

## Nefrolojide Sağlık Hizmetinden Doğan Zararlar

Alper ÖZKÖK<sup>1</sup>

Emre YAŞAR<sup>2</sup>

Yasemin ERTEN<sup>3</sup>

### I- Giriş

İnsanın öznesi olduğu bütün alanlarda olduğu gibi, sağlık hizmetlerinin sunumu sırasında da kaçınılmaz olarak çeşitli zararlar meydana gelebilmektedir. Dünya Sağlık Örgütü (DSÖ) sağlık hizmetleri ile ilişkili zararı; alatta yatan bir hastalık ya da yaralanma dışında, sağlık hizmeti sunumu sırasında uygulanan planlardan veya eylemlerden kaynaklanan veya bunlarla ilişkili olarak ortaya çıkan zarar olarak tanımlamıştır(1). Teknoloji, tip, ulaşım, iletişim başta olmak üzere birçok alanda meydana gelen ve günümüzde giderek hızlanan bilimsel gelişmeler neticesinde, hem sağlık hizmeti sunumu sırasında ortaya çıkabilecek zararların önlenmesi konusundaki girişimler artmış, hem de zararın oluşması durumunda sorumluluğa yönelik şikayetler artmıştır. Bu nedenle “hekim hatası”, “tıbbi hata”, “tıbbi uygulama hatası” ya da “tıbbi

malpraktis” gibi kavramlar, dünyada ve ülkemizde gün geçikçe daha fazla karşılaştığımız kavramlar haline gelmiştir.

Bu kitabın konusunu oluşturan ve bahsi geçen kavramları kapsayan tıbbi zarar kavramı yalnızca bir tek tanımı olmayan geniş bir kavramdır. Dünyanın onde gelen sağlık organizasyonları bu anlamda çeşitli tanımlamalar yapmıştır. DSÖ tıbbi zararı; “hastalığın komplikasyonları dışında, hastalığın tıbbi yönetimi ile ilişkili meydana gelen yaralanma” olarak tanımlamış, burada sözü edilen tıbbi yönetimin; “teşhis ve tedaviyi, teşhis veya tedavide başarısızlığı, bakım sağlamak için kullanılan sistemler ve ekipman dahil olmak üzere tıbbi bakımın tüm yönlerini” içerdigini belirtmiştir(2). *Institute for Healthcare Improvement (IHI)* ise tıbbi zararı; “istenmeden meydana getirilen, tıbbi bakıma bağlı olarak (belirlenen tıbbi tedavinin verilmemesi durumu da dahil) ya da onun katkısıyla ortaya çıkan, ek

<sup>1</sup> Dr. Öğr. Üyesi, Gazi Üniversitesi Tip Fakültesi, Adli Tıp AD., alperozkok@gazi.edu.tr

<sup>2</sup> Arş. Gör. Dr., Gazi Üniversitesi Tip Fakültesi, Dahiliye AD. Nefroloji BD., rasayerm@hotmail.com

<sup>3</sup> Prof. Dr., Gazi Üniversitesi Tip Fakültesi, Dahiliye AD. Nefroloji BD., yaserten@yahoo.com

## Kaynaklar

1. World Health Organization. World Alliance for Patient Safety. Report on the Web-Based Modified Delphi Survey of the International Classification for Patient Safety. 2007 June.
2. World Health Organization. Glossary of Patient Safety Concepts and References. Concept Framew Int Classif Patient Saf. 2009;(January):1-49.
3. IHI launches national campaign to reduce medical harm in U.S. hospitals, building on its landmark 100,000 lives campaign. IHI Estimates that 15 Million Incidents of Patient Harm Occur in U.S. Hospitals Each Year. Accessed June 4, 2021. [www.ihi.org](http://www.ihi.org)
4. Yıldırım MŞ, Odabaşı AB, Köse Ç, Lale A, Tümer AR. Tibbi Uygulama Hatası İddialarının Değerlendirilmesinde Örnek Bir Sistem Hatası Olgusu. Bull Leg Med. 2018;23(1):65-68. doi:10.17986/blm.2017136900
5. Dokgöz H, Özkar E. Tibbi Uygulama Hataları. In: Dokgöz H, ed. *Adli Tip ve Adli Bilimler*. Akademisyen Kitabevi; 2019:71-90.
6. World Medical Association Statement on Medical Malpractice – WMA – The World Medical Association. In: ; 1992. Accessed July 14, 2021. <https://www.wma.net/policies-post/world-medical-association-statement-on-medical-malpractice/>
7. Uygur AB. Hekimin kusurunun değerlendirilmesi. Published online 2019:0-3.
8. Kohn L, Corrigan J, Donaldson M. *To Err Is Human: Building a Safer Health System*. National Academies Press; 2000. doi:10.17226/9728
9. Vincent C, Neale G, Woloshynowych M. Adverse events in British hospitals: preliminary retrospective record review. BMJ. 2001;322(7285):517-519. doi:10.1136/BMJ.322.7285.517
10. Wilson R, Runciman W, Gibberd R, Harrison B, Newby L, Hamilton J. The Quality in Australian Health Care Study. Med J Aust. 1995;163(9):458-471. doi:10.5694/J.1326-5377.1995.TB124691.X
11. Levinson DR. Office of inspector general adverse events in hospitals: national incidence among medicare beneficiaries objectives. Published online 2010.
12. Ulrich B, Kear T. Patient Safety and Patient Safety Culture: Foundations of Excellent Health Care Delivery. Nephrol Nurs J. 2014;41(5):447-456. Accessed July 15, 2021. <https://pubmed.ncbi.nlm.nih.gov/26295088/>
13. Garrick R, Kliger A, Stefanchik B. Patient and facility safety in hemodialysis: opportunities and strategies to develop a culture of safety. Clin J Am Soc Nephrol. 2012;7(4):680-688. doi:10.2215/CJN.06530711
14. Kliger AS. Patient safety in the dialysis facility. Blood Purif. 2006;24(1):19-21. doi:10.1159/000089431
15. Ebbens M, Errami H, Moes D, van den Bemt P, van der Boog P, Gombert-Handoko K. Prevalence of medication transfer errors in nephrology patients and potential risk factors. Eur J Intern Med. 2019;70:50-53. doi:10.1016/J.EJIM.2019.09.003
16. Fink J, Chertow G. Medication errors in chronic kidney disease: one piece in the patient safety puzzle. Kidney Int. 2009;76(11):1123-1125. doi:10.1038/KI.2009.315
17. Mason N. Polypharmacy and medication-related complications in the chronic kidney disease patient. Curr Opin Nephrol Hypertens. 2011;20(5):492-497. doi:10.1097/MNH.0B013E328349C261
18. Chiu Y, Teitelbaum I, Misra M, De Leon E, Adzize T, Mehrotra R. Pill burden, adherence, hyperphosphatemia, and quality of life in maintenance dialysis patients. Clin J Am Soc Nephrol. 2009;4(6):1089-1096. doi:10.2215/CJN.00290109
19. Weir M, Fink J. Safety of medical therapy in patients with chronic kidney disease and end-stage renal disease. Curr Opin Nephrol Hypertens. 2014;23(3):306-313. doi:10.1097/01.MNH.0000444912.40418.45
20. Cardone K, Bacchus S, Assimon M, Pai A, Manley H. Medication-related problems in CKD. Adv Chronic Kidney Dis. 2010;17(5):404-412. doi:10.1053/J.ACKD.2010.06.004
21. Hias J, Van der Linden L, Spriet I, Vanbrabant P, Willems L, Tournoy J, et al. Predictors for unintentional medication reconciliation discrepancies in preadmission medication: a systematic review. Eur J Clin Pharmacol. 2017;73(11):1355-1377. doi:10.1007/S00228-017-2308-1
22. Alshamran I, Almaliki A, Qureshi M, Yusuf O, Ismail S. Polypharmacy and Medication-Related Problems in Hemodialysis Patients: A Call for Deprescribing. Pharm (Basel, Switzerland). 2018;6(3):76. doi:10.3390/PHARMACY6030076
23. Ledger S, Choma G. Medication reconciliation in hemodialysis patients. CANNT J. 2008;18(4):41-43. Accessed July 15, 2021. <https://pubmed.ncbi.nlm.nih.gov/19175192/>
24. Chapin E, Zhan M, Hsu V, Seliger S, Walker L, Fink J. Adverse safety events in chronic kidney disease: the frequency of “multiple hits.” Clin J Am Soc Nephrol. 2010;5(1):95-101. doi:10.2215/CJN.06210909
25. Davison S. Pain in hemodialysis patients: prevalence, cause, severity, and management. Am J Kidney Dis. 2003;42(6):1239-1247. doi:10.1053/J.AJKD.2003.08.025
26. Laliberté M, Normandieu M, Lord A, Lamarre D, Cantin I, Berbiche D, et al. Use of over-the-counter medications and natural products in patients with moderate and severe chronic renal insufficiency. Am J Kidney Dis. 2007;49(2):245-256. doi:10.1053/J.AJKD.2006.11.023
27. Hug B, Witkowsk D, Sox C, Keohane C, Seger D, Yoon C, et al. Occurrence of adverse, often preventable, events in community hospitals involving nephrotoxic drugs or those excreted by the kidney. Kidney Int. 2009;76(11):1192-1198. doi:10.1038/KI.2009.353
28. Chertow G, Lee J, Kuperman G, Burdick E, Horsky J, DL S, et al. Guided medication dosing for inpatients with renal insufficiency. JAMA. 2001;286(22):2839-2844. doi:10.1001/JAMA.286.22.2839

29. Salomon L, Deray G, Jaudon M, C C, P B, V LV, et al. Medication misuse in hospitalized patients with renal impairment. *Int J Qual Heal care J Int Soc Qual Heal Care.* 2003;15(4):331-335. doi:10.1093/INTQHC/MZG046
30. Kim K, Fonda J, Lawler E, Gagnon D, Kaufman J. Change in use of gadolinium-enhanced magnetic resonance studies in kidney disease patients after US Food and Drug Administration warnings: a cross-sectional study of Veterans Affairs Health Care System data from 2005-2008. *Am J Kidney Dis.* 2010;56(3):458-467. doi:10.1053/J.AJKD.2010.03.027
31. Obialo C, Ofili E, Mirza T. Hyperkalemia in congestive heart failure patients aged 63 to 85 years with subclinical renal disease. *Am J Cardiol.* 2002;90(6):663-665. doi:10.1016/S0002-9149(02)02581-X
32. Weir M. Are drugs that block the renin-angiotensin system effective and safe in patients with renal insufficiency? *Am J Hypertens.* 1999;12(12 Pt 3). doi:10.1016/S0895-7061(99)00104-1
33. Zaman F, Abreo K. Severe hypermagnesemia as a result of laxative use in renal insufficiency. *South Med J.* 2003;96(1):102-103. doi:10.1097/01.SMJ.0000049844.49028.1D
34. Hurst F, Bohen E, Osgard E, DK O, NP D, SW G, et al. Association of oral sodium phosphate purgative use with acute kidney injury. *J Am Soc Nephrol.* 2007;18(12):3192-3198. doi:10.1681/ASN.2007030349
35. Burrowes J, Van Houten G. Use of alternative medicine by patients with stage 5 chronic kidney disease. *Adv Chronic Kidney Dis.* 2005;12(3):312-325. doi:10.1016/J.ACKD.2005.04.001
36. Biesenbach G, Rami A, Schmekal B, Eichbauer-Sturm G. Decreased insulin requirement in relation to GFR in nephropathic Type 1 and insulin-treated Type 2 diabetic patients. *Diabet Med.* 2003;20(8):642-645. doi:10.1046/J.1464-5491.2003.01025.X
37. Singh A, Szczech L, Tang K, Barnhart H, Sapp S, Wolfson M, et al. Correction of anemia with epoetin alfa in chronic kidney disease. *N Engl J Med.* 2006;355(20):2085-2098. doi:10.1056/NEJMoa065485
38. Pfeffer M, Burdmann E, Chen C, Cooper M, de Zeeuw D, Eckardt K, et al. A trial of darbepoetin alfa in type 2 diabetes and chronic kidney disease. *N Engl J Med.* 2009;361(21):2019-2032. doi:10.1056/NEJMoa0907845
39. Hedley B, Allan A, Xenocostas A. The role of erythropoietin and erythropoiesis-stimulating agents in tumor progression. *Clin Cancer Res.* 2011;17(20):6373-6380. doi:10.1158/1078-0432.CCR-10-2577
40. Chan K, Lazarus J, Thadhani R, Hakim R. Anticoagulant and antiplatelet usage associates with mortality among hemodialysis patients. *J Am Soc Nephrol.* 2009;20(4):872-881. doi:10.1681/ASN.2008080824
41. Phelan P, O'Kelly P, Holian J, Walshe J, Delany C, Slaby J, et al. Warfarin use in hemodialysis patients: what is the risk? *Clin Nephrol.* 2011;75(3):204-211. doi:10.5414/CN106481
42. Shah M, Avgil Tsadok M, Jackevicius C, Essebag V, Eisenberg M, Rahme E, et al. Warfarin use and the risk for stroke and bleeding in patients with atrial fibrillation undergoing dialysis. *Circulation.* 2014;129(11):1196-1203. doi:10.1161/CIRCULATIONAHA.113.004777
43. Winkelmayr W, Liu J, Setoguchi S, Choudhry N. Effectiveness and safety of warfarin initiation in older hemodialysis patients with incident atrial fibrillation. *Clin J Am Soc Nephrol.* 2011;6(11):2662-2668. doi:10.2215/CJN.04550511
44. Lim W, Dentali F, Eikelboom J, Crowther M. Meta-analysis: low-molecular-weight heparin and bleeding in patients with severe renal insufficiency. *Ann Intern Med.* 2006;144(9):673-684. doi:10.7326/0003-4819-144-9-200605020-00011
45. Boots J, Christiaans M, van Hooff J. Effect of immunosuppressive agents on long-term survival of renal transplant recipients: focus on the cardiovascular risk. *Drugs.* 2004;64(18):2047-2073. doi:10.2165/00003495-200464180-00004
46. Robson R, Cecka J, Opelz G, Budde M, Sacks S. Prospective registry-based observational cohort study of the long-term risk of malignancies in renal transplant patients treated with mycophenolate mofetil. *Am J Transplant.* 2005;5(12):2954-2960. doi:10.1111/J.1600-6143.2005.01125.X
47. Parasuraman R, Samarapungavan D, Venkat K. Updated principles and clinical caveats in the management of infection in renal transplant recipients. *Transplant Rev (Orlando).* 2010;24(2):43-51. doi:10.1016/J.TRRE.2009.09.001
48. Srinivas T, Meier-Kriesche H, Kaplan B. Pharmacokinetic principles of immunosuppressive drugs. *Am J Transplant.* 2005;5(2):207-217. doi:10.1111/J.1600-6143.2005.00748.X
49. Leguelinel-Blache G, Arnaud F, Bouvet S, Dubois F, Castelli C, Roux-Marson C, et al. Impact of admission medication reconciliation performed by clinical pharmacists on medication safety. *Eur J Intern Med.* 2014;25(9):808-814. doi:10.1016/J.EJIM.2014.09.012
50. Tam V, Knowles S, Cornish P, Fine N, Marchesano R, Etchells E. Frequency, type and clinical importance of medication history errors at admission to hospital: a systematic review. *CMAJ.* 2005;173(5):510-515. doi:10.1503/CMAJ.045311
51. Browne T, Merighi J. Barriers to adult hemodialysis patients' self-management of oral medications. *Am J Kidney Dis.* 2010;56(3):547-557. doi:10.1053/J.AJKD.2010.03.002
52. Katzir Z, Boaz M, Backshi I, Cernes R, Barnea Z, Biro A. Medication apprehension and compliance among dialysis patients--a comprehensive guidance attitude. *Nephron Clin Pract.* 2010;114(2). doi:10.1159/000254388
53. Pai A, Boyd A, Depczynski J, Chavez I, Khan N, Manley H. Reduced drug use and hospitalization rates in patients undergoing hemodialysis who received pharmaceutical care: a 2-year, randomized, control-

- led study. *Pharmacotherapy*. 2009;29(12):1433-1440. doi:10.1592/PHCO.29.12.1433
54. Davenport A. Complications of hemodialysis treatments due to dialysate contamination and composition errors. *Hemodial Int.* 2015;19 Suppl 3:S30-S33. doi:10.1111/HDI.12350
  55. Garrick R, Morey R. Dialysis Facility Safety: Processes and Opportunities. *Semin Dial.* 2015;28(5):514-524. doi:10.1111/SDI.12395
  56. Alciati MH. Health and safety survey to improve patient safety in end stage renal disease report of findings from the ESRD patient survey. Published online 2007. Accessed July 17, 2021. [www.renalmd.org](http://www.renalmd.org)
  57. Bray B, Boyd J, Daly C, Doyle A, Donaldson K, Fox J, et al. How safe is renal replacement therapy? A national study of mortality and adverse events contributing to the death of renal replacement therapy recipients. *Nephrol Dial Transplant.* 2014;29(3):681-687. doi:10.1093/NDT/GFT197
  58. Campbell A, Borrie M, Spears G. Risk factors for falls in a community-based prospective study of people 70 years and older. *J Gerontol.* 1989;44(4). doi:10.1093/GERONJ/44.4.M112
  59. O'Loughlin J, Robitaille Y, Boivin J, Suissa S. Incidence of and risk factors for falls and injurious falls among the community-dwelling elderly. *Am J Epidemiol.* 1993;137(3):342-354. doi:10.1093/OXFORDJOURNALS.AJE.A116681
  60. Farragher J, Chiu E, Ulutas O, Tomlinson G, Cook W, Jassal S. Accidental falls and risk of mortality among older adults on chronic peritoneal dialysis. *Clin J Am Soc Nephrol.* 2014;9(7):1248-1253. doi:10.2215/CJN.11001013
  61. Desmet C, Beguin C, Swine C, Jadoul M. Falls in hemodialysis patients: prospective study of incidence, risk factors, and complications. *Am J Kidney Dis.* 2005;45(1):148-153. doi:10.1053/J.AJKD.2004.09.027
  62. Cook W, Tomlinson G, Donaldson M, Markowitz S, Naglie G, Sobolev B, et al. Falls and fall-related injuries in older dialysis patients. *Clin J Am Soc Nephrol.* 2006;1(6):1197-1204. doi:10.2215/CJN.01650506
  63. Ellingson K, Palekar R, Lucero C, Kurkjian K, Chai S, Schlossberg D, et al. Vascular access hemorrhages contribute to deaths among hemodialysis patients. *Kidney Int.* 2012;82(6):686-692. doi:10.1038/KI.2012.185
  64. Amerling R, Ronco C, Kuhlman M, Winchester J. Arteriovenous fistula toxicity. *Blood Purif.* 2011;31(1-3):113-120. doi:10.1159/000322695
  65. Bream PR, Jr. Update on Insertion and Complications of Central Venous Catheters for Hemodialysis. *Semin Intervent Radiol.* 2016;33(1):31. doi:10.1055/S-0036-1572547
  66. Tordoir J, Canaud B, Haage P, Konner K, Basci A, Fouque D, et al. EBPG on Vascular Access. *Nephrol Dial Transplant.* 2007;22 Suppl 2(SUPPL.2). doi:10.1093/NDT/GFM021
  67. Clinical practice guidelines for vascular access. *Am J Kidney Dis.* 2006;48 Suppl 1(SUPPL. 1). doi:10.1053/J.AJKD.2006.04.040
  68. NKF KDOQI guidelines. Accessed July 19, 2021. [http://kidneyfoundation.cachefly.net/professionals/KDOQI/guideline\\_upHD\\_PD\\_VA/va\\_guide2.htm](http://kidneyfoundation.cachefly.net/professionals/KDOQI/guideline_upHD_PD_VA/va_guide2.htm)
  69. Malas M, Canner J, Hicks C, Arhuidese I, Zarkowsky D, Qazi U, et al. Trends in incident hemodialysis access and mortality. *JAMA Surg.* 2015;150(5):441-448. doi:10.1001/JAMASURG.2014.3484
  70. Handlos P, Marecová K, Smatanová M, Dvořáček I, Dobiáš M. Fatal Hemorrhage from an Arteriovenous Fistula. *J Forensic Sci.* 2018;63(5):1577-1581. doi:10.1111/1556-4029.13730
  71. Blake P, Quinn R, Oliver M. The risks of vascular access. *Kidney Int.* 2012;82(6):623-625. doi:10.1038/KI.2012.181
  72. Gill J, Storck K, Kelly S. Fatal exsanguination from hemodialysis vascular access sites. *Forensic Sci Med Pathol.* 2012;8(3):259-262. doi:10.1007/S12024-011-9303-0
  73. Edirisinghe P, Busuttil A. Suicide by severing the arterio-venous subclavian dialysis catheter. *J Clin Forensic Med.* 2006;13(2):86-88. doi:10.1016/J.JCFM.2005.08.005
  74. Brown PA, Magner PO, Hiremath S, Clark EG. Death due to delirium: a case of a self-cut hemodialysis dialysis catheter - a case report. *BMC Nephrol* 2019 201. 2019;20(1):1-4. doi:10.1186/S12882-019-1571-Z
  75. Mazzoleni L, Jadoul M, Labriola L. Arteriovenous fistula infection as a cause of vascular access hemorrhage. *Kidney Int.* 2013;83(5):969-970. doi:10.1038/KI.2013.29
  76. Byard R, James R. Forensic issues in cases of fatal hemorrhage from arteriovenous dialysis access sites. *Forensic Sci Med Pathol.* 2007;3(2):128-132. doi:10.1007/S12024-007-0003-8
  77. Fitzgerald J, Schanzer A, Chin A, McVicar J, Perez R, Troppmann C. Outcomes of upper arm arteriovenous fistulas for maintenance hemodialysis access. *Arch Surg.* 2004;139(2):201-208. doi:10.1001/ARCH-SURG.139.2.201
  78. Craven J, Rodin G, Johnson L, Kennedy S. The diagnosis of major depression in renal dialysis patients. *Psychosom Med.* 1987;49(5):482-492. doi:10.1097/00006842-198709000-00005
  79. Marc B, Baudry F, Zerrouki L, Ghaith A, Garnier M. Suicidal incised wound of a fistula for hemodialysis access in an elderly woman: case report. *Am J Forensic Med Pathol.* 2000;21(3):270-272. doi:10.1097/00000433-200009000-00018
  80. Fluck S, McKane W, Cairns T, Fairchild V, Lawrence A, Lee J, et al. Chloramine-induced haemolysis presenting as erythropoietin resistance. *Nephrol Dial Transpl.* 1999;14:1687-1691. Accessed July 22, 2021. <https://academic.oup.com/ndt/article/14/7/1687/1818110>
  81. Davidovits M, Barak A, Cleper R, Krause I, Gamzo Z, Eisenstein B. Methaemoglobinemia and haemolysis associated with hydrogen peroxide in a paediatric haemodialysis centre: a warning note. *Nephrol Dial Transplant.* 2003;18(11):2354-2358. doi:10.1093/NDT/GFG395

82. Kettritz R, Pilz B, Luft F. Hard times with hard water. *Nephrol Dial Transplant.* 2004;19(7):1925-1927. doi:10.1093/NDT/GFH109
83. Sanghavi S, Whiting S, Uribarri J. Potassium balance in dialysis patients. *Semin Dial.* 2013;26(5):597-603. doi:10.1111/SDI.12123
84. Andreoli MCC, Totoli C. Peritoneal Dialysis. *Rev Assoc Med Bras.* 2020;66(1):s37-s44. doi:10.1590/1806-9282.66.S1.37
85. Cribbs RK, Greenbaum LA, Heiss KF. Risk factors for early peritoneal dialysis catheter failure in children. *J Pediatr Surg.* 2010;45(3):585-589. doi:10.1016/J.JPE-DSURG.2009.06.019
86. Mehrotra R, Devuyst O, Davies S, DW J. The Current State of Peritoneal Dialysis. *J Am Soc Nephrol.* 2016;27(11):3238-3252. doi:10.1681/ASN.2016010112
87. Li PKT, Szeto CC, Piraino B, Arteaga J de, Fan S, Figueiredo AE, et al. ISPD Peritonitis Recommendations: 2016 Update on Prevention and Treatment. *Perit Dial Int.* 2016;36(5):481. doi:10.3747/PDI.2016.00078
88. Muthucumarana K, Howson, Crawford D, Burrows, Swaminathan R, Irish A. The relationship between presentation and the time of initial administration of antibiotics with outcomes of peritonitis in peritoneal dialysis patients: the PROMPT study. *Kidney Int reports.* 2016;1(2):65-72. doi:10.1016/J.EKIR.2016.05.003
89. Miles R, Hawley C, McDonald S, Brown F, Rosman J, Wiggins K, et al. Predictors and outcomes of fungal peritonitis in peritoneal dialysis patients. *Kidney Int.* 2009;76(6):622-628. doi:10.1038/KI.2009.202
90. Sahlawi M Al, Bargman JM, Perl J. Peritoneal Dialysis-Associated Peritonitis: Suggestions for Management and Mistakes to Avoid. *Kidney Med.* 2020;2(4):467. doi:10.1016/J.XKME.2020.04.010
91. Sodo M, Bracale U, Argentino G, Merola G, Russo R, Sannino G, et al. Simultaneous abdominal wall defect repair and Tenckhoff catheter placement in candidates for peritoneal dialysis. *J Nephrol.* 2016;29(5):699-702. doi:10.1007/S40620-015-0251-8
92. Afshentopoulos I, Panduranga Rao S, Mathews R, Oreopoulos D. Hernia development in CAPD patients and the effect of 2.5 l dialysate volume in selected patients. *Clin Nephrol.* 1998;49(4):251-257. Accessed July 22, 2021. <https://europepmc.org/article/med/9582557>
93. Taylor P. Image-guided peritoneal access and management of complications in peritoneal dialysis. *Semin Dial.* 2002;15(4):250-258. doi:10.1046/J.1525-139X.2002.00067.X
94. Yip T, Tse KC, Lam MF, Cheng SW, Lui SL, Tang S, et al. Risks and Outcomes of Peritonitis after Flexible Colonoscopy in CAPD Patients: <https://doi.org/101177/089686080702700517>. 2020;27(5):560-564. doi:10.1177/089686080702700517
95. Wu HH, Li IJ, Weng CH, Lee CC, Chen YC, Chang MY, et al. Prophylactic Antibiotics for Endoscopy-Associated Peritonitis in Peritoneal Dialysis Patients. *PLoS One.* 2013;8(8):e71532. doi:10.1371/JOURNAL.PONE.0071532
96. Strippoli GF, Tong A, Johnson DW, Schena FP, Craig JC. Antimicrobial agents for preventing peritonitis in peritoneal dialysis patients. *Cochrane Database Syst Rev.* Published online October 18, 2004. doi:10.1002/14651858.CD004679.PUB2
97. Piraino B, Bernardini J, Brown E, Figueiredo A, Johnson D, Lye W, et al. ISPD position statement on reducing the risks of peritoneal dialysis-related infections. *Perit Dial Int.* 2011;31(6):614-630. doi:10.3747/PDI.2011.00057
98. Mannucci P, Remuzzi G, Pusineri F, Lombardi R, Valsecchi C, Mecca G, et al. Deamino-8-D-arginine vasopressin shortens the bleeding time in uremia. *N Engl J Med.* 1983;308(1):8-12. doi:10.1056/NEJM198301063080102
99. Walker P. The renal biopsy. *Arch Pathol Lab Med.* 2009;133(2):181-188. doi:10.5858/133.2.181
100. Wiseman D, Hawkins R, Numerow L, Taub K. Percutaneous renal biopsy utilizing real time, ultrasonic guidance and a semiautomated biopsy device. *Kidney Int.* 1990;38(2):347-349. doi:10.1038/KI.1990.208
101. Eiro M, Katoh T, Watanabe T. Risk factors for bleeding complications in percutaneous renal biopsy. *Clin Exp Nephrol.* 2005;9(1):40-45. doi:10.1007/S10157-004-0326-7
102. Hergesell O, Felten H, Andrassy K, Kühn K, Ritz E. Safety of ultrasound-guided percutaneous renal biopsy-retrospective analysis of 1090 consecutive cases. *Nephrol Dial Transplant.* 1998;13(4):975-977. doi:10.1093/NDT/13.4.975
103. Poggio E, McClelland R, Blank K, Hansen S, Bansal S, Bomba A, et al. Systematic Review and Meta-Analysis of Native Kidney Biopsy Complications. *Clin J Am Soc Nephrol.* 2020;15(11):1595-1602. doi:10.2215/CJN.04710420
104. Suthanthiran M, Strom T. Renal transplantation. *N Engl J Med.* 1994;331(6):365-376. doi:10.1056/NEJM199408113310606
105. Cohen-Bucay A, Gordon C, Francis J. Non-immunological complications following kidney transplantation. *F1000Research.* 2019;8. doi:10.12688/F1000RESEARCH.16627.1
106. Baig ZF, Siddiqui UA, Mahmood A, Sabir H, Tareen TB. Medical Complications Of Renal Transplant - 2 Years' Experience At Armed Forces Institute Of Urology . *J Ayub Med Coll Abbottabad.* 2018;30(3):345-350. Accessed July 22, 2021. <https://pubmed.ncbi.nlm.nih.gov/30465363/>
107. Penn I. Occurrence of cancers in immunosuppressed organ transplant recipients. [europepmc.org](https://europepmc.org/). Accessed July 22, 2021. <https://europepmc.org/article/med/7547597>
108. ANZDATA 41st Annual Report 2018 (Data to 2017) - ANZDATA. Accessed July 22, 2021. <https://www.anzdata.org.au/report/anzdata-41st-annual-report-2018-anzdata/>
109. Knoll G, Cockfield S, Blydt-Hansen T, Baran D, Kiberd B, Landsberg D, et al. Canadian Society of

- Transplantation consensus guidelines on eligibility for kidney transplantation. *C Can Med Assoc J.* 2005;173(10):1181. doi:10.1503/CMAJ.051291
110. Fishman J, Rubin R. Infection in organ-transplant recipients. *N Engl J Med.* 1998;338(24):174-179. doi:10.1056/NEJM199806113382407
111. Fishman J. Infection in solid-organ transplant recipients. *N Engl J Med.* 2007;357(25):2601-2614. doi:10.1056/NEJMRA064928
112. Cordero E, Casasola C, Ecarma R, Danguilan R. Cytomegalovirus disease in kidney transplant recipients: incidence, clinical profile, and risk factors. *Transplant Proc.* 2012;44(3):694-700. doi:10.1016/J.TRANSCEED.2011.11.053
113. Mallat S, Tanios B, Itani H, Lotfi T, McMullan C, Gabardi S, et al. CMV and BKPyV Infections in Renal Transplant Recipients Receiving an mTOR Inhibitor-Based Regimen Versus a CNI-Based Regimen: A Systematic Review and Meta-Analysis of Randomized, Controlled Trials. *Clin J Am Soc Nephrol.* 2017;12(8):1321-1336. doi:10.2215/CJN.13221216
114. Singh N, Paterson D. Mycobacterium tuberculosis infection in solid-organ transplant recipients: impact and implications for management. *Clin Infect Dis.* 1998;27(5):1266-1277. doi:10.1086/514993
115. Vlahakos D, Marathias K, Agroyannis B, Madias N. Posttransplant erythrocytosis. *Kidney Int.* 2003;63(4):1187-1194. doi:10.1046/J.1523-1755.2003.00850.X
116. Schechter A, Gaffer-Gvili A, Shepshelovich D, Rahamimov R, Gafter U, Mor E, et al. Post renal transplant anemia: severity, causes and their association with graft and patient survival. *BMC Nephrol.* 2019;20(1):1-11. doi:10.1186/S12882-019-1244-Y
117. Bouchta N, Ghisdal L, Abramowicz D, Broeders N, Surquin M, Hoang A, et al. Conversion from tacrolimus to cyclosporin is associated with a significant improvement of glucose metabolism in patients with new-onset diabetes mellitus after renal transplantation. *Transplant Proc.* 2005;37(4):1857-1860. doi:10.1016/J.TRANSCEED.2005.03.137
118. Lentine K, Brennan D, Schnitzler M. Incidence and predictors of myocardial infarction after kidney transplantation. *J Am Soc Nephrol.* 2005;16(2):496-506. doi:10.1681/ASN.2004070580
119. Ojo A. Cardiovascular complications after renal transplantation and their prevention. *Transplantation.* 2006;82(5):603-611. doi:10.1097/01.TP.0000235527.81917.FE
120. Lentine K, Costa S, Weir M, Robb J, Fleisher L, Kasiske B, et al. Cardiac disease evaluation and management among kidney and liver transplantation candidates: a scientific statement from the American Heart Association and the American College of Cardiology Foundation: endorsed by the American Society of Transplant Surge. *Circulation.* 2012;126(5):617-663. doi:10.1161/CIR.0B013E31823EB07A
121. Cooper WA, O'Brien SM, Thourani VH, Guyton RA, Bridges CR, Szczecz LA, et al. Impact of Renal Dysfunction on Outcomes of Coronary Artery Bypass Surgery. *Circulation.* 2006;113(8):1063-1070. doi:10.1161/CIRCULATIONAHA.105.580084
122. Nguyen K, Patel A, American FWCJ of the, undefined. Ionizing radiation exposure among kidney transplant recipients due to medical imaging during the pretransplant evaluation. *Am Soc Nephrol.* 2013;8:833-839. doi:10.2215/CJN.03990412
123. Hart A, Weir MR, Kasiske BL. Cardiovascular risk assessment in kidney transplantation. *Kidney Int.* 2015;87(3):527-534. doi:10.1038/KI.2014.335
124. Davidson J, Wilkinson A, Dantal J, Dotta F, Halter H, Hernández D, et al. New-onset diabetes after transplantation: 2003 International consensus guidelines. Proceedings of an international expert panel meeting. Barcelona, Spain, 19 February 2003. *Transplantation.* 2003;75(10 Suppl). doi:10.1097/01.TP.0000069952.49242.3E
125. Kasiske B, Snyder J, Gilbertson D, Matas A. Diabetes mellitus after kidney transplantation in the United States. *Am J Transplant.* 2003;3(2):178-185. doi:10.1034/J.1600-6143.2003.00010.X
126. Sharif A, Hecking M, de Vries A, Porrini E, Hornum M, Rasoul-Rockenschaub S, et al. Proceedings from an international consensus meeting on posttransplantation diabetes mellitus: recommendations and future directions. *Am J Transplant.* 2014;14(9):1992-2000. doi:10.1111/AJT.12850
127. Hojo M, Morimoto T, Maluccio M, Asano T, Nature KM, 1999 undefined. Cyclosporine induces cancer progression by a cell-autonomous mechanism. *nature.com.* Accessed July 22, 2021. <https://www.nature.com/articles/17401>
128. Tremblay F, Fernandes M, Habbab F, de Edwardes MDB, Loertscher R, Meterissian S. Malignancy after renal transplantation: Incidence and role of type of immunosuppression. *Ann Surg Oncol.* 2002;9(8):785-788. doi:10.1007/BF02574501
129. Jiyad Z, Olsen C, Burke M, Isbel N, Green A. Azathioprine and Risk of Skin Cancer in Organ Transplant Recipients: Systematic Review and Meta-Analysis. *Am J Transplant.* 2016;16(12):3490-3503. doi:10.1111/AJT.13863
130. Jensik S. Tacrolimus (FK 506) in kidney transplantation: three-year survival results of the US multicenter, randomized, comparative trial. FK 506 Kidney Transplant Study Group. *Transplant Proc.* 1998;30(4):1216-1218. doi:10.1016/S0041-1345(98)00216-4
131. Webster A, Woodroffe R, Taylor R, Chapman J, Craig J. Tacrolimus versus cyclosporin as primary immunosuppression for kidney transplant recipients. *Cochrane database Syst Rev.* 2005;(4). doi:10.1002/14651858.CD003961.PUB2
132. Martin S, Powell J, Patel M, Tsapepas D. Risk of posttransplant lymphoproliferative disorder associated with use of belatacept. *Am J Health Syst Pharm.* 2013;70(22):1977-1983. doi:10.2146/AJHP120770
133. Opelz G, Unterrainer C, Süsal C, Döhler B. Efficacy and safety of antibody induction therapy in the current era of kidney transplantation. *Nephrol Dial Transplant.* 2016;31(10):1730-1738. doi:10.1093/NDT/GFW086

134. Slagt I, Ijzermans J, Visser L, Weimar W, Roodnat J, Terkivatan T. Independent risk factors for urological complications after deceased donor kidney transplantation. *PLoS One.* 2014;9(3). doi:10.1371/JOURNAL.PONE.0091211
135. Kumar S, Ameli-Renani S, Hakim A, Jeon J, Shrivastava S, Patel U. Ureteral obstruction following renal transplantation: causes, diagnosis and management. *Br J Radiol.* 2014;87(1044). doi:10.1259/BJR.20140169
136. Soliman S, Shokeir A, El-Hefnawy A, Harraz A, Kamal M, Shehab El-Din A, et al. Vascular and haemorrhagic complications of adult and paediatric live-donor renal transplantation: A single-centre study with a long-term follow-up. *Arab J Urol.* 2012;10(2):155-161. doi:10.1016/J.AJU.2011.12.002
137. Sachdeva A, Bhatia N, Paul B, Kumar V. External iliac artery pseudoaneurysm complicating renal transplantation. *J Assoc Physicians India.* 2013;61(10):752-753. doi:10.1510/ICVTS.2008.200386
138. Lentine K, Lam N, Axelrod D, Schnitzler M, Garg A, Xiao H, et al. Perioperative Complications After Living Kidney Donation: A National Study. *Am J Transplant.* 2016;16(6):1848-1857. doi:10.1111/AJT.13687