Management of Dental Caries in an HIV-infected Child: A Case Report.

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ABSTRACT

Background

HIV/AIDS remains prevalent in Sub-Saharan Africa with South Africa maintaining the highest number of daily infections and the largest population of individuals living with HIV. Dental caries as an oral disease itself, is highly prevalent in the same epidemiological region. Contemporary literature documents an increased prevalence and severity of dental caries in association with HIV- infection. This case report describes the clinical presentation of dental caries in an HIV-infected child whilst outlining the management undertaken.

Case Report

A 5-year-old male patient was diagnosed with Human Immunodeficiency Virus (HIV) infection shortly after birth. The patient was initiated on Highly Active Antiretroviral Therapy (HAART) in 2017. HIV was acquired in this case because of vertical transmission from mother-to-child. Clinical examination showed dental caries on all primary molars as well as the interproximal surfaces of the anterior teeth.

Discussion

Oral disease is a common manifestation of HIV within the paediatric patient group. The oral manifestations of HIV need to be documented to underscore the significance of these in Paediatric Dentistry. The detailed management of dental disease should be highlighted to compare treatment with that undertaken in HIV-negative patients.

Conclusion

Increased research related to HIV-status and caries risk is essential for understanding the management principles required in treating these patients. Furthermore, the synergistic relationship between dental caries and lowered immunity should be highlighted.

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Keywords

HAART, HIV, ART, oral manifestations, dental caries, Paediatric Dentistry.

Introduction

The World Health Organisation (WHO) defines HIV as a viral infection which targets the immune system, weakening its defence against other forms of infectious disease. The virus destroys the function of immune cells which is measured by the CD4 T-cell count. In 2020, the WHO documented that an estimated 680 000 (480 000 to 1.0 million) people died because of HIV-associated disease with an estimated 1.5 million (1 to 2 million) newly acquired HIV- infections. Furthermore, it was estimated that by the end of 2020, there were 37.7 million (30.2 to 45.1 million) people living with HIV and over two thirds of these (25.4 million) reside in WHO African regions.[1]

The elimination of mother-to-child (vertical) transmission is a global public health goal and priority. Studies have shown that antiretroviral intervention can assist to reduce the risk of vertical transmission with a documented 15 to 30% risk reduction during pregnancy and labour, less than 2% risk reduction with non-breast feeding and less than 5% risk reduction with breastfeeding.[1, 2]

Although HIV-infection is associated with well-known pathologies, the need remains for comprehensive comparative studies to determine the association between HIV and early childhood caries. Contemporary studies from several African countries as well as Thailand, have shown a distinct increase in both the prevalence and severity of dental caries in both children and adult patients living with HIV-infection.[3-8] HIV-infection is characterised by impairment of functional immunity thereby facilitating the development of opportunistic infections particularly in the oral cavity. About 30 to 80% of HIV- infected individuals present with one or more oral disease/manifestations. In spite of the initiation of HAART which has reduced the incidence of oral manifestations, an increase in dental caries has been reported within the HIV-positive population.[2] Even if there is initiation of HAART in South Africa , the country is still faced with many individuals who do not disclose their HIV status. This may lead to no uptake of HAART by those HIV- infected individuals, thus it invariably relates well with some of the cited reasons for non-disclosure of serostatus amongst pregnant women which were documented in a study conducted in Tshwane, Pretoria – South Africa in 2007. Some of the reasons cited by these pregnant women were that their biggest fear was discrimination and abandonment.[9] South Africa has the largest combination antiretroviral therapy programme resulting in survival benefits, but the number of infections is high in key populations such as young females. Advances in the use of antiretroviral therapy for HIV in the prevention of transmission of HIV has brought hope and optimism to

control the spread of HIV-infection.[10] There is a high burden of HIV-infections in Southern Africa with the prevalence of HIV-positivity among 15 to 49-year-old's in KwaZulu Natal at 27,6%; being three times higher than in the Western Cape Province at 9,2%.[10] A recent study undertaken in Cape Town, revealed a high prevalence of dental caries (78,8%) in a group of HIV-positive children between the ages of 2 and 12-years.[7]

Case Report

A 5-year-old male patient accompanied by his mother, presented for a dental consultation at the Paedodontics Clinic of the Oral and Dental Hospital at Sefako Makgatho Health Sciences University. The main complaint of the patient was "painful, rotten teeth". The patient's mother explained that several black spots were initially observed on the teeth when the patient was about 4-years old, although these did not prompt any form of intervention as the affected teeth were going to be shed. The mother confirmed that the child had been diagnosed with HIV in his first year of life at which time antiretroviral therapy was initiated. The mother expressed great discomfort to mention the term "HIV" and stated that this information has never been disclosed to the son.

Clinical extra-oral examination showed bilateral submandibular lymphadenopathy with pain on the left. In addition, eczema was noted on the facial skin and the patient's lips were markedly cracked whilst he displayed short stature for his age. Intra-oral examination showed a draining fistula in association with tooth 75 (Figure 1). There was carious involvement of teeth 51, 52, 53, 61, 63, 65, 74, 84 and 85 (Figure 2).

Figure 1: Clinical intra-oral photograph of the mandibular dentition in which a fistula and gingival abscess can be seen on the buccal gingiva in association with the carious 75.

Figure 2: Intra-oral photograph of the maxillary dentition. Gross carious involvement of the molar teeth is depicted as well as interproximal decay of the incisor teeth.

Informed consent was obtained from the mother to continue with treatment. The child was noted to be both negative and withdrawn and was slightly uncooperative. Periapical and panoramic radiographs were taken to assess the extent of carious defects and to assist with treatment planning (Figures 3 to 5).

Figure 3: Panoramic radiograph obtained for diagnostic and treatment planning purposes. Carious involvement of the deciduous dentition is conspicuous.

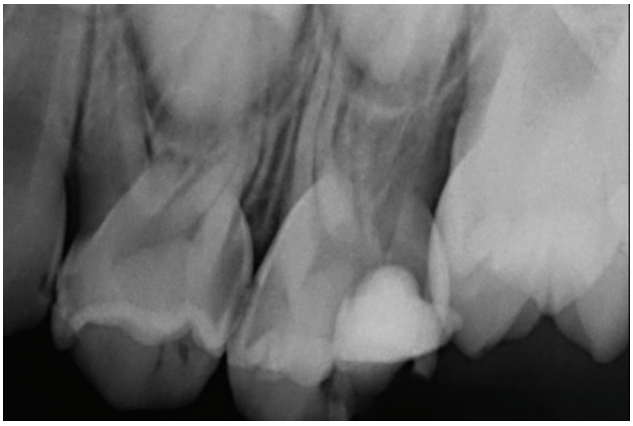

Figure 4: Periapical radiograph of the upper right deciduous dentition highlighting interproximal caries in which the Atraumatic Restorative Technique (ART) has been used.

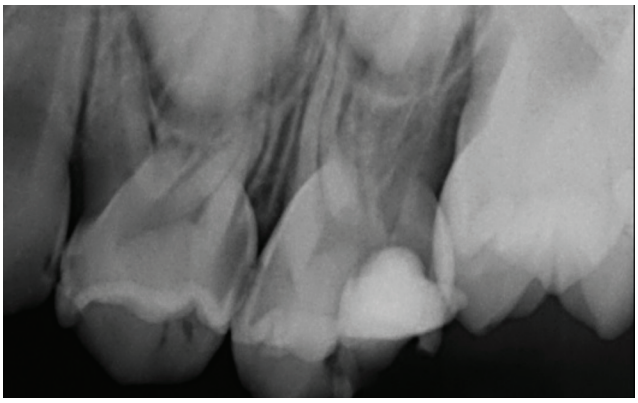

Figure 5: Periapical radiograph of upper left maxillary dentition showing interproximal decay with encroachment of the pulp of tooth 64. The tooth was previously treated by means of Atraumatic Restorative Technique (ART).

After discussing the treatment plan options, it was agreed that an emergency extraction of tooth 75 be performed (Figure 6). The preventive phase was subsequently commenced and comprised of a scaling and polishing, demonstration of oral hygiene maintenance, placement of fissure sealants on teeth 16, 26, 36 and 46 using 3M™ Clinpro ™ sealant as well as a

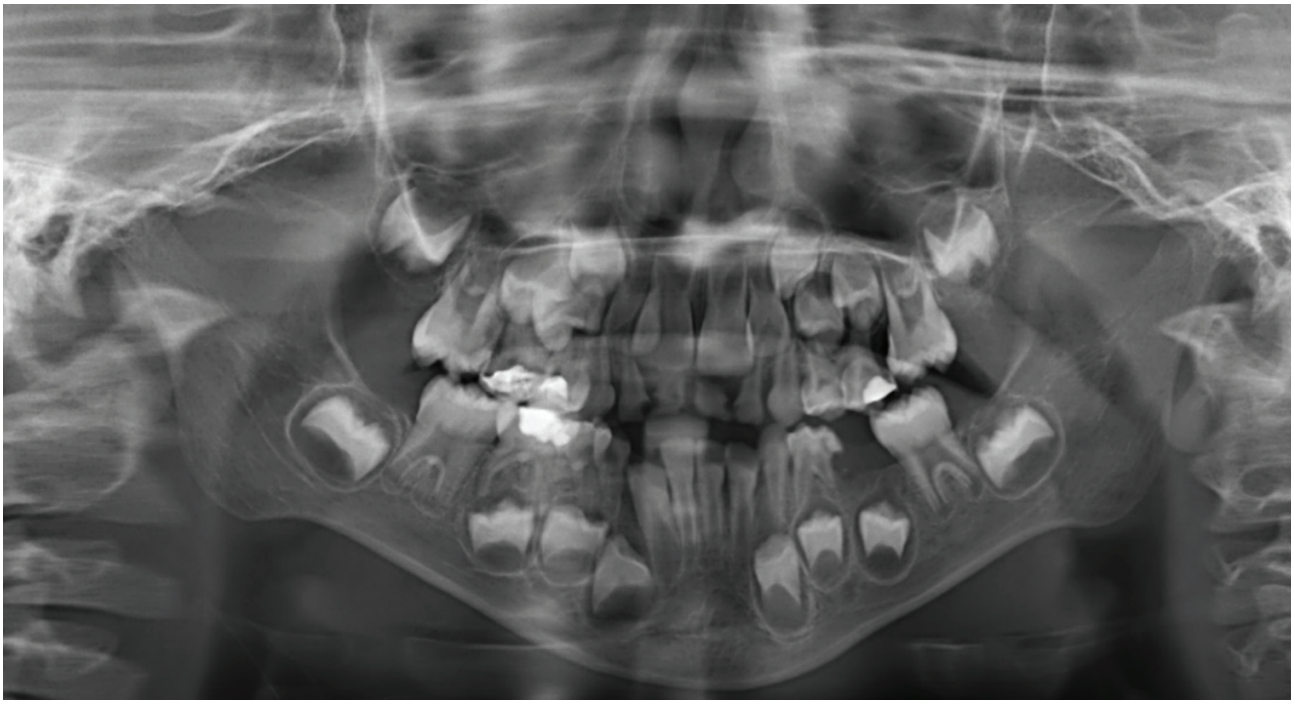

Figure 6: Panoramic radiograph following emergency management including extraction of tooth 75.

diet review. The corrective phase included pulpotomies on tooth 55 and tooth 85 using Ultradent Astringedent™ -15.5% Ferric Sulfate to stop bleeding followed by the application of pure Dentsply Kalzinol- Zinc Oxide Eugenol Cement Powder and normal saline as a medicament. Restorations using 3M™ Ketac™ Universal Glass Ionomer were done on teeth 55, 84 and 85.

Unfortunately, the patient's mother, who is the primary caregiver, was unavailable for subsequent visits where the placement of stainless-steel crowns and space maintainers were planned. This was to be followed by the maintenance phase to be conducted at 3-monthly and then 6-monthly intervals.

DISCUSSION:

The number of paediatric patients affected by HIV remains high in developing countries with vertical transmission from mother-to-child being the major contributor .[11] Oral disease remains one of the common manifestations of HIV in paediatric patients. Oral lesions are due to dysregulation of oral microbiota which facilitates opportunistic infections in a subset of patients who still have immature immunity. South Africa has a high burden of HIV-infection and there is a need to examine the relationship between caries and HIV-infection particularly in the epidemiological regions where infection rate is high.[2, 6]

The prevalence of dental caries is much higher in HIV-infected children than in those who are HIV-negative.[3-8] It is thus imperative that oral health education be prioritised together with regular screening and prevention.[11] A study performed in children with HIV/AIDS since 1992 demonstrated a range of problems regarding dental caries and to date it is notable that there are subsequent studies that confirmed these observations . The study by Howell and others showed that medication such as Zidovudine and Nystatin for candidiasis had high sucrose levels which promotes the development of dental caries. Another side effect of these medications is decreased saliva flow which also contributes to the prevalence of dental caries in these patients.[12] Another study in 1996 by Madigan and others in which caries prevalence was assessed between HIV-infected children and their uninfected siblings in the same environment confirmed a greater risk for dental decay particularly involving the primary dentition in those who were HIV-positive.[13] A different study conducted in the United States in 2011 confirmed the findings of sucrose and its effects on saliva production and further confirmed an association between the incidence of dental decay and HIV-infected patients who have not yet started taking HAART The association decreases in patients who have undergone HAART-initiation.[14] A study performed in 2004 firmly established a significantly higher prevalence of dental caries in HIV-infected children which correlated with the severity of HIV disease. This study identified high levels of salivary IgA which lead to the hypothesis that the sucrose content of medication, a high caloric diet used to compensate for weight loss in combination with immune deficiency and decreased saliva flow all promote the development of dental caries.[15] Indeed different studies from different parts of the world have also reported that there was high caries experience amongst HIV-infected children[15,16,17] . In our South African context, a study conducted by Mohamed and others in 2020 stated that children as the vulnerable group continue to suffer the impact of the HIV/AIDS pandemic and they may have an increased caries experience compared with their healthy peers.[7]

It has been shown that HIV-infected children and adults have a significantly higher caries experience with involvement of both the deciduous and permanent dentitions. Furthermore, the presence of caries in HIV-positive children is often associated with hypoplasia of the deciduous dentition, gingival inflammation and lower CD4 T-cell counts.[3] A study conducted amongst children with HIV infection in Tygerberg Hospital's Paediatric Infectious Disease Clinic in Cape Town ,South Africa highlighted the oral health status among children living with HIV, with regard to their dental caries and the majority of which were untreated . [7] Amongst several factors that were important it was evident that the increased

prevalence of dental decay in children with HIV was due to a lack of awareness regarding oral health issues as well as inadequate access to oral health services. [7]

The impact of dental caries on the quality of life and daily functioning in both children with HIV and their accompanying caregivers is of great public concern. Caries affects mastication, growth and development. Furthermore, the pain and frequent dental visits which are required, may affect those who are of school going age and work attendance by the accompanying parents /guardian/ caregivers. A carious dentition may have a long-term psychological effect on patients which may be compounded by the stigma associated with HIV-status. The increasing prevalence of dental caries in developing countries is largely because of increased consumption of sugary foods, poor oral hygiene, xerostomia, as well as an altered oral microbiome in conjunction with low levels of awareness of the problem in health care workers.[5,7,18]

A Ugandan study conducted in patients attending an HIV Care Clinic, revealed general xerostomia within in all HIV-positive patients. This was shown to be because of HIV infiltration of the lymphoid rich salivary glands where it infects the follicular dendritic cells during apparent dormancy whilst it replicates and may result in increased numbers of CD8 lymphocytes. This is what results in generalised lymphadenopathy throughout the body. Many of these patients develop cystic lymphoid hyperplasia of the salivary glands characterised by lymphoepithelial cyst formation. Involvement of the salivary parenchyma results in decreased salivary flow which increases the risk for caries development. The same study showed that female gender and longer duration of antiretroviral treatment are independent risk factors for caries development. Chronic antiretroviral therapy may cause alterations in the normal microbial flora of the oral cavity thus facilitating opportunistic infections which is exacerbated by xerostomia. Moreover, HIV-positive patients are at risk for malnutrition which is worsened by dental caries especially in children and the elderly.[5]

The oral status of HIV-infected children who attended a Paediatric Infectious Diseases Clinic in Cape Town, South Africa was investigated.[7] Sixty-six HIV-positive children aged two to twelve years were recruited for investigation. It was shown that the prevalence of dental caries was exceedingly high (78,8%). More notably, it was determined that an unmet treatment need of 90,4% was recorded among participants. HIV-infected children in the Western Cape often receive their antiretroviral treatment at facilities like Tygerberg Hospital's Paediatric Infectious Diseases Clinic. [7] These findings suggest a need for intensified collaborative care between Paediatric Clinics and Paediatric Dental Clinics.[7] Doctors and nurses are usually the first health care workers to have contact with HIV-infected children. Increasing awareness of the high prevalence of dental caries in these patients is essential to provide holistic patient care.[7]

CONCLUSION:

It is thus apparent that additional research into the association between HIV-infection and dental caries is required. The literary findings sugg est a relationship exists between HIV-infection and dental caries which requires an understanding of how lowered immunity may synergistically affect multiple factors predisposing to the development of dental caries. There is a need for effective oral health interventions in HIV-positive patients. Thus, the awareness of the high prevalence of dental caries in association with HIV emphasizes the need for strategic public oral health care policies which highlight preventative care and include comprehensive care programmes to holistically meet the needs of these patients.

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CPD questionnaire on page 222

The Continuing Professional Development (CPD) section provides for twenty general questions and five ethics questions. The section provides members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure continuing education. The importance of continuing professional development should not be underestimated, it is a career-long obligation for practicing professionals.