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BRIEF REPORTS

DISCORDANCE ABOUT FRAILTY DIAGNOSIS BETWEEN SURROGATES AND PHYSICIANS AND ITS RELATIONSHIP TO HOSPITAL MORTALITY IN CRITICALLY ILL OLDER ADULTS

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Abstract: The preponderance of studies on frailty assessment in critically ill adults have used the Clinical Frailty Scale (CFS) to quantify frailty and previous research suggests that surrogates were more likely to be optimistic than physicians in their CFS scores. Whether discordance between surrogates and physicians was relevant to prognosis has been underexplored. Therefore, in a prospective observational cohort of 298 critically ill older adults, we aimed 1) to describe factors related to discordance and 2) to estimate the relationship between such discordance and hospital mortality and other short-term outcomes. Discordance between surrogates and physician was present in 89/298 (29.9%) and independently associated with a higher risk of hospital mortality. Discordance was not associated with markers of intensity of treatment such as intubation, blood transfusion, incident dialysis for acute renal failure and prolonged hospital length of stay. Understanding factors relevant to discordance between physicians and surrogates may lend further insights into short-term prognosis for older adults with critical illness. .

Key words: Frailty, prognosis, risk assessment, critical illness.

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Introduction

Much of the literature on frailty and adverse outcomes in the ICU setting has measured frailty using the Clinical Frailty Scale (CFS) which is a judgment-based assessment of frailty based on factors such as the patient's fitness, co-morbidities, disability and life expectancy (1, 2). Previous research suggests that the level of agreement between surrogates and research physicians was modest and that surrogates were more likely to be optimistic in their frailty assessment using the CFS (3). No previous research has explored factors related to discordance between surrogates and physicians nor whether such discordance was relevant to short-term hospital outcomes. Therefore, in a cohort of critically ill older adults, we aimed to address these knowledge gaps by: 1) describing factors related to discordance between surrogates and research physicians and 2) estimating the relationship between such discordance and short-term outcomes such as hospital mortality.

Methods

Study Design and Participants

Data for this analysis were obtained from a previously described prospective cohort study which enrolled adults ≥ 50 years old admitted to one of 4 ICUs at two tertiary academic medical centers in Bronx, New York between January 2016 and July 2017. The study was approved by the Institutional Review Board of the Albert Einstein College of Medicine (3). We excluded patients who were expected to be discharged from the ICU within 24 hours, those who did not speak English or Spanish, and those with no available surrogate or next of kin who knew their prehospitalization medical and social history (3).

Pre-Hospital Frailty, Frailty Discordance and Other Study Variables

The data collection for pre-hospital disability, pre-hospital cognitive impairment and other relevant pre-morbid factors, acute illness factors, ICU and hospital treatment factors this cohort has been previously described (3). Briefly, surrogates who were aware of the patient's medical and social history, were asked to make a judgment of the patient's pre-hospitalization frailty using the 9-point Clinical Frailty Scale (CFS): a score of 1-3 is considered fit; a score of 4 is considered vulnerable; a score ≥5 is considered frail (4-6). Study physicians were blinded to the surrogates' CFS and completed the CFS using the medical chart and information collected by the research coordinators in the baseline questionnaire.

Discordance between surrogates and physicians was defined as present if 1) physician scored the patient as frail (CFS≥5) and the surrogates rated the patient as not frail (CFS≤4) or 2) physician scored the patient as vulnerable (CFS=4) and surrogates rated the patient as fit (CFS≤3). We captured level of discordance with an ordinal variable that classified the difference between surrogate and physician CFS scores being ≤ 0, 1 and ≥2 as 0, 1 and 2 respectively.

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Table 1
Showing baseline characteristics, clinical processes and hospital outcomes by frailty discordance

	Total (n=298)	Discordance (N=89)	No Discordance (N=209)	p-value
		Baseline Characteristics		
Age, mean years (SD)	67.2 (10.5)	68.0 (10.6)	66.9 (10.4)	0.416
Female, n (%)	157 (52.7)	42 (47.2)	115 (55.0)	0.215
Education > high school, n (%)	105 (35.4)	36 (40.5)	69 (33.2)	0.230
Admitted from Home, n (%)	266 (89.3)	79 (88.8)	187 (98.5)	0.856
Charlson Co-morbidity Score, median (IQR)	1 (0-4)	2 (0-4)	1 (0-4)	0.266
APACHE IV Score, mean (SD)	81.3 (25.7)	78.1 (23.5)	82.6 (26.5)	0.169
Day 1 SOFA score, median (IQR)	6 (4-9)	6 (4-9)	6 (3-9)	0.494
Body Mass Index, mean (SD)	30.3 (10.5)	30.4 (10.3)	30.3 (10.5)	0.941
No Pre-hospital Disability by ADLs, n (%)	201 (67.5)	73 (82.0)	128 (61.2)	0.005
Pre-Hospital Cognitive Impairment*	64 (22.1)	9 (10.2)	55 (27.2)	0.001
Clinical Frailty Scale, median (IQR)	4 (4-6)	5 (4-5)	4 (3-6)	0.436
Clinical Processes and Hospital Outcome				
Intubation, n (%)	193 (64.8)	59 (66.3)	134 (64.1)	0.719
Blood Transfusion, n (%)	158 (53.6)	49 (55.7)	109 (52.7)	0.634
New Dialysis, n (%)	45 (15.3)	13 (14.9)	32 (15.4)	0.923
Prolonged Hospital LOS, n (%)	74(24.8)	20 (22.5)	54 (25.8))	0.538
Hospital Mortality, n (%)	79 (26.5)	31 (34.8)	48 (23.0)	0.034

APACHE – Acute Physiology and Chronic Health Evaluation score is a severity of illness score used in the critical care setting; SOFA – Sequential Organ Failure Assessment score is a measure of acute organ dysfunction that is used a measure of severity of illness in the critical care setting; SD – Standard Deviation; IQR – interquartile range; ADL- Activities of Daily living used a modified Katz scale that included walking and so ranged from 0-7; LOS – length of stay; *-Pre-hospital cognitive impairment was assessed using the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) score > 3.3, n=290.

Statistical Analysis

The exposure variable of interest was discordance between surrogates and physicians regarding the frailty diagnosis. The primary outcome of interest was hospital mortality. Secondary process outcomes of interest included markers of treatment intensity such as intubation, blood transfusions, incident dialysis and prolonged hospital length of stay ≥ 30 days (which was the 75th percentile of the variable) (7). We explored baseline and pre-morbid factors related to frailty discordance and used multivariate logistic regression to estimate the independent effect of frailty discordance on our outcomes of interest adjusting for other pre-morbid factors including age, co-morbidity score, pre-hospital dependence on Activities of Daily Living, severity of illness as measured by the day 1 total Sequential Organ Failure (SOFA) score and pre-hospital cognitive impairment. In sensitivity analyses, we explored 1) the effect of the level of discordance and hospital mortality and 2) the potential bias due to the differences in observation period between patients by repeating our analysis using a Cox proportional hazards model in which the outcome was time to death censored at hospital discharge.

Results

In a cohort of older adults (mean age (standard deviation (SD) 67.2 (10.5), 89.3% of whom were admitted from home, frailty and vulnerability as diagnosed by physicians' CFS were quite prevalent: 151 (50.0%) patients identified as frail and 84 (27.8%) identified as vulnerable. Discordance between surrogates and physician was present in 89 (29.9%) of the patients. Surrogates in our sample were mostly adult children (134 (45%)], spouses (71 (23.8%)] or siblings (42 (14.1%)]. Patients with discordance in frailty diagnosis were less likely to have a pre-hospital cognitive impairment and were more likely to have no disabilities in their ADLs prior to hospital admission (table 1). Discordance was not associated with measures of intensity of treatment such as intubation, blood transfusions, incident dialysis during the index admission and prolonged hospital length of stay (table 1). Discordance between surrogates and physician was independently associated with a higher risk of hospital mortality (adjusted Odds Ratio (aOR) (95% confidence interval (95% CI)] 2.98 (1.47-6.06), p-value 0.002). Sensitivity analyses that assessed the association between the level of discordance and mortality found that risk of mortality increased as the level of discordance increased (see table 2). When we examined the association

Table 2
Shows logistic regression models showing the effect estimates for frailty discordance and hospital mortality

Exposure Variable	Unadjusted OR (95% CI)	p-value	Adjusted OR* (95% CI)	p-value
Frailty Discordance	1.79 (1.04 – 3.08)	0.035	2.98 (1.47-6.06)	0.002
Level of Frailty Discordance				
1 vs 0	0.91 (0.49 – 1.70)	0.770	1.22 (0.61-2.69)	0.532
≥2 vs 0	1.89 (1.00-3.55)	0.050	2.61 (1.15 – 5.94)	0.022

OR – Odds Ratio; 95% CI – 95 percent Confidence Interval; CFS – Clinical Frailty Scale; *adjusted odds ratios represent results from a logistic regression model that included hospital mortality as outcome and was adjusted for age, co-morbidity score, day 1 Sequential Organ Failure Assessment (SOFA) score which is a measure of acute organ dysfunction and illness severity, pre-hospital cognitive impairment which was measured using a modified Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) > 3.3, pre-hospital impairment in Activities of Daily Living, and pre-hospital frailty as identified by physicians' CFS.

between frailty discordance with time to hospital death using a Cox proportional hazards model we found a similarly strong effect between discordance and short-term mortality outcome (adjusted Hazard Ratio (95% CI) 2.07 (1.22-3.51), p=0.008).

Discussion

In an observational study in which research physicians and surrogates were asked to independently judge critically ill patient's level of pre-hospital frailty using the CFS, we found that a high proportion of surrogates reported a more optimistic estimate of the patient's pre-hospital frailty than the research physicians. This discordance was less likely when the patient had pre-hospital cognitive impairment and was more likely when the surrogate reported no ADL disabilities prior to the hospital. Importantly, we found that the frailty discordance was associated with higher hospital mortality, with a large effect estimate for short-term mortality. Frailty discordance was not associated significantly with markers of intensity of treatment such as intubation, blood transfusion, incident dialysis for acute renal failure and prolonged hospital length of stay.

Previous studies that have explored differences between surrogates and physicians' perception of prognosis in the ICU have primarily approached surrogates with real or simulated cases and have primarily focused on capturing the magnitude and the potential factors related to the discordance (3, 8-10). When taken together, these studies suggest that cognitive misunderstanding as well as emotional and heuristic biases are all possible factors contributing to prognosis discordance between physicians and surrogates (8). The present study extends the literature by examining the potential impact of such discordance on short-term hospital outcomes, particularly hospital mortality.

Hospital mortality in critically ill adults is usually predicted by a mix of pre-morbid patient characteristics and acute illness factors (11). Pre-hospital frailty, across multiple studies, is usually more strongly associated with long-term mortality and disability outcomes than with short-term hospital mortality outcomes (1, 3, 4). Such a strong association between frailty identification discordance and hospital mortality does not seem consistent with discordance being simply a cognitive misclassification error, particularly since our previous work in this study sample suggested that physicians were indeed more accurate than surrogates in identifying patients who died or had increased disability in the months after discharge (3). The strong association between discordance and short-term mortality also seems inconsistent with discordance reflecting optimism bias of the surrogates since we had expected that such surrogate optimism to be associated with prolonged ICU treatment trials and lower short-term mortality. One possible explanation that would require further study to explore is that that frailty discordance may be capturing patients whose frailty status were rapidly changing prior to their acute/subacute illness.

Although we believe our results that may be hypothesis generating, it is important to underline some limitations. Our study sample size is small and may not be generalizable to all critically ill older adults. The research physicians were investigators with an interest in frailty in the ICU which could have impacted the discordance rates; there was little training provided to the surrogates to complete the CFS. Nevertheless, the strong association between discordance and short-term mortality suggest that both qualitative and quantitative approaches to elucidating factors underlying the discordance may uncover important new variables to better predict short-term prognosis of the older adult in the ICU setting. In conclusion, discordance in frailty assessment between surrogates and physicians was common and was strongly associated with hospital mortality. Understanding factors relevant to the discordance may lend further insights into short-term mortality for older adults with critical illness.

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