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REVIEW

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Oral Manifestations in Patients with Chronic Renal Disease: Literature Review

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Abstract

Kidney disease is the loss of kidney function, which can be acute or chronic. Acute is the mild state of the disease in which normal kidney function can be restored in a few weeks, the chronic affects the kidneys more slowly and is irreversible. The treatment is instituted by the doctor according to the progression of the loss of renal function, and dialysis, which is subdivided into hemodialysis and peritoneal dialysis, or kidney transplantation, may be indicated. Changes in the oral mucosa, such as uremic stomatitis, can be found in patients with this disorder. This study aimed to conceptualize chronic kidney disease, highlight oral changes and dental procedures. The care for patients with kidney disease must be multidisciplinary, and the dentist must be part of the treatment team to investigate changes in the oral region and perform the procedures that are appropriate, bringing comfort to the patient and helping to prevent systemic complications..

Keywords: *kidney diseases; oral health; oral medicine; oral diagnosis*

Introduction

Renal failure (RF) is the condition in which the kidneys lose their basic ability to filter blood to eliminate harmful substances to the organism. In addition, the kidneys do not maintain the balance of fluids and electrolytes in the body, and the secretion of hormones from the renin-angiotensin and erythropoietin system is compromised [1]. RF can lead to a sudden and rapid loss of kidney function, called acute renal failure (ARF). Chronic kidney disease (CKD) is characterized by slow, progressive and irreversible loss of kidney function leading to failures in the glomerular and tubular filtration systems and, in its advanced stage, the destruction of the nephrons [1-3].

Diabetic nephropathy, hypertension and primary glomerulonephritis are the most common causes of CKD [4]. However, factors such as diabetes mellitus, obesity, polycystic kidney disease, urinary tract obstruction, infections, drug intoxications and vascular disorders are also involved in the etiology of this condition [5-7]. Early detection and adequate treatment in the early stages is a challenge, as the patient often does not present specific signs or symptoms. However, they help to prevent deleterious outcomes and morbidity and mortality related to nephropathies, resulting in benefits in quality of life, longevity and cost reduction associated with public health care [2,3,8-10].

Patients with CKD may present oral manifestations, such as: uremic breath, dry mouth sensation, altered taste, petechiae and ecchymosis in the mucosa and decreased salivary flow. Uremic stomatitis, radiographic changes in the maxillary and mandibular bones, abnormal bone remodeling after extraction and delayed tooth eruption are also manifested [2,3,11-13].

The dentist must know this condition to identify and treat oral manifestations resulting from kidney disease. Therefore, this study aimed to conceptualize chronic kidney disease, highlight oral changes and dental procedures.

Chronic Kidney Disease Considerations

CKD is usually identified by the serum chemical alterations and urine of patients with risk factors for the disease, or as an incidental finding. Less common is the presentation of symptoms such as macroscopic hematuria, "foamy urine" (a sign of albuminuria), nocturia, flank pain or decreased urine production. If the disease is advanced, patients may report fatigue, lack of appetite, nausea, vomiting, metallic taste, involuntary weight loss, itching, changes in mental status, dyspnea or peripheral edema [2,6,9]. The evolution of renal function up to the final stage of CKD is shown in (Figure 1).

This disease affects 8% to 16% population and is a major cause of death around the world. Optimal CKD management includes reducing cardiovascular risk, treating albuminuria, preventing nephrotoxins and adjusting the dose of the drug. Patients also need to monitor CKD complications, such as hyperkalaemia, metabolic acidosis, hyperphosphatemia, vitamin D deficiency, secondary hyperparathyroidism and anemia [4,8,9,11,14].

Treatment for Chronic Kidney Disease

Dialysis is a procedure that performs the metabolic function of the kidney, but is not effective in correcting endocrine abnormalities, bone diseases, neuropathies or any alteration related to chronic kidney disease. Dialysis is subdivided into hemodialysis and peritoneal dialysis [1-3,10] (Figure 2).

Hemodialysis is performed using a machine called a dialyzer that contains semipermeable membranes that allow the passage of fluid and excessive waste, returning to the patient after being filtered [1,2,11]. Arteriovenous maneuvers or fistulas gain access to the bloodstream, but are unable to fully replace the organ [2,3,11]. It is a tense and distressing moment for the patient, therefore its psychological impact must be considered [3,15]. Hemodialysis is a high cost / complexity procedure that involves highly specialized

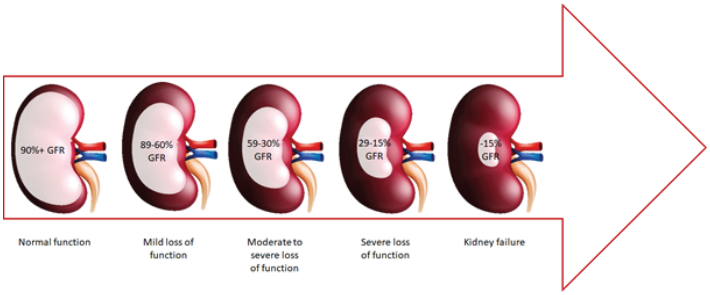

Figure 1. Stages of kidney disease based on Glomerular filtration rate (GFR)

assistance, advanced technology, highly complex actions and requires articulation between the secondary and tertiary levels of care [11].

Peritoneal dialysis is performed by introducing a catheter through the abdominal wall to the peritoneal cavity, which is rich in blood vessels and acts as a filter. The catheter performs the function of filtering and excreting excess water, body waste and chemicals, this process occurs periodically through a flexible tube [10,11].

Kidney transplantation is the treatment of choice for end-stage kidney disease because it improves patient survival and provides a better quality of life compared to hemodialysis treatment [1,16]. Patients with an organ transplant need immunosuppressive drugs to prevent rejection for the rest of their lives. As a consequence of immunosuppression, these patients may develop oral lesions such as gingival growth induced by cyclosporine or calcium channel blockers, oral candidiasis, viral infections and malignancies [16].

Oral Manifestations of Chronic Kidney Disease

Halitosis may be present in individuals affected by CKD due to the difficulty in which the body has to filter, thus causing an accumulation of urea in the blood and consequently causing its metabolism to ammonia [1,2,11]. Xerostomia in patients with CKD is directly related to the decrease in salivary flow, due to dehydration of the salivary glands, the use of certain medications, such as antihypertensive and antidepressant drugs, and by the disorders caused by the disease [1,5,11]. Thus, it predisposes to the appearance of caries lesions, mucositis, oral infections and a rapid accumulation of plaque on the teeth, since there is a deficit in the saliva's protective factors [2,3,11]. Oral conditions resulting from CKD can be seen in (Table 1).

Due to the weakened physiological and psychological states of the patient with CKD, there is also a negligence in oral hygiene which, together with the increased metabolism of ammonia and decreased salivary flow, alters the palate, giving the sensation of iron taste in the mouth and enhances the development of dental and periodontal problems [3,5,10,11,15,17-19]. Periodontal disease (PD) with pocket formation, gingival recession and bone loss is due not only to inadequate oral hygiene and the inflammatory process of the disease, but also to renal osteodystrophy [2,3,20]. Renal osteodystrophy results from disorders in the metabolism of calcium, phosphorus and vitamin D, and increased parathyroid activity, being characterized by excessive bone resorption by osteoclasts, increased bone neoformation and fibrosis [11,12,21]. Systemic inflammation caused by PD is considered a risk factor for CKD [10,16,18].

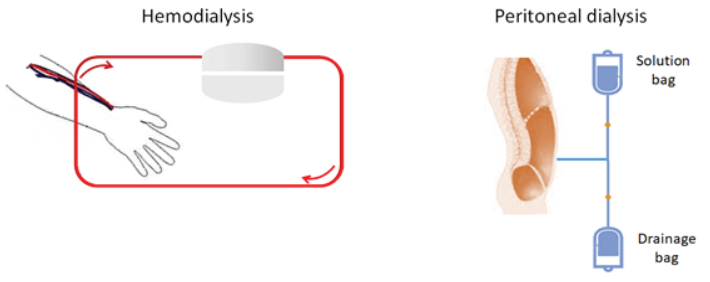

Figure 2. Schematic illustration of hemodialysis and peritoneal dialysis

Radiographic changes in the maxillary and mandibular bones are secondary to the loss of calcium from bone tissue due to increased parathyroid hormone, where it also causes loss of the hard lamina and radiolucent lesions, abnormal bone remodeling after extraction, delayed tooth eruption [1-3,12,13,20].

Uremic stomatitis, petechias and ecchymosis are commonly found in patients with CKD. Uremic stomatitis is characterized by a red / ulcerated oral mucosa covered by a thick pseudomembrane, a condition caused by the use of drugs, such as beta-blockers, antidiuretics and by the increase in the levels of urea and nitrogen urea in the blood. When these levels are normal, there is regression of these injuries [1-3,13]. Oral conditions resulting from CKD can be seen in (table 1).

Dental care for patients with Chronic Kidney Disease

Dental care for chronic kidney patients requires special care, therefore, the dental therapeutic protocol and drug therapy must be differentiated according to the clinical status of each patient [1,3,11,22]. Patients undergoing renal dialysis use anticoagulants such as heparin in order to avoid the risk of bleeding, so it is preferable that dental care for these patients is performed on days without dialysis [1,3,22].

Antibiotic prophylaxis aims to prevent systemic infection when performing an invasive dental procedure. The antimicrobial regimen should be established in conjunction with the nephrologist or follow the protocol of the American Heart Association (AHA) [1,4,22]. Maintaining oral hygiene would be the most important factor in preventing the risk of infectious endocarditis. It is important to emphasize that, in transplant patients, who are more susceptible to infection, antibiotic prophylaxis should be indicated [1,3,11].

Table 1. Oral conditions resulting from CKD, 2021

Conditions	Characteristics
Oral lesions	Petechial hemorrhage Aphthous ulcers Depapillated tongue
Periodontal alteration	Bleeding gums Gingivitis Periodontitis Periodontal pocket Gingivae recession
Salivary alteration	Xerostomia
Mucosa alteration	Hyperpigmented
	Pale
	Hyperemic
Infection	Oral Candida
Others Conditions	Burning mouth
	Abnormal taste
	Halitosis

In cases of procedures or oral conditions that require the prescription of anti-inflammatory drugs, the use of non-steroidal anti-inflammatory drugs (NSAIDs) should be avoided, due to their nephrotoxicity and adverse effects [1-3,22]. If the use of local anesthetic is necessary, the literature indicates lidocaine as the safest anesthetic, as its metabolism is hepatic [2,3].

Many patients with CKD also have systemic arterial hypertension (SAH) as a consequence of the disease. However, in the case of patients with CKD and with compensated SAH, lidocaine with vasoconstrictor at a concentration of 1: 100,000 is well indicated, whereas in cases of non-compensated SAH, 3% mepivacaine, without vasoconstrictor [1-4].

Conclusion

Chronic Kidney Disease is slow, progressive and irreversible loss of kidney function. Both the disease and the side effects of CKD treatment can cause significant oral changes. Thus, the dentist's knowledge about the pathophysiology of the disease and good communication with the nephrologist are essential, since dental management is adjusted according to the patient's clinical status and the stage of his systemic treatment.

Author Contributions

- **Hiris de Oliveira Cardoso:** Search and review of literature, search and data analysis, writing the manuscript.
- **Luiza Nayara Almeida Lyra Correia:** Data analysis, suggestions in the methodology, review of the manuscript.
- **Gefter Thiago Batista Corrêa:** Data analysis, suggestions and supervision of the manuscript, review of the manuscript
- **Kariza Vargens Diniz Correia:** conceptualization, project orientation, data analysis, solving fundamental research problems, writing and supervision of the manuscript, review of the manuscript

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Rec: 10 Feb 2021; **Acc**: 06 Mar 2021; **Pub**: 09 Mar 2021

Global Dentistry. 2021;4(1):137
DOI: 10.36879/GoD.20.000137