Integrating GLP -1's and Metabolic and Bariatric Surgery for Graft and Patient Survival

MTIS MIAMI TRANSPLANT INSTITUTE SYMPOSIUM 2026

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Finacial Disclosures

No relevant financial relationship to disclose

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Objectives

- Review the burden of obesity in organ transplantation
- Describe the use of GLP-1 receptor agonists to promote weight loss in transplant candidates and recipients
- Review the use of metabolic and bariatric surgery to promote weight loss in transplant candidates and recipients

Obesity Prevalence

- U.S. adults:
  - Obesity: ~40%
  - Severe obesity: ~9%
- Rising prevalence of obesity among transplant candidates
  - Kidney (ESKD): ~16%
  - Liver: Class I ~23%, Class II ~10%, Class III ~4%
  - Lung: ~12%
  - Heart: ~41.9%

CDC 2024, Prudhomme et al., 2023, ozani et al., 2025, Ghanem et al., 2024, OPTN/SRTR Annual Data Reports, 2020

Obesity & Transplant Candidacy

- Body weight is one of several factors considered in transplant eligibility
- Obesity is associated with a higher risk of complications before, during, and after surgery
- BMI cutoffs vary across transplant centers
- Measures beyond BMI may be used, such as waist circumference or waist-to-hip ratio
- Visceral adiposity, sarcopenic obesity, and ectopic fat deposition (hepatic, pancreatic, and epicardial) are more strongly associated with perioperative risk and adverse metabolic outcomes than BMI alone

Prudhomme et al., 2023

Post Transplant Weight Gain

- Common after solid organ transplantation, often within 6–12 months
- Studies shown that 1 in 3 patients will develop obesity within 3 years post-transplantation
- Contributing factors:
  - Immunosuppressive medications (especially corticosteroids)
  - Improved appetite and fewer dietary restrictions
  - Reduced physical activity
  - Metabolic changes (insulin resistance, dyslipidemia)

Rozani et al., 2025, Ghanem et al., 2024

Potential Complications

- Metabolic complications of obesity
  - Higher risk of insulin resistance
  - Higher risk of dyslipidemia
  - Higher risk of hypertension
- Metabolic complications of solid organ transplant (SOT)
  - 50% develop complications, including post-transplant diabetes, nonalcoholic fatty liver disease, dyslipidemia, and obesity
- Long-term survival posttransplant is significantly affected by metabolic complications

Rozani et al., 2025, Bhat et al., 2020

Weight Loss Options

Lifestyle interventions

Pharmacology interventions

Metabolic surgery

https://www.sciencedirect.com/science/article/pii/S2589936825000660#bib11

Lifestyle Interventions

Lifestyle Intervention

- Frequent counseling is recommended > 16 visits in 6 months
- Many insurance plans now cover nutrition counseling, ranging from 3 visits to unlimited visits
- Board Certified Specialist in Obesity and Weight Management (CSOWM)
- Lifestyle intervention remains necessary even when a patient chooses medication or surgery

Pharmacology Interventions

The Evolving Landscape of Anti -Obesity Medications (AOMs)

The Evolving Landscape of AOMs

- Glucagon Like Peptide 1 (GLP-1) Receptor Agonists
  - Stimulate insulin release in response to glucose, helping lower blood sugar
  - Suppresses glucagon, reducing post-meal blood sugar spikes
  - Slows gastric emptying, so food leaves the stomach more gradually
  - Enhance satiety signals in the brain, helping people feel full with less food
- Glucose-dependent insulinotropic polypeptide (GIP) receptor agonist
  - Act on brain pathways that regulate appetite and food reward, helping reduce hunger and cravings.
  - Improve insulin sensitivity

Current GLP -1 Available (Jan 2026)

- Liraglutide (GLP-1)
  - Daily injection
- Semaglutide (GLP-1)
  - Daily pill (new approval for weight loss)
  - Weekly injection
- Tirzepatide (GLP-1 + GIP)
  - Weekly injection
- FDA approval for a new oral peptide is expected in 2026
- Late clinical trials for other weight loss medications

	Liraglutide	Tirzepatide	Semaglutide
Agent Type	Single agent: • GLP-1	Double agent: • GLP-1 • GIP (glucose-dependent insulinotropic polypeptide)	Single agent: GLP-1
Generic Versions	Available (2025)	Not available	Not available
Weight Loss Injectable	8% (Meta analysis)	25.3% (88 weeks)	14.9% (68 weeks) 17.4% (104 weeks)
Weight Loss Oral			13.6% (72 weeks)

Wilding et al, 2021, Garvey 2022, Aronne et al, 2024

Benefits Beyond Weight Loss

Semaglutide

- Type 2 DM
- Metabolically-dysfunction-associated steatohepatitis (MASH)
- Moderate-to-advanced liver fibrosis (without cirrhosis)
- Chronic kidney disease
- Heart disease

Tirzepatide

- Type 2 DM
- Sleep apnea

Side Effects

- Nausea
- Vomiting
- Constipation
- Diarrhea
- Stomach pain
- Bloating
- Belching
- Gas
- Heartburn
- Headache
- Fatigue
- Dizziness
- Pancreatitis
- Gallbladder-related disorder
- Gastroparesis

GLP-1 RAs & Solid Organ Transplant

- Limited data
- Approval for weight loss is relatively new
  - 2021 Semaglutide (injection)
  - 2023 Tirzepatide (injection)
  - 2025 Semaglutide (oral)
- Medication shortages, insurance coverage, cost, and other barriers

Pre -Liver Transplant & GLP -1 RAs

- Participants:
  - Ineligible candidates with BMI >40 kg/m², or BMI ≥35 kg/m² with excess adipose tissue
  - 19 subjects
- Intervention
  - Metabolic clinic
    - Multidisciplinary team, including physicians trained in transplant and obesity medicine and registered dietitians
- Anti-obesity medications used:
  - Liraglutide (n = 5)
  - Semaglutide (n = 8)
  - Tirzepatide (n = 1)
  - Phentermine (n = 4)

Gonzalez et al., 2024

Outcomes

- Median weight loss: 11.7 kg across all 19 patients
- 8 patients received a transplant
- 4 patients were successfully listed
- 3 patients continued medical therapy
- 4 patients died due to the progression of liver disease or infection

Pre -Kidney Transplant

- Participants:
  - End-stage renal disease (ESRD) on renal replacement therapy
  - Mean BMI: 35.9 kg/m²
  - Study period: 2021–2023
  - 23 patients included
- Care delivered by a multidisciplinary team, including:
  - Medical and surgical transplant team members, psychologist, endocrinologist, and registered dietitian
- Anti-obesity medication:
  - Semaglutide 1.0 mg

Navaux et al., 2025

Outcomes

- Average weight loss: 11.4 kg
- 56.5% of patients were initially rejected for transplantation
- Of those initially rejected, 61.5% were ultimately transplanted

Semaglutide in ESKD Pre -Transplant

- Participants:
  - Adults on dialysis with BMI ≥ 30 kg/m²
  - Not listed for transplant due to excess weight
  - 13 patients included
  - Prospective, 12-week, open-label trial
- Intervention
  - Semaglutide administered weekly, titrated as follows:
    - 0.25 mg → 0.5 mg → 1.0 mg

Vanek et al., 2024

Outcomes

- Mean weight loss: 4.6 ± 2.4 kg
- Range: 2.0–9.7 kg
- Significant reductions in body weight and BMI

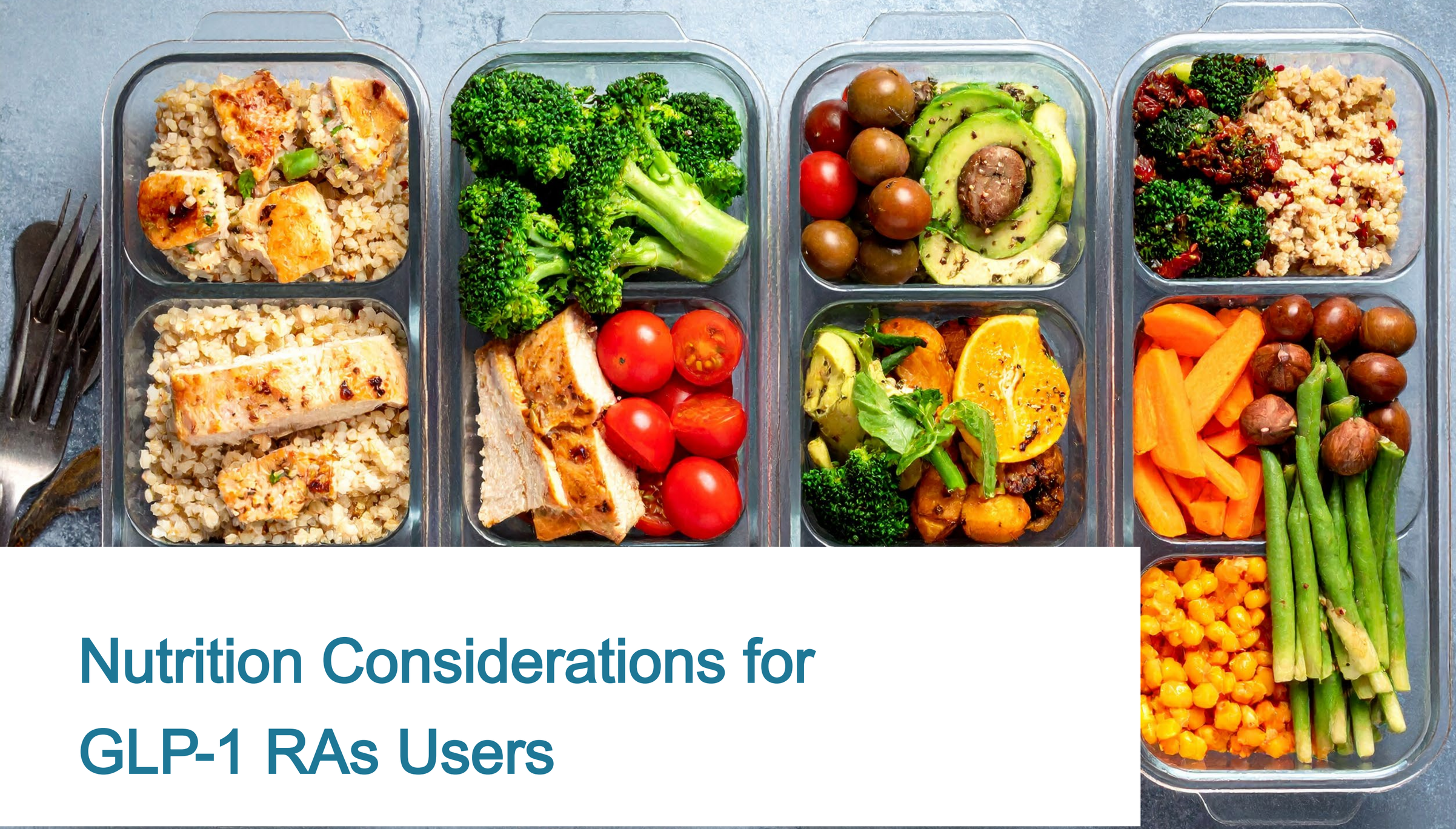
GLP-1 RAs After Kidney Transplantation in Patients with Diabetes

- Review of medical records
- Large Medicare-Based Cohort Study (2013–2020)
- 18,016 recipients with type 2 diabetes included
- 1,969 patients (10.9%) received a GLP-1 receptor agonist post-transplant

Orandi et al., 2025

5-Year Outcomes (Adjusted)

- 49% lower risk of graft loss
- 31% lower mortality



Nutrition Considerations for GLP-1 RAs Users

Goals

- Support weight loss
- Preserve lean mass
- Adequate energy intake
- Prevent or manage nutrition deficiences
- Managing GLP-1–related side effects
- Create sustainable, healthy eating habits

Nutrition Recommendations

- Adequate protein intake
  - Minimum of 60g protein daily and up to 1.2-1.5 g/kg IBW during weight loss
  - Distribute protein throughout the day
  - High-protein foods first
  - Supplement with protein powders, shakes, or bars if necessary
- Prioritizing fiber
  - 14 grams of fiber per 1000 calories
- Adequate hydration
  - Minimum of 64 fl oz of water or other noncaloric beverages
  - Moderate use of carbonated beverages

Gigliotti et al., 2025

Metabolic & Bariatric Surgery (MBS)

MBS

- Common Procedures
  - Sleeve gastrectomy
  - Roux-en-Y gastric bypass
- Mechanism of Action
  - Enhanced satiety and reduced appetite
  - ↑ GLP-1 and PYY, ↓ ghrelin → earlier and prolonged fullness
  - Improved insulin sensitivity
  - Modulation of appetite regulation and food reward pathways

Outcomes

Average outcomes

- **Total Body Weight Loss (TBWL): ~20 –35%**
- Excess Weight Loss (EWL): ~50–75%

By procedure (1–2 years post-op)

- Sleeve Gastrectomy (SG):
  - ~25–35% TBWL
  - ~50–70% EWL
- Roux-en-Y Gastric Bypass (RYGB):
  - ~30–35% TBWL
  - ~60–75% EWL

Timing of Surgery

- Can be performed:
  - Before
  - At the time of liver and kidney transplant
  - After
- Pre-bariatric surgery
  - Offers the greatest metabolic benefit
  - Often not feasible in patients with decompensated liver disease due to surgical risk

Rozani et al., 2025

Timing of Surgery

- At the time of transplant
  - Performed in highly specialized centers
  - Associated with durable weight loss
  - Leads to improvements in metabolic syndrome
  - Linked to reduced allograft steatosis
  - Technically complex procedure
  - Best suited for carefully selected patients
- Post-transplant
  - Feasible in selected patients
  - Might need to wait 1 year prior sx

Rozani et al., 2025, Ghanem et al., 2024

Safety Data

Registry data show:

- 30-day major complication rates are ~3× higher in transplant patients
- Mortality rates are similar to the general bariatric population

Ghanem et al., 2024

MBS + LVAD: Impact on Transplant Eligibility

- Eligibility:
  - 60–75% achieved BMI <35 kg/m² within 8–14 months
  - Enabled transplant listing in patients with severe obesity and end-stage heart failure
- Transplant and Clinical Outcomes
  - 35–45% successfully transplanted after MBS
  - Reduced need for:
  - Diuretics, vasodilators, anticoagulation

(Ng et al., 2022

Evidence Supporting MBS in Transplant Patients

- Decreased risk of:
  - Obesity, metabolic syndrome, and diabetes
- Decreased risk of hypertension, dyslipidemia, and atherosclerotic cardiovascular disease
- Reduce risk of MASLD / NAFLD and MASH
- Lower risk of metabolically driven CKD

Ghanem et al., 2024

Concerns Limiting Use of MBS

- Reluctance to refer transplant patients due to concerns about:
  - Staple-line leaks and marginal ulcers
  - Malnutrition and malabsorption
  - Potential compromise of graft outcomes
- Obesity medicine specialists and surgeons may hesitate due to the perceived higher risk
- Highlights the need for specialized centers
- Improved graph and patient survival

Nutrition Considerations for MBS

Goals

- Support safe weight loss and metabolic improvement
- Preserve lean body mass
- Prevent micronutrient deficiencies
- Promote long-term adherence and graft/organ protection (when applicable)

Nutrition Recommendations

- Adequate protein intake
  - Minimum of 60g protein daily and up to 1.2-1.5 g/kg IBW during weight loss
  - Distribute protein throughout the day
  - High-protein foods first
  - Supplement with protein powders, shakes, or bars if necessary
- Prioritizing fiber
  - 14 grams of fiber per 1000 calories
- Adequate hydration
  - Minimum of 64 fl oz of water or other noncaloric beverages
  - Moderate use of carbonated beverages

Nutrition Recommendations

Preoperative Nutrition Priorities

- Optimize:
  - Protein intake
  - Micronutrient status (iron, B12, folate, vitamin D, calcium)
- Early Postoperative Nutrition (Weeks 0–6)
  - Key focuses:
    - Hydration
    - Protein
    - Small, frequent meals
  - Avoid: sugary beverages, carbonation, alcohol

Nutrition Considerations

Long-Term Nutrition Considerations

- Balanced meals:
  - Protein + fiber-rich carbohydrates + healthy fats
- Monitor for:
  - Weight regain
  - Nutrient deficiencies
  - GI symptoms (dumping, intolerance)
- Ongoing nutrition counseling improves outcomes

Micronutrient Supplementation

Lifelong supplementation required

- Common regimen includes:
  - Multivitamin with minerals
  - Vitamin B12
  - Iron
  - Calcium + vitamin D
- Labs are monitored regularly and adjusted as needed

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Thank you!