life (Spearman rank correlations .38, $P < .003$, and .33, $P < .002$).

Patients with cancers of the prostate/bladder and breast used very large daily amounts of analgesics. For example, one breast cancer patient required over 1500 OMEs of pain medication per day.

Discussion

This retrospective study of home hospice cancer patients examined analgesic use during the last 30 days and during the last 5 days of life. During both time periods, analgesic use varied widely. Not all patients used analgesics as death approached. Of those who did, some used analgesics daily, while others required analgesics less often. In general, analgesic use increased as death approached and the variability of use was more pronounced. The sample mean value for the 30 days was 114 OMEs. The median value for our distribution of 91 patient means during this period was 82 OMEs. In the last 5 days of life, less analgesics were used among those over age 75 years, more among those with bone metastases, and more among those with colon/rectal or kidney cancer. Because of the skewed distribution, we have presented the median values. The median OME may be a more clinically relevant number to represent analgesic use in this sample.

Describing analgesic use in hospice cancer patients is problematic for several reasons. Not all of the patients used oral morphine. The conversion of a dose of a nonmorphine analgesic to that of oral morphine for the purpose of determining analgesic equivalency is at best an approximation. Most of the patients in this study, however, used the long-acting form of oral morphine. Therefore, the majority of analgesics did not require conversion. We were also unable to take into account the use of adjuvant therapy. Adjuvants such as benzodiazepines, anticonvulsants, and steroids are thought to have some analgesic properties; however, there are no accepted analgesic equivalencies for these medications. No attempt was made, therefore, to determine the analgesic contribution of adjuvants in this patient sample.

We analyzed the mean and median OME values for analgesic use only for those patients who had actually used analgesics and only on the days during which analgesics had been used. Days on which analgesics had not been used were excluded. This method resulted in higher mean and median values. Recalculating the values to include all days of hospice care did not change the results. With long-acting forms of oral morphine, including days on which analgesics had not been used, may have better reflected the action of the previous day's analgesics. The

issue of excluding days on which analgesics had not been used may be important with the elderly or in patients with certain disease states in which the half-lives of drugs may be extended, leading to prolonged activity of analgesic medications. Prospective studies are needed to examine analgesic pharmacodynamics in the pain management of hospice patients.

In our study, patients older than 74 years of age used less analgesics. However, one can not conclude that older patients require less analgesics. There are a number of factors that could have influenced this result. It was assumed in our study that the analgesics consumed by our sample provided the best possible pain relief. We could not address the response of patients to analgesics, however, or their ability to self-assess or communicate their level of discomfort. The presence of dementia, depression, cerebral vascular disease, or diabetes, all of which are more common in the elderly, may affect the perception of pain and the ability to communicate. Nevertheless, pain intensity at admission into home hospice care significantly correlated with analgesic use during the last 5 days of life and during the total length of stay.

The psychodynamics of pain in the elderly may be different as well. The elderly may be accustomed to chronic pain and therefore tolerate greater degrees of discomfort. Another possibility is that the elderly more often accept pain as a part of aging.

Identifying the presence of metastatic disease is important in the assessment of analgesic use by cancer patients. More analgesics were used by patients with bone metastases than by patients with other sites of metastases or those without evidence of metastases. Invasion of the bone, by either primary or metastatic tumors, is a common cause of pain in both adults and children with cancer.¹⁰

In the last 5 days of life, as a group, patients with the diagnosis of colon/rectal or kidney cancer used approximately twice the analgesia in OMEs as compared with those with blood, breast, lung, and pancreatic cancers. No significant differences were found between these two groups in terms of age, or presence of metastases, including bone metastases. Owing to the small sample sizes when patients were divided by cancer site, individual comparisons were not performed.

In conclusion, pain control is the cornerstone of hospice treatment. Integral to pain management is medication choice, route, and dosage. There is consternation by patients and health care workers associated with the fear of under- or overuse of analgesics, particularly narcotics. Our data emphasize that individual variability in analgesic use is the norm. The clinical assessment of the patient's response to analgesia should be the governing factor in determining dosage and route of administra-

tion. Large, and even enormous, doses of narcotics are sometimes required and should be given if indicated. The association of analgesic use with cancer site, presence of metastases, and the patient's age indicate the need for prospective studies in advanced cancer analgesia.

We must all die. But that I can save him from days of torture, that is what I feel as my great and ever new privilege. Pain is a more terrible lord of mankind than even death himself.
—Albert Schweitzer (1875–1965)¹¹

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