Factors associated with good death of patients with advanced cancer: a prospective study in Japan

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Abstract

Purpose It is important for palliative care providers to identify what factors are associated with a “good death” for patients with advanced cancer. We aimed to identify factors associated with a “good death” evaluated by the Good Death Scale (GDS) score among inpatients with advanced cancer in palliative care units (PCUs) in Japan.

Methods The study is a sub-analysis of a multicenter prospective cohort study conducted in Japan. All variables were recorded on a structured data collecting sheet designed for the study. We classified each patient into better GDS group or worse GDS group, and examined factors associated with better GDS using multivariate analysis.

Results Between January and December 2017, 1896 patients were enrolled across 22 PCUs in Japan. Among them, a total of 1157 patients were evaluated. Five variables were significantly associated with a better GDS score in multivariate analysis: preferred place of death at PCU (odds ratio [OR] 2.85; 95% confidence interval [CI] 1.72–4.71; p < 0.01), longer survival time (OR 1.02; 95% CI 1.00–1.03; p < 0.01), not sudden death (OR 1.96; 95% CI 1.27–3.04; p < 0.01), better spiritual well-being in the last 3 days in life (OR 0.53; 95% CI 0.42–0.68; p < 0.01), and better communication between patient and family (OR 0.81; 95% CI 0.66–0.98; p = 0.03).

Conclusions We identified factors associated with a “good death” using GDS among advanced cancer patients in Japanese PCUs. Recognition of factors associated with GDS could help to improve the quality of end-of-life care.

Keywords Good death scale · Palliative care · End-of-life care · Advanced cancer · Palliative care unit

Key message The multicenter prospective cohort study identified five factors associated with good death in patients admitted to palliative care units; preferred place of death at palliative care units, longer survival time, not sudden death, better spiritual well-being in the last 3 days in life, and better communication between patient and family.

Abbreviations

(CCS) Communication Capacity Scale
(CI) Confidence interval
(DRS-R-98) Delirium Rating Scale-revised-98

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Introduction

“Good death” is one of the primary goals of palliative care. There are various definitions for a “good death” in different cultural contexts [1]. It is important for palliative care providers to identify what factors are associated with a “good death” which refers to the quality of dying (QOD) for the patient with advanced cancer [2–11]. To date, many studies [12, 13] have reported the factors associated with better QOD, such as preparing for death, dying comfortably, adequate symptom control, and clear decision-making.

The Good Death Inventory (GDI) was developed to evaluate good death in Japanese patients with advanced cancer. The GDI was evaluated by the bereaved family member, using the 18 domains such as “environmental comfort,” “life completion,” and “dying in a favorite place” [2–4]. The survey of bereaved families using GDI is limited by the fact that some bereaved families may feel that responding using the GDI is painful or uncomfortable; this psychological stress may cause a low response rate to the questionnaires [6]. Meanwhile, the Good Death Scale (GDS) is an objective measure of good death developed in Taiwan. It has been verified to be reliable and valid in palliative care units (PCUs) in Taiwan [7–11]. To date, most previous studies have reported the QOD evaluated by patients or families, and no studies investigated QOD using GDS in Japan. In addition, there have been few studies about the factors associated with better GDS scores specifically. We considered that recognizing the factors associated with GDS could help improve the quality of end-of-life care. Thus, we aimed to clarify factors associated with better GDS score among patients with advanced cancer in PCUs in Japan.

Methods

Participants

This study is a sub-analysis of a multicenter prospective cohort study conducted in Japan. The parent study is the East-Asian collaborative cross-cultural Study to Elucidate the Dying Process (EASED), which investigated the end-of-life care and dying process of patients with advanced cancer in PCUs nationwide in Japan [14].

We enrolled consecutively newly admitted patients to the participating PCUs in the study duration. The inclusion criteria were as follows: (1) adult (age ≥ 18 years), (2) admitted to a participating PCU, and (3) suffering from locally extensive or metastatic cancer. The exclusion criteria were as follows: (1) refusal to enroll on the part of patients or their families, and (2) scheduled discharge within 7 days. All observations were performed in the course of routine clinical practice.

Data collection

We determined the measurement variables associated with GDS and the related demographics and clinical characteristics based on a relevant literature review to identify relevant evidence. [2–4, 7–11].

We prospectively recorded all variables on a data collecting sheet designed for this study on the first day of enrollment and at death. We collected and analyzed the following data: patients characteristics on admission (age, sex, marital status, living with family, children under age of 20 and preferred place of death) and data about death and symptoms in the last 3 days in life (sudden death, drowsiness, fatigue, dry mouth, spiritual well-being (SWB), end-of-life discussion with patient, communication between patients and families, hyperactive delirium, hallucination, dyspnea, respiratory secretion, intermittent sedation, continuous deep sedation, hydration volume, days to death from last walking, eating and communicating and GDS.

Measurements

We analyzed the data of enrolled patients who died in PCUs, and we calculated survival time by subtracting the cases on the admission date from those on death date.

If a physician answered “yes” to the question “Were you surprised by the timing of the death?” we defined a priori that a patient had a sudden death [15].
As for end-of-life discussion, we determined whether the physicians informed the patients of the impending death, which was defined as the prediction of death within a few days [16].

We used the Integrated Palliative Outcome Scale (IPOS) to objectively assess patients’ symptoms (fatigue, drowsiness, dry mouth, SWB): 0, always; 1, most of the time; 2, sometimes; 3, occasionally; 4, not at all; 5, cannot assess because of unconsciousness. The Japanese version of IPOS has been reported to be a valid and reliable tool for assessing physical, psychological, spiritual, and social symptoms, as well as assessing the outcomes of adult patients with cancer in Japan [17, 18].

We used the Support Team Assessment Schedule (STAS) to assess communication between patients and families: 0, communicating openly and honestly, verbally and non-verbally; 1, communicating openly at some times or with some family members. Sometimes with partners or with some members of family members; 2, acknowledge condition but discussion does not satisfy either the patient or their family who feels full implications are not discussed. Maybe with partner but not family; 3, out of step, all discussions guarded; 4, pretending; 8, cannot assess. The Japanese version of STAS (STAS-J) has been reported to be verified as highly reliable [19].

We used the Memorial Delirium Assessment Scale (MDAS) to assess delirium by using items 9 (psychomotor activity); 0 (normal or psychomotor hypoactivity), 1 (mild), 2 (moderate), and 3 (severe) [20]. We assessed Hallucination using the Delirium Rating Scale-revised-98 (DRS-R-98), items 2 (perceptual disturbances and hallucinations); 0 (not present), 1 (mild perceptual disturbances), 2 (illusions present), and 3 (hallucinations present) [21].

Dyspnea was assessed as 0 (normal), 1 (exertional only) and 2 (at rest). We defined respiratory secretion as 0 (not audible), 1 (only audible at the head of the bed), 2 (clearly audible at the foot of the bed), and 3 (clearly audible at 6 m away from the foot of the bed) [22].

According to a previous study [23], we defined the last day of walking as the day when the patients had Eastern Cooperative Oncology Group performance status (ECOG PS) 3 or less. We defined the last day of eating as the day when patients could eat more than a few bites and the last day of communicating was defined as the day when Communication Capacity Scale (CCS) was 2 or less. Thus, we defined the last day of walking as the admission date when the patient had ECOG PS 4 on admission. Similarly, the last day of eating was defined as the admission date when the patient could eat a few bites on admission, and the last day of communicating was defined as the admission date when the patient had CCS 3 on admission.

The Good Death Scale (GDS) [7–11] consists of 5 domains: awareness of dying (0, no reference to the will of either the patient or the family; 1, ignorance; 2, partial awareness; 3, complete awareness), acceptance of death (0, complete unacceptance; 1, unacceptance; 2, acceptance; 3, complete acceptance), honoring of the patient’s wishes (0, no reference to the will of the family; 1, following the family’s will alone; 2, following the patient’s will alone; 3, following the will of both), death timing (0, no preparation; 1, family alone had prepared; 2, patient alone had prepared; 3, both had prepared well), and the degree of physical comfort before death (0, a lot of suffering; 1, suffering; 2, a little suffering; 3, no suffering). The GDS was evaluated by the physicians after each patients’ death. The GDS has been translated into Japanese [6], but has not yet been validated in this country.

The physicians assessed symptoms by direct observations at admission and in the last 3 days in life. If the patients had difficulties with verbal communication, the physicians assessed the patients’ status by proxy.

Data analysis and statistics

We performed all analyses using JMP version 16 for Windows (SAS, Cary, NC, USA).

We classified the patients into two groups based on GDS score. According to previous studies [24, 25], the cut-off point was set at 12-point. Therefore, the better GDS group had 12–15 points and the worse GDS group had 0–11 points. We excluded patients with missing values for any of the GDS items. We performed univariate logistic regression analysis for all variables to clarify the factors related to better GDS score. Finally, we used the variables with p values of <0.05 for model fitting with multivariate logistic regression to clarify the factors associated with a better GDS score. We defined p values of <0.05 as statistically significant.

Results

Patient characteristics

From January to December 2017, a total of 1,896 patients were enrolled across 22 Japanese PCUs. Two hundred sixty-three ineligible patients were excluded because of their alive discharge, and 476 were excluded because of missing value for GDS scoring. Consequently, 1157 patients were evaluated (Fig. 1). These 1157 patients included 559 men (51.8%). The mean (standard deviation) age was 71.8 (12.0) years, and the most common primary cancer site was hepatobiliary/pancreatic (19.5%). The median survival time was 16.0 days (range 1–376). The better GDS group (GDS score: 12–15 points) comprised a total of 802 patients, while the worse GDS group (GDS score: 0–11 points) contained 355 patients. Table 1 showed the characteristics of the patients. As for GDS scores, we have calculated Cronbach’s alpha value to assess internal consistency and it was 0.65.
Factors associated with the better GDS score

Table 2 shows the results of univariate analysis. Thirteen factors were associated with the better GDS score: younger age (odds ratio [OR] 1.01; 95% confidence interval [CI] 1.00–1.02; \( p = 0.01 \)), female (OR 1.44; 95% CI 1.12–1.85; \( p < 0.01 \)), preferred place of death (OR 2.42; 95% CI 1.68–3.47; \( p < 0.01 \)), longer survival time (OR 2.42; 95% CI 1.68–3.47; \( p < 0.01 \)), not sudden death (OR 2.11; 95% CI 1.56–2.87; \( p < 0.01 \)), better SWB IPOS in the last 3 days in life (OR 0.66; 95% CI 0.58–0.75; \( p < 0.01 \)), no hyperactive delirium in the last 3 days in life (OR 0.70; 95% CI 0.59–0.83; \( p < 0.01 \)), mild dyspnea in the last 3 days in life (OR 0.77; 95% CI 0.67–0.88; \( p < 0.01 \)), lower hydration volume (OR 1.00; 95% CI 1.00–1.00; \( p < 0.01 \)), longer days to death from last walking day (OR 1.01; 95% CI 1.00–1.02; \( p < 0.01 \)).

Table 3 lists the results of multivariate analyses, which clarified 5 variables significantly associated with the better GDS score: preferred place of death at PCU (OR 2.85; 95% CI 1.72–4.71; \( p < 0.01 \)), longer survival time (OR 1.02; 95% CI 1.00–1.03; \( p < 0.01 \)), not sudden death (OR 1.96; 95% CI 1.27–3.04; \( p < 0.01 \)), better SWB IPOS in the last 3 days in life (OR 0.53; 95% CI 0.42–0.68; \( p < 0.01 \)), and better communication between patient and family STAS-J (OR 0.81; 95% CI 0.66–0.98; \( p = 0.03 \)). There are decreased OR of a better GDS score for “better SWB IPOS in the last 3 days in life” and “better communication between patient and family STAS-J.” This is due to the fact that the GDS is a scale where higher scores lead to better evaluations, whereas the SWB IPOS and the STAS-J are scales where lower scores lead to better evaluations.

Discussion

To our knowledge, this study is the first one using GDS to identify factors associated with a good death in Japan. We found five factors associated with better GDS score in Japan: preferred place of death at PCU, longer survival time, not sudden death, better SWB in the last 3 days in life and better communication between patient and family. We firstly reported about the association of “better communication between patient and family STAS-J (Better communication)” and “not sudden death” with GDS. In a previous report [10], dedicated family care was associated with better GDS score, using the social context of Taiwan. Because better communication is essential for dedicated family care [26], “better communication between patient and family evaluated by using STAS-J” may be associated with better GDS score. Since “sudden death,” which was unexpected by the physicians, is related to the domains “death timing” and “awareness that one is dying” of the GDS components, “sudden death” might worsen these scores. It is expected that “not sudden death” was associated with better GDS. Based on these results, we believe that it was important to facilitate communication to dying patients and their families at PCUs for good death. As for sudden death, it was very hard for healthcare providers to predict sudden death associated with worse GDS scores [27]. Therefore, it was suggested that health care providers were required to focus on bereavement care after patients’ sudden death.

Hiratsuka et al. [28, 29], reported that three domains of GDS [acceptance of death peacefully / death timing / degree of physical comfort 3 days before death] were significantly related to SWB in the last 3 days in life. We assumed the same causal relationship was shown in our study. Previous studies [8, 10, 30] showed that patients in the PCUs achieved good death than those in other wards. The primary mission of the PCUs is to relieve physical and psychological suffering could contribute to better GDS [10]. Additionally, the past studies in Japan have reported that “dying in a preferred place” is associated with a good death [2–4]. These suggests that achieving the wish of patients in the PCUs is a factor that is associated with better GDS. Cheng et al. [24], reported that admission to PCUs for more than 7 days is a factor that is associated with better GDS score, which is similar to the conclusion in this study that “longer survival time” is associated with better GDS.

This study has some limitations. First, the GDS score is assessed by only the attending physician. The GDS is a scale that relies on objective measures of evaluation, but results may still vary depending on the physician or medical staff member who evaluates them. Second, this study...
| Characteristics                                      |   |
|----------------------------------------------------|---|
| Age [years, mean ± SD]                              | 71.8 ± 12.0 |
| Sex                                                |   |
| Male                                               | 559 (51.8) |
| Female                                             | 558 (48.2) |
| Marital status*                                     |   |
| Married                                            | 707 (61.2) |
| Widowed                                            | 247 (21.4) |
| Unmarried                                          | 126 (10.9) |
| Separated                                          | 76 (6.6)   |
| Primary cancer site                                |   |
| Lung                                               | 193 (16.7) |
| Gastroesophageal                                   | 171 (14.8) |
| Colorectal                                         | 152 (13.1) |
| Hepatobiliary/Pancreas                             | 226 (19.5) |
| Breast                                             | 77 (6.7)   |
| Gynecological                                      | 78 (6.7)   |
| Urological                                         | 83 (7.2)   |
| Head/Neck                                          | 49 (4.2)   |
| Others                                             | 128 (11.1) |
| Living with family                                 |   |
| 851 (73.6)                                         |   |
| Preferred place of death**                         |   |
| Palliative care unit                               | 751 (82.9) |
| General ward                                       | 16 (1.8)   |
| Home                                               | 135 (14.9) |
| Nursing home                                       | 4 (0.4)    |
| Sudden death*                                      | 213 (18.4) |
| Spiritual well-being IPOS in the last 3 days in life*** |   |
| Always                                             | 103 (10.2) |
| Most of the time                                   | 545 (53.9) |
| Some times                                         | 216 (21.3) |
| Occasionally                                       | 138 (13.6) |
| Not at all                                         | 10 (1.0)   |
| End-of-life discussion with patients*              | 70 (6.1)   |
| Communication between patient and family (STAS-J) **** |   |
| Communicating openly and honestly. Verbally and non-verbally | 239 (21.6) |
| Communicating openly at some times or with some family members. Sometimes with partners or with some members of family members | 101 (9.1) |
| Acknowledge condition but discussion does not satisfy either the patient or their family who feels full implications are not discussed. Maybe with partner but not family | 57 (5.1) |
| Out of step, all discussions guarded               | 22 (2.0)   |
| Pretending                                         |   |
| Fatigue IPOS in the last 3 days in life *****      |   |
| Always                                             | 66 (8.3)   |
| Most of the time                                   | 204 (25.8) |
| Some times                                         | 279 (35.3) |
| Occasionally                                       | 176 (22.3) |
| Not at all                                         | 66 (8.3)   |
| Drowsiness IPOS in the last 3 days in life *****   |   |
| Always                                             | 157 (19.9) |
| Most of the time                                   | 282 (35.7) |
included only patients admitted to PCUs in Japan; thus, the external validity is limited. The patients admitted to PCUs have different GDS scores compared to patients in general wards [7, 9, 24], and thus the factors related to GDS scores may also be different. Many patients admitted to the PCUs are likely to have requested to be admitted there, and it is inferred that the GDS may be higher. Japanese culture and view of life and death differs from other cultures in some respects, and results may differ if the cultural context changes. Further research on factors related to “good death” across countries and types of wards is needed. Third, the GDS has been translated into Japanese [6], but it has not been validated in Japan. The Cronbach’s alpha value is not high even for the results of this study and there is a possibility that GDS does not capture good death in Japanese patients with advanced cancer. Further research for validation of GDS in Japanese patients with advanced cancer is needed.

**Conclusion**

We identified factors associated with good death using the GDS among patients with advanced cancer in Japan. Providing an environment that facilitates communication between the patients and their families at the place the patient wants is important.
Table 2  Univariate logistic regression analysis: identification of factors associated with good death [Good Deats Scale ≥ 12] (n = 1157)

| Variables                                      | Odds ratio | 95% confidence interval | p value |
|------------------------------------------------|------------|--------------------------|---------|
| Age                                            | 1.01       | 1.00–1.02                | 0.01    |
| Sex                                            |            |                          |         |
| Female                                         | 1.44       | 1.12–1.85                | < 0.01  |
| Male Reference                                 |            |                          |         |
| Marital status                                 |            |                          |         |
| Married                                        | 1.22       | 0.94–1.57                | 0.13    |
| Not married Reference                          |            |                          |         |
| Living with family                             |            |                          |         |
| Yes                                            | 1.31       | 0.99–1.73                | 0.06    |
| No Reference                                    |            |                          |         |
| Children under age of 20                       |            |                          |         |
| No                                             | 1.26       | 0.67–2.34                | 0.48    |
| Yes                                            | Reference  |                          |         |
| Preferred place of death                       |            |                          |         |
| Palliative care unit                           | 2.42       | 1.68–3.47                | < 0.01  |
| Not palliative care unit                       | Reference  |                          |         |
| Survival time                                  | 1.01       | 1.00–1.02                | < 0.01  |
| Sudden death                                   |            |                          |         |
| No                                             | 2.11       | 1.56–2.87                | < 0.01  |
| Yes                                            | Reference  |                          |         |
| Spiritual well-being IPOS in the last 3 days in life | 0.41     | 0.35–0.49                | < 0.01  |
| End-of-life discussion with patients           |            |                          |         |
| Yes                                            | 1.83       | 1.01–3.33                | 0.04    |
| No                                             | Reference  |                          |         |
| Communication between patient and family (STAS-J) | 0.66     | 0.58–0.75                | < 0.01  |
| Fatigue IPOS in the last 3 days in life         | 0.81       | 0.70–0.93                | < 0.01  |
| Drowsiness IPOS in the last 3 days in life      | 1.05       | 0.90–1.22                | 0.54    |
| Dry mouth IPOS in the last 3 days in life       | 1.03       | 0.87–1.21                | 0.74    |
| Hyperactive delirium severity in the last 3 days in life | 0.70     | 0.59–0.83                | < 0.01  |
| Hallucination severity in the last 3 days in life | 0.89     | 0.77–1.03                | 0.13    |
| Dyspnea severity in the last 3 days in life     | 0.77       | 0.67–0.88                | < 0.01  |
| Respiratory secretion severity in the last 3 days in life | 0.93     | 0.80–1.06                | 0.28    |
| Intermittent sedation                          |            |                          |         |
| No                                             | 1.25       | 0.93–1.68                | 0.14    |
| Yes                                            | Reference  |                          |         |
| Continuous sedation                            |            |                          |         |
| No                                             | 1.11       | 0.76–1.61                | 0.60    |
| Yes                                            | Reference  |                          |         |
| Hydration volume                               | 1.00       | 1.00–1.00                | < 0.01  |
| Days to death from last walking                | 1.01       | 1.00–1.02                | < 0.01  |
| Days to death from last eating                 | 1.01       | 1.00–1.02                | 0.29    |
| Days to death from last communicating          | 1.00       | 0.99–1.01                | 0.62    |

IPOS, Integrated Palliative Outcome Scale; STAS-J, Japanese version Support Team Assessment Schedule
Table 3 Multivariate logistic regression analysis: identification of factors associated with good death [Good Deats Scale≥12] (n = 1157)

| Variables                        | Odds ratio | 95% confidence interval | p value |
|----------------------------------|------------|-------------------------|---------|
| Preferred place of death         |            |                         |         |
| Palliative care unit             | 2.85       | 1.72–4.71               | <0.01   |
| Not palliative care unit         | Reference  |                         |         |
| Survival time                    | 1.02       | 1.00–1.03               | <0.01   |
| Sudden death                     | 1.96       | 1.27–3.04               | <0.01   |
| No                               | Reference  |                         |         |
| Yes                              | Reference  |                         |         |
| Spiritual well-being IPOS in the last 3 days in life | 0.53 | 0.42–0.68 | <0.01 |
| Communication between patient and family (STAS-J) | 0.81 | 0.66–0.98 | 0.03 |

R² = 0.23

IPOS, Integrated Palliative Outcome Scale; STAS-J, Japanese version Support Team Assessment Schedule

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Declarations

Competing interests The authors declare no competing interests.

Ethics approval This study was conducted in accordance with the ethical standards of the Declaration of Helsinki. The ethical guidelines for medical and health research involving human subjects presented by the Japanese Ministry of Health, Labor, and Welfare, and were approved by the local Institutional Review Boards of all participating institutions. Japanese law does not require individual informed consent from participants in a non-invasive observational trial such as the present study.

Consent to participate We used an opt-out method rather than acquiring written or oral informed consent; all patients could find information on the study through the instructions posted on the ward or institutional website, and they had the opportunity to decline participation.

Consent for publication All authors read and approved the final manuscript.

Conflict of interest The authors declare no competing interests.

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