Original Article

# Quality of end-of-life care in the emergency department

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ABSTRACT

*Objective:* To assess appropriateness of end-of-life treatments provided to actively dying patients attending the emergency department of a primary care hospital.
*Methods:* Retrospective cohort study of patients who died in the emergency department of a French primary care hospital between January 2014 and January 2017. The deceased were identified through the admissions register. Then, electronic medical records were screened for bio-demographic data, data relative to decisions to withhold or withdraw treatments, to diagnosis and to the care provided. Patients were clustered into two categories, actively dying or non-actively dying, using clinical opinion based on their medical records. Appropriateness of care was appraised following French guidelines.
*Results:* One hundred and forty-six deaths were recorded. Actively dying patients mostly suffered from vascular conditions (29.4%). When compared to the overall sample, they were more likely to have decisions to withhold or withdraw treatments (OR = 5.3 [1.56; 20.7], p-value = 0.003), to have strong opioids (OR = 5.32 [2.1; 13.9], p-value < 0.0001), hypnotics (OR = 2.6 [0.95; 8.39], p-value = 0.05), and scopolamine (OR = 2.5 [1.1; 6.13], p-value = 0.03). Moreover, they were less likely to have unbeneficial treatments in terminal conditions, such as resuscitation care (OR = 0.06 [0.001; 0.52], p = 0.002) and antibiotics (OR = 0.42 [0.19; 0.92], p-value = 0.022). There were no differences in rate of hydration, venous access and use of tracheal aspirations.
*Conclusions:* Overall, actively dying patients were appropriately supported. However, several issues regarding hydration management, drug administration routes, and broncho-pulmonary secretions management remain to be addressed.

## 1. Introduction

Nearly one percent of patients attending the emergency department (ED) die in this place,[1,2] either after long-lasting conditions expected to be the leading cause of death or from acute events.[3] For patients seeking care, the ED represents an interface between community and hospital and a crucial gateway to medical care, especially near the end of life.[2,4,5] Therefore, EDs have a responsibility to provide high-quality end-of-life care.[6] This is a challenge as end-of-life care requires time, which cannot always be provided in the emergency department.[7] Moreover, it often leads to disorganization of emergency care and has significant impact on healthcare providers.[8]

However, as this represents a daily encountered situation, the quality of care delivered to these patients must be addressed in order to achieve the highest possible quality in end-of-life care. Unfortunately,

very little is known about the management of these patients.[9]

Our primary objective was to assess the appropriateness of palliative treatments provided to patients who were actively dying at the time of care. Our secondary aims were to analyse data about causes of death, management and care among 3 different populations who that died in the ED: cancer patients, patients over 80 years old and those who were actively dying at the time of the first medical note.

## 2. Methods

We performed a retrospective analysis using the medical records of all patients who died in the emergency department, Centre Hospitalier de Roanne, France, between January 2014 and January 2017.

As data were collected retrospectively, no ethical committee opinion was needed. This project has been officially authorised by the local

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hospital board of the Centre Hospitalier de Roanne.

## 2.1. Settings

The emergency department, where the study took place, is the main entry point for admissions to a tertiary semi-rural hospital in France.[10] The hospital represents almost every speciality and corresponds to a level 2 trauma centre.[11] The emergency department itself cares for nearly 30 000 patients a year and represents the main entry point for admissions, it has two resuscitation rooms and a mobile emergency medical assistance service (SAMU) that can provide critical care from the hospital.

The hospital area lacks of ambulatory medical care services, resulting in a high use of the ED.[10]

## 2.2. Data collection

Patients who attended the ED and died were identified through admissions registers. We, then searched electronic medical records to extract bio-demographic data, time of admission, length of stay before death, cause of death, the decision of withholding or withdrawing treatment and how it was made, the care provided and the clinical assessment of the stages of the dying process. The data extraction process was anonymized.

## 2.3. Assessment of the stages of dying process

We clustered patients into two different groups: actively dying patients and non-actively dying patients. If the clinical assessment of these stages was not clearly stated in the medical notes, two investigators (one specialized in emergency medicine and the other in palliative care) reviewed the medical record to categorize the patient in one of the two above categories, using an overall analysis of the data provided at the time of the first complete medical note (providing diagnosis and care plan). Wherever possible, the assessment relied on the APACHE III prognostic system criteria. It was completed by using relevant prognostic criteria (age, body temperature, mean arterial pressure, heart rate, oxygenation, arterial pH when available, biochemical essays, signs of multi-organ failure, and clinical signs of impending death[12–14]), and pragmatic criteria such as comorbidities, Do Not Resuscitate Order prior to the admission and the care plan (explicitly curative care or palliative care).[15]

## 2.4. Data analysis

Data were analysed to assess treatment limitations and care provided to actively dying patients, cancer patients and patients over 80 years old. Comparisons between the proportions of each cause of death or treatment in each group were performed using R-software and Fisher's exact test using a threshold of $\alpha = 0.005$ for statistical significance.

## 2.5. Assessment of good practice for decisions of withholding or withdrawing treatment (DWWT)

The scientific community recommends discussing withdrawing or withholding treatment in multi-professional meetings.[16,17] Under French law, discussion must be specified to have occurred in the medical record. Therefore, we considered that if this multi-professional discussion had been recorded in the medical file, it would reflect the best practices for DWWT.

## 2.6. Assessment of the appropriateness of care

We relied on the French Agency for Accreditation and Assessments in Health 2002 guidelines to assess the appropriateness of end-of-life

**Table 1**
Characteristics of the population.

| Variable | N (%) |
| --- | --- |
| Gender | |
| Female | 84 (57.5) |
| Male | 62 (42.5) |
| Mean age in years | 83.3 [53–107] |
| Age | |
| Under 70 years old | 19 (13.0) |
| 70–80 years old | 15 (10.3) |
| 80–90 years old | 67 (45.9) |
| 90–100 years old | 41 (28.1) |
| Over 100 years old | 4 (2.7) |
| Time of arrival | |
| Daytime (8AM-8PM) | 105 (71.9) |
| Nighttime (8PM-8AM) | 41 (28.1) |
| Mean length of stay prior to death HH:MM | 21:19 [1:40–90.15] |
| Cancer diagnosed prior to the admission | 30 (20.5) |
| Chemotherapy in the last month | 6 (20) |
| Actively dying patient | 97 (66.4) |

care.[18] As there were no newer French guidelines for managing end of life, ED physicians were expected to follow these. Thus, we considered the following treatments inappropriate for the care of actively dying patients: venous access, daily venous hydration over 500 mL by crystalloids or any macromolecule, use of antibiotics, use of resuscitation measures, artificial nutrition and tracheal aspiration procedures. We considered appropriate: the use of painkillers, scopolamine, hypnotics, and anxiolytics.

We considered that if care were appropriate, the population of actively dying patients would have received less inappropriate care and greater appropriate care when compared to non-actively dying patients.

## 3. Results

We recorded 146 deaths in the emergency department during the screened period. Overall, patients were mostly female (57.5%) aged about 83.3 years on average (SD = 11.3). Nearly a fifth of the patients had cancer diagnosed prior to admission. Forty patients did not have a clear statement recorded about the stages of the dying process. Almost two-thirds of the patients were actively dying at the time of the first medical note (Table 1).

### 3.1. Causes of death

Overall, the first leading causes of death were vascular conditions (including myocardial infarction, 29.4%), followed by infections (22.6%) and cardiac conditions (14.3%). Less frequently, infections (22.6%), respiratory failures (11.6%), gastro-intestinal conditions and cancer progressions (each 5.5%), and metabolic disorders (1.4%) were responsible for death (Table 2).

Actively dying patients were more likely to suffer from vascular conditions (OR = 3.5 [1.4; 10.3], p = 0.004) and less likely to suffer from an infection (OR = 0.40 [0.2; 0.95], p = 0.02). There were no statistical differences in other conditions.

Cancer patients were more likely to die from infections when compared to non-cancer patients (OR = 0.53 [0.005; 1.1], p-value = 0.05). There were no statistical differences in other conditions.

Patients over 80 were more likely to die from vascular conditions (OR = 3.97 [1.27; 16.64], p = 0.01) and cancers (OR = 0.36 [0.001–0.3], p = 0.0001) than younger patients. There were no statistical differences in other conditions.

### 3.2. Care provided before the death

The great majority of patients had DWWT (86.7%) (Table 3). Patients who were actively dying were more likely to have a DWWT

**Table 2**
Causes of death in the overall sample, cancer population and older population.

| Cause of death | Overall sample N = 146 (%) | Cancer N = 30 (%) | Non-cancer N = 116 (%) | p-value | Patients over 80 N = 112 (%) | Patients under 80 N = 34 (%) | p-value | Actively dying patient N = 97 (%) | Non actively dying patient N = 49 (%) | p-value |
|---|---|---|---|---|---|---|---|---|---|---|
| Respiratory failure | 17 (11.6) | 6 (20) | 11 (9.48) | p = 0.12 | 10 (8.93) | 7 | p = 0.07 | 10 (10.3) | 7 (14.3) | P = 0.59 |
| Cardiac | 21 (14.3) | 3 (10) | 18 (15.5) | p = 0.57 | 17 (15.2) | 4 | p = 0.8 | 12 (12.4) | 9 (18.4) | p = 0.33 |
|   Acute cardiac failure | 19 (13.0) | 3 | 16 | | 15 | 4 | | 2 | 9 | |
|   Cardiogenic shock | 2 (1.4) | 0 | 2 | | 2 | 0 | | 10 | 0 | |
| Vascular | 43 (29.4) | 5 (16.7) | 38 (32.7) | p = 011 | 39 (34.8) | 4 | **p = 0.01** | 36 (37.1) | 7 (14.3) | **p = 0.004** |
|   Myocardial infarction | 3 (2.0) | 0 | 3 | | 2 | 1 | | 2 | 1 | |
|   Mesenteric infarction | 5 (3.4) | 1 | 4 | | 5 | 0 | | 4 | 1 | |
|   Ischemic stroke | 23 (15.7) | 1 | 11 | | 11 | 1 | | 10 | 2 | |
|   Hemorrhagic stroke | 12 (8.2) | 3 | 20 | | 21 | 3 | | 20 | 3 | |
| Acute hepatic failure | 1 (0.7) | 1 (3.33) | 0 (0) | / | 0 (0) | 1 | / | 1 (1.03) | 0 (0) | / |
| Acute renal failure | 1 (0.7) | 1 (3.33) | 0 (0) | / | 1 (0.9) | 0 (0) | / | 1 (1.03) | 0 (0) | / |
| Digestive | 8 (5.5) | 2 (6.66) | 5 (4.3) | p = 0.63 | 8 (7.14) | 0 (0) | / | 4 (4.12) | 4 (8.2) | p = 0.44 |
|   Bowel obstruction | 4 (2.7) | 2 | 2 | | 4 | 0 | | 2 | 2 | |
|   Acute pancreatitis | 1 (0.7) | 0 | 1 | | 1 | 0 | | 0 | 1 | |
|   Digestive hemorrhage | 3 (2.0) | 0 | 2 | | 3 | 0 | | 2 | 1 | |
| Infection | 33 (22.6) | 3 (10) | 31 (26.7) | **p = 0.05** | 25 (22.32) | 9 (26.5) | p = 0.65 | 17 (17.5) | 17 (34.7) | **p = 0.02** |
|   Shock | 4 (2.8) | 0 | 4 | | 3 | 1 | | 3 | 1 | |
|   Lung | 23 (15.7) | 3 | 20 | | 16 | 7 | | 13 | 10 | |
|   Digestive system | 5 (3.4) | 0 | 5 | | 4 | 1 | | 1 | 4 | |
|   Urinary system | 2 (1.4) | 0 | 2 | | 2 | 0 | | 0 | 2 | |
| Cancer progression, | 8 (5.5) | 8 | 0 | / | 1 (0.9) | 7 | **p < 0.001** | 7 (7.22) | 1 (2.04) | p = 0.26 |
| Other | 14 (9.6) | 1 (3.3) | 10 (8.62) | p = 0.46 | 9 (8.0) | 2 (5.88) | p = 1 | 8 (8.25) | 3 (6.12) | p = 0.75 |

(OR = 5.3 [1.56; 20.7], p-value = 0.003). There were no statistical differences in this rate between cancer and non-cancer patients (OR = 4.28 [0.07; 187], p = 0.19) or between patients over 80 years old and younger patients (OR = 0.19 [0.004; 1.38], p = 0.12). Regarding best practices for DWWT, only 45.4% of them were decided after a pluri-professional discussion. There were no statistical differences for actively dying patients or cancer patients. Patients over 80 were more likely to have a DWWT stated without any multi-professional discussion (OR = 0.03 [0.0007; 0.21], p < 0.0001).

Regarding the care provided before death, consistent with the aim

**Table 3**
Care provided before the death.

| Treatment | Overall sample N = 146 (%) | Cancer N = 30 (%) | Non-cancer N = 116 (%) | p-value | Patients over 80 N = 112 (%) | Patients under 80 N = 34 (%) | p-value | Actively dying patients N = 97 (%) | Non-actively dying patients N = 49 (%) | p-value |
|---|---|---|---|---|---|---|---|---|---|---|
| Treatment restriction | 130 (89) | 29 (96.7) | 101 (87.1) | 0.19 | 97 (86.6) | 33 (97.1) | 0.12 | 92 (94.8) | 38 (77.5) | **0.003** |
|   Decided in multiprofessional discussion | 59 (40.4) | 15 (50) | 44 (37.9) | 0.53 | 38 (33.9) | 21 (61.8) | **< 0.0001** | 47 (48.4) | 13 (26.5) | 0.09 |
| Resuscitation care | 8 (5.5) | 1 (3.3) | 7 (6.0) | 1 | 6 (5.4) | 2 (5.9) | 1 | 1 (1.0) | 7 (14.3) | **0.002** |
| *Painkillers:* | | | | | | | | | | |
| Paracetamol | 91 (62.3) | 19 (63.3) | 72 (62.1) | 1 | 69 (61.6) | 22 (64.7) | 0.84 | 56 (57.7) | 35 (71.4) | 0.15 |
| Weak-opioids | 0 | 0 | 0 | NA | 0 | 0 | NA | 0 | 0 | NA |
| Strong opioids | 115 (78.8) | 27 (90) | 88 (75.9) | 0.13 | 89 (79.5) | 26 (76.5) | 0.81 | 86 (88.7) | 29 (59.2) | **< 0.0001** |
| Anxyolitics | 43 (29.4) | 7 (23.3) | 36 (31.0) | 0.5 | 34 (30.3) | 9 (26.5) | 0.83 | 24 (24.7) | 19 (38.7) | 0.08 |
| Hypnotics | 32 (21.9) | 8 (26.7) | 24 (20.7) | 0.47 | 23 (20.5) | 9 (26.5) | 0.48 | 26 (26.8) | 6 (12.4) | **0.05** |
| Antiemetics | 15 (10.3) | 4 (13.3) | 11 (9.48) | 0.51 | 13 (11.6) | 2 (5.9) | 0.52 | 11 (11.3) | 4 (8.1) | 0.77 |
| Scopolamine | 52 (35.6) | 13 (43.3) | 39 (33.6) | 0.39 | 41 (36.6) | 11 (32.3) | 0.69 | 41 (42.3) | 11 (22.4) | **0.02** |
| Antispasmodics | 4 (2.7) | 1 (3.3) | 3 (2.59) | 1 | 3 (2.69) | 1 (2.94) | 1 | 2 (2.06) | 2 (4.08) | 0.6 |
| Antibiotics | 44 (30.1) | 5 (16.7) | 39 (33.6) | 0.07 | 32 (28.6) | 12 (35.3) | 0.52 | 23 (23.7) | 21 (42.9) | **0.02** |
| Artificial nutrition | 1 (0.68) | 0 (0) | 1 (0.86) | NA | 1 (0.89) | 0 (0) | NA | 0 (0) | 1 (2.04) | 0 |
| Hydration over 500 mL | 114 (78.1) | 24 (80) | 90 (77.6) | 0.77 | 88 (78.6) | 26 (76.5) | 0.81 | 74 (76.3) | 40 (81.6) | 0.53 |
| Oxygen | 84 (57.5) | 17 (56.7) | 67 (57.7) | 1 | 63 (56.2) | 20 (58.8) | 0.84 | 55 (56.7) | 29 (59.2) | 0.86 |
| Nasal canula | 60 (41.1) | 15 (50) | 45 (38.8) | 0.30 | 44 (39.3) | 16 (47.1) | 0.43 | 42 (43.3) | 18 (36.7) | 0.48 |
| High concentration mask | 29 (19.9) | 3 (10) | 26 (22.4) | 0.19 | 22 (19.6) | 7 (20.6) | 0.19 | 17 (17.5) | 12 (24.5) | 0.38 |
| Non-invasive ventilation | 8 (5.48) | 2 (6.67) | 6 (5.17) | 0.67 | 4 (3.57) | 4 (11.7) | 0.08 | 4 (4.12) | 4 (3.45) | 0.44 |
| Oro-tracheal intubation | 1 (0.68) | 1 (3.33) | 0 (0) | NA | 0 (0) | 1 (2.94) | NA | 0 (0) | 1 (2.04) | NA |
| Venous access | 139 (95.2) | 30 (100) | 109 (94) | NA | 107 (95.5) | 32 (94.1) | 0.66 | 92 (94.8) | 47 (95.9) | 1 |
| Nebulized medications | 10 (6.8) | 1 (3.33) | 9 (7.76) | 0.69 | 7 (6.25) | 2 (5.88) | 1 | 3 (3.09) | 6 (12.2) | 0.06 |
| Tracheal aspirations | 10 (6.8) | 1 (3.33) | 9 (7.76) | 0.69 | 9 (8.04) | 1 (2.94) | 0.45 | 7 (7.22) | 3 (6.12) | 1 |
| Naso-gastric tube | 3 (2.05) | 0 (0) | 3 (2.59) | NA | 2 (1.79) | 1 (2.94) | 0.55 | 2 (2.06) | 1 (2.04) | 1 |
| Urinary catheter | 14 (9.59) | 2 (6.67) | 12 (10.3) | 0.73 | 12 (10.7) | 2 (5.88) | 0.52 | 7 (7.21) | 7 (14.3) | 0.23 |

NA: Statistical analysis is not applicable for this variable.

of the care, actively dying patients were less likely to have resuscitation care (OR = 0.06 [0.001; 0.52], p = 0.002) and antibiotics (OR = 0.42 [0.19; 0.92], p-value = 0.022). However, we did not find any difference in the rate of hydration over 500 mL, venous access, and use of high concentration masks, non-invasive ventilation or tracheal aspirations. Nonetheless, actively dying patients were more likely to have several beneficial treatments at the end of life such as strong opioids (OR = 5.32 [2.1; 13.9], p-value < 0.0001), hypnotics (OR = 2.6 [0.95; 8.39], p-value = 0.05) or scopolamine (OR = 2.5 [1.1; 6.13], p-value = 0.03).

There were no statistical differences in end-of-life care for cancer patients when compared to the non-cancer population and for patients over 80 years old when compared to patients younger than 80.

## 4. Discussion

To our knowledge, our study is the first to assess the appropriateness of end-of-life care provided to actively dying patients admitted to the emergency department. Our results suggest that emergency physicians acknowledge the actively dying patients and adapt their attitudes accordingly. These patients are more likely to have treatment limitation and less likely to have resuscitation care, which is consistent with the available literature.[19] It leads to an adaptation of their medications and care with the purpose of improving their quality of end of life.[6] They are particularly more likely to have strong opioid painkillers, hypnotics or scopolamine.

Nonetheless, efforts still need to be made, particularly toward venous accesses, hydration and tracheal aspirations to treat end-of-life bronchorrhea.

Indeed, the quality of life is strongly related to the strict control of futile care and medications.[20] As most palliative treatments are available to be used through sub-cutaneous access, such use should be considered more often. Indeed, venous access decreases the quality of end-of-life care – it is unbeneficial and adversely impacts the family experience of care.[16]

Another futile treatment is artificial hydration, even if this point is still controversial. The majority (76.3%) of actively dying patients had hydration in their treatments, whereas dehydration distressing symptoms only occur in 18% of this population.[21] We therefore, assume an overuse of hydration in this population. This overuse might be related to emergency physicians' habits to prescribe hydration to keep venous access functional in case of urgent intravenous treatment,[22] or to avoid any acute functional renal failure. This decision of prescribing hydration should be carefully addressed as dehydration symptoms could be distressing, and over hydration is highly harmful at this stage of life.[23] For instance, hydration enhances bronchorrhea, one of the most distressing symptoms at end of life and dehydration decreases the threshold of pain and consciousness.[24] All in all, hydration should be restricted to patients suffering from dehydration.

As explained above, bronchorrhea is highly distressing at end of life.[25] To relieve it, two main approaches can be implemented: Tracheal aspirations or antisecretory treatment administration. In our study scopolamine was the only medication used as an antisecretory treatment. Scopolamine is an antimuscarinic agent commonly used to alleviate excessive secretions at the end of life. This medication is an essential medicine for palliative care according to the World Health Organization.[26] The most-encountered adverse effect is dry mouth, which justifies proper mouth care.[23] On the other hand, tracheal aspirations could cause pain and could adversely stimulate receptors in the throat that activate the process of mucus secretion, leading to a vicious circle.[27] For these reasons, ED physicians should consider scopolamine buthylbromide to alleviate bronchorrhea rather than tracheal aspirations.

Additionally, whilst the great majority of actively dying patients received opioid painkillers, only 6 out of 10 received paracetamol and opioids. Prescribing paracetamol in combination with opioids improves

pain control. Moreover, it can decrease opioid doses and mitigate opioid-related adverse events.[28] The morphine prescription is not by itself a criterion for best practice; however, assessment of pain and the side effects of opioids must be thoroughly monitored.[29]

### 4.1. Limitations

#### 4.1.1. Our study reveals several weaknesses

The first is related to the retrospective design of this study. Even though medical records are expected to be properly completed, retrospective designs led to a memory bias that could have adversely impacted our results. Our criteria to classify patients into actively dying patients and non-actively dying patients relied on these data. Any inaccurate data could have strongly impacted the classification. Finally, the small sample and specific settings prevent generalisation of the results.

Given the above remarks, some authors suggest that a way to take a step forward in improving end-of-life care in the emergency department would be to teach palliative care to emergency physicians and to consider it as an emerging subspecialty.[30]

## 5. Conclusion

Overall, emergency physicians in primary EDs adequately care for patients who are actively dying. Further research is required in the management of terminal bronchorrhea, limitation of hydration and use of subcutaneous injections. These results are encouraging, but still highlight the importance of palliative care training for emergency physicians.

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