

The Obese Kidney Donor

Author: S. Taler, MD

Editor: D. Lapointe Rudow, DNP

ISSUE

What are the requirements and concerns for a potential kidney donor with obesity?

DATA

Obesity is defined by body mass index (BMI) calculated using an individual's height (in meters) and weight (in kilograms) as kg per meter squared (kg/m^2) (Table 1). Most centers avoid donations from individuals with BMI above $35 \text{ kg}/\text{m}^2$. Obesity has greater operative complications¹ and is a risk factor for the development of type 2 diabetes mellitus and as a result, diabetic kidney disease, now the most common cause of end stage kidney disease in the US.² Obesity is also associated with hyperfiltration and may lead to obesity related glomerulopathy.³ While the largest study of risk factors for future ESRD did not find an association between BMI and ESRD (Grams NEJM 2015), there was a relatively weak association between the presence of obesity and the risk of ESRD for those with a BMI of more than 30 (hazard ratio per increase of 5 above 30, 1.16; 95% CI, 1.04 to 1.29)⁴. Whether removal of one kidney for kidney donation increases the risks related to hyperfiltration is uncertain. Based on this concern, individuals with severe obesity (BMI $>35 \text{ kg}/\text{m}^2$) are often excluded from donation and those with less severe obesity are advised to make lifestyle changes to reduce their weight.

A potential kidney donor with BMI of $35 \text{ kg}/\text{m}^2$ or higher (some centers use lower limits for younger donors and there is some variability in the upper limit by center) will be advised to institute lifestyle changes to lose weight by changing their diet and increasing exercise. It is important to understand that the lifestyle changes that are effective to lose weight will need to be continued for the long term. Some weight loss procedures cause high urine oxalate levels (related to food malabsorption inherent to the successful weight loss) that may increase the risk for kidney stones. Individuals who have undergone a surgical procedure (gastric bypass or gastric sleeve) to effectively lose weight may require additional testing of oxalate metabolism in order to be considered as donors and may be excluded at some centers even if oxalate metabolism is normal.

Recommendation

1. An obese donor is at increased risk for surgical morbidity.
2. A potential donor with obesity may be at higher risk for developing diabetes and as a consequence diabetic kidney disease or obesity related glomerulopathy.
3. A potential donor with obesity may have additional characteristics that put them at greater risk for cardiovascular disease such as hypertension, elevated cholesterol and triglyceride levels, or elevated fasting glucose level (pre-diabetes). UNOS recommends that potential donors with multiple metabolic abnormalities must be carefully evaluated for their potential risk for cardiovascular complications at the time of or after donor surgery. If that risk is felt to be too high, the donor would be excluded from donation⁵.

Table 1: World Health Organization (WHO) definition and classification of obesity based on body mass index (BMI)

Severity, grade	BMI, kg/m ²
Grade 1 overweight	25-29.9 kg/m ²
Grade 2 obesity	30-39.9 kg/m ²
Grade 3 severe or morbid obesity	≥40 kg/m ²

References

1. Segev DL, Muzzaale AD, Caffo BS, et al. Perioperative mortality and long-term survival following live kidney donation. *JAMA*. 2010; 303(10): 959-966.
2. USRDS accessed at http://www.usrds.org/2015/view/v2_01.aspx
3. Kambham N, Markowitz GS, Valeri AM, Lin J, D'Agati VD. Obesity-related glomerulopathy: An emerging epidemic. *Kidney International* 2001; 59:1498–1509.
4. Grams ME, Sang Y, Levey AS, Matsushita K, Ballew S, Chang AR, et al. Kidney-Failure Risk. Projection for the Living Kidney-Donor Candidate. *N Engl J Med*. 2016;374(5):411-21.
5. UNOS donor evaluation policy accessed at http://optn.transplant.hrsa.gov/ContentDocuments/OPTN_Policies.pdf#nameddest=Policy_14

Note: The recommendations in these chapters are the opinions of the Living Donor Community of Practice of AST. They are not meant to be prescriptive and opinions by other groups or institutions may be equally valid.