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REVIEW ARTICLE

Oral conditions in renal disorders and treatment considerations – A review for pediatric dentist

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Dental caries

Abstract This article reviews the current understanding of the oral and dental aspects of chronic renal disease (CRD). A PubMed literature search was performed and all relevant studies were assessed. As the number of people suffering from CRD increases worldwide, dentists are expected to encounter more patients with CRD who need oral care. In children, CRD can elicit a wide spectrum of oral manifestations in the hard and soft tissues. Bleeding, altered drug metabolism, impaired immune function, and an increased risk of dentally induced bacterial endocarditis are some important features that require attention. Dental management of patients with CRD requires that clinicians appreciate that multiple systems can be affected by the disease. Dentists should consult with nephrologists regarding the specific precautions required for each patient. Medical treatments in these patients may need to be postponed due to an unfavorable oral health status or potential risk of life-threatening infection after surgery. Improving oral hygiene and performing necessary dental and oral treatment before hemodialysis or transplantation may prevent endocarditis and septicemia in these patients. Hence, treatment plans should be formulated to restore the patient's dentition and protect them from potentially severe infections of dental origin.

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1. Introduction

Various medical conditions can affect the oral health of patients. With advances in medical treatment and improved survival rates for many disorders, dentists can be expected to treat an increasing number of patients with complex medical conditions. In particular, the prevalence of chronic renal disease (CRD) is increasing worldwide (Olivas-Escárcega et al., 2008). Common renal disorders seen in children include congenital nephropathies, nephrotic syndrome, chronic renal failure (CRF), glomerulonephritis, hydronephrosis, and multicystic renal dysplasia, which ultimately lead to end-stage renal disease (ESRD) (Bagga et al., 2009; Warady and Chadha, 2007).

CRF is a progressive and irreversible decline in the total number of functioning nephrons, which causes a decline in the glomerular filtration rate. CRF is accompanied by clinical and laboratory changes that are related to the inability of the kidney to excrete metabolites and perform endocrine functions, including secretion of active vitamin D and erythropoietin (Fogo and Kon, 2004). Nephrotic syndrome is a common chronic disorder that is characterized by alterations of permselectivity at the glomerular capillary wall, resulting in protein loss through the urine. Nephrotic range proteinuria is defined as proteinuria exceeding 1000 mg/m^2/d or a spot urinary protein-to-creatinine ratio exceeding 2 mg/mg (Bagga and Mantan, 2005). ESRD is the stage when renal replacement therapy by dialysis or transplantation is required (Greenberg and Glick, 2003).

In children, renal disease can give rise to a wide spectrum of oral manifestations in the hard and soft tissues. Renal disease may lead to the development of pale oral mucosa (Al Nowaiser et al., 2003), dental calculus (Davidovich et al., 2009; Martins et al., 2008), enamel hypoplasia (Al Nowaiser et al., 2003; Martins et al., 2008), dry mouth (Martins et al., 2008), low caries rate (Al Nowaiser et al., 2003; Nakhjavani and Bayramy, 2007; Nunn et al., 2000), poor oral hygiene, and uremic stomatitis, and may cause changes in the salivary composition (Guzeldemir et al., 2009) and flow rate (Al Nowaiser et al., 2003; Guzeldemir et al., 2009; Martins et al., 2008). These complications can lead to excessive bleeding, anemia, increased susceptibility to infection, drug intolerance, renal osteodystrophy, adrenal crisis, and enamel defects in children. This manuscript provides an up-to-date review of the clinical and oral manifestations of CRD and the role of pediatric dentists in the treatment of patients with CRD.

2. Epidemiology

There is limited information on the epidemiology of CRD in the pediatric population. Because this disease is often asymptomatic in its early stages, it is both underdiagnosed and underreported (Warady and Chadha, 2007). The estimated incidence of ESRF in childhood, either due to a congenital or acquired condition, is 10–12 cases per 1 million children, with a prevalence varying from 39 to 56 million children (Trivedi and Pang, 2003). In North America, up to 11% of the population (19 million) may have chronic kidney disease (Coresh et al., 2003). Surveys in Australia, Europe, and Japan describe the prevalence of chronic kidney disease to be 6–16% of their respective populations (El Nahas and Bello, 2005; Hallan et al., 2006). The overall prevalence of genetic kidney disease in children in Australia and New Zealand is 70.6 children per million in the age-representative population. Congenital anomalies of the kidney and urinary tract (16.3 cases per million children) and steroid-resistant nephrotic syndrome (10.7 cases per million children) are the most frequent anomalies (Fletcher et al., 2013).

Fifty-seven percent of the world's population resides in Asia, which is a geographic region characterized by a very high proportion of children. In spite of this, epidemiological information from Asia is scant and primarily based on patients referred to tertiary medical centers (Hari et al., 2003). Estimates of the annual incidence of nephrotic syndrome range from 2 to 7 cases per 100,000 children and prevalence from 12 to 16 cases per 100,000 (Eddy and Symons, 2003). There is epidemiological evidence of a higher incidence of nephrotic syndrome in children from South Asia (Mc Kinney et al., 2001). Prevalence rates of genetic renal diseases, like congenital and infantile nephrotic syndrome, are high in Kingdom of Saudi Arabia. Postinfection glomerular pathologies are also common (Kari, 2012).