Improvement in Heart Failure Symptoms Following Bariatric Surgery as Measured by a Novel Heart Failure Specific Health-Related Quality of Life Instrument

Zachary N Weitzner MD, Hila Zelicha RD PhD, Tony Babb PhD, Vipa Bernhardt PhD, Faraz S Ahmad MD, David Cella PhD, Yijun Chen MD, Edward H Livingston MD

UCLA Health

INTRODUCTION

Recent studies have demonstrated improvement in congestive heart failure (CHF) symptoms and exercise function associated with GLP-1 agonist induced weight loss. The dyspnea associated with CHF can be severely debilitating, and has been shown to be present in up to 40% of otherwise healthy patients with obesity. Despite its profound health-related quality of life (HRQOL) effects, dyspnea is not usually considered an obesity-related comorbidity.

PROMIS+HF 27 TOOL

PROMIS measures are part of an NIH initiative to improve the measurement of patient-reported outcomes (PROMs) using state of the art response theory techniques that improve the efficiency and information gained from HRQOL instruments.

PROMIS+HF 27 is a recently validated HRQOL tool designed to measure HRQOL in patients with CHF. PROMIS+HF 27 has not previously been tested as a measure of the impact of obesity, bariatric surgery, or weight loss on HRQOL

HYPOTHESIS

We hypothesized that obesity results in CHF, and therefore CHF symptoms are commonly present in patients with obesity.

Therefore, we sought to evaluate the change in CHF symptoms, including dyspnea, in patients with severe obesity 12 months after bariatric surgery using PROMIS+HF 27.

METHODS

Ongoing prospective cohort study of adults over 18 years of age who underwent primary bariatric surgery at a single center between 1/1/2019 – 10/31/2023.

Patients were provided digital survey at preoperative clinic appointment and at 1 year postoperatively. Participation was voluntary and the study was IRB approved.

Medical records were retrospectively reviewed to obtain clinical and weight loss data.

Primary aim: change in CHF symptoms postoperatively

Table 1: Patient Demographics and Characteristics

	Entire(N=106)
Women (%)	81 (76%)
Age (time of surgery), year	43.5 ±12.2
White, n (%)	35 (33%)
Black or African American, n (%)	13 (12%)
Hispanics or Latino, n (%)	39 (37%)
Asian, n (%)	2 (2 %)
Unknown/refused to answer, n (%)	8 (7.5%)
Multiple races, n (%)	9 (8.5%)
Body mass index, kg/m^2	45.3±7.4
Weight (kg)	125.5±24.7
HbA1c (%)	6.1±0.7
Diabetes, no insulin intake, n (%)	17 (16%)
Diabetes, with insulin intake, n (%)	0 (0%)
Current Smoker within 1 year, n (%)	4 (4%)
Obstructive sleep apnea requiring CPAP, n (%)	22 (21%)
Asthma, n (%)	15 (14%)
Dyspnea, n (%)	1(1%)
History of pulmonary embolism, n (%)	1 (1%)
COPD, N (%)	0 (0%)
Myocardial Infarction, n (%)	1 (1%)
CHF, n (%)	0 (0%)
Aortic atherosclerosis, n (%)	3 (3%)
GERD requiring medication within 30 days, n (%)	13 (12%)
Hypertension required medication, n (%)	38 (36%)
Hyperlipidemia required medication, n (%)	32 (30%)
ASA 2 – Mild systemic disease, n (%)	2 (2%)
ASA 3 – Severe systemic disease, n (%)	100 (94%)
ASA 4 – Severe systemic disease threat to life, n (%)	2 (2%)

PROMIS+HF 27

Overall score calculated 0-100 with higher score representing better health

Domains:

- Dyspnea
- Fatigue
- Physical Function
- Pain interference
- Depression
- Cognitive Function
- Sleep Disturbance
- Ability to participate in social activities

T score for each domain with overall average = 50, SD = 10 compared to general population (dyspnea compared to COPD population)

Table 2: Changes of PROMIS+HF 27 T-scores by Domain (Baseline vs 1 year)

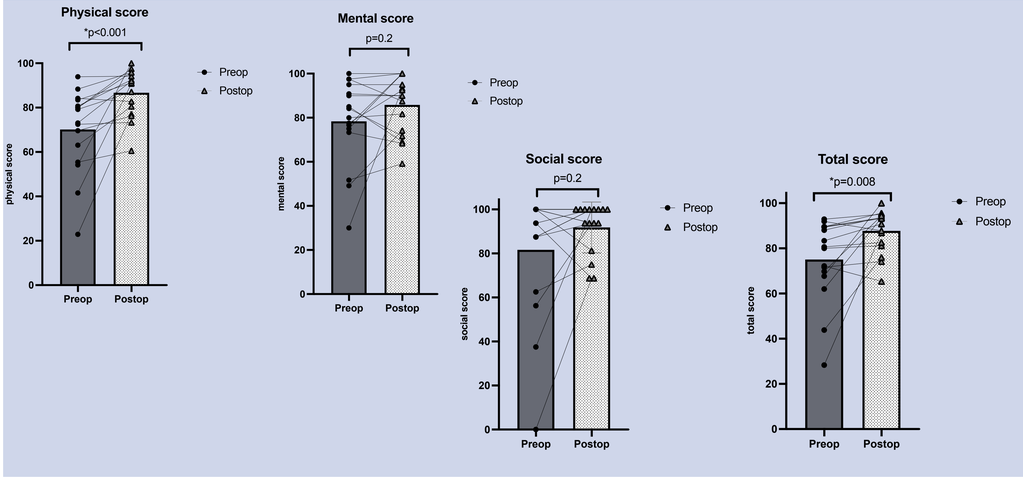
Domain Measure	Preoperation		1 year post operation		p	Results Interpretation
	Mean	SD	Mean	SD		
Dyspnea	47.0	7.5	37.4	6.4	<0.001	Significant improvement
Physical function	46.8	7.9	52.5	5.0	<0.001	Significant improvement
Sleep	52.2	8.3	48.4	8.6	0.004	Significant improvement
Fatigue	54.8	8.4	49.0	9.2	<0.001	Significant improvement
Pain	54.0	9.1	48.5	8.0	<0.001	Significant improvement
Depression	48.7	8.0	50.5	8.7	0.16	No significant difference
Social	53.2	6.9	54.8	7.7	0.15	No significant difference
Cognitive function	49.3	8.1	49.3	8.1	0.98	No significant difference

(1) – Unpaired T- test

(2) – Preoperative bariatric surgery patients, n=106, postoperative, n=72

(3) - Scores for fatigue, physical function, sleep disturbance, pain interference, cognitive function, depression, and social function were centered on reference populations, resulting in mean scores of 50 with a standard deviation (SD) of 10, representing the distribution of reference populations. Dyspnea was centered on a COPD population.

Figure 3: Sensitivity analysis of paired changes in PROMIS+HF 27 summary scores after 1-year follow-up



Results

106 patients completed the preoperative survey, 72 completed postoperative survey, 16 patients completed both. Mean preoperative BMI was 45.3 kg/m2. At baseline, 90% of patients reported some degree of dyspnea (38% mild, 39% moderate, 13% severe). Only 1 patient was diagnosed previously with dyspnea.

Postoperatively, dyspnea, physical function, fatigue, sleep disorder, and pain t-scores were all significantly improved. Depression, cognitive disturbances, and social t-scores did not significantly change. Overall, HRQOL total scores were significantly improved.

ANCOVA modeling was used to compare summary and domain t-scores with other demographic data, and none were significantly associated with weight loss.

Discussion

Based on results of this study, dyspnea is significantly underdiagnosed in the bariatric surgery population. Upwards of 90% of the cohort described symptoms of dyspnea, though only 1 patient was previously diagnosed with dyspnea.

Interestingly, most domain scores averaged below 50, representing better health than the general population. However, dyspnea in the PROMIS+HF 27 instrument is based on the COPD population, thus the bariatric population was found to have similar prevalence of dyspnea to this population

Conclusion and Future Directions

CHF symptoms are present in patients with severe obesity, and bariatric surgery was shown to improve these symptoms after a 1-year follow-up. The newly developed PROMIS+HF 27 HRQOL instrument could be a relevant and important tool for bariatric surgery patients. The symptoms of CHF may be overlooked in individuals with obesity, and there is insufficient recognition of the benefits of bariatric surgery in enhancing HRQOL associated with these conditions.