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Case Report

Oral Health in Chronic Kidney Disease

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Abbreviations

CKD: Chronic Kidney Disease

Case Report

Chronic Kidney Disease (CKD) presents a major public health challenge with an estimated global prevalence of 11-13% [1]. Around 0.1% of the populations of developed countries live with end-stage renal disease, so that in the UK there are 60,000 patients dependent on renal replacement therapy in the form of dialysis or a kidney transplant [2]. In the earlier stages of CKD patients may be asymptomatic and unaware of their diagnosis, but demonstrate proteinuria and reduced renal excretory function [3] and are exposed to significant risks of cardiovascular disease and other complications [4].

The relationship of CKD and oral health is varied and complex. CKD has been said to protect against caries, because of the effect of salivary urea in increasing oral pH [5]. However many patients with CKD, particularly in advanced disease, complain of a range of oral symptoms including altered (often metallic) taste, halitosis, stomatitis and xerostomia [6]. Objectively both in patients and experimental models, CKD has been shown to reduce salivary flow rates and alter salivary biochemistry, with increased concentrations of urea and creatinine and high oral pH [7-9]. Such oral disease may have implications for the quality of life, nutritional status and the general health of patients living with CKD [10]. Furthermore, some research suggests that patients with CKD may have limited access to dental care, and have poor oral hygiene routines [11,12].

Importantly, the most robust evidence available associates CKD with a high prevalence of gingival disease and periodontitis. Pooled data suggest that roughly 20% of dialysis patients have no teeth, and over half of those that remain have significant periodontitis, with mean periodontal probing depths of 2.3mm and clinical attachment loss of 3.5mm [6]. Another meta-analysis found a similar, consistent association between CKD and periodontitis with an odds ratio of 1.65 compared to the general population [13]. Data from the RIISC cohort patients in the UK found that CKD patients had an odds ratio of 4.0 compared to community-matched controls for all forms of periodontitis and 3.9 for the severest form of the disease [14]. In the NHANES III dataset from the US, subjects with all stages of CKD had a combined prevalence of periodontitis of 12.9% compared to 7.5% in subjects without CKD, and a trend was seen towards a dose-dependent increase in periodontitis rates in more severe stages of CKD that reached statistical significance in non-white populations [15].

There are well established associations in the general population between periodontitis and both cardiovascular disease and all-cause mortality [16,17]. This association holds true in CKD, as CKD patients with periodontitis have an increased mortality compared to CKD patients without periodontitis, a deleterious effect similar in size to the effect of suffering diabetes as a comorbidity [18]. A similar increase in mortality in CKD patients with periodontitis compared to those without was found in a recent meta-analysis, although they were not able to establish a specific link with cardiovascular disease [19]. Furthermore, CKD patients with periodontitis have been shown to have higher levels of systemic inflammation and malnutrition compared to those with better oral health [20,21], and this systemic inflammatory milieu, driven by periodontal inflammation, with oxidative stress and endothelial dysfunction , may account for some of the excess cardiovascular disease seen in the CKD patient population.

Periodontitis is a complex inflammatory disease, and it is unclear exactly what factors cause its increased prevalence in CKD patients. Patient factors, including smoking, poor oral hygiene and limited engagement with dental screening programmes may be contributory. It is possible that CKD mineral and bone disease, in which rapid bone turnover driven by secondary hyperparathyroidism disrupts normal bony architecture, may contribute to periodontal bone loss and loosening of tooth attachment. CKD is associated with functional abnormalities of the immune system, including of neutrophil activity, which are cells known to be important in maintaining periodontal health [22,23]. It is also possible that alterations in salivary biochemistry cause changes in bacterial populations in the oral cavity, resulting in a different level of microbial pathogenicity to the gingival tissues.

In the general population there is evidence to suggest that treatment of periodontal disease improves cardiovascular and inflammatory parameters [24,25]. These results have been mirrored in the CKD population [8,26], although evidence of the long-term outcomes of such interventions is presently lacking.

As the incidence of CKD increases, the proportion of patients with CKD-associated gum disease looks set to rise accordingly. It will be important to deepen our understanding of the pathological mechanisms involved and of the benefits of periodontal treatment not just on periodontal health but also on critical patient end-points such as cardiovascular events and mortality.

References

1. Hill NR, Fatoba ST, Oke JL, Hirst JA, O'Callaghan CA, Lasserson DS, et al. Global Prevalence of Chronic Kidney Disease – A Systematic Review and Meta-Analysis. PLoS ONE. 2016; 11.

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2. UK Renal Registry 19th Annual Report. UK Renal Registry. 2016.

3. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney Int Suppl. 2013; 3: 1–150.

4. Meisinger C, Döring A, Löwel H. KORA Study Group. Chronic kidney disease and risk of incident myocardial infarction and all-cause and cardiovascular disease mortality in middle-aged men and women from the general population. Eur Heart J. 2006; 27: 1245–1250.

5. Andrade MR, Antunes LA, Soares RM, Leão AT, Maia LC, Primo LG. Lower dental caries prevalence associated to chronic kidney disease: a systematic review. Pediatr Nephrol. 2014; 29: 771-778.

6. Ruospo M, Palmer SC, Craig JC, Gentile G, Johnson DW, Ford PJ, et al. Prevalence and severity of oral disease in adults with chronic kidney disease: a systematic review of observational studies. Nephrol Dial Transplant. 2014; 29: 364–375.

7. Anuradha BR, Katta S, Kode VS, Praveena C, Sathe N, Sandeep N, et al. Oral and salivary changes in patients with chronic kidney disease: A clinical and biochemical study. J Indian Soc Periodontol. 2015; 19: 297–301.

8. Lasisi TJ, Raji YR, Salako BL. Salivary creatinine and urea analysis in patients with chronic kidney disease: a case control study. BMC Nephrol. 2016; 17: 10.

9. Romero AC, Bergamaschi CT, de Souza DN, Nogueira FN. Salivary Alterations in Rats with Experimental Chronic Kidney Disease. PLoS ONE. 2016; 11.

10. Akar H, Akar GC, Carrero JJ, Stenvinkel P, Lindholm B. Systemic consequences of poor oral health in chronic kidney disease patients. Clin J Am Soc Nephrol. 2011; 6: 218-226.

11. Gurkan A, Kose T, Atilla G. Oral health status and oral hygiene habits of an adult Turkish population on dialysis. Oral Health Prev Dent. 2008; 6: 37-43.

12. Guzeldemir E, Toygar HU, Tasdelen B, Torun D. Oral health-related quality of life and periodontal health status in patients undergoing hemodialysis. J Am Dent Assoc. 2009; 140: 1283-1293.

13. Chambrone L, Foz AM, Guglielmetti MR, Pannuti CM, Artese HP, Feres M, et al. Periodontitis and chronic kidney disease: a systematic review of the association of diseases and the effect of periodontal treatment on estimated glomerular filtration rate. J Clin Periodontol. 2013; 40: 443-456.

14. Sharma P, Dietrich T, Sidhu A, Vithlani V, Rahman M, Stringer S, et al. The periodontal health component of the Renal Impairment In Secondary Care (RIISC) cohort study: a description of the rationale, methodology and initial baseline results. J Clin Periodontol. 2014; 41: 653-661.

15. Ioannidou E, Swede H. Disparities in Periodontitis Prevalence among Chronic Kidney Disease Patients. J Dent Res. 2011; 90: 730–734.

16. Dietrich T, Jimenez M, Krall Kaye EA, Vokonas PS, Garcia RI. Age-dependent associations between chronic periodontitis/edentulism and risk of coronary heart disease. J Clin Periodontol. 2008.

17. Xu F, Lu B. Prospective association of periodontal disease with cardiovascular and all-cause mortality: NHANES III follow-up study. Atherosclerosis. 2011; 218: 536-542.

18. Sharma P, Dietrich T, Ferro CJ, Cockwell P, Chapple ILC. Association between periodontitis and mortality in stages 3–5 chronic kidney disease: NHANES III and linked mortality study. J Clin Periodontol. 2016; 43: 104–113.

19. Zhang J, Jiang H, Sun M, Chen J. Association between periodontal disease and mortality in people with CKD: a meta-analysis of cohort studies. BMC Nephrol 2017; 18: 269.

20. Chen LP, Chiang CK, Chan CP, Hung KY, Huang CS. Does periodontitis reflect inflammation and malnutrition status in hemodialysis patients? Am J Kidney Dis. 2006; 47: 815-822.

21. Buhlin K, Bárány P, Heimbürger O, Stenvinkel P, Gustafsson A. Oral health and pro-inflammatory status in end-stage renal disease patients. Oral Health Prev Dent. 2007; 5: 235-244.

22. Lemesch S, Ribitsch W, Schilcher G, Spindelböck W, Hafner-Gießauf H, Marsche G, et al. Mode of renal replacement therapy determines endotoxemia and neutrophil dysfunction in chronic kidney disease. Sci Rep. 2016; 6: 34534.

23. Kato S, Chmielewski M, Honda H, Pecoits-Filho R, Matsuo S, Yuzawa Y, et al. Aspects of Immune Dysfunction in End-stage Renal Disease. CJASN. 2008; 3: 1526-1533.

24. Tonetti MS, D'Aiuto F, Nibali L, Donald A, Storry C, Parkar M, et al. Treatment of Periodontitis and Endothelial Function. N Engl J Med. 2007; 356: 911-920.

25. Seinost G, Wimmer G, Skerget M, Thaller E, Brodmann M, Gasser R, et al. Periodontal treatment improves endothelial dysfunction in patients with severe periodontitis. Am Heart J. 2005; 149: 1050-1054.

26. Siribamrungwong M, Puangpanngam K. Treatment of periodontal diseases reduces chronic systemic inflammation in maintenance hemodialysis patients. Ren Fail. 2012; 34: 171-175.

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