Frailty is associated with poor CPR outcomes in the COVID-19 pandemic

Dr Jess Gurney

Victoria Hospital, NHS Fife, Hayfield Rd, Kirkcaldy KY2 5AH

Introduction

There is evidence from the literature demonstrating poor CPR outcomes for frail patients independent of age[1-5]. CPR is a resource intensive[6] and potentially traumatic experience for both patients[7] and healthcare workers [8]. Significant harm can be caused by CPR carried out in a futile scenario[9]. As such, CPR should not be offered in cases where it would be futile and the evidence suggests frailty may be one marker that can help indicate futility[3]. COVID-19 was known to change the behaviour of healthcare workers in regards to discussions about ceilings of care[10] and studies have shown an increase in do not attempt cardiopulmonary resuscitation (DNACPR) decisions[11].

Aims

1. To investigate the relationship between frailty and CPR outcomes
2. To explore if the relationship has been maintained during the COVID-19 pandemic given the change in attitudes towards DNACPR decisions.

Methods

The National Cardiac Arrest Audit Database was used to identify all adults within NHS Fife who suffered a cardiac arrest between April 2020-March 2022. The data for age, sex, initial arrest rhythm, return of spontaneous circulation (ROSC) and in-hospital mortality were collected from this database. Rockwood clinical frailty scale (CFS)[12] and Charlson comorbidity index (CCI)[13] were retrospectively calculated. The data was stratified in to frail (CFS ≥5) and non-frail (CFS <5) cohorts. Univariate analysis was carried out using chi-squared and Mann-Whitney U tests. P<0.05 was considered statistically significant. Multivariable analysis was performed via binary logistic regression.

Results

86 CPR attempts that matched the inclusion criteria. From these, 21 were excluded making the final data set 65 patients. In univariate analysis, there was a significant difference between the frail and non-frail groups in age (p=0.006), ROSC (p=0.02) and survival to discharge (p=0.004). Only 10 out of 34 (29.4%) frail patients had ROSC and of those only 3 (8.8%) survived to discharge compared to 35.3% of non-frail patients. In a binary logistic regression, there was a significant association between frailty and both ROSC (adjusted OR 3.31 [95% CI: 1.12-9.78}) and survival to discharge (adjusted OR 6.33 [95% CI: 1.48-27.13]) and no significant association with age, CCI or sex.

Conclusions

Although limited by the small sample size, this study adds to the pre-existing literature highlighting the association between frailty as defined by CFS ≥5 and poor CPR outcomes independent of age and co-morbidity. This association was still present during the COVID-19 pandemic despite changes in implementation of DNACPR decisions.

Results

Table 1: Characteristics of all patients, frail patients and non-frail patients

	Total (n=65)		Frail (CFS <5, n=34)		Non-frail (CFS ≥5, n=31)		Analysis between frail and non-frail groups	Effect Size
CCI (median, IQR)	4	1-7	5	3-7	4	0-8	P=0.262	-
Male (n, %)	42	64.6%	23	67.6%	19	61.3%	P=0.614	-
Age in years (median, IQR)	75	57-93	77	62-92	72	53-91	P=0.006*	0.34

p values for differences between the frail and non-frail groups. Asterisks indicate significant findings.

Table 2: Outcomes for all patients, frail patients and non-frail patients

	Total (n=65)		Frail (CFS <5, n=34)		Non-frail (CFS ≥5, n=31)		Analysis between frail and non-frail groups	Odds Ratio
ROSC (n, %)	28	43.1%	10	29.4%	18	58.1%	P=0.026*	3.32
Survived to discharge (n, %)	15	23.1%	3	8.8%	12	35.3%	P=0.004*	6.53
Length of stay between ROSC and discharge in days (median, range)	6	0-44	6	2-8	5	0-44	P=0.884	-

p values for differences between the frail and non-frail groups. Asterisks indicate significant findings

References:

1. Fernando SM, McIsaac DI, Rochwerg B, Cook DJ, Bagshaw SM, Muscedere J, Munshi L, Nolan JP, Perry JJ, Downar J *et al*: **Frailty and associated outcomes and resource utilization following in-hospital cardiac arrest**. *Resuscitation* 2020, **146**:138-144.
2. Hu FY, Streiter S, O'Mara L, Sison SM, Theou O, Bernacki R, Orkaby A: **Frailty and Survival After In-Hospital Cardiopulmonary Resuscitation**. *Journal of General Internal Medicine* 2022.
3. Ibitoye SE, Rawlinson S, Cavanagh A, Phillips V, Shipway DJH: **Frailty status predicts futility of cardiopulmonary resuscitation in older adults**. *Age and Ageing* 2021, **50**(1):147-152.
4. Thomas EH, Lloyd AR, Leopold N: **Frailty, multimorbidity and in-hospital cardiopulmonary resuscitation: predictable markers of outcome?** *Clin Med (Lond)* 2021, **21**(4):e357-e362.
5. Wharton C, King E, MacDuff A: **Frailty is associated with adverse outcome from in-hospital cardiopulmonary resuscitation**. *Resuscitation* 2019, **143**:208-211.
Stanger DE, Fordyce CB: **The cost of care for cardiac arrest**. *Resuscitation* 2018, **131**:A7-A8.
6. Agarwal S, Presciutti A, Cornelius T, Birk J, Roh DJ, Park S, Claassen J, Elkind MSV, Edmondson D: **Cardiac Arrest and Subsequent Hospitalization–Induced Posttraumatic Stress Is Associated With 1-Year Risk of Major Adverse Cardiovascular Events and All-Cause Mortality**. *Critical Care Medicine* 2019, **47**(6):e502-e505.
7. Spencer SA, Nolan JP, Osborn M, Georgiou A: **The presence of psychological trauma symptoms in resuscitation providers and an exploration of debriefing practices**. *Resuscitation* 2019, **142**:175-181.
8. Mentzelopoulos SD, Slowther AM, Fritz Z, Sandroni C, Xanthos T, Callaway C, Perkins GD, Newgard C, Ischaki E, Greif R *et al*: **Ethical challenges in resuscitation**. *Intensive Care Med* 2018, **44**(6):703-716.
9. Chang BKW, Matthews P: **How is COVID-19 changing the ways doctors make end-of-life decisions?** *J Med Ethics* 2022.
10. Coleman JJ, Botkai A, Marson EJ, Evison F, Atia J, Wang J, Gallier S, Speakman J, Pankhurst T: **Bringing into focus treatment limitation and DNACPR decisions: How COVID-19 has changed practice**. *Resuscitation* 2020, **155**:172-179.
11. Connellan D, Diffley K, McCabe J, Cotter A, McGinty T, Sheehan G, Ryan K, Cullen W, Lambert JS, Callaly EL *et al*: **Documentation of Do-Not-Attempt-Cardiopulmonary-Resuscitation orders amid the COVID-19 pandemic**. *Age Ageing* 2021, **50**(4):1048-1051.
12. Stille K, Temmel N, Hepp J, Herget-Rosenthal S: **Validation of the Clinical Frailty Scale for retrospective use in acute care**. European Geriatric Medicine 2020, 11(6):1009-1015.
13. Bannay A, Chaignot C, Blotière P-O, Basson M, Weill A, Ricordeau P, Alla F: **The Best Use of the Charlson Comorbidity Index With Electronic Health Care Database to Predict Mortality**. Medical Care 2016, 54(2):188-194.