The effect of do-not-resuscitate orders on length of stay

GEORGE A. KANOTI, STD; WILLIAM R. GOMBESKI, Jr, MBA, MPH; A. DALE GULLEDGE, MD;
DALE KONRAD, MBA; ROBERT COLLINS, MD; SHARON V. MEDENDORP, MPH

■ In 1988, a new do-not-resuscitate policy aimed at assisting professional staff, nurses, patients, and families in end-of-life choices replaced the existing policy at The Cleveland Clinic Foundation. We conducted a retrospective chart review to examine the effects of the new policy on length of stay. Data were collected on demographics, clinical information, length of stay, and the frequency of do-not-resuscitate orders for expired Medicare patients in 1987 (n=125) and 1989 (n=135). Length of stay for patients who received a do-not-resuscitate order was significantly reduced in 1989 compared with 1987, partly because the orders were issued earlier in patients' stays in 1989. The number of days from writing the order until death did not change significantly from 1987 to 1989. We conclude that a well-defined do-not-resuscitate policy can reduce length of stay.
□ INDEX TERMS: LENGTH OF STAY; RESUSCITATION ORDERS □ CLEVE CLIN J MED 1992; 59:591–594

FOR MANY PATIENTS with end-stage illnesses such as terminal cancer or acquired immunodeficiency syndrome (AIDS), therapies do not restore function but prolong the dying process.[1] Recognition of the limits of therapy has influenced some hospitals to formalize their end-of-life protocols by writing do-not-resuscitate (DNR) and other policies related to forgoing life support.[2-4]

■ See editorial, p. 649

In this article, we hypothesize that using these policies to address end-of-life decisions and questions of

From the Departments of Bioethics (G.A.K.), Planning and Research (W.R.G.), Finance (D.K.), Gynecology (R.C.), and Biostatistics and Epidemiology (S.V.M.), The Cleveland Clinic Foundation, and the Department of Psychiatry (A.D.G.), The Cleveland Clinic Florida.
Address reprint requests to G.A.K., Department of Bioethics, P37, The Cleveland Clinic Foundation, 9500 Euclid Avenue, Cleveland, OH 44195.

quality of care will influence the length of stay (LOS).

DNR POLICY AT THE CLEVELAND CLINIC

The Ethics Committee of The Cleveland Clinic Foundation (CCF), with the assistance of the Foundation's Department of Bioethics, physicians, and nurses, studied and critiqued the Foundation's 1979 DNR policy during 1986 and 1987. Analysis of the 1979 DNR policy revealed significant omissions and ambiguities in its language and interpretation.

New DNR guidelines were developed and became CCF policy on January 1, 1988. The Department of Bioethics and the Ethics Committee were charged with educating and providing consultation to physicians and nurses at the Cleveland Clinic on the use of the new policy. To examine the impact of the new policy, educational efforts, and ethics consultations on the use of DNR orders and on overall length of stay (LOS), we undertook a retrospective chart review of Medicare deaths in 1987 and 1989.

TABLE 1
LENGTH OF STAY FOR MEDICARE EXPIRED PATIENTS*

DNR orders	1987					1989				
	n	%	Mean LOS (days)	Standard deviation	Median LOS (days)	n	%	Mean LOS (days)	Standard deviation	Mean LOS (days)
Explicit	61	48.8	23.1	36.0	10.0	62	45.9	16.7	20.1	9.5
Implicit	8	6.4	30.4	38.7	15.5	16	11.9	27.6	19.5	22.0
None	56	44.8	15.9	24.3	7.5	57	42.2	22.4	28.0	12.0
Overall	125	100.0	20.4	31.5	9.0	135	100.0	20.4	23.9	12.0

DNR, do not resuscitate; LOS, length of stay
*Kruskal-Wallis test: 1987, P = .09; 1989 P = .03

METHODS

The Cleveland Clinic Hospital experienced 901 in-house deaths in 1987 and 891 in 1989. A sample of in-house deaths on every fourth day of these years was taken for statistical analysis. The sampling identified 231 deaths in 1987 and 239 in 1989. Of these, there were 14 patients whose charts were not available, resulting in sample sizes of 225 for 1987, and 231 in 1989. These represented 24.9% and 25.9% of all deaths in 1987 and 1989, respectively.

Each patient's medical chart was reviewed to determine if the DNR order was explicit or implicit: an explicit DNR order was defined as "no resuscitation," "no code," "no CPR," "DNR," or a similar order. An implicit order was defined as "withdraw ventilator," "withhold dialysis," "withhold antibiotics," "life-support removal" or a similar order. In each case where an implicit order was written, no resuscitation attempt was documented. Also gathered from the medical chart were patient identification number, date on which the DNR order was written, and the patient's admission source (ie, regular admission or hospital transfer).

The admission date, patient's age and sex, date of death, primary service, and primary payer were gathered from the patient information data base. We calculated the following: (1) the total number of hospital days, (2) the hospital days from admission to the date the DNR (explicit or implicit) order was written, and (3) the hospital days from the time of the order to the time of death.

Analysis of these data indicated no significant difference in LOS between the Medicare and non-Medicare groups in 1987 (P=.41) and 1989 (P=.60). The Medicare group was chosen for study because of its homogeneity (eg, similar age, disease, and third-party payer). The sample sizes for Medicare patients who died were 125 for 1987 and 135 for 1989. These represented 26.4% of all Cleveland Clinic Hospital Medicare deaths in 1987 and 26.5% of all Cleveland Clinic Hospital Medicare deaths in 1989.

The chi-square and exact chi-square tests were used to examine the relationships of categorical factors, while the Kruskal-Wallis and Wilcoxon rank-sum tests were used to compare distributions of continuous factors.[5-7] Differences were considered significant at the P ≤ .05 level. All P values given are based on two-tailed tests.

RESULTS

The distributions of age, sex, admission status, and medical diagnostic category were similar for the sampled and unsampled 1987 and 1989 Medicare populations of expired patients. Both samples were composed of patients with a mean age in the low 70s and with equal numbers of men and women. For both years, 27% of the Medicare deaths were transferred patients with a mean LOS of 20.4 days. The patients suffered from a wide range of medical problems, with circulatory problems being the most common (about 42% of patients in both groups).

Explicit DNR orders decreased slightly from 1987 to 1989, while implicit DNR orders increased (Table 1). These differences were not statistically significant. The median LOS for all expired patients increased 3.0 days, while LOS for patients with explicit DNR orders decreased slightly (0.5 days). While not statistically significant, this decrease in LOS for explicit DNR patients—when compared with the overall increase in LOS for expired patients—suggests an important trend.

Age and sex were not significantly associated with the use of DNR orders. Examination of the relationship between use of a DNR order and the medical problem showed that patients with a primary diagnosis of a cir-

culatory system problem were less likely (*P*< .001) to have an order issued both in 1987 and 1989. Patients transferred from other hospitals (27% of all deaths in each year) were less likely to have an order issued in 1989 (*P*=.05) than were those regularly admitted.

Patients with LOS ≥ 15 days accounted for 33.6% of deaths and 80.3% of hospital days in 1987, and 45.9% of deaths and 85.0% of hospital days in 1989.

TABLE 2
UNIVARIATE ANALYSIS COMPARING LENGTH OF STAY IN 1987 AND 1989*

| | Type of DNR order | | | | | |
| | Explicit | | Implicit | | None | |
	1987	1989	1987	1989	1987	1989
Patients with LOS≥15 days	20	24	4	11	18	27
% of total yearly deaths	16.0%	17.7%	3.2%	8.2%	14.4%	20.0%
Mean LOS (days)	56.70	33.67	51.25	35.45	39.28	42.41
Median LOS (days)	49	28	33.5	27	29	29
Standard deviation	47.89	23.67	48.24	18.73	31.95	29.74
Total hospital days	1,134	808	205	390	707	1,145
% total hospital days	44.5%	29.3%	8.0%	14.2%	27.8%	41.5%

DNR, do not resuscitate; LOS, length of stay
*Wilcoxon rank-sum test: explicit, *P* = .03; implicit, *P* = .85; none, *P* =.66

There were no significant changes for patients whose LOS was less than 15 days; however, for the 17.7% of patients with explicit DNR orders and a LOS ≥ 15 days, the LOS decreased significantly (median reduction 21 days) between 1987 and 1989 (*Table 2*). Projecting this reduction to all 1989 Medicare deaths results in a reduction of 1,911 hospital days (17.7% × 510 Medicare deaths = 91 Medicare patients with explicit DNR orders who died after LOS ≥ 15 days; 91 patients × 21 days = 1,911 days reduction in LOS for 1989).

The median reduced LOS of 21 days for patients with explicit DNR orders and LOS ≥ 15 days can be explained primarily by a decrease in time from admission to issuing the order (*Table 3*). The median time from admission to explicit DNR order for these patients was 40.5 days in 1987 and 22 days in 1989 (marginal significance *P*=.07), while the number of days from the DNR order to death did not differ significantly (*P*=.18, 4 days in 1987, 2 days in 1989).

DISCUSSION

These data suggest that implementing a DNR policy can significantly reduce LOS. The median reduction of 21 hospital days for patients with a hospital stay ≥ 15 days who died after an explicit DNR order was issued may amount to an overall reduction of 1,911 days for all Medicare patients who died in 1989. This reduction preserved time, energy, and nonreusable supplies that would be consumed in resuscitation attempts. Furthermore, anecdotal information indicates that writing an explicit DNR order reduces stress for everyone involved, clarifies the care plan, and enhances the ability of the patient, family, and health care providers to adjust to death.

This study shows that, when a health care institution has a well-defined DNR policy, DNR orders are issued sooner than when the policy is unclear. This finding, coupled with the palliative care given to DNR patients, supports the hypothesis that not intervening in the natural history of end-stage diseases improves the quality of patient care by excluding potentially harmful resuscitation efforts that merely prolong the dying process. These data also indicate that the decision to write a DNR order is influenced by medical issues and not by patient characteristics such as age and sex. This supports the notion that the recognition of the limits of therapy for a specific disease in a specific patient is a crucial factor in DNR decisions.

In every case of an implicit DNR order, resuscitation was not attempted when the patient experienced cardiac or pulmonary arrest. The increase in the percentage of implicit DNR orders (from 6% in 1987 to 12% 1989) suggests that some physicians who acknowledge the limits of therapy nevertheless find writing an explicit DNR order unacceptable. These physicians may view explicit DNR orders as physician failure, whereas a decision to stop therapy may be perceived more positively as recognizing therapeutic limits or allowing the disease to follow its natural course. This implies a need for continuing education on end-of-life policies and for assessment of clinical issues involved with the appropriateness of implicit DNR orders.

In 1989, transferred patients who died were less likely to have DNR orders written than were patients admitted in other manners. We hypothesize that the difference may be due to the need to conduct diagnostic and therapeutic procedures for referred patients before discussions of DNR orders are initiated.

TABLE 3
TIMING OF EXPLICIT DNR ORDERS FOR PATIENTS WITH LENGTH OF STAY ≥15 DAYS*

Year	n	Time from admission to explicit DNR order (days)			Time from explicit DNR order to death (days)		
		Mean	SD	Median	Mean	SD	Median
1987	20	48.25	45.17	40.5	8.45	9.19	4
1989	24	28.46	23.98	22.0	5.21	6.66	2

DNR, do not resuscitate; SD, standard deviation
*Wilcoxon rank-sum test: admission to explicit DNR order, $P = .07$; explicit DNR order to death, $P = .18$

Further questions

Further research is needed to examine how DNR policies and other policies for forgoing life support affect quality indicators and costs. Key questions remain. For instance, in what percentage of Medicare deaths with no DNR order was a DNR order appropriate? What percentage of patients had a DNR order and survived to discharge, or to 30 days or longer after discharge? Was the DNR order written when the patient was in the intensive-care unit or not? Does LOS increase for patients on whom cardiopulmonary resuscitation was performed? Other issues include the degree of patient and family involvement in the decision-making process, the use of DNR orders on patients under age 65, and the differences in the use of DNR orders between patients transferred from other hospitals and those admitted otherwise.

CONCLUSION

Our experience at CCF supports the hypothesis that when health care institutions create and follow ethically and legally responsible DNR policies, patient LOS will decline significantly. In an era in which society must be both ethically and economically conscious, appropriate use of a DNR policy not only provides quality care, but also conserves medical resources.

ACKNOWLEDGMENT

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