RESEARCH ARTICLE

Surgical Outcome Of Obese Living Kidney Donors: A Retrospective Comparative Study

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Abstract

Objective: To explore the surgical outcomes among obese and non-obese living kidney donors.

Method: The retrospective cohort study was conducted from July to December 2024 at the Renal Transplant Unit of Dow University of Health Sciences, Karachi, and comprised data from January 1, 2020, to June 30, 2024, of living kidney donors aged 18-65 years who had undergone open nephrectomy operations. Individuals with body mass index 25kg/m^2 or higher were designated as obese donors, while those with body mass index <25kg/m^2 were taken as non-obese donors. A-priori sample size was calculated (minimum 60); 70 donors met the eligibility criteria and were included through non-probability consecutive sampling. Perioperative and postoperative parameters were compared using SPSS version 26.

Results: Of the 70 patients, 31 were obese (21 males, 10 female) having mean age 37.7 ± 9.73 years and mean BMI 32.5 ± 1.1 kg/m^2. There were 39 non-obese subjects (25 males, 14 female) with mean age 47.1 ± 11.7 years and mean BMI 24.4 ± 1.32 kg/m^2. Mean length of hospitalization among obese patients was 4.65 ± 1.2 days compared to 3.0 ± 0.0 days among non-obese patients ($p = 0.009$). The difference in duration of surgery between obese and non-obese donors was significant ($p < 0.001$). Postoperative complications were less frequent among non-obese donors, but the difference was not significant ($p = 0.144$).

Conclusion: Donors who were obese experienced major operating difficulties together with longer procedure durations and longer postoperative hospitalization.

Key Words: Obesity, Living kidney donation, Surgical outcomes, Postoperative complications, Renal function.

(JPMA 75: 10 S-25 (Supple-3); 2025) **DOI: https://doi.org/10.47391/JPMA.DUHS-25-06**

Introduction

Patients with end-stage renal disease (ESRD) achieve their best treatment through kidney transplant because survival expectancy and overall life improvement exceed those of renal dialysis.[1] Chronic kidney disease (CKD) has led to a worldwide increase in demand for kidney transplants because hypertension (HTN) and diabetes mellitus (DM) with obesity happen to be the main diseases that cause CKD. The process of live kidney donation stands as a fundamental support for organ transplantation because it provides superior results for both transplant survival and recipient longevity in comparison to deceased donor kidney transplants.[2] The practice of living kidney donation has proved beneficial, but it has introduced important safety risks that may affect donor health. The rise in donor obesity requires medical organisations to establish evidence-based approaches for handling potential kidney donors with obesity. Weight control protocols should precede donation procedures in the guidelines, while operational and supervisory procedures need to exist to minimise operative risks for obese kidney donors. The number of obese persons is growing worldwide having body mass index (BMI) >30kg/m^2. The Asian population, in particular, faces unique challenges in the context of obesity and kidney donation. BMI cut-off values for obesity among Asian populations are lower than those in Western healthcare systems. According to Asia-Pacific guidelines, obesity is a medical condition affecting people with BMI >25kg/m^2.[3]

Poor weight management leads to serious complications during all stages of a kidney donation procedure that threaten donor safety.[4] The recovery process becomes extended for obese donors due to higher risks of postoperative complications, which include wound infections and delayed transplant recovery time, and extended length of hospital stay (LOS).[5]

The combination of obesity in donors with pre-existing health problems, such as HTN and DM, results in increased kidney-related risks that could lead to kidney failure after donation. Obese individuals face increased risks for developing CKD along with renal insufficiency

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when they have comorbidities that act as risk factors.[6] Short-term surgical outcomes and long-term health benefits are better for obese donors after applying bariatric surgery in kidney donation candidates.[7]

The increasing prevalence of obesity necessitates a deeper understanding of its implications on donor outcomes. The current study was planned to explore the surgical outcomes among obese and non-obese living kidney donors.

Materials and Methods

The retrospective cohort study was conducted from July to December 2024 at the Renal Transplant Unit of Dow University of Health Sciences (DUHS), Karachi, and comprised data from January 1, 2020, to June 30, 2024, of living kidney donors aged 18-65 years who had undergone open nephrectomy operations. Owing to the retrospective design, the study did not need approval from the institutional ethics review committee. Data of all living kidney donors who received open nephrectomy operations was accessed. Individuals with BMI 25kg/m^2 or higher were designated as obese donors, while those with BMI <25kg/m^2 were taken as non-obese donors. Cases with incomplete medical records, those with pre-existing kidney disease, malignancies or autoimmune diseases were excluded. All the donors had received evaluation for blood pressure along with blood glucose testing and estimated glomerular filtration rate (eGFR) assessments. Also, thorough preoperative cardiovascular assessments had been done to ensure only physician-approved donors with no cardiac malfunction were selected.

Using a structured proforma, data was collected, including demographic details, surgical and postoperative information, age, gender, BMI, and pre-existing comorbidities. Surgical details included the choice of nephrectomy method between open or laparoscopic procedures, duration of surgery, blood-loss and intraoperative complications. Post-surgery outcomes included LOS, wound infection, healing time and hospital readmission. Renal function monitoring had continued for 6 months post-surgery along with assessments of donor quality of life (QOL).

A-priori sample size was calculated using a power of 80% and a significance level of 5%, expecting a medium effect size (Cohen's d = 0.5) for differences in duration of surgery and LOS between obese and non-obese donors. The minimum required sample size was estimated at 60 donors. Ultimately, 70 donors fulfilling the inclusion criteria were available and included in the study.

Non-probability consecutive sampling was used, in which all eligible donors during the study period who fulfilled the inclusion criteria were enrolled.

Data was analyzed using SPSS 26. Data was expressed as mean ± standard deviation or frequencies and percentages, as appropriate. Chi-square test was used where necessary. P<0.05 was taken as statistically significant.

Results

Of the 85 cases screened, 15 (17.6%) were excluded (Figure 1). Of the 70 patients included, 31were obese (21 male, 10 female) having mean age 37.7 ± 9.73 years and mean BMI 32.5 ± 1.1 kg/m^2, and 39 were non-obese (25 male, 14 female) with mean age 47.1 ± 11.7 years and mean BMI 24.4 ± 1.32 kg/m^2. The duration of surgery was 5.27 ± 0.26 hours for obese patients, while it was 4.38 ± 0.55 hours for non-obese patients (p < 0.001). Mean length of stay among obese patients was 4.65 ± 1.2 days

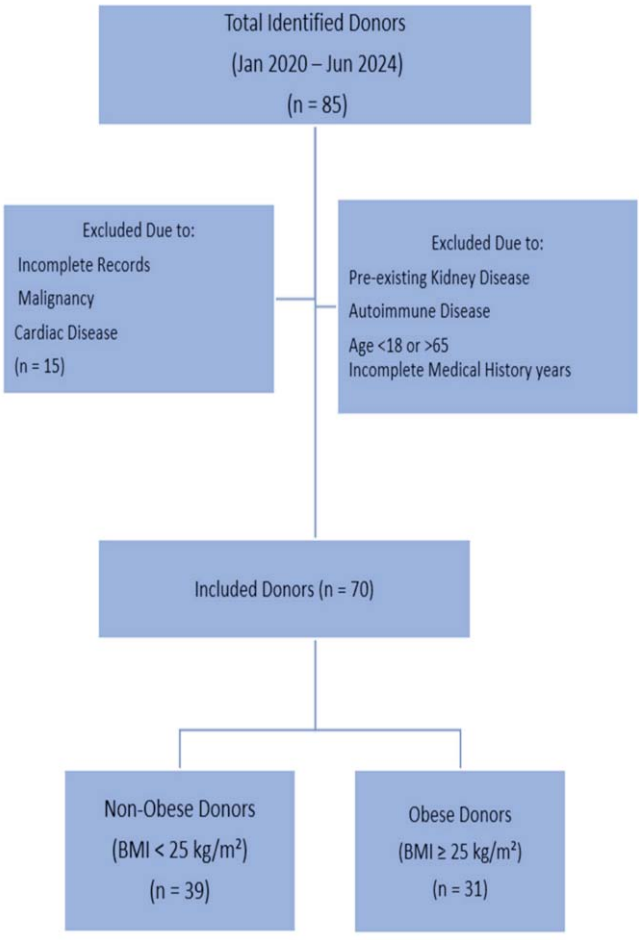

Figure: Patient selection flowchart.

Table-1: Comparison of demographic and clinical characteristics between obese and non-obese donors.

Variables	Obese/ non-obese	N	Mean	Std. Deviation	Std. Error Mean
Age (Years)	Obese	31	37.77	9.732	1.748
	Non-Obese	39	47.10	11.774	1.885
BMI (kg/m^2)	Obese	31	32.52	1.180	.212
	Non-Obese	39	24.49	1.315	.211
Hospital Stay Duration (Days)	Obese	31	4.65	1.279	.230
	Non-Obese	39	3.00	.000	.000
Surgery Time (Hours)	Obese	31	5.27	.259	.046
	Non-Obese	39	4.38	.547	.088

*BMI: Body mass index

Table-2: Association of postoperative complications with obesity status.

Variable	Obese/ non-obese		Total
	Obese	Non-Obese	
Complications			
Cardiac Issue	1	1	2
ICU Admission	1	0	1
None	25	38	63
Readmission	1	0	1
Wound Infection	3	0	3
Total	31	39	70
Chi-Square Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	6.858a	4	.144
Likelihood Ratio	8.717	4	.069
N of Valid Cases	70		

*ICU: Intensive care unit.

Table-3: Gender distribution of study participants

Group	Male	Female	Total
Obese	21	10	31
Non obese	25	14	39
Total	46	24	70

compared to 3.0 ± 0.0 days among non-obese patients (p = 0.009) (Table 1). Postoperative complications were encountered in 7 (10%) patients, and these were less frequent among non-obese donors, but the difference was not significant (p = 0.144). Overall, 3 (4.3%) patients suffered wound infections, 2 (2.8%) developed cardiac issues, while 1 (1.4%) each required intensive care unit (ICU) admission and hospital readmission (Table 2).

Discussion

The current study demonstrated how obesity influences kidney donation outcomes by extending both procedural times and LOS, which was in line with earlier research.[8,9] Obese patients undergo procedures that require significantly more time because of the technical issues linked to extra adipose tissue and difficult anatomical structure access and mandatory additional precautions during surgery.[10] Previous studies showed that obese donors usually need extended hospital stays due to delayed wound healing and increased likelihood of postoperative infections.[11] The current study showed that obesity measurements did not have a significant association with post-surgical complications (p=0.144). The current sample might not have been powerful enough to confirm the statistical significance of the connection between obesity and wound infections, but research has pointed to obesity as a factor that raises surgical site infection risks because of slow wound healing, but more extensive multicentre studies are necessary to substantiate this association.[12]

In the current study, obesity did not have any meaningful impact on cardiac problems through the perioperative period. Research has shown that compromised lung function does not increase the need for ventilation or cardiac distress.[13,14] The current findings might have been influenced by strict donor screening in the preoperative stage regarding cardiovascular health. Extended clinical research is needed to confirm how obesity affects cardiovascular morbidity risks for kidney donors during their lifespan.

The current study has several limitations, including its retrospective design and a single-centre dataset. Besides, the study examined short-term outcomes up to 6 months postoperatively, but failed to reveal future risks related to kidney function deteriorations, metabolism disorders and heart disease occurrences in obese donors. Finally, the modest sample size potentially reduced the statistical validity of the findings.[15] Future management of obese donors should consider structured weight loss programme, including bariatric surgery, to optimize outcomes.[16,17]

In the light of the current findings, it is clear that an integrated system of controlled measures at multiple

stages is needed to target improvement in kidney donation success rates and safety of obese donors. Weight management programs need to be established as a standard practice to support donors who exhibit high BMI levels.[17] Besides, continuous observation and therapeutic practices must be part of the process to manage obese donors who undergo surgery.

Conclusion

Kidney donors with obesity experienced longer operating times and needed extended hospitalisation. Obese donors had more complications even though statistical evidence pointed towards no connection between obesity and postoperative complications. Comprehensive preoperative screening procedures and weight management programmes need to be established for optimising donor selection and operating outcomes.

Acknowledgment: We are grateful to Laraib Khan for editorial assistance.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

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