



Clinical case

Conservative Endodontic Management in a Patient with Metastatic Carcinoma. Review and Report of a Case

Celia Elena del Perpetuo Socorro Mendiburu-Zavala¹, Pamela Baeza-Denis²,
Josué Carrillo-Mendiburu³, Ricardo Peñaloza-Cuevas¹

- ¹. Facultad de Odontología de la Universidad Autónoma de Yucatán.
². Cirujano Dentista de práctica privada.
³. Centro Médico Dalinde, CDMX.

Corresponding author:

Celia Elena del Perpetuo Socorro Mendiburu-Zavala
E-mail: cel_mendi@hotmail.com

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ABSTRACT

Introduction: Carcinoma is defined as a malignant neoplasm that forms from epithelial tissue, of unknown and multifactorial etiology, related to tobacco and alcohol consumption habits; with rapid growth, local tissue destruction and ability to metastasize. **Objective:** To present conservative endodontic management in a patient with metastatic carcinoma. **Case presentation:** A 69-year-old Mayan-speaking male patient, who came for evaluation and treatment of teeth 32 (with fenestrated crown) and 33, both symptomatic. During the anamnesis, he reported being a former smoker and alcoholic, being under analgesic treatment for pain from an indurated mass in the left cervical lymph nodes, chronic otitis media and chronic otorrhea, without pain or fever,

with one year of evolution. Upon the extraoral clinical inspection, the enlarged and indurated left cervical lymph node region was palpated and it extended to the submandibular and preauricular area. He manifested mild odynophagia and dysphagia. Chronic apical periodontitis (32) and aseptic partial pulp necrosis (33) were diagnosed. Treatment of both teeth was performed without anaesthesia, atraumatic isolation, opening, apical stop, StepBack instrumentation technique, irrigation of the canal with 5% sodium hypochlorite (NaClO) for disinfection and shaping, drying and placement of calcium hydroxide (Ca(OH)₂), sealing with resin. No gutta-percha obturation was performed. After the endodontic treatment, an interconsultation with Oncology was carried out, doing a biopsy of the left cervical nodule by fine needle aspiration, showing metastasis of poorly differentiated carcinoma with extensive necrosis. Primary tumour was located using contrast ultrasound: carcinoma in the larynx. **Conclusions:** Management was conservative, due to suspicion of the neoplastic condition that the patient presented.

Keywords: Conservative endodontic treatment, laryngeal carcinoma, metastatic carcinoma.

INTRODUCTION

Cancer is one of the most important noncommunicable diseases in the Region of the Americas. It was estimated that 4 million people were diagnosed in 2020 and an increase of 6 million is predicted by 2040. Therefore, it is one of the main causes of mortality. During 2020 it caused approximately 1.4 million deaths, 47% in people aged 69 or younger. It is estimated that a third of all cancer cases that occurred could be prevented by avoiding key risk factors, such as tobacco consumption, alcohol abuse, unhealthy or unbalanced diets, sedentary lifestyle, etc. In the same way, many cancers have a high probability of cure if they are detected early and treated appropriately¹.

In Mexico, neoplasms have mortality rates above 75 deaths per 100,000 inhabitants, with the northern states (Chihuahua, Sonora and Nuevo León) being the most affected, as well as Mexico City and Veracruz (77.16 and 76.04 deaths per 100,000 inhabitants respectively). Meanwhile, the states of Tlaxcala, State of Mexico and Guerrero have the lowest cancer mortality rates (\leq 54 deaths per 100,000 inhabitants). Mortality projections show the top ten causes of cancer death: breast, prostate, and liver cancer continually increase each year, reaching rates of more than five deaths per 100,000 people. Specifically, by the year 2020 breast cancer exceeded 11 cases per 100,000 people. It is important to note that the higher the age, the higher the mortality rate².

No less important is head and neck cancer, which ranks 6th among malignant tumours in humans. They can be diagnosed by evaluating symptoms, signs and minimally invasive tests. However, in order to diagnose them early, there must be a high degree of suspicion on the part of the treating physician, along with a specific medical history of the patient, who unfortunately in most cases does not manifest it in time. One of the most common non-melanoma skin carcinomas is squamous cell carcinoma (scc), which can have aggressive behaviour with extensive, recurrent local invasion and sometimes metastasis³⁻⁶.

When it comes to laryngeal cancer, squamous cells can be found with histological analysis, and keratinising and non-keratinising subtypes can be identified; also with a well-differentiated or a poorly differentiated degree. Besides, there are a variety of non-squamous cell laryngeal

cancers⁷. According to the American Cancer Society⁸, by 2023 in the United States there will be an estimated 12,389 new cases of laryngeal cancer and 3,820 deaths from this illness. Forastiere *et al.*,⁹ report that locally advanced lesions are managed in a combined way, involving radiation therapy (RT) and chemotherapy (CT), either with or without surgery. The primary objective, in certain selected people, is the preservation of the larynx. Unfortunately, despite the medical applications that are done and even if the primary tumor (larynx) is controlled, distant metastases are considerably common.

If a patient with head or neck cancer needs dental treatment, appropriate care should be provided before receiving chemotherapy and/or radiation therapy. In the case of root canal treatment, it is preferably done in a single session when calcium hydroxide (Ca(OH)₂) is used as an intracanal medication, a material used in conservative treatments due to its bactericidal and antifungal action, in addition to stimulating the remineralization of dentin and helping in the healing of tissues. Martins *et al.*,¹⁰ state that if canal sealing cement based on epoxy resin or some filling material based on Mineral Trioxide Aggregate (MTA) is used to obturate the canal, radiation to the head and/or neck influences the adhesion of these in the dentin of the canal. However, other sources in the literature^{3,10,11} mention that, regardless of the sealant, when they receive radiation, more spaces form at the interface of the sealant and dentin. Based on the above, the objective of this case report is to present conservative endodontic management in a patient with metastatic carcinoma.

CLINICAL CASE PRESENTATION

We presented a 69-year-old male patient, born and resident in a Mayan community in the State of Yucatan, Mayan-speaker, farmer and beekeeper. He attended the endodontic clinic for evaluation and treatment of teeth 32 (with fenestrated crown) and 33, both symptomatic of occlusion. In his clinical record, he declared that he was not diabetic (blood glucose monitoring was achieved with a glucometer (Accu-Chek®, Roche Diabetes Care, Inc., Basel, Switzerland), obtaining 102 mg/dL), nor hypertensive (blood pressure was taken with a digital blood pressure monitor (OMRON®, Omron Healthcare, Inc., Osaka, Japan), having 110/80 mmHg). As pernicious habits, he manifested smoking and alcoholism during his youth and adulthood. He mentioned being under analgesic treatment with tramadol and paracetamol, one tablet every 12 hours due to indurated mass pain in the left cervical region (Figure 1). Additionally, he had chronic otitis media and chronic otorrhoea, without pain or fever. The left cervical lymph nodes were palpated with the index and middle fingers. They were enlarged, indurated, erythematous, hyperthermic, non-mobile and apparently fixed to deep planes, extending to the submandibular and preauricular area of the cervical lymph node region. Left eye was partially closed. He manifested mildodynophagia and dysphagia. Patient and family members are unaware of their medical condition regarding the indurated mass. Acceptable oral hygiene was observed, with the absence of some posterior mandibular teeth. Presence of a fenestrated, leaky and poorly adjusted crown on tooth 32, and tooth 33 with attrition on the incisal edge and abfraction in the cervical area. For this publication, written authorization was requested through informed and voluntary consent, obtaining a response of approval from the patient.

A routine clinical history was taken about the symptomatology of teeth 32 and 33, and at percussion he reported pain of 7 according to the Visual Analogue Scale (VAS). A cold thermal test was realised, isolating the teeth with a rubber dam without staples, placing Vaseline, soaking a cotton pellet with tetrafluoroethane (HYGENIC® Endo-Ice Refrigerant Spray, COLTENE Inc.,

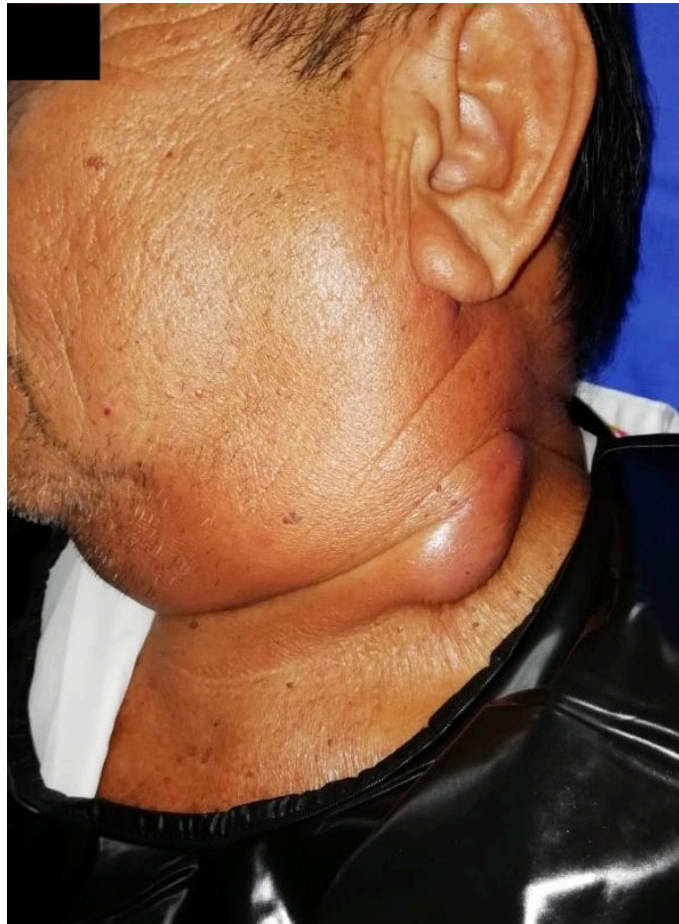


Figure 1. Extraoral photograph showing an increase in volume located in the left cervical lymph nodes.

Altstätten, Switzerland), reporting 0 sensitivity in vas. A dentoalveolar radiograph was made with a parallelism technique (Figure 2 A), observing a radiolucent area and root resorption on tooth 32 and severe incisal wear on tooth 33. According to symptoms and signs, tooth 32 was diagnosed as chronic apical periodontitis and tooth 33 was diagnosed as aseptic partial pulp necrosis. An orthopantomography was also performed to check or rule out any other condition in the oral cavity.

Given the suspicion of some type of malignant neoplasm of the head or neck, conservative treatment of the teeth was accomplished without anaesthesia and without damage to the periodontal tissue. The fenestrated crown of tooth 32 was removed with a truncated conical bur (Great White® Gold Series, SS White® DENTAL, New Jersey, USA). At the next appointment, without anaesthesia, the rubber dam was placed atraumatically (without staple), tooth prophylaxis was fulfilled and in a single appointment, root canal treatment with adequate conductometry, biomechanical work forming an apical stop and using the StepBack technique for greater control, with conventional manual files (K-Flexofile®, Dentsply Maillefer, Ballaigues, Switzerland), washing slowly, carefully and consistently with 5% NaClO, was done. Once cleaned, disinfected, shaped and dried, the root canal was filled with a mixture of pure Ca(OH)₂ (Calcium Hydroxide Viarden, ViardenLab, Mexico City, Mexico) and double-distilled water. Glass ionomer (GC Gold Label 2 Universal Restorative, CG Corporation, Tokyo, Japan)

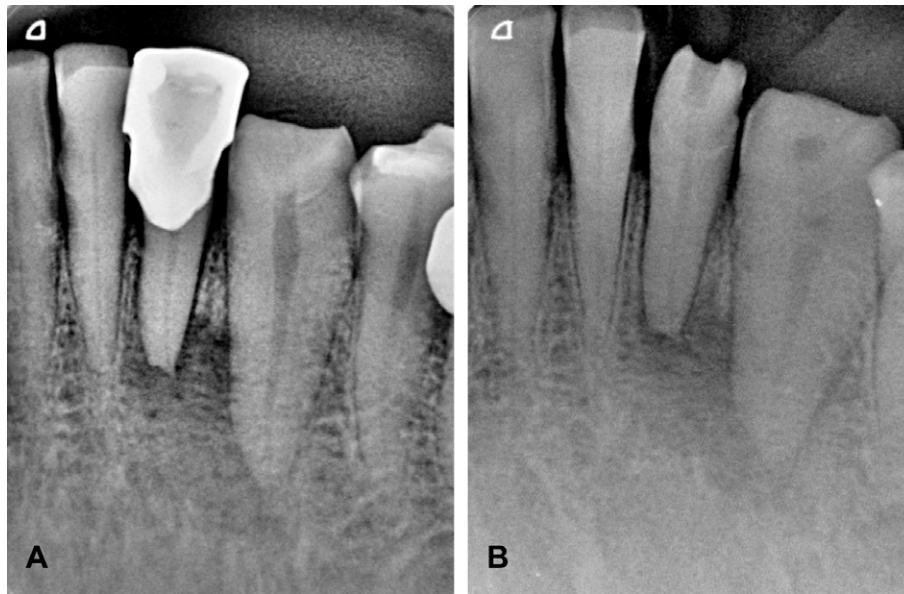


Figure 2. Dentoalveolar radiographs of teeth 32 and 33. A. Preoperative radiograph of teeth 32 with fenestrated crown, and 33. B. Postoperative radiograph, where intracanal medication of pure calcium hydroxide and glass ionomer was placed as a provisional coronal filling.

was placed as a temporary restoration. In a subsequent appointment, exactly the same procedure was executed on tooth 33, with the only difference being the application of anaesthesia because the patient reported pain during canal preparation. A 1/4 cartridge of anaesthesia (2% lidocaine with epinephrine 1:100,000, (FD[®], Zeyco[®], Mexico) was applied with a needle bent at 90° with the intrapulpal technique (Figure 2 B). The crowns were restored with composite resin A3 shade (voco GmbH, Germany) and with a 5th generation adhesive system (Futurabond[®] NR, voco GmbH, Germany).

At the end of both root canal treatments, the patient decided to go to an oncological consultation, based on recommendations by the dental personnel and the otolaryngologist contacted digitally, who made the presumptive diagnosis of some type of carcinoma. An ultrasound-guided fine-needle aspiration biopsy (FNAB) was performed on the left cervical nodule, resulting in the definitive diagnosis: Metastasis of squamous cell carcinoma, poorly differentiated, with extensive necrosis. Primary tumour was located by means of contrast ultrasound: carcinoma in the larynx. According to the oncologist, surgery on the primary tumour (larynx) was contraindicated because of the patient's age, area, and systemic condition. For this reason, the treatment consisted of 10 sessions of outpatient chemotherapy, and 10 sessions of localised radiation therapy, lasting 10 minutes each.

DISCUSSION

Andrade *et al.*,¹² suggest that the treatment of head and neck cancer establishes three therapeutic modalities: radiation therapy, chemotherapy and surgery. Forastiere *et al.*,⁹ remark that locally advanced lesions are managed in combination, involving radiation therapy and chemotherapy, with or without surgery if it is not necessary. In suitably selected individuals, the primary goal is preservation of the larynx. Despite the efforts made and even if the primary

tumour (larynx) is controlled, distant metastases are quite common. Such therapeutics can be combined or done individually, depending on the location and stage of the disease⁹. In turn, Kielbassa *et al.*,¹³ found that the objective of dental treatment in patients with cancer is to preserve the dentition and basic oral physiology. Rehabilitation strategies must be interdisciplinary, covering preventive, periodontal, endodontic, surgical and prosthetic measures, which last in the long term. In the presence of foci of infection in the oral cavity, the dentist must assess the risk of developing osteoradionecrosis of the jaws, one of the most serious consequences of radiation therapy in the head and neck region.

In their retrospective study related to the effectiveness of the StepBack technique and after reviewing the literature, Lilly *et al.*,¹⁴ found a high percentage of endodontic failure in multiple references when using other instrumentation techniques. Subsequently, they take a sample of 22 teeth from patients previously subjected to radiation therapy, to whom endodontic treatment is performed using the StepBack technique and followed up for 19 months, obtaining a 91% success rate.

Khaw *et al.*,¹⁵ explain that radiation therapy uses high-energy radiation to damage the deoxyribonucleic acid (DNA) of cells that have vertiginous mitosis, such as cancer cells. So the usual DNA repair mechanisms, which are generally less effective in cancer cells compared to normal cells, fail and the cells die. Radiation affects cellular DNA through two main mechanisms: 1) the direct action of radiation that results from the interaction between radiation and DNA damages the chromosomes and mitotic apparatus of the cell and 2) the indirect action involves the interaction of radiation with other atoms or molecules in the cell (particularly water) to produce free radicals. These free radicals, such as superoxide, hydrogen peroxide and free hydroxyl radicals can diffuse far enough to reach and damage critical sites.

Similarly, Mora-Jiménez¹¹, indicates that cancer cells are radiosensitive because they reproduce more quickly than normal cells, as explained by Khaw *et al.*,¹⁵. Yanaguizawa *et al.*,¹⁶ report that the endodontic procedure plays an important role in patients undergoing head and neck radiation therapy. Tooth extractions are not recommended due to the risk of osteoradionecrosis, likewise the more aggressive evolution of the foci of infection. Hence the importance of endodontic therapy as the treatment of choice for these patients. Proper sealing of the root canal is essential, especially for maintaining oral health and preventing side effects. It is not advisable to perform root canal treatment during the radiation therapy period. In the study of Martins *et al.*,¹⁰ they observed that teeth with endodontics that were subjected to radiation therapy had lower intraradicular dentin bond strength compared to non-irradiated ones, regardless of the sealant and the third of the root.

In the present clinical case, we avoided trauma to the oral mucosa that could cause bleeding; we chose to work without local anaesthetics and staples, in accordance with Yanaguizawa *et al.*,¹⁶, who indicate that endodontics must be atraumatic and appropriate to the area to be treated, because the patients present a natural vasoconstriction of the blood vessels with radiation therapy. Additionally, absolute isolation with a rubber dam and without the use of staples is used to avoid damage to any surrounding tissue. It is worth mentioning that endodontically treated teeth have sufficient dental structure to support the dam atraumatically. Also, both teeth are provisionally filled with Ca(OH)₂ intracanal medication mixed with distilled water due to its antiseptic, bactericidal and fungicidal action. Mora-Jiménez¹¹ and Lévano-Villanueva³ indicate that the appropriate and ideal management for filling teeth before or during oncological treatment with radiation therapy is carried out with said medication.

CONCLUSIONS

Multidisciplinary participation (dentist, otolaryngologist, radiologist, oncologist, among others) is essential in the treatment of head and neck cancer making an adequate diagnosis, in order to provide the best quality of life to those who have this condition. The role of the dentist is preponderant to observe, analyse and evaluate not only the stomatognathic system, but the structures of the head and neck also, in order to guide the patient to consult with the corresponding professional, as is the present case who was referred with the oncologist. The dentist must choose to carry out treatments in an adequate, accurate and conservative manner, such as root canal therapy. Furthermore, to reduce the patient's probability of suffering from severe pathologies such as osteoradionecrosis.

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