RESULTADOS DE UN PROGRAMA DE TRASPLANTE RENAL EN UNA CLÍNICA DE LA REGIÓN CARIBE – 2019 A 2022

Leinad Yamile Moran Marin

Código Estudiantil: 2015213568532

Trabajo de Investigación presentado como requisito para optar el título de:

ESPECIALISTA EN NEFROLOGIA

Tutores:

OMAR DE JESÚS CABARCAS BARBOSA

MD | Internista | Nefrólogo

SANTOS ANGEL DE PINE

MD| Internista | Nefrologo

HENRY J GONZALEZ-TORRES

Bio | Spc App Stat | MSc Bio (GenPop) | PhD (c) BioMed

RESUMEN

El trasplante renal es una opción de tratamiento efectiva y, en muchos casos, la mejor alternativa para pacientes con enfermedad renal en etapa terminal. Sin embargo, aún enfrenta desafíos significativos que deben abordarse para mejorar la calidad de vida y la supervivencia de los receptores de trasplantes. Por lo tanto, los programas de seguimiento para estos pacientes renales son esenciales.

Objetivo: Evaluar los resultados de un programa de trasplante renal en una clínica en la Región Caribe Colombiana entre los años 2019 y 2022.

Métodos: El estudio utilizó un enfoque de cohorte analítica, resumiendo variables con medias o medianas según la normalidad. Las variables categóricas se describieron utilizando frecuencias. Las pruebas estadísticas incluyeron la prueba t de Student, la prueba de Wilcox, la prueba de Kruskal-Wallis para medianas de GFR y las pruebas de Fisher o Chi-cuadrado para variables categóricas. El análisis de Kaplan-Meier estimó la supervivencia del injerto por tipo de donante. La significancia se estableció en $p<0.05$. El software R-CRAN versión 4.3.2 se realizaron los análisis estadísticos.

Resultados: Se siguieron 164 participantes en un programa de trasplante renal, el 62% eran hombres, con hipertensión como comorbilidad predominante (77%) y diabetes tipo 2 en el 16%. Las principales enfermedades renales primarias fueron Nefroangiosclerosis (NAH) en un 20% y Nefropatía Diabética (DN) en un 16%. Los trasplantes se distribuyeron equitativamente entre donantes cadavéricos (49%) y vivos (51%). Las tasas de pérdida de injertos y mortalidad fueron del 8.5% y 2.4%, respectivamente. El análisis de género reveló una mayor prevalencia de diabetes tipo 2 en hombres y más hipertensión en mujeres. No se encontraron diferencias estadísticas en enfermedad renal primaria, GFR, tipo de donante, anticuerpos Anti-HLA, pérdida de injerto o mortalidad ($p>0.05$). A pesar de un menor GFR y un tiempo de isquemia fría más prolongado en receptores de donantes cadavéricos, el análisis de Kaplan-Meier demostró una supervivencia del injerto a 10 años significativamente mayor (89% vs. 60%) en comparación con los receptores de donantes vivos. El estudio destaca la importancia del GFR, el tiempo de isquemia fría y el tipo de donante en el manejo del trasplante renal.

Conclusiones: La supervivencia del injerto a 10 años fue notablemente mayor en pacientes que recibieron trasplantes de donantes fallecidos, destacando la importancia de esta fuente de órganos en el programa de trasplantes. Esto indica que la gestión de los trasplantes renales en la Región Caribe Colombiana debe mejorarse y optimizarse con el objetivo de beneficiar a un mayor número de pacientes en el futuro.

Palabras clave: Trasplante renal; Donantes vivos; Donación de fallecidos; Programa de trasplantes; Región Caribe Colombiana.

ABSTRACT

Kidney transplantation is an effective treatment option and, in many cases, the best option for patients with end-stage renal disease. However, it still faces significant challenges that need to be addressed to improve the quality of life and survival of transplant recipients. Therefore, follow-up programs for these renal patients are essential.

Objective: To evaluate the outcomes of a kidney transplant program in a clinic in the Colombian Caribbean Region between the years 2019 and 2022.

Methods: The study employed an analytical cohort approach, summarizing variables with means or medians based on normality. Categorical variables were described using frequencies. Statistical tests included Student's t-test, Wilcox test, Kruskal-Wallis test for GFR medians, and Fisher or Chi-square tests for categorical variables. Kaplan-Meier analysis estimated graft survival by donor type. Significance was set at $p<0.05$. R-CRAN software version 4.3.2 facilitated statistical analyses.

Results: In a study involving 164 participants in a kidney transplant program, 62% were male, with hypertension as the predominant comorbidity (77%) and type 2 diabetes in 16%. The leading primary kidney diseases were Nephroangiosclerosis (NAH) at 20% and Diabetic Nephropathy (DN) at 16%. Transplants were evenly split between cadaveric (49%) and living donors (51%). Graft loss and mortality rates were 8.5% and 2.4%, respectively. Gender analysis revealed higher type 2 diabetes prevalence in men and more hypertension in women. No statistical differences were found in primary kidney disease, GFR, donor type, Anti-HLA antibodies, graft loss, or mortality ($p>0.05$). Despite lower GFR and longer cold ischemia time in cadaveric donor recipients, Kaplan-Meier analysis demonstrated significantly higher 10-year graft survival (89% vs. 60%) compared to living donor recipients. The study emphasizes the importance of GFR, cold ischemia time, and donor type in kidney transplant management.

Conclusions: The 10-year graft survival was notably higher in patients who received transplants from deceased donors, emphasizing the importance of this source of organs in the transplant program. This indicates that the management of kidney transplants in the Colombian Caribbean Region should be improved and optimized with the aim of benefiting a greater number of patients in the future.

Keywords: Kidney transplantation; Living donors; Deceased donation; Transplant program; Colombian Caribbean Region

REFERENCIAS BIBLIOGRÁFICAS

1. Dominy CL, Shamsian EB, Okhawere KE, Korn TG, Meilika K, Badani K. Recent innovations in renal replacement technology and potential applications to transplantation and dialysis patients: a review of current methods. Kidney Res Clin Pract [Internet]. 2023 Jan;42(1):53–62. Available from: http://www.ncbi.nlm.nih.gov/pubmed/36328990
2. Abramyan S, Hanlon M. Kidney Transplantation [Internet]. StatPearls. 2023. Available from: http://www.ncbi.nlm.nih.gov/pubmed/7832839
3. Avrami C. Why is living kidney donation important? [Internet]. Current Strategies for Living Donor Kidney Transplantation. 2021. Available from: http://www.ncbi.nlm.nih.gov/pubmed/21883901
4. Rodrigue JR, Schold JD, Mandelbrot DA. The decline in living kidney donation in the United States: random variation or cause for concern? Transplantation [Internet]. 2013 Nov 15;96(9):767–73. Available from: http://www.ncbi.nlm.nih.gov/pubmed/23759882
5. Justiz Vaillant AA, Misra S, Fitzgerald BM. Acute Transplantation Rejection [Internet]. StatPearls. 2023. Available from: http://www.ncbi.nlm.nih.gov/pubmed/27334415
6. Perico N, Remuzzi G. Prevention of transplant rejection: current treatment guidelines and future developments. Drugs [Internet]. 1997 Oct;54(4):533–70. Available from: http://www.ncbi.nlm.nih.gov/pubmed/9339960
7. Kim H, Cheigh JS. Kidney transplantation in patients with type 1 diabetes mellitus: long-term prognosis for patients and grafts. Korean J Intern Med [Internet]. 2001 Jun;16(2):98–104. Available from: http://www.ncbi.nlm.nih.gov/pubmed/11590909
8. Seeman T. Hypertension after renal transplantation. Pediatr Nephrol [Internet]. 2009 May;24(5):959–72. Available from: http://www.ncbi.nlm.nih.gov/pubmed/17955265
9. Fourtounas C. Transplant options for patients with type 2 diabetes and chronic kidney disease. World J Transplant [Internet]. 2014 Jun 24;4(2):102–10. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25032099
10. Rangaswami J, Mathew RO, Parasuraman R, Tantisattamo E, Lubetzky M, Rao S, et al. Cardiovascular disease in the kidney transplant recipient: epidemiology, diagnosis and management strategies. Nephrol Dial Transplant [Internet]. 2019 May 1;34(5):760–73. Available from: http://www.ncbi.nlm.nih.gov/pubmed/30984976
11. Reyna-Sepúlveda F, Ponce-Escobedo A, Guevara-Charles A, Escobedo-Villarreal M, Pérez-Rodríguez E, Muñoz-Maldonado G, et al. Outcomes and Surgical Complications in Kidney Transplantation. Int J organ Transplant Med

[Internet]. 2017;8(2):78–84. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28828167

12. Tonelli M, Wiebe N, Knoll G, Bello A, Browne S, Jadhav D, et al. Systematic review: kidney transplantation compared with dialysis in clinically relevant outcomes. Am J Transplant [Internet]. 2011 Oct;11(10):2093–109. Available from: http://www.ncbi.nlm.nih.gov/pubmed/21883901
13. Asderakis A, Augustine T, Dyer P, Short C, Campbell B, Parrott NR, et al. Pre-emptive kidney transplantation: the attractive alternative. Nephrol Dial Transplant [Internet]. 1998 Jul;13(7):1799–803. Available from: http://www.ncbi.nlm.nih.gov/pubmed/9681731
14. Ali H, Soliman K, Mohamed MM, Rahman M, Herberth J, Fülöp T, et al. Impact of kidney transplantation on functional status. Ann Med [Internet]. 2021 Dec;53(1):1302–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/34387134
15. Iqbal MM, Rahman N, Alam M, Deb Nath PK, Waheed S, Islam K, et al. Quality of Life Is Improved in Renal Transplant Recipients Versus That Shown in Patients With Chronic Kidney Disease With or Without Dialysis. Exp Clin Transplant [Internet]. 2020 Jan;18(Suppl 1):64–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/32008498
16. Heldal K, Midtvedt K, Lønning K, Iversen T, Hernæs KH, Tsarpali V, et al. Kidney transplantation: an attractive and cost-effective alternative for older patients? A cost-utility study. Clin Kidney J [Internet]. 2019 Dec;12(6):888–94. Available from: http://www.ncbi.nlm.nih.gov/pubmed/31807304
17. Abecassis M, Bartlett ST, Collins AJ, Davis CL, Delmonico FL, Friedewald JJ, et al. Kidney transplantation as primary therapy for end-stage renal disease: a National Kidney Foundation/Kidney Disease Outcomes Quality Initiative (NKF/KDOQITM) conference. Clin J Am Soc Nephrol [Internet]. 2008 Mar;3(2):471–80. Available from: http://www.ncbi.nlm.nih.gov/pubmed/18256371
18. Carminatti M, Tedesco-Silva H, Silva Fernandes NM, Sanders-Pinheiro H. Chronic kidney disease progression in kidney transplant recipients: A focus on traditional risk factors. Nephrology (Carlton) [Internet]. 2019 Feb;24(2):141–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/30159972
19. Vaidya SR, Aeddula NR. Chronic Renal Failure. StatPearls. 2023.
20. Foster MH, Ord JR. Emerging immunotherapies for autoimmune kidney disease. Hum Vaccin Immunother [Internet]. 2019;15(4):876–90. Available from: http://www.ncbi.nlm.nih.gov/pubmed/30550361
21. Drożdżal S, Lechowicz K, Szostak B, Rosik J, Kotfis K, Machoy-Mokrzyńska A, et al. Kidney damage from nonsteroidal anti-inflammatory drugs-Myth or truth? Review of selected literature. Pharmacol Res Perspect [Internet]. 2021 Aug;9(4):e00817. Available from: http://www.ncbi.nlm.nih.gov/pubmed/34310861
22. MacRae C, Mercer SW, Guthrie B, Henderson D. Comorbidity in chronic kidney disease: a large cross-sectional study of prevalence in Scottish primary care. Br J Gen Pract [Internet]. 2021;71(704):e243–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/33558333

23. Yacoub R, Habib H, Lahdo A, Al Ali R, Varjabedian L, Atalla G, et al. Association between smoking and chronic kidney disease: a case control study. BMC Public Health [Internet]. 2010 Nov 25;10:731. Available from: http://www.ncbi.nlm.nih.gov/pubmed/21108832
24. Elias MF, Dore GA, Davey A. Kidney disease and cognitive function. Contrib Nephrol [Internet]. 2013;179:42–57. Available from: http://www.ncbi.nlm.nih.gov/pubmed/23652448
25. Hashmi MF, Benjamin O, Lappin SL. End-Stage Renal Disease. StatPearls. 2023.
26. Pugh D, Gallacher PJ, Dhaun N. Management of Hypertension in Chronic Kidney Disease. Drugs. 2019 Mar;79(4):365–79.
27. Hahr AJ, Molitch ME. Management of diabetes mellitus in patients with chronic kidney disease. Clin diabetes Endocrinol [Internet]. 2015;1:2. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28702221
28. Park CW. Diabetic kidney disease: from epidemiology to clinical perspectives. Diabetes Metab J [Internet]. 2014 Aug [cited 2014 Dec 7];38(4):252–60. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4160578&tool=pmcentrez&rendertype=abstract
29. Agarwal P, Garg V, Karagaiah P, Szepietowski JC, Grabbe S, Goldust M. Chronic Kidney Disease-Associated Pruritus. Toxins (Basel) [Internet]. 2021 Jul 28;13(8). Available from: http://www.ncbi.nlm.nih.gov/pubmed/34437400
30. Hercz D, Jiang SH, Webster AC. Interventions for itch in people with advanced chronic kidney disease. Cochrane database Syst Rev [Internet]. 2020 Dec 7;12(12):CD011393. Available from: http://www.ncbi.nlm.nih.gov/pubmed/33283264
31. Shaikh H, Hashmi MF, Aeddula NR. Anemia of Chronic Renal Disease [Internet]. StatPearls. 2023. Available from: http://www.ncbi.nlm.nih.gov/pubmed/4975372
32. Hahr AJ, Molitch ME. Management of diabetes mellitus in patients with chronic kidney disease. Clin diabetes Endocrinol. 2015;1:2.
33. Suki WN, Moore LW. Phosphorus Regulation in Chronic Kidney Disease. Methodist Debakey Cardiovasc J [Internet]. 2016;12(4 Suppl):6–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28298956
34. [Internet]. I or. Dialysis in chronic kidney disease [Internet]. cologne, Germany: Institute for Quality and Efficiency in Health Care (IQWiG); 2018. Available from: https://www.ncbi.nlm.nih.gov/books/NBK492979/
35. Tonelli M, Wiebe N, Knoll G, Bello A, Browne S, Jadhav D, et al. Systematic Review: Kidney Transplantation Compared With Dialysis in Clinically Relevant Outcomes. Am J Transplant [Internet]. 2011 Oct;11(10):2093–109. Available from: https://linkinghub.elsevier.com/retrieve/pii/S1600613522281131
36. Marroquin CE. Patient Selection for Kidney Transplant. Surg Clin North Am [Internet]. 2019 Feb;99(1):1–35. Available from: http://www.ncbi.nlm.nih.gov/pubmed/30471735
37. Pankhurst T, Evison F, Mytton J, Williamson S, Kerecuk L, Lipkin G. Young adults have worse kidney transplant outcomes than other age groups. Nephrol

Dial Transplant [Internet]. 2020 Jun 1;35(6):1043–51. Available from: http://www.ncbi.nlm.nih.gov/pubmed/32459843

38. Weng FL, Joffe MM, Feldman HI, Mange KC. Rates of completion of the medical evaluation for renal transplantation. Am J Kidney Dis [Internet]. 2005 Oct;46(4):734–45. Available from: http://www.ncbi.nlm.nih.gov/pubmed/16183429
39. Delos Santos RB, Gmurczyk A, Obhrai JS, Watnick SG. Cardiac evaluation prior to kidney transplantation. Semin Dial [Internet]. 2010;23(3):324–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/20636926
40. Naqvi R. Evaluation of psychiatric issues in renal transplant setting. Indian J Nephrol [Internet]. 2015;25(6):321–5. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26664203
41. Kenawy AS, Gheith O, Al-Otaibi T, Othman N, Abo Atya H, Al-Otaibi M, et al. Medication compliance and lifestyle adherence in renal transplant recipients in Kuwait. Patient Prefer Adherence [Internet]. 2019;13:1477–86. Available from: http://www.ncbi.nlm.nih.gov/pubmed/31564836
42. Kasiske BL. The evaluation of prospective renal transplant recipients and living donors. Surg Clin North Am [Internet]. 1998 Feb;78(1):27–39. Available from: http://www.ncbi.nlm.nih.gov/pubmed/9531933
43. Sawinski D, Locke JE. Evaluation of Kidney Donors: Core Curriculum 2018. Am J Kidney Dis [Internet]. 2018 May;71(5):737–47. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0272638617310788
44. Kotta PA, Elango M, Papalois V. Preoperative Cardiovascular Assessment of the Renal Transplant Recipient: A Narrative Review. J Clin Med [Internet]. 2021 Jun 7;10(11). Available from: http://www.ncbi.nlm.nih.gov/pubmed/34200235
45. Henrik Ekberg, Zhongquan Qi. Practical Protocols for LKD. 2010;
46. de Klerk M, Ijzermans JN, Kranenburg LW, Hilhorst MT, van Busschbach JJ, Weimar W. [Cross-over transplantation; a new national program for living kidney donations]. Ned Tijdschr Geneeskd [Internet]. 2004 Feb 28;148(9):420–3. Available from: http://www.ncbi.nlm.nih.gov/pubmed/15038201
47. Mohamed M, Sweeney T, Alkhader D, Nassar M, Alqassieh A, Lakhdar S, et al. ABO incompatibility in renal transplantation. World J Transplant [Internet]. 2021 Sep 18;11(9):388–99. Available from: http://www.ncbi.nlm.nih.gov/pubmed/34631470
48. Salvadori M, Tsalouchos A. Current protocols and outcomes of ABO-incompatible kidney transplantation. World J Transplant [Internet]. 2020 Jul 29;10(7):191–205. Available from: http://www.ncbi.nlm.nih.gov/pubmed/32844095
49. Ghelichi-Ghojogh M, Ghaem H, Mohammadizadeh F, Vali M, Ahmed F, Hassanipour S, et al. Graft and Patient Survival Rates in Kidney Transplantation, and Their Associated Factors: A Systematic Review and Meta-Analysis. Iran J Public Health [Internet]. 2021 Aug;50(8):1555–63. Available from: http://www.ncbi.nlm.nih.gov/pubmed/34917526
50. Ghelichi-Ghojogh M, Mohammadizadeh F, Jafari F, Vali M, Jahanian S,

Mohammadi M, et al. The global survival rate of graft and patient in kidney transplantation of children: a systematic review and meta-analysis. BMC Pediatr [Internet]. 2022 Aug 24;22(1):503. Available from: http://www.ncbi.nlm.nih.gov/pubmed/36002803

51. Naik RH, Shawar SH. Renal Transplantation Rejection [Internet]. StatPearls. 2023. Available from: http://www.ncbi.nlm.nih.gov/pubmed/20925547
52. Shimizu T, Tokiwa M, Yamaguchi Y. A case of acute antidonor antibody-mediated humoral rejection after renal transplantation with specific consideration of serial graft biopsy histology. Clin Transplant [Internet]. 2002;16 Suppl 8:62–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/12464135
53. Fletcher JT, Nankivell BJ, Alexander SI. Chronic allograft nephropathy. Pediatr Nephrol [Internet]. 2009 Aug;24(8):1465–71. Available from: http://www.ncbi.nlm.nih.gov/pubmed/18584214
54. Blagosklonny M V. Immunosuppressants in cancer prevention and therapy. Oncoimmunology [Internet]. 2013 Dec 1;2(12):e26961. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24575379
55. Vial T, Descotes J. Immunosuppressive drugs and cancer. Toxicology [Internet]. 2003 Apr 1;185(3):229–40. Available from: http://www.ncbi.nlm.nih.gov/pubmed/12581698
56. Ahmad I. Biopsy of the transplanted kidney. Semin Intervent Radiol [Internet]. 2004 Dec;21(4):275–81. Available from: http://www.ncbi.nlm.nih.gov/pubmed/21331139
57. Schinstock C, Tambur A, Stegall M. Current Approaches to Desensitization in Solid Organ Transplantation. Front Immunol [Internet]. 2021;12:686271. Available from: http://www.ncbi.nlm.nih.gov/pubmed/34046044
58. Mudiayi D, Shojai S, Okpechi I, Christie EA, Wen K, Kamaleldin M, et al. Global Estimates of Capacity for Kidney Transplantation in World Countries and Regions. Transplantation [Internet]. 2022 Jun 1;106(6):1113–22. Available from: http://www.ncbi.nlm.nih.gov/pubmed/34495014
59. Jung CW, Jorgensen D, Sood P, Mehta R, Molinari M, Hariharan S, et al. Outcomes and factors leading to graft failure in kidney transplants from deceased donors with acute kidney injury-A retrospective cohort study. PLoS One [Internet]. 2021;16(8):e0254115. Available from: http://www.ncbi.nlm.nih.gov/pubmed/34437548
60. Koyawala N, Parikh CR. A Review of Donor Acute Kidney Injury and Posttransplant Outcomes. Transplantation [Internet]. 2020 Aug;104(8):1553–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/32732831
61. Domagala P, Gorski L, Wszola M, Kieszek R, Diuwe P, Goralski P, et al. Successful transplantation of kidneys from deceased donors with terminal acute kidney injury. Ren Fail [Internet]. 2019 Nov;41(1):167–74. Available from: http://www.ncbi.nlm.nih.gov/pubmed/30909784
62. Krishnan A, Wong G, Teixeira-Pinto A, Lim WH. Incidence and Outcomes of Early Cancers After Kidney Transplantation. Transpl Int [Internet]. 2022;35:10024. Available from: http://www.ncbi.nlm.nih.gov/pubmed/35592449

63. Katz-Greenberg G, Shah S. Sex and Gender Differences in Kidney Transplantation. Semin Nephrol. 2022 Mar;42(2):219–29.
64. Maria Aurora Posadas Salas, 1 Elizabeth Chua, 2 Ana Rossi, 3 Silvi Shah, 4 Goni Katz-Greenberg, 5 Lisa Coscia, 6 Deirdre Sawinski 7 and Deborah Adey8. Sex and gender disparity in kidney transplantation: Historical and future perspectives. HHS Author Manuscripts. 2022;
65. Brett KE, Ertel E, Grimshaw J, Knoll GA. Perspectives on Quality of Care in Kidney Transplantation: A Semistructured Interview Study. Transplant direct. 2018 Sep;4(9):e383.
66. García-García G, Harden P, Chapman J, Abraham G, Beerkens P, Chapman JR, et al. The global role of kidney transplantation. Nefrologia. 2012;32(1):1–6.
67. Pugh D, Gallacher PJ, Dhaun N. Management of Hypertension in Chronic Kidney Disease. Drugs [Internet]. 2019 Mar;79(4):365–79. Available from: http://www.ncbi.nlm.nih.gov/pubmed/30758803
68. Yee J. Diabetic Kidney Disease: Chronic Kidney Disease and Diabetes. Diabetes Spectr. 2008 Jan;21(1):8–10.
69. Nemati E, Einollahi B, Lesan Pezeshki M, Porfarziani V, Fattahi MR. Does kidney transplantation with deceased or living donor affect graft survival? Nephrourol Mon. 2014 Jul;6(4):e12182.
70. Morales JM, Marcén R, del Castillo D, Andres A, Gonzalez-Molina M, Oppenheimer F, et al. Risk factors for graft loss and mortality after renal transplantation according to recipient age: a prospective multicentre study. Nephrol Dial Transplant. 2012 Dec;27 Suppl 4(Suppl 4):iv39-46.
71. Pinto-Ramirez J, Garcia-Lopez A, Salcedo-Herrera S, Patino-Jaramillo N, Garcia-Lopez J, Barbosa-Salinas J, et al. Risk factors for graft loss and death among kidney transplant recipients: A competing risk analysis. PLoS One. 2022;17(7):e0269990.
72. Nordström A, Hadrévi J, Olsson T, Franks PW, Nordström P. Higher Prevalence of Type 2 Diabetes in Men Than in Women Is Associated With Differences in Visceral Fat Mass. J Clin Endocrinol Metab. 2016 Oct;101(10):3740–6.
73. Kasiske BL, Snyder JJ, Gilbertson D, Matas AJ. Diabetes Mellitus after Kidney Transplantation in the United States. Am J Transplant. 2003 Feb;3(2):178–85.
74. Douthat WG, Castellano M, Berenguer L, Guzmán MA, de Arteaga J, Chiurchiu CR, et al. Elevada prevalencia de hiperparatiroidismo secundario en pacientes con enfermedad renal crónica en diálisis en Argentina. Nefrologia. 2013;33(5):657–66.
75. Chen P-D, Tsai M-K, Lee C-Y, Yang C-Y, Hu R-H, Lee P-H, et al. Gender differences in renal transplant graft survival. J Formos Med Assoc. 2013 Dec;112(12):783–8.
76. Santos J, Martins LS. Estimating glomerular filtration rate in kidney transplantation: Still searching for the best marker. World J Nephrol. 2015 Jul;4(3):345–53.
77. Chow EK, DiBrito S, Luo X, Wickliffe CE, Massie AB, Locke JE, et al. Long Cold Ischemia Times in Same Hospital Deceased Donor Transplants.

Transplantation. 2018 Mar;102(3):471–7.

78. Rafael Tuesca M, Edgar Navarro L, Elles R, Espinosa D, Herrera JM, Macías JC. Conocimientos y actitudes de los médicos de instituciones hospitalarias en Barranquillla sobre donación y trasplante de órganos Julio-Noviembre de 1999. Salud Uninorte. 2003;17:9–18.
79. Matas AJ, Gillingham KJ, Humar A, Kandaswamy R, Sutherland DER, Payne WD, et al. 2202 kidney transplant recipients with 10 years of graft function: what happens next? Am J Transplant. 2008 Nov;8(11):2410–9.