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CASE REPORT

# Laparoscopic Living Donor Nephrectomy at a Nigerian Kidney Transplant Center

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## ABSTRACT

Kidney transplantation is the best treatment option for patients with end-stage renal disease, with better survival rates. Laparoscopic donor nephrectomy, which is a surgical advancement from the open donor nephrectomy, was first performed in 1995 and was found to have a better cosmetic outcome, shorter hospitalization, with similar quality of allograft when compared to those harvested by open donor nephrectomy. We commenced laparoscopic donor nephrectomy in 2022 at Zenith Medical and Kidney Center, Abuja, Nigeria, and hereby present the case series of the three patients operated on so far. Laparoscopic donor nephrectomy is a welcomed surgical procedure with improved patient satisfaction after surgery and better cosmetic outcomes. Renal function after recipient surgery is also satisfactory.

**Descriptors:** Laparoscopic; Nephrectomy; Donor; Surgery.

## *Nefrectomia Laparoscópica com Doador Vivo em um Centro de Transplante Renal Nigeriano*

## RESUMO

O transplante renal é a melhor opção de tratamento para pacientes com doença renal terminal, com melhores taxas de sobrevida. A nefrectomia laparoscópica do doador, um avanço cirúrgico da nefrectomia aberta do doador, foi realizada pela primeira vez em 1995, e demonstrou apresentar melhor resultado estético, menor tempo de hospitalização e qualidade semelhante do aloenxerto quando comparado aos obtidos por nefrectomia aberta do doador. Iniciamos a nefrectomia laparoscópica do doador em 2022 no Zenith Medical and Kidney Center, em Abuja, Nigéria, e apresentamos aqui a série de casos dos três pacientes operados até o momento. A nefrectomia laparoscópica do doador é um procedimento cirúrgico bem-vindo, com maior satisfação do paciente após a cirurgia e melhor resultado estético. A função renal após a cirurgia do receptor também é satisfatória.

**Descritores:** Laparoscopia; Nefrectomia; Doador; Cirurgia.

## INTRODUCTION

Compared to hemodialysis, kidney transplantation is the best treatment option for patients with end-stage renal disease, with significantly better survival rates.[1] Advancement in surgical techniques, improvements in postoperative care, specialized immunosuppressive treatment protocols, and an increased rate of live kidney donations have certainly improved kidney transplant outcomes.[2] Laparoscopic live donor nephrectomy was first performed in February 1995.[3]

Subsequent series have demonstrated that when compared with an open donor nephrectomy through a flank approach, the laparoscopic operation resulted in significantly shorter hospitalization, quicker return to full activities, and sooner return to work.[4-7] Leow[8] questioned whether the shorter hospitalization for the donor is offset by poor allograft function and protracted recipient

length of stay. Studies in both large animal[9,10] and small animal[11] models have demonstrated a decrease in renal blood flow, with elevated intra-abdominal pressure; also, the major histocompatibility complex (MHC) class II is upregulated after renal ischemia.[12,13] These support poor allograft function after laparoscopic donor nephrectomy when compared to open donor nephrectomy. Laparoscopic live donor nephrectomies were performed as previously described.[3] This involves placing the patient under general anesthesia, positioning the patient in a modified flank position, making several small incisions on the abdomen for port placement, with the largest for the camera port placed at the peri-umbilical position. The camera was then used to visualize the internal abdominal organs, followed by careful dissection and mobilization of the colon and then the kidney. The renal vessels were carefully mobilized and prepared for clipping and division using hemolock clips; the ureter division was also done, followed by the extraction of the kidney through a small Pfannenstiel skin incision. The camera ports and Pfannenstiel skin incisions were then closed in two layers, while other port incisions were closed in one layer.

We report a case series of the first three laparoscopic living donor nephrectomies performed at Zenith Medical and Kidney Center, Abuja, Nigeria.

## CASE SERIES

### Case 1

A 29-year-old male who presented at the urology clinic, Zenith Medical and Kidney Center, Abuja, Nigeria, in September 2022 as a potential kidney donor for a 47-year-old male on management for chronic kidney disease secondary to chronic glomerulonephritis. The recipients come with their donors for review and investigations to determine compatibility.

There was no positive history of hypertension or diabetes mellitus. He does not consume alcohol, smoke cigarettes, or use herbal medications. There was no history of surgery and no known drug allergies.

Physical examination revealed no abnormal findings. The requested laboratory and radiological investigations were normal.

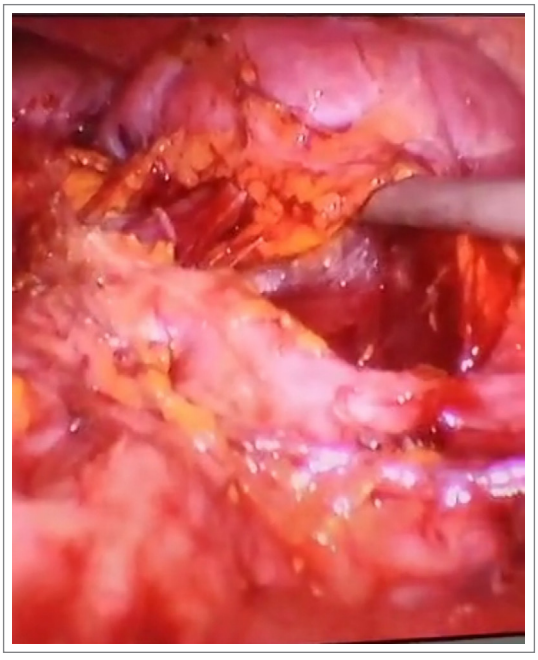
He had video-covered counseling on laparoscopic living donor nephrectomy, and consent for the procedure was obtained.

#### Immunology

Human leukocyte antigen (HLA) 1-2-1 mismatch with T-cell negative cross-match.

The surgeries were performed by two teams of experienced kidney transplant surgeons, one team for donor surgery and the other for recipient surgery.

He subsequently had transperitoneal left laparoscopic living donor nephrectomy under general anesthesia (Fig. 1). Operative time was 2 hours and 30 minutes, estimated blood loss was 70 milliliters, and warm ischemia time (WIT) was 2 minutes. He had a satisfactory postoperative recovery and was discharged home on the 5th postoperative day.



Source: The authors.

**Figure 1.** Mobilization of the left kidney during transperitoneal laparoscopic living donor nephrectomy.

The recipient surgery, under spinal/epidural anesthesia, was done through a right groin incision with the use of the right external iliac vessels for vascular anastomosis. Ureteroneocystostomy was done using the Lich-Gregoir technique. There was immediate graft function with serum creatinine dropping to 120 µmol/L by the 7th postoperative day.

Tacrolimus/ mycophenolate mofetil/prednisolone were used for immunosuppression. Declining graft function was noticed 9 months post-surgery, with creatinine rising to 200 µmol/L, which progressively worsened despite adjustment of immunosuppressants. The allograft biopsy done was in keeping with T-cell-mediated rejection. He is currently on hemodialysis, awaiting a possible second transplant. One year after transplant, he is still on hemodialysis.

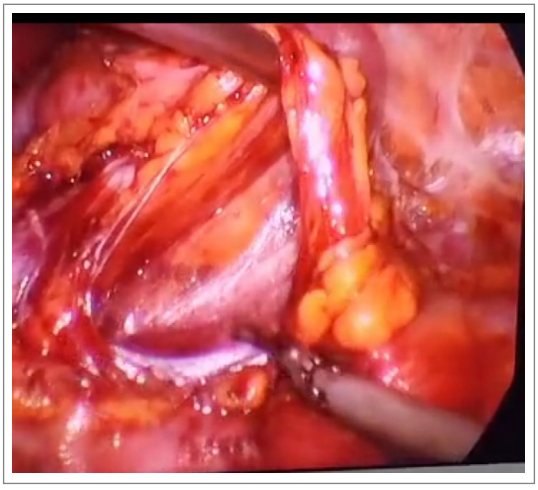
## Case 2

A 35-year-old male presented as a potential donor for a 65-year-old male on management for chronic kidney disease secondary to hypertension in October 2022. History taking and physical examination were unremarkable.

The requested laboratory and radiological investigations were normal. He had video-covered counseling on laparoscopic living donor nephrectomy, and consent for the procedure was obtained.

### Immunology

HLA 0-1-1 mismatch with T-cell negative cross-match. He subsequently had transperitoneal left laparoscopic living donor nephrectomy under general anesthesia (Fig. 2). Operative time was 3 hours, estimated blood loss was 100 milliliters, and WIT was 2 minutes 20 seconds. There was satisfactory postoperative recovery, and he was discharged home on the 5th postoperative day.



Source: The authors.

**Figure 2.** Mobilization of the left ureter during transperitoneal laparoscopic living donor nephrectomy.

The recipient surgery was done through a right groin incision with the use of right external iliac vessels for vascular anastomosis, and ureteroneocystostomy was done using the Lich-Gregoir technique.

There was delayed graft function with serum creatinine of 280 µmol/L by the 7th postoperative day. The serum creatinine dropped to 128 µmol/L on the17th postoperative day. Serum creatinine 1 year after transplant revealed a value of 122 µmol/L. He is currently on regular follow-up visits.

## Case 3

A 32-year-old male presented as a potential donor for a 56-year-old male on management for chronic kidney disease secondary to hypertension in May 2024. History taking and physical examination were unremarkable. The requested laboratory and radiological investigations were normal. He had video-covered counseling on laparoscopic living donor nephrectomy, and consent for the procedure was obtained.

### Immunology

HLA 1-1-0 mismatch with T-cell negative cross-match.

He subsequently had a transperitoneal left laparoscopic living donor nephrectomy. Operative time was 2 hours 50 minutes, estimated blood loss was 90 milliliters, and WIT was 2 minutes 50 seconds. There was an uneventful postoperative recovery, and he was discharged on the 5th postoperative day. The recipient surgery was done through a right groin incision with the use of right external iliac vessels for vascular anastomosis, and ureteroneocystostomy was done using the Lich-Gregoir technique.

There was immediate graft function with serum creatinine of 129 μmol/L by the 7th postoperative day. He had a satisfactory post postoperative recovery. Serum creatinine was 108 μmol/L after 1 year of kidney transplantation.

## DISCUSSION

All the patients in the case series were males, both donors and recipients. Although this is common in our environment, it contradicts global information where women are more likely to be living donors. It, however, buttresses well-known facts that chronic kidney disease is more common in males than females, and males are more likely to donate kidneys than females. Chronic kidney disease in the recipients resulted from hypertension in two of the patients involved in the case series, buttressing the well-known fact that hypertension is the most common cause of chronic kidney disease.

All the patients had undergone left laparoscopic donor nephrectomy, as we had just started the procedure, and surgeries on the left have been known to have fewer complications compared to the right. The patients did not have complications after surgery and were all discharged after 5 days, which was the same duration of stay as patients who had open donor nephrectomy at our facility . Although this practice is not supported by global studies, our facility just started the procedure, and as our experience improves, we will start discharging patients earlier than 5 days.

One of the recipients had delayed graft function. Whether this was due to elevated intra-abdominal pressure associated with pneumoperitoneum, which might result in oliguria and acute tubular necrosis, as noted by Leow,[8] is yet to be determined, as it was noticed in just one patient. Efforts at investigating other possible causes of the delayed graft function did not yield any positive results. Further experience with this procedure will help buttress or refute that fact.

The patients were happier with the Pfannenstiel scar, as it is more hidden and thus more cosmetic compared with the flank scar for open donor nephrectomy. Although the procedure has a steep learning curve, it was found to be more acceptable to the patients and has no significant deleterious effect on graft quality for the recipients. Further experience involving more patients will help validate the findings noted in these cases.

## CONCLUSION

Laparoscopic donor nephrectomy is a welcomed surgical procedure that offers superior outcomes for the patients who undergo donor nephrectomy.

The patients who had the procedure were well satisfied with the postoperative recovery as well as the postoperative scar.

Although it has a steep learning curve, the benefits outweigh the difficulty, and it does not lead to poor quality of renal allograft. Offering the procedure to more patients followed up for a longer duration will help support or refute these findings.

## CONFLICT OF INTEREST

Nothing to declare.

## AUTHOR'S CONTRIBUTION

**Substantive scientific and intellectual contributions to the study:** Onwuasoanya U; **Conception and design:** Onwuasoanya U; **Data analysis and interpretation:** Olorunfemi P, Rex-ogbuku W, Odunfa I; **Article writing:** Onwuasoanya U; **Critical revision:** Olatise O, Agrawal R, Ekwuazi H, Uyobong B, Musa B; **Final approval:** Olatise O.

## DATA AVAILABILITY STATEMENT

Not applicable.

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Not applicable.

## REFERENCES

1. Guler S, Cimen S, Hurton S, Molinari M. Risks and benefits of early catheter removal after renal transplantation. Transplant Proc, 2015;47:2855-9. https://doi.org/10.1016/j.transproceed.2015.10.032
2. Cimen S, Guler S, Alwayn I, Lawen J, Kiberd B. Correlation of surgical times with laparoscopic live donor kidney transplant outcomes. Open J Organ Transpl Surg, 2013; 3: 68-72. http://doi.org/10.4236/ojots.2013.34014
3. Ratner LE, Ciseck LJ, Moore RG, Cigarrua FG, Kaufman HS, Kavoussi LR. Laparoscopic live donor nephrectomy. Transplantation. 1995; 60:1047-9. Available at: https://pubmed.ncbi.nlm.nih.gov/7491680/
4. Ratner LE, Kavoussi LR, Sroka M, Hiller J, Weber R, Schulam PG, et al. Laparoscopic assisted live donor nephrectomy A comparison with the open approach. Transplantation. 1997; 63: 229-33. Available at: https://journals.lww.com/transplantjournal/abstract/1997/01270/laparoscopic_assisted_live_donor_nephrectomy___a.9.aspx
5. Ratner LE, Hiller J, Sroka M, Weber R, Sikorsky I, Montgomery RA, et al. Laparoscopic live donor nephrectomy removes disincentives to live donation. Transplant Proc, 1997; 29: 3402. https://doi.org/10.1016/S0041-1345(97)00955-X
6. Ratner LE, Kavoussi LR, Schulam PG, Bender JS, Magnuson TH, Montgomery R. Comparison of laparoscopic live donor nephrectomy versus the standard open approach. Transplant Proc, 1997; 29: 138. https://doi.org/10.1016/S0041-1345(96)00037-1
7. Flowers JC, Jacobs S, Cho E, Morton A, Rosenberger WF, Evans D, et al. Comparison of open and laparoscopic live donor nephrectomy. Ann Surg. 1997; 226:483-90. Available at: https://journals.lww.com/annalsofsurgery/abstract/1997/10000/comparison_of_open_and_laparoscopic_live_donor.9.aspx
8. Leow CK. Comment on "laparoscopic-assisted live donor nephrectomy: a comparison with the open approach." Transplantation. 1997; 64: 1222. Available at: https://journals.lww.com/transplantjournal/fulltext/1997/10270/comment_on__laparoscopic_assisted_live_donor.30.aspx
9. Harman PK, Kron IL, Mclachlan HD, Freedlender AE, Nolan SP. Elevated intra-abdominal pressure and renal function. Ann Surg, 1982; 196: 594. https://doi.org/10.1097/00000658-198211000-00015
10. London E, Neuhaus A, Ho H, Wolfe B, Rudich S, Perez R. Beneficial effect of volume expansion on the altered renal hemodynamics of prolonged pneumoperitoneum 24th Annual Scientific Meeting of the American Society of Transplant Surgeons; 1998; Chicago, IL.
11. Kirsch AJ, Kayton ML, Hensle TW, Olsson CA, Chang DT, Sawczuk IS. Renal effects of $CO_2$ insufflation: oliguria and renal dysfunction in a rat pneumoperitoneum model. Urology. 1994; 43: 453. Available at: https://www.sciencedirect.com/science/article/abs/pii/0090429594902305
12. Shoskes DA, Parfrey NA, Hauoran PF. Increased major histocompatibility complex antigen expression in unilateral ischaemic acute tubular necrosis in the mouse. Transplantation. 1990; 49: 201. https://doi.org/10.1097/00007890-199001000-00045
13. Ibrahim S, Jakobs F, Zukin Y, Enriquez D, Holt D, Baldwin W, et al. Immunohistochemical manifestations of unilateral kidney ischaemia. Clin Transpl, 1996; 10: 646. Available at: https://pubmed.ncbi.nlm.nih.gov/8996759/