

Complement-mediated kidney diseases and their impact

The kidneys play a vital role in keeping us healthy, and it is often only when something goes wrong that we realize just how important they are.¹ Unfortunately, as many as 1 in 10 people are affected by chronic kidney disease (CKD) worldwide, which occurs when the kidneys have been damaged over time and can no longer function the way they should.²

There are many different causes of CKD.² In some rare kidney diseases, called complement-mediated kidney diseases, damage to the kidneys is caused when a part of the immune system becomes overly active.³⁻⁵ This generates an inflammatory response that leads to kidney damage, resulting in protein in the urine (proteinuria) and lower kidney function.^{3,5}



Types of complement-mediated kidney diseases

Complement-mediated kidney diseases are chronic, rare, complex and progressive and occur when the immune system becomes overly active.³⁻⁹ They include diseases such as C3 glomerulopathy (C3G), IgA nephropathy (IgAN), atypical hemolytic uremic syndrome (aHUS) and membranous nephropathy (MN).⁷⁻¹⁰



These rare kidney diseases, with the exception of MN, can start early in life, mainly affecting teens and young adults, though symptoms may not be noticed until later in life.¹¹⁻¹⁴ Unfortunately, some patients will progress to kidney failure within only 10 years of being diagnosed.^{7,15-21}

Living with complement-mediated kidney diseases



People living with complement-mediated kidney diseases can experience a variety of symptoms, including debilitating fatigue, that have a significant impact on their quality of life.²²⁻²⁵ This can limit physical activities and abilities to socialize, resulting in severe psychosocial consequences, including reduced motivation, depression and anxiety.²³⁻²⁵

Unfortunately, there are limited treatment options specifically approved for these rare kidney diseases.^{7,10,15,25-27} Oral corticosteroids and immunosuppressants can be used in patients at high risk of disease progression, but these often come with significant side effects, including hypertension, diabetes, obesity and a heightened risk of infections.²⁵⁻²⁸

Progression of these diseases to kidney failure can also mean that people require dialysis for life or may need a kidney transplant, which contributes to an impaired quality of life and an increased risk of premature death.²⁹⁻³⁰

The symptoms associated with complement-mediated kidney diseases, along with the challenges of therapy and time-consuming dialysis, can lead to impaired quality of life and feelings of social isolation and increasingly poor health.²²⁻²⁵

The human and societal impact of complement-mediated kidney diseases

In addition to the personal impact of complement-mediated kidney diseases, many people can experience unemployment and productivity loss, given the high prevalence of these diseases among working-aged adults.³¹⁻³³ In the U.S., only 11-31% of people who were previously employed retained their job a year after starting on dialysis, compared with 30% in Europe, and 55% in Japan.³⁴

There is also a significant impact on healthcare systems, with high-income countries typically spending more than 2-3% of their annual healthcare budget on the treatment of kidney failure.^{35,37} In the U.S., for example, the treatment of chronic kidney disease cost more than \$87.2 billion in 2019.³⁶

Without new treatment options, there will continue to be a significant economic burden on healthcare systems across the globe, driven by dialysis and kidney transplantation costs.³⁶⁻³⁸

Our commitment to complement-mediated kidney diseases



At Novartis, we are committed to developing treatments for people living with complement-mediated kidney diseases through continued investment in research and development, and targeted acquisitions.

There is a need for well-tolerated therapies that target key drivers of disease progression in complement-mediated kidney diseases to help delay kidney failure, and in doing so, extend dialysis-free life.³⁹

References:

1. National Kidney Foundation. Top 5 Jobs Kidneys Do. Available at: <https://www.kidney.org/kidneydisease/top-5-jobs-kidneys-do> [Accessed Feb 2022]
2. World Kidney Day. What is Chronic Kidney Disease? Available at: <https://www.worldkidneyday.org/facts/chronic-kidney-disease/> [Accessed Feb 2022]
3. Luo W, et al. (2018) *Front. Immunol.* 9:1433.
4. Morgan B et al. (2015) *Nat Rev Drug Discov.* 14:857–77.
5. Thurman JM. (2020) Complement and the Kidney: An Overview. *Adv Chronic Kidney Dis.*27(2):86-94.
6. Koscielska-Kasprzak, K et al. (2014) *Archivum immunologiae et therapiae experimentalis* 62(1), pp.47-57.
7. Smith R, et al. (2019) *Nat Rev Nephrol.* 15:129–43.
8. Schena F, et al. (2020) *Int J Mol Sci.* 21:525.
9. Wong EKS et al. (2018) *Semin Immunopathol.*40(1):49-64.
10. Boyd J, et al. (2012) *Kid Int.* 81:833–43.
11. Nair R, Walker PD. *Kidney Int* 2006;69:1455-83.
12. Nester CM et al. (2013). *Curr Opin Nephrol Hypertens.* 22(2):231-237.
13. Fremeaux-Bacchi, V et al. (2013) *Clin J Am Soc Nephrol.* 8(4), pp.554-562.
14. McGrogan A et al. (2011) *Nephrol Dial Transplant.* 26(2):414-30.

15. Goodship TH et al. (2017) *Kidney Int.* 91(3):539-551.
16. Medjeral-Thomas NR et al. (2014) *Clin J Am Soc Nephrol.* 9(1):46-53.
17. Nam KH et al. (2014) *PLoS One.* 8;9(7):e101935.
18. Sevillano, A.M et al. (2017) *Clin J Am Soc Nephrol.* 28(10), pp.3089-3099.
19. Fremeaux-Bacchi, V et al. (2013) *Clin J Am Soc Nephrol.* 8(4), pp.554-562.
20. Licht, C (2015) *BMC nephrology.* 16(1), pp.1-8.
21. Polanco N et al. (2010) *J Am Soc Nephrol.* 21(4):697-704. doi:10.1681/ASN.2009080861.
22. Tyagi N, et al. (2019). *Value in Health.* 22:S919. ISPOR-EU abstract PUK33.
23. Gonzalez A, et al. (2020) *Am J Kidney Dis.* S0272-6386(20)30719-8.
24. Perlman R, et al. (2005) *Am J Kidney Dis.* 45:658–66.
25. Zhao Y, et al. (2020) *J Int Med Res.* 48(1):300060519898008.
26. Rauen T, et al. (2020) *Kidney Int.* Epub ahead of print.
27. Caravaca-Fontán F et al. (2021) *Nephrol Dial Transplant.* 29:gfab075. Epub ahead of print.
28. KDIGO Clinical Practice Guideline for the Management of Glomerular Diseases (2021) *Kidney Int.* 100(4S):S1-S276. Available at: <https://www.kidney-international.org/action/showPdf?pii=S0085-2538%2821%2900562-7> [Accessed Feb 2022].
29. Koscielska-Kasprzak, K et al. (2014) *Archivum immunologiae et therapiae experimentalis* 62(1), pp.47-57.
30. National Kidney Foundation. *Kidney disease: The basics.* Available at: <https://www.kidney.org/news/newsroom/fsindex> [Accessed Feb 2022].
31. Hallab A et al. (2018) *Clin J Am Soc Nephrol.* 13(2):203-204.
32. Holley J et al. (1994) *Am J Kidney Dis.* 23(5):681–5.
33. Kutner NG, et al. (2010) ;5(11):2040–5.
34. Nie Y et al, (2020). *Clin Kidney J.* 14;13(3):434-441.
35. Luyckx, VA et al. (2018) *Bulletin of the World Health Organization,* 96(6), p.414.
36. CDC. *Chronic Kidney Disease Basics.* Available at <https://www.cdc.gov/kidneydisease/basics.html> [Accessed Feb 2022]
37. Couser WG et al. (2011). *Kidney Int.* 2011 Dec;80(12):1258–70.
38. Cattran, DC et al. *Kidney International Supplements.* (2012) 2(2), pp.139-274.
39. Oh, Gia J., et al. *Kidney international reports.* (2019) 1608-1616.

Source URL: <https://prod1.novartis.com/diseases/rare-kidney-diseases/complement-mediated-kidney-diseases-and-their-impact>

List of links present in page

1. <https://prod1.novartis.com/diseases/rare-kidney-diseases/complement-mediated-kidney-diseases-and-their-impact>
2. <https://www.kidney.org/kidneydisease/top-5-jobs-kidneys-do>
3. <https://www.worldkidneyday.org/facts/chronic-kidney-disease/>
4. <https://www.kidney-international.org/action/showPdf?pii=S0085-2538%2821%2900562-7>
5. <https://www.kidney.org/news/newsroom/fsindex>
6. <https://www.cdc.gov/kidneydisease/basics.html>