

Shadi Al-Bahri, MD; Tannous K. Fakhry, MD; John Paul Gonzalvo, MD; Michel M. Murr, MD

## INTRODUCTION

Morbid obesity is considered to be a contraindication to organ allo-transplantation in most transplant centers worldwide, and is a common risk factor in the development of end stage renal disease. The majority (60%) of patients with ESRD are overweight or obese at the time of transplantation. Moreover, obesity contributes to poor patient and graft survival. The aim of our study was to report our experience with metabolic surgery in those whose candidacy for kidney transplantation was contingent upon weight loss.

## METHODS

Data from patients with ESRD was abstracted from our database of 3,500 bariatric surgery patients (1998-2015). Patient demographics, obesity related co-morbidities, etiology of renal failure, pre and post-operative BMI, %EBWL, time from bariatric surgery to listing for kidney transplantation and time, weight loss procedure type, listing status, morbidity and mortality were reviewed. All data was reported as mean  $\pm$  SD. All patients were followed by a nephrologist and were diagnosed with CKD prior to referral to our center for treatment of clinically significant obesity

## RESULTS

We reviewed **16** patients (6 M, 10 F) with ESRD on hemodialysis who underwent metabolic surgery before kidney transplantation. Their average BMI was  $48 \pm 8$  kg/m<sup>2</sup>, 12 patients underwent a LRYGB, 3 underwent a LAGB and 1 a LSG. There were no operative complications or deaths in the peri-operative period. At  $48 \pm 36$  months, weight loss was  $118 \pm 50$  lbs, BMI decreased from  $48 \pm 8$  to  $31 \pm 7$  kg/m<sup>2</sup>; **EBWL % was  $62 \pm 24\%$** . Of the above patients, **4** patients underwent renal **allo-transplantation**, **5** patients are currently **listed** for transplantation, **5** patients were **not listed** due to their comorbid conditions, and **2** patients were **lost** to follow-up. 2 of the 5 patients not listed unfortunately died as a consequence of their co-morbidities. One was admitted with bilateral pneumonia and progressed to multi-organ system failure years after her index operation and the other was found dead after being admitted for missing her hemodialysis appointments. Eight patients achieved the prerequisite weight loss for transplantation but have not been listed.

**Legend:** ESRD – End Stage Renal Disease, BMI – Basal Metabolic Index, %EBWL – % Estimated Body Weight Loss, SD – Standard deviation, CKD – Chronic Kidney Disease, LRYGB – Laparoscopic Roux-en Y Gastric Bypass, LAGB – Laparoscopic adjustable Gastric Band, LSG – Laparoscopic Sleeve Gastrectomy, FU – Followup, TXP – transplant, UNOS – United Network for Organ Sharing

Age/ Gender	% EBWL	FU (yrs)	Txp Status	Procedure	Comments
54 F	94	4	Listed	LAGB	Deceased
56 M	53	3	Not listed	LAGB	Lost to FU
66 F	21	7	Not listed	LAGB	Weight regain
56 F	86	2	Followup	RYGB	Lost to FU
48 F	78	2	Listed	RYGB	Pre-txp Prep
47 M	55	2	Listed	RYGB	Cardiac surgery
66 M	85	2	Not listed	RYGB	Prostate cancer
57 F	71	6	Not listed	RYGB	Improved function
54 F	49	3	Not listed	RYGB	BMI > 35
53 M	19	2	Lost to Followup	RYGB	Stabilized function
50 F	47	3	Listed	RYGB	Cardiac surgery
54 M	28	1	Listed	SG	Deceased
54 F	83	2	Transplanted	RYGB	Cardiac surgery
55 F	74	10	Transplanted	RYGB	Deceased donor txp
60 F	84	3	Transplanted	RYGB	Living donor txp
43 M	80	10	Transplanted	RYGB	Deceased donor txp

## DISCUSSION

Obesity increases the risk of chronic kidney disease and renal failure. Transplant recipients with obesity have a higher likelihood of post-transplant diabetes, delayed graft function, surgical site complications and are more likely to die prematurely of obesity-related disorders. The upper weight limit for cadaveric kidney transplant varies among institutions but for most transplant surgeons, a BMI > 35 is considered a contraindication. Bariatric and metabolic surgery induces sustainable and durable weight loss and remission of obesity related comorbidities. Specifically, RYGB improves function of the native kidneys by improving glomerular function but tubular defects continue to worsen. The relatively long follow-up time of our cohort gave us an opportunity to assess some of the dynamics of waiting for transplantation. The nadir of weight loss, which typically occurs at 1-2 years post surgery does not necessarily coincide with activation on the UNOS list or receiving the allograft. Four patients who met the weight criteria are awaiting to improve other co-morbidities such as cardiac issues, diabetic complications or osteomyelitis. In the interim, these patients continue to receive hemodialysis and undergo rigorous follow-up for protein and vitamin supplementation.

## CONCLUSION

Metabolic surgery in patients with ESRD is effective in inducing weight loss, allowing access to the transplant waiting list to patients previously deemed unsuitable to undergo the procedure.

