The Obesity Paradox and Predictors of Thirty Day Mortality in a Single Center Heart Failure Population

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Introduction

- Even with advances in therapies, CHF continues to be a large source of morbidity and mortality in the US, currently affecting between 5 - 6 million people[1]

- CHF continues to be a leading cause of hospitalization for patients over the age of 64[2]

- 30 day mortality has been slow to improve, with multiple studies showing no significant decreases over in the early 2000s[4]

- 30 day mortality and readmission rates are important markers of hospital discharge outcomes as it relates to heart failure

- Given that reimbursement is becoming more focused on these outcomes, it is important to identify ways of identifying patients at highest risk and tailoring interventions to try and help improve these outcomes (more aggressive follow up, appropriate referrals to hospice)

- At our institution, there is also a strain on our palliative care services for advanced heart failure patients. Identifying those patients with higher immediate mortality risk would help efficiently direct care

- Given this, we designed this study to look at different patient clinical characteristics to see if they were independent predictors of thirty day mortality in our patient population

Methods

- A retrospective analysis was performed on all Froedtert hospital admissions from July 2015 to July 2017 with a primary discharge diagnosis of acute decompensated heart failure

- Patients were treated according to attending discretion without any specific interventions

- Exclusion criteria for our study were patients discharged to hospice and patients who died in hospital in order to focus on out of hospital mortality

- A total of 5885 patients were analyzed and their status at 30 days post discharge (alive or dead) was determined

- Utilizing a chi-square analysis, we reviewed 15 patient characteristics to establish if they were independent predictors of 30 day mortality at an alpha level of 0.05

- We then investigated the relationship of BMI vs 30 day mortality in our population, looking at overall mortality trend with increasing BMI and the trend among BMI groupings

Results

Patient characteristics	Chi-Square P value	Significance?
Age > 75	<0.001	Yes
Male or Female sex	0.340	No
BUN > 20 mg/dl	<0.001	Yes
Home dobutamine	0.058	No
Home milrinone	0.004	Yes
Sodium < 135 meq/L	<0.001	Yes
Systolic BP < 100 mmHg	<0.001	Yes
Current smoker	<0.001	Yes
Active malignancy	<0.001	Yes
Dx of dementia	0.006	Yes
Current VAD implant	0.811	No
Current dialysis patient	0.032	Yes
Walter Score	<0.001	Yes
Hx of CAD	0.001	Yes
Albumin < 3.0	<0.001	Yes

Table One: Independent predictors of 30 day mortality

- A total of 15 patient characteristics were analyzed in the study. All labs and vitals were based on original admission values
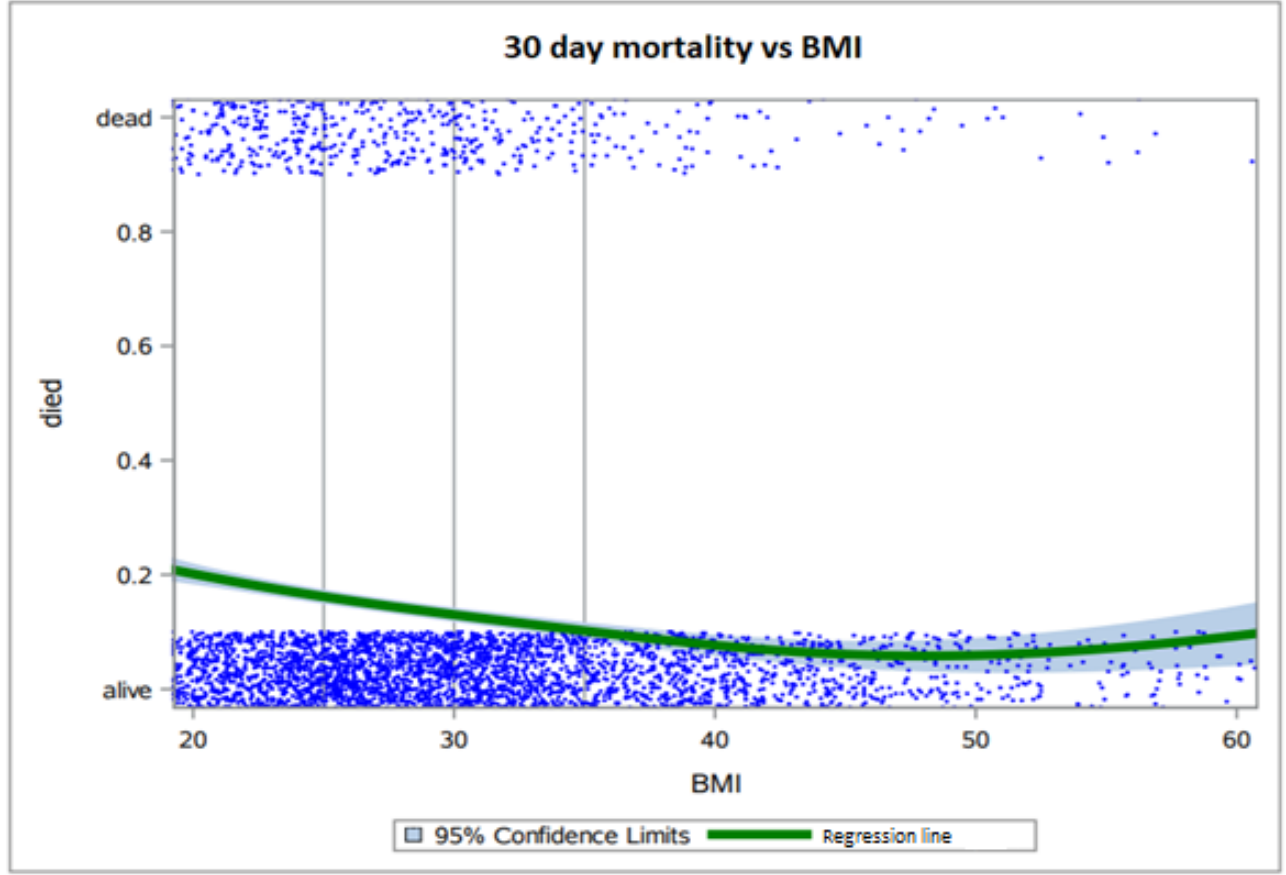
Figure One: 30 day mortality vs BMI – Plot identifying 30 day mortality outcome (alive or dead) vs patient BMI

- As part of the analysis, we reviewed BMI in relation to 30 day mortality

- Mortality decreased with increasing BMI until a BMI of 45, suggestive of the previously demonstrated obesity paradox
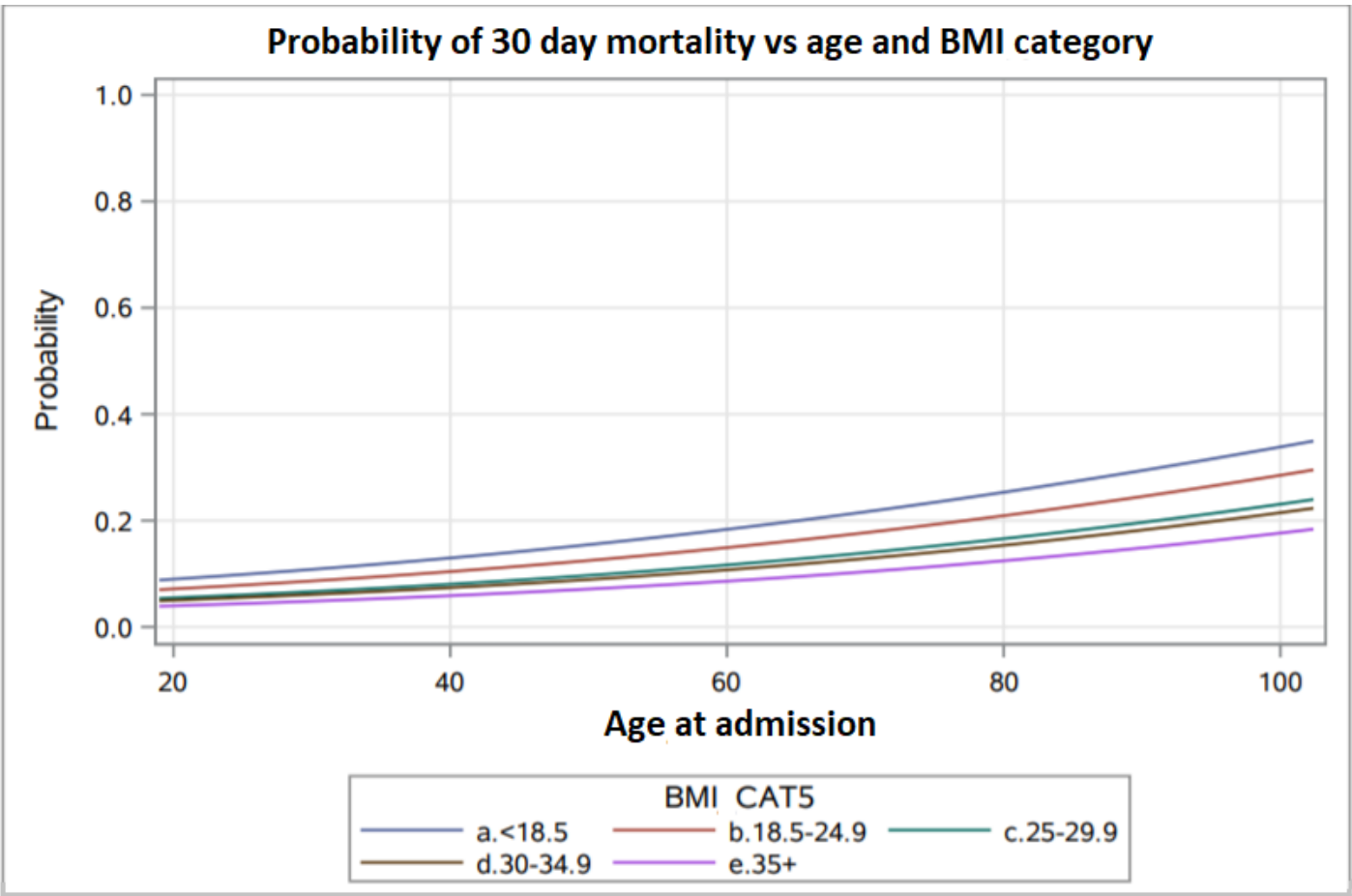
Figure Two: Probability of 30 day mortality vs age and BMI category – probability plotted against age at 5 specified BMI classes

- As BMI category increases, probability of 30 day mortality decreases

- As expected, mortality increases with increasing age in all BMI categories

Conclusions

- In our patient population, we were able to identify several patient characteristics that were independent predictors of 30 day mortality:

  -age > 75, BUN > 20, systolic BP < 100, current dialysis patients and Walter score

- When reviewing BMI vs 30 day mortality, our patient population survival was consistent with the previously demonstrated obesity paradox.

- With increasing BMI categories, 30 day mortality probability decreased in our population until a BMI of 45

- However, further work and research is needed to elucidate why this was the case (hormonal effects, cardiac cachexia, etc.)

- Future directions include utilizing these predictors to develop a risk calculator for 30 day mortality in the heart failure population which could then be validated against other populations for more general use

References
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