

Dental management of a child undergoing treatment for Wilms' tumor: A case report.

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Abstract: Introduction: Wilms' Tumor is a malignant renal neoplasm that frequently occurs in children during the first decade of life. Clinically, it is a rapidly growing abdominal mass that causes low back pain and hematuria. Computerized axial tomography or nuclear magnetic resonance are fundamental for its diagnosis, and chemotherapy and surgery have become first-choice treatments. After diagnosis, the majority of treatment plans involve the administration of antineoplastic drugs, whose side effects may include mucositis, candidiasis, xerostomia, caries, and worsen other previously diagnosed lesions, regardless of the organ affected by the tumor. Treatment is more effective if provided by a multidisciplinary team in which the dentist plays a significant role in the implementation of an integral oral care protocol. In the present study, the management of a pediatric patient under antineoplastic treatment for Wilms' tumor is reported. Case report: A four-year-old female patient diagnosed with Wilms' tumor, who required antineoplastic treatment. She had temporary dentition with early childhood caries, irreversible pulpal lesions and agenesis of teeth 72, 82, and the germ of tooth 42. The patient received modeling based behavior management therapy, prophylactic oral hygiene, and restoration of teeth affected by caries. To present this case, the "CARE" guidelines were used. Conclusion: Poor oral health status prior to cancer therapy directly affects the quality of life and the treatment of a patient, increasing the risks of local or systemic infections. As such evaluation and dental treatment before antineoplastic therapy is important to prevent oral complications and lesions.

Keywords: *medical oncology; Wilms tumor; antineoplastic agents; dental caries; preventive dentistry.*

INTRODUCTION.

Wilms' Tumor (WT), also known as nephroblastoma, is one of the most common malignant renal neoplasms in children.^{1,2} It is usually diagnosed in the first 5 years of life (90% before the age of 10), although it can also occur in adults.^{3,4} A small number of cases of bilateral nephroblastoma have been documented (5% to 10%), and few others have been linked to inheritance and family history (1% to 2%).⁵

Clinically, it manifests as a rapidly growing abdominal mass, accompanied by low back pain and hematuria (late presentation).^{2,3} Computerized axial tomography or nuclear magnetic resonance are fundamental for diagnosis.³

The National Wilms Tumor Study (NWTs) classifies these tumors in 5 stages according to their extent and severity: limited and surgically

resected (S-I), with extra-renal extension and complete resection (S-II), residual abdominal tumor (S-III), those with extra-abdominal lymphadenopathy (hematogenous metastasis) (S-IV), and those with bilateral presentation (S-V).³

Treatment of WT is based on chemotherapy, surgery, or both. Chemotherapy kills neoplastic cells, reducing the size of the tumor, facilitating surgical treatment and decreasing complication rates. Surgery consists of radical nephrectomy with regional lymph node dissection and excision of any suspicious lesion.⁵

In any neoplastic disease, the role of the dentist as member of the multidisciplinary team is central to timely diagnose oral injuries, which in turn can improve the prognosis of the patients. The National Institute for Clinical Excellence (NICE) recommends performing a specialized dental evaluation before the start of oncological treatment, with the purpose of improving oral status, through oral hygiene instructions, and elimination of infectious foci, local irritants, and defective restorations.⁶ The dentist's performance should be directed towards preventive measures, starting at the time of the clinical and histological diagnosis of the disease up to the completion of chemotherapy or radiotherapy treatment.⁷

Dentists should be aware that the administration of antineoplastic drugs may frequently result in immediate complications at a stomatological level (erythema, mucositis, dysgeusia, glossodynia, candidiasis, herpetic gingivostomatitis, xerostomia, periodontitis and pulp necrosis). Likewise, other alterations may appear in the medium term, almost always after the third month of treatment (trismus, caries, dysphagia and dental hypersensitivity); while others manifest at a later stage (osteoradionecrosis, pain, pulpal necrosis, agenesis, enamel hypocalcification, apical root shortening, early apex closing and dilacerations).^{6,8}

For an adequate management of these patients, the implementation of an intervention protocol divided into three stages is recommended:⁸

Prior to cancer treatment

Under the supervision of the oncologist, it is possible to perform various dental hygiene procedures on a regular basis, application of fluoride (in different presentations),

conservative treatment of soft tissues, restoration of teeth with dental caries, replacement of temporary fillings, as well as pulp treatments. It is recommended to extract only those teeth that are close to exfoliate or that have some type of infection (this should be done between five or seven days before the start of the antineoplastic therapy). All orthodontic appliances and prostheses must be removed, as they contribute to the accumulation of debris. In general and prior to cancer treatment, the use of chlorhexidine mouthwash 2 or 3 times a day is recommended.⁹

During cancer treatment

At this stage, only examination of the child is recommended, while avoiding operative and invasive treatments, due to the possible presence of myelosuppression and immunosuppression. Close communication must be maintained with the treating oncologist, who must approve any dental procedures beforehand.¹⁰

After cancer treatment

After antineoplastic therapy is completed, the patient should be evaluated every three months during the first year and attend regular check-ups every six months from the second year onwards. Before and during these sessions, patients should be educated and informed about the possible side effects of the chemotherapy treatment. Complex treatments such as extractions should be avoided between two months and twelve months after cancer treatment, due to the possible risk of osteoradionecrosis.⁹

CASE REPORT.

The "CARE" guidelines were followed in the presentation of this case. A four-year-old female patient was referred by the Mexican Association of Aid to Children with Cancer (AMANC) to the Pediatric Dental Clinic at Universidad Autónoma de Zacatecas, Mexico, for multiple carious lesions. The patient required oral rehabilitation and elimination of foci of infection before initiating treatment with antineoplastic chemotherapy and subsequent surgical intervention of the right kidney due to Wilms' tumor. In the clinic, the patient showed a negative attitude and lack of cooperation towards dental care (classification of 1 on the Frankl's behavior rating scale: clearly negative).

Facial analysis revealed a straight, mesoprosopic profile (Figure 1). Intraoral examination showed Severe Early Childhood Caries (S-ECC); lesions codes 2, 5 and 6 according to ICDAS in 51, 52, 54, 55, 61, 62, 64, 65, 74, 75, 84 and 85; irreversible pulpitis in 84, agenesis in 72 and 82 (Figure 2). These findings were radiographically determined, as well as the absence of tooth germ of 42 (Figure 3).

Dental treatment

Once the oral diagnosis was established, an

interconsultation was scheduled with an oncologist, to determine the oral treatment plan (which would last one week, as the patient needed to start antineoplastic treatment, in addition to surgical intervention). live modeling and tell-show-do behavior management technique.

After signing the informed consent, an intervention for behavior modification was carried out using the tell-show-do behavior management technique and positive reinforcement. This facilitated the preventive intervention

Figure 1. Patient with Wilms' tumor.



Figure 2. Temporary dentition of the patient with multiple active lesions.



Figure 3. Panoramic radiography. The absence of teeth 72, 82 and germ of 42 can be observed.

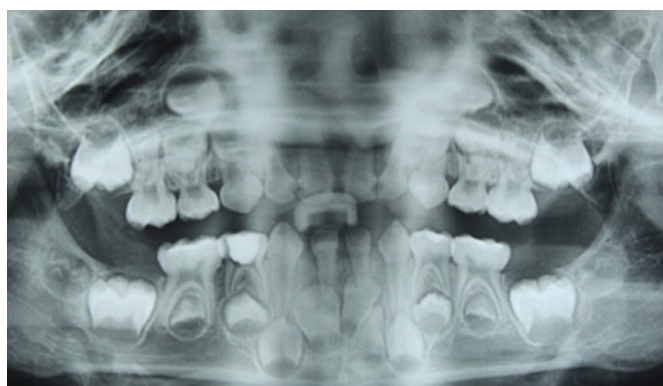


Figure 4. Glass ionomer sealants and restoration of carious lesions can be observed after treatment was completed.



to control dental plaque, reinforcement of the brushing technique, placement of atraumatic glass ionomer sealants in teeth 74, 75 (first session), and in 55, 54, 64, 65, and 85 (later sessions). Curative treatment included pulpotomy in tooth 84 and resin placement, in addition to the removal of affected tissues and filling with resin in teeth 51, 52, 61 and 62. Finally, comprehensive treatment was completed, in addition to the application of fluoride varnish and check-ups every three months during the first year and every 6 months from the second year onwards (Figure 4).

The child's parents were informed about the importance of maintaining a satisfactory oral health status, especially regarding the elimination of foci of infection, due to the possible risks of immunosuppression during antineoplastic therapy.

DISCUSSION.

Cancer is currently the second leading cause of death in children over one year of age. Significant advances have been made in terms of treatment, and a significant number of child patients can now be cured due to early diagnosis and adequate management.¹¹

A multidisciplinary approach involving physicians, nurses, social workers, nutritionists, dentists and other health-related professionals is essential for the care of the child, before, during and after immunosuppressive therapy. The oral cavity is highly susceptible to the side effects of antineoplastic therapy, either with chemotherapy or radiotherapy, making it one of the most frequent areas of sepsis.¹² In this context, the prevention and treatment of the long-term effects of oncological treatment have become a priority. Among the most common effects of this type of therapy are oral conditions, such as xerostomia, hyposalivation, dental caries, mucositis, candidiasis, trismus and osteonecrosis.¹³

According to Effinger *et al.*,¹⁴ oral health should be ideally evaluated at the initial diagnosis of cancer, in order to anticipate the potential impact of the treatment and to control existing dental conditions. It is recommended to consider various elements during this evaluation: number of teeth, oral status (healthy, decayed, filled, lost teeth), visual examination of all dental surfaces (applying ICDAS-II criteria), physical evaluation of

the enamel and dentin, assessment of salivary flow, gingival and periodontal status, inspection of prostheses or orthopedic-orthodontic appliances (if applicable), measurement of mouth opening, and any oral condition that may require treatment.¹⁵

In the present case, before starting oncological treatment and due to the young age of the patient, an approach oriented to her adaptation to the dental environment was designed. It also included the number of carious lesions and medical history. It was focused on the most serious conditions, such as pulpal injury, and restoration of active lesions in order to reduce risks, as well as removing any type of infectious foci.

Prevention and treatment of pre-existing oral diseases is essential to minimize complications in these patients. The key to success in maintaining a healthy oral cavity during therapy is compliance by the patient with the instructions provided. The child and parents should be informed and educated on the possible long-term side effects and lesions that may occur in the oral cavity due to antineoplastic treatment.¹⁶ Regarding this, Kuhl *et al.*,¹⁷ indicate that each patient must be managed individually; maintaining consultations with different physicians and, when appropriate, with other specialists in the dental area before any dental treatment is carried out.

In the present case, communication with parents and with the attending physician was reinforced to motivate the patient in the implementation of more effective hygiene measures. A preventive system was also implemented using fluoride agents, sealing of pits and fissures, with the purpose of maintaining good oral hygiene, with the lowest bacterial load possible. These types of therapies are supported by several studies that recommend the use of fluoride agents to promote the reduction of demineralization of dental structures, and increase the remineralization process of vulnerable areas.^{18,19}

Similarly, a care protocol was adopted, taking into consideration the medical history of the patient, with the aim of establishing an individualized treatment plan according to the needs of the patient. Consultation with the treating oncologist favored the adoption of an appropriate approach to the patient, thus improving her quality of life.

Maintenance of oral hygiene throughout the treatment is key for avoiding future complications. Oral and dental disorders that may occur during cancer in children can be associated with oral infections, speech delay, poor nutrition, sleep disturbances or facial aesthetic problems, negatively impacting the quality of life of these patients.¹⁴ Clinicians should have a broad and adequate knowledge of the signs and symptoms of oral pathologies. They must inform and educate patients and their parents effectively so that patients can receive timely treatment.²⁰

REFERENCES.

1. Ratajczyk K, Czekaj A, Rogala J, Kowal P. Adult Wilms tumor with inferior vena cava thrombus and distal deep vein thrombosis - a case report and literature review. *World J Surg Oncol.* 2018;16(1):38.
2. Graverán Sánchez LA, Verdecia Cañizares C, Santos Labarcena ME, Pineda Fernández D. Nefroblastoma o tumor de Wilms teratomatoso. *Rev Cubana Pediatr.* 2017;89(4):1-8.
3. Mirabal A, Yalcouye H, Pantoja M, Cobas C, Romero LI. Características clinicoterapéuticas de niños y adolescentes con neoplasias renales. *MEDISAN.* 2015;19(7):824.
4. Llorca Sales A, Gros Subias L. Tumores renales en la infancia y adolescencia. *Pediatr Integral.* 2016;20(7):447-57.
5. Fernández-Plaza S, Reques-Llorente B. Bases del tratamiento del cáncer en Pediatría: principios de la terapia multimodal. *Pediatr Integral.* 2016;20(7):465-74.
6. Ortiz-Rubio A, López-Verdín S, Ochoa-Velázquez H. Manejo odontológico de las complicaciones orales como resultado de la terapia contra el cáncer. *Revista ADM.* 2016;73(1):6-10.
7. Rebolledo-Cobos ML, Toloza-Gutiérrez OP, Alonso-Brujes ID. Condiciones estomatológicas en pacientes con cáncer durante y posterior al tratamiento antineoplásico: revisión narrativa de la literatura. *Rev Nac Odontología.* 2017;13(24):87-99.
8. Lanza Echeveste DG. Tratamiento odontológico integral del paciente oncológico. Parte I. *Odontostomatología.* 2011;13(17):14-25.
9. Lanza Echeveste DG. Tratamiento odontológico integral del paciente oncológico. Parte II. *Odontostomatología.* 2013;25(22):46-63.
10. Montealegre CS, Espinoza SC. Manejo odontopediátrico de paciente con leucemia linfoblástica aguda. *Arch Inv Mat Inf.* 2013;2:74-9.
11. Figueiredo PBA, Nogueira AJS. Prevalence of neoplasia, caries and gingivitis in pediatric cancer patients in the City of Belém, PA, Brazil. *Pesq Bras Odontoped Clin Integr.* 2013;13(2):141-6.
12. American Academy of Pediatric Dentistry. Guideline on

CONCLUSION.

Patients under cancer treatment require special protocols and individualized management, because, due to long periods of neutropenia, they are more prone to oral infections, as well as to experiencing exacerbations of chronic conditions. A proper introduction to oral hygiene habits is essential for the maintenance of oral health in this type of patients, as well as previous consultation with and assessment by the dentist, during and after antineoplastic therapy, with the aim of preventing local and systemic complications.

dental management of pediatric patients receiving chemotherapy, hematopoietic cell transplantation, and/or radiation. *Pediatr Dent.* 2013;35(5):E185-93.

13. Deng J, Jackson L, Epstein JB, Migliorati CA, Murphy BA. Dental demineralization and caries in patients with head and neck cancer. *Oral Oncol.* 2015;51(9):824-31.

14. Effinger KE, Migliorati CA, Hudson MM, McMullen KP, Kaste SC, Ruble K, Guilcher GM, Shah AJ, Castellino SM. Oral and dental late effects in survivors of childhood cancer: a Children's Oncology Group report. *Support Care Cancer.* 2014;22(7):2009-19.

15. Jackson LK, Epstein JB, Migliorati CA, Rezk J, Shintaku WH, Noujeim ME, Santos-Silva AR, Dietrich MS, Murphy BA. Development of tools for the oral health and panoramic radiograph evaluation of head and neck cancer patients: a methodological study. *Spec Care Dentist.* 2015;35(5):243-52.

16. American Academy of Pediatric Dentistry. Management considerations for oral surgery and oral pathology. *Pediatr Dent.* 2017;39(6):361-70.

17. Kühn S, Walter C, Acham S, Pfeffer R, Lambrecht JT. Bisphosphonate-related osteonecrosis of the jaws--a review. *Oral Oncol.* 2012;48(10):938-47.

18. Juárez-López MLA, Hernández-Palacios RD, Hernández-Guerrero JC, Jiménez-Farfán D, Molina-Frechero N. Preventive and remineralization effect over incipient lesions of caries decay by phosphopeptic phosphate of calcium amorphous. *Rev Invest Clin.* 2014;66(2):144-51.

19. Cochrane NJ, Cai F, Huq NL, Burrow MF, Reynolds EC. New approaches to enhanced remineralization of tooth enamel. *J Dent Res.* 2010;89(11):1187-97.

20. de Siqueira Mellara T, Palma-Dibb RG, de Oliveira HF, Garcia Paula-Silva FW, Nelson-Filho P, da Silva RA, da Silva LA, de Queiroz AM. The effect of radiation therapy on the mechanical and morphological properties of the enamel and dentin of deciduous teeth--an in vitro study. *Radiat Oncol.* 2014;9:22-30.