

“Do-Not-Resuscitate” Orders in Children with Cancer at the End of Life: A Retrospective Review

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Abstract

“Do-not-resuscitate” (DNR) orders constitute a vital part of End-of-Life (EOL) care for patients with terminal cancer. In this retrospective study, we reviewed the medical records of patients treated at a tertiary referral pediatric oncology unit between May 2006 and May 2017. We gathered data about days from signing the DNR to death, age at death, gender, disease and its status, place of death, and survival and performed t-test and χ^2 test as appropriate. Of the 225 patients [127 males, 98 females; median age: 10.0 years (range, 0.4-23.4) years] enrolled, 130 (57.8%) provided DNR orders signed by their surrogates. In addition, 29.3%, 44.8%, and 25.8% of deaths occurred in the pediatric oncology ward, the intensive care unit, and at home or another hospital, respectively. We observed an annual increase in the signing rate of DNR orders. The median duration between signing a DNR order and death was 2 (range: 0-88) days. Furthermore, DNR orders tended to be committed by patients with slowly deteriorating disease and those with extended overall survival. This study deduces that an explicit DNR order is now a rule rather than an exception, with more DNR orders being signed for patients aged >10 years hospitalized for EOL cancer care. Hence, the early implementation of a DNR order could be underutilized in younger patients with cancer.

Keywords: Cardiopulmonary resuscitation; Do-not-resuscitate orders; Ethics; Cancer; Children

Introduction

The modern treatment modalities have facilitated the attainment of approximately 83% five year disease-free survival among children with various forms of cancer [1]. In some patients, cardiopulmonary resuscitation (CPR) can be successful in restarting the heart and lungs if attempted in appropriate situations. The last few decades have witnessed an upsurge in the use of futile medical procedures, particularly among patients with a terminal illness. Although the “do-not-resuscitate” (DNR) order allows the omission of the inappropriate and futile use of CPR, it entails great ethical, legal, and economic implications [2-4].

In Taiwan, the regulations of the Hospital Palliative Care have enforced the DNR policy since May, 2000 [5,6]. However, the management of treatment and associated emotional concerns remain challenging because of disputes between the medical staff and patients' families. Therefore, this study aimed to review the implementation of DNR orders among families of children with terminal cancer to ascertain the circumstances that result in these difficult and complicated decisions.

Objective

To assess the prevalence of DNR orders and recognize relevant factors affecting the DNR decision-making process by patients' surrogates at a tertiary institution.

Materials and Methods

Setting, participants, and ethical consideration

In this study, we retrospectively reviewed the medical records of patients with cancer who died either in the ward or intensive care unit (ICU) of our institution between May 2006 and May 2017. At our institution, the 28-bed multidisciplinary unit of our oncology ward receives nearly 9000 admissions per year. We gathered patients' demographic data, such as age, gender, and background illness; hospital course, including the ICU stay, hospital stay, and days from signing the DNR to death; DNR data, including the correlation between DNR signatories and proxies and occasions when the DNR order was reversed; and clinical laboratory testing on the date of death and enrollment in hospice care.

Subjects included surrogates of patients with terminal cancer in critical condition who could communicate in either Chinese or Taiwanese and with whom the physicians had communicated the patients' condition and offered suggestions when they needed to sign a DNR. However, we excluded surrogates of surgical patients and out-of-hospital cardiac arrest cases.

This study protocol was approved by the Ethics Committee of Chang Gung Memorial Hospital (Taoyuan, Taiwan), which waived the requirement for informed consent because of the retrospective study design.

Data collection

The attending physician described the poor condition of the terminally ill patients with cancer to the surrogates, explored the

perceptions of medical futility, and informed on consent to palliative care. For each enrolled patient, we reviewed the medical records of the last month before death to ascertain the administration of CPR and basic life support drugs. We retrospectively enrolled 225 patients [127 males and 98 females; median age, 10.0 (range, 0.4-23.4) years]. Of all, 47 children had acute lymphoblastic leukemia, 38 acute myeloid leukemia, 19 lymphoma, 90 solid tumors, 22 brain tumors, and 9 other types of cancer (Table 1).

Diagnosis	Resuscitation status		
	CPR	DNR	Total
Acute lymphoblastic leukemia	21	26	47
Acute myeloid leukemia	17	21	38
Lymphomas	8	11	19
Soft solid tumor	37	53	90
Brain tumor	9	13	22
Other	3	6	9
Total	95	130	225

Note: CPR: cardiopulmonary; DNR: do-not-resuscitate

Table 1: Relationship between primary diagnosis and resuscitation status.

Typically, the oncology attending physicians actively participate in the clinical decision-making. If an attending physician establishes the futility of performing CPR on a patient and another physician concurs with the judgment, then the attending physician can obtain the informed consent of the surrogate before including a DNR order in the patient's medical record. Nevertheless, DNR orders do not exclude interventions, such as parenteral fluids, nutrition, oxygen, sedation, analgesia, vasopressors, and anti-arrhythmic medications.

Furthermore, a family meeting session was cooperatively organized for potentially futile medical interventions to discuss the DNR status with the rationale that CPR would be futile for patients with progressive cancer. Notably, we recognized the DNR orders signed by patients or surrogates were identified by examining medical records. Moreover, DNR orders, documented in approximately 58% of cases, were drafted after obtaining consent, not by patients but by their family or surrogates.

Statistical Analysis

In this study, the endpoint of analysis for all patients was either the date of last follow-up or the date of death. In addition, we performed the Fisher's exact test to assess statistical differences and considered $P < 0.05$ as statistically significant. All data analysis was performed using the SPSS software package (version 18.0, SPSS Inc., Chicago, IL, USA).

Results and Discussion

During the 11-year period of this study, all 225 pediatric patients died because of their respective malignancies. The findings revealed that 29.3%, 44.8%, and 25.8% of deaths occurred in the pediatric oncology ward, the ICU, and at home or another hospital, respectively

(Table 2). While 95 out of 225 (42.2%) patients died after attempted CPR, 130 (57.8%) died with a DNR order in effect (median age at death, 10.0 and 10.1 years, respectively). Almost 60% of patients have a DNR order at the time of death, but these actually occur late in the course of the hospital stay. Seemingly, DNR orders tended to be committed by patients with slowly deteriorating disease and those with longer overall survival.

Variables	DNR order		P Value
	With (n=130)	Without (n=95)	
Gender, n (%)			0.87
Male	74 (56.92)	53 (55.79)	
Female	56 (43.08)	42 (44.21)	
Age group (years), n (%)			0.09
<2	7 (5.38)	13 (13.68)	
2-10	56 (43.08)	36 (37.89)	
>10	67 (51.54)	46 (48.42)	
The place of death, n (%)			< 0.001
Wards	55 (42.3)	11(11.6)	
ICU	61 (46.9)	40 (42.1)	
Home care discharge status	11 (8.5)	13 (13.7)	
Other hospital	3 (2.3)	31 (32.6)	

Table 2: Demography and medical diagnosis of the patients.

The overall case fatality rate declined from 21.8% (2006-2012) to 18.7% (2012-2017). Multiple organ failure (MOF) was the primary cause of death in ICUs, especially in septic patients. Overall, sepsis syndrome with MOF was the leading cause of death (36.7%), followed by progressive or metastatic disease (32.6%) and respiratory failure (19.2%), accounting for only a small percentage of deaths.

In this study, the median duration between signing a DNR and death was 2 (range: 0-88) days. The median duration between palliative care consultation and death was 3 (range: 0-301) days. In addition, the median duration between palliative consultation and DNR consent was 0 (range: 0-222) days. In 37 patients, parents or surrogates provided consent to a DNR order on an incapacitated patient after CPR attempt. Furthermore, the time elapsed was >3 days between entering a DNR in the medical record and death in 58 patients. Of note, consent was obtained from most patients in the ward. No patient with a DNR order in place received subsequent CPR. The findings revealed that an explicit DNR order is now a rule rather than an exception, with more DNR orders being written for patients aged >10 years hospitalized for cancer care.

All patients in the study were in the terminal stage of their diseases with a poor performance status. In addition, the leading cause of death was primarily attributed to cancer progression. Furthermore, those with a DNR tended to remain in the ward and less likely to die in ICU or while connected to a ventilator.

Several physicians consider informed consent (to obtain a patient's signature on a form) is merely a formality mandatory for allowing the performance of a specific procedure or treatment on the patient.

Regarding pediatric patients, DNR orders are at the discretion of treating physicians when they ascertain that an attempt to resuscitate a child is futile and when parents or surrogate decision-makers expressed their preference that CPR be withheld if a child suffers a cardiopulmonary arrest. Ideally, a discussion on end-of-life (EOL) care should resolve around the prognosis, options for palliative or aggressive therapies, and decision to die at home or under hospice care. Although the EOL care encompasses several factors, it comprises withholding or withdrawing life-sustaining treatment and palliative care [7-9]. DNR orders constitute an essential part of EOL care discussions, because they prevent medical futility during resuscitation of patients with advanced cancer.

Typically, DNR orders facilitate the prevention of futile and needless medical interventions up to the time of death [10-12]. However, definition of the term "medical futility" remains debatable till date. Simply comprehending the benefits of a DNR order does not, however, facilitate the decision to provide consent for terminally ill or severely disabled children and their parents. Conversely, if the physician wishes to continue treatment of a very ill child, but there is doubt on the benefit, the physician can be put in a difficult legal position if the parents withhold consent.

This study has some limitations. First, the retrospective study design and the small number of enrolled patients offer significant limitations. For the treating oncologist, discontinuing aggressive therapy and consider palliative therapies are much easier clinical decision if the parents provide consent of DNR. Second, DNR patients in the pediatric ward might have been more severely affected or had worse prognoses than some patients in ICU. Third, the attitudes toward life and death could vary among different cultures as well as depend on legal and insurance reasons. Of note, if no patient personally signed his or her DNR consent, they should not be supposed incompetent of making treatment decisions. In fact, it is often problematic for young patients to participate in decisions regarding DNR orders. Regarding patients who had their DNR order entered during their hospital stay, order entry occurs upon the involvement of a surrogate. Reportedly, surrogate decision-making might take longer because of the higher ethical, emotional, or communication complexity of making decisions with surrogates than with patients [13-15]. Finally, because this study was conducted at a single center, and the findings might not be valid for other hospitals or regions. Hence, further extensive studies are warranted to validate the findings of our study.

Conclusion

Placing DNR orders is, indeed, challenging, and the remission status seemingly affects physicians' attitude about discussing resuscitation or DNR orders. The study deduces that DNR orders were drafted in more than half the charts of patients with progressive cancer. In several cases, DNR orders were issued close to death. Furthermore, this study highlights the necessity of advanced discussion of DNR orders with parents to decrease parental and medical staff stress accompanying the death of a child and optimize the management of the terminal phase of the disease.

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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