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## Learning Objectives

- Recognize the importance of weight loss in lung transplant candidates
- Recognize very low calorie diet as a potential modality of weight loss to improve lung transplantation candidacy

## Case Description

- Patient is a 68-year-old male with a history of nonspecific interstitial pneumonitis (on 3L O<sub>2</sub> at baseline), prediabetes, coronary artery disease status-post percutaneous coronary intervention (2014), and obstructive sleep apnea who was referred to clinical nutrition for weight loss in order to improve lung transplantation candidacy.
- His starting weight was 310 lbs (BMI 42 kg/m<sup>2</sup>), with a goal of 230 lbs to be eligible for transplant.
- He was started on a very low calorie diet (VLCD) of 960 kcal and 180g of protein per day, as well as metformin.
- Started light resistance training 2x/week at 2 months
- Started on modified very low calorie diet (MVLCD) at 4 months
- He was able to lose 50 lbs in the first 4 months and plateaued at a weight of 255 lbs (BMI 35 kg/m<sup>2</sup>) at 5 months.
- He achieved a weight of 242 lbs (BMI 33 kg/m<sup>2</sup>) and received a lung transplantation at 15 months.

## Very Low Calorie Diet

- VLCD consists of 800-1000kcal per day, with adequate dietary protein to maintain muscle mass (1g protein/lb fat-free body mass /day).
- Side effects of VLCD and rapid weight loss include gallstones, hypokalemia, fatigue, constipation, and lightheadedness.
- Monitor BMP q2-3 weeks, EKG q1-2 months
- Outpatient follow-up q2-4 weeks for monitoring and accountability
- Modified VLCD - modified diet to include both meal replacement protein shakes and whole, unprocessed foods, while maintaining a low caloric intake.

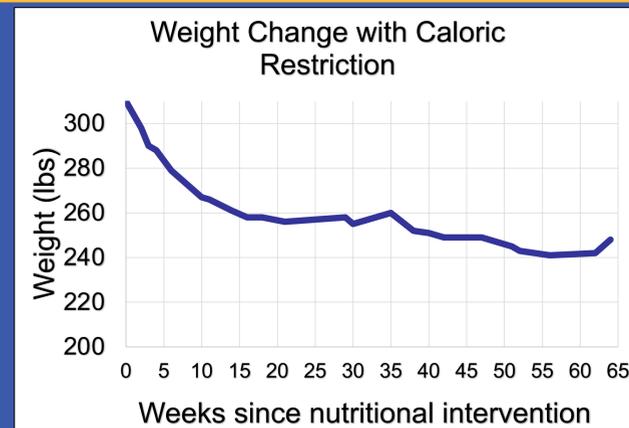


Figure 1. Change in body weight since initiating nutritional intervention. Patient's weight started at 310lbs (BMI 42) at week 0, with rapid initial weight loss. He was 242lbs (BMI 33) at time of transplant (week 62).

## Discussion

- Obesity, defined as a (BMI)  $\geq 30$  kg/m<sup>2</sup>, is associated with poor clinical outcomes after lung transplantation, including increased risk for acute graft dysfunction, reduced functional status, and increased mortality.
- A BMI  $\geq 30$  kg/m<sup>2</sup> is considered a relative contraindication, and BMI  $\geq 35$  kg/m<sup>2</sup> an absolute contraindication to lung transplant surgery.
- It has been shown that weight loss prior to lung transplantation is associated with improved survival and reduced perioperative complications among overweight and obese patients (BMI  $\geq 25$  kg/m<sup>2</sup>).
- Patients on VLCD, especially during initial rapid weight loss, needs close monitoring for lab abnormalities, EKG abnormalities, and diet adherence. Though frequent, follow-ups and lab draws can be managed in an outpatient setting.
- Adequate protein intake (1g protein/lb fat-free body mass) ensures maintenance of lean muscle mass, which is essential for patients potentially undergoing transplantation and recovery.

	Week 0	Week 15	Week 27
Wt (lbs)	310	258	255
Body fat %	39.90	35.80	35.70
Fat (lbs)	123.7	92.4	91
Lean body weight (lbs)	186.3	165.6	164
Basal metabolic rate (kcal/d)	2571	2285	2263

Fig 2. Change in body composition based on bio-electrical impedance analysis. Patient experienced significant loss of both body fat and lean body mass in the first 15 weeks. Patient's weight loss slowed down, but had adequate maintenance of lean body mass.

## Implications

Implementation of a medically supervised very low calorie diet with adequate dietary protein in an outpatient setting is one method for weight loss and improvement of lung transplant candidacy for obese subjects, thereby decreasing the risk of post-lung transplant morbidity and mortality, as well as other obesity-related conditions.