

AGENESIS AND SHORTNESS ROOTS OF PERMANENT TEETH FOLLOWING ANTINEOPLASTIC CHEMO-RADIATION THERAPY: A CASE REPORT

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ABSTRACT

Chemotherapy and radiotherapy in head and neck may have serious effects on developing teeth such as delayed dental development, microdontia, hypoplasia, agenesis and V-shaped and shortened roots. The effect of chemotherapy and radiotherapy on developing dentition has been widely demonstrated. Survivorship care for patients with cancer requires a multidisciplinary approach, including early involvement of the dental team. This article intends to document a case of agenesis and shortness roots of permanent teeth secondary to chemo-radiation therapy in a 15-year-old boy.

Keywords: Chemo-radiation therapy; Dental abnormalities; Root agenesis.

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INTRODUCTION

The survival rates of patients suffering from childhood cancers have improved dramatically with the advent of chemo-radiation therapy. However, with this antineoplastic therapy, a number of harmful effects may occur in oro-facial region such as facial asymmetry, trismus, velopharyngeal incompetency, dental abnormalities and other soft tissue pathologies who are well recognized [1-3].

Dental abnormalities are common in pediatric patients treated by chemo-radiation therapy who then require dental follow-up [1, 2, 4, 5]. These abnormalities included impaired amelogenesis, dentinogenesis, radiation caries, tooth agenesis, shortening of roots, microdontia, hypodontia, altered eruption patterns, coronal hypocalcification, early apical closure [1, 2, 4]. Some dental abnormalities may have important consequences for these children, such as aesthetic, functional and occlusal disturbances [1, 5, 6].

CASE REPORT

15-year-old boy presented to the center of consultations and dental treatments of Rabat for rehabilitation of oral cavity. The medical history

revealed that the child had undergone chemo-radiation therapy for embryonal rhabdomyosarcoma (RMS) of the nasopharynx when he was 8 years old. After this therapy, he has been relatively free of any symptoms.

On clinical examination, we revealed a limitation of the oral opening (trismus) and carious lesions in the first permanent right and left maxillary molars and the second permanent mandibular right molar. A panoramic X-ray [Fig.1] was taken to have an overview of the dental and periodontal structures and a retro- alveolar assessment was done [Fig.2]. The both revealed an incomplete root development of all permanent teeth (all the tooth presented shortness or even total agenesis of roots).

Since most of her teeth were short rooted, a treatment plan was formulated to conserve them with restorations of decayed teeth (first permanent right and left maxillary molars and the second permanent mandibular right molar), fissure sealants application in the first right and left mandibular permanent molars and the second left mandibular molar was done. A fluoride application has been made to prevent dental caries and avoid pulpal damage. A follow-up of 3 to 6 months will be established to early detect and treat any eventual carious lesion.



Fig.1: Orthopantomograph taken 6 years after patient finished oncologic treatment: All teeth showed stop of development of the dental roots with premature closure of the apices



Fig.2: Retro-alveolar radiography showed stop of development of the dental roots with premature closure of the apices

DISCUSSION

RMS is an aggressive malignant tumor with rapidly growing local extension, including bony destruction [7] and is most commonly seen in children who are between the ages of 1 and 4 [1]. No clear etiologic factor has been identified [2]. Three histologic variants have been described, namely embryonal, alveolar, and pleomorphic [2]. The head and neck is the most common site for RMS [1-3]. The localization of the tumor in the nasopharynx (which

is the most common site in the head and neck area) would have resulted in considerable mutilation in the event of surgery [7]. In patients with inoperable tumors, chemotherapy with 2, 3, or 4 agents combined with radiotherapy has been used successfully [7]. The prognosis depends on several factors including initial diagnosis, histologic subtype, and stage [1].

Dento-facial developmental abnormalities have been described in these patients treated for RMS [2-4]:

- Trismus, hyposalivation/ xerostomia.
- Velopharyngeal incompetency.
- Facial asymmetry and jaw hypoplasia.
- Radiographically underdeveloped mandible.
- Effects on the dental tissue.

Dental sequelae are not a surprising consequence of combined-modality therapy for head and neck RMS in children because this malignancy commonly occurs in children during the period of tooth development [4]. Localized or systemic insults to ameloblasts and odontoblasts during tooth development can cause dental growth perturbation or arrest [4]. These effects can include: agenesis/hypodontia, root agenesis/ stunting/ malformation/ disturbed root formation, and/or enamel hypoplasia... [1- 4, 8, 9]

Unfortunately, the complications mentioned above are irreversible [10,11] and have significant adverse effects on the patient's quality of life post-treatment [1, 3, 5]. Children who are treated at young ages appear to be more severely affected than children who are treated later. Additionally, radiotherapy seems to cause more extensive and severe dental defects compared to chemotherapy [4].

These dental sequelae are generally symptomless and diagnosed during routine radiologic investigations. In present case, a dental radiograph up to 6 years after antineoplastic chemo-radiation therapy, we found that all the teeth who were still immature when oncologic treatment started, has shown abnormality of dental roots. All teeth showed stop of development of the dental roots with premature closure of the apices. The roots in this case were not uniformly short; incisors' and first molars' were nearer to completion as compared to the other teeth. The whole picture gave an impression that the root formation had been proceeding normally until some unfavorable event abruptly led to complete cessation of the process. In consideration of the developmental stages of roots of different teeth, it appears that root cessation occurred at around the age of 7 to 8 years. This coincides with the age at which the patient began receiving different regimens of chemo-radiotherapy.

No crown defects were noted except those caused by caries. This observation can be explained by the fact that crown formation was already completed before the start of the cancer treatment. It is interesting to note that the teeth have continued their eruption even though root formation had completely ceased.

Dental oncologists should be integral members in the management of children with head and neck cancers [1, 2, 10]. A panoramic radiograph may be indicated as a routine part of a child's pre-oncology dental

treatment care plan. Post-chemo-radiation therapy radiographs indicate the severity of dental damage and provide retrospective clues as to the stage of dental development during chemo-radiation therapy [1].

Dental protocols and guidelines consisting of frequent follow-ups, early detection of caries, and prevention of periodontal disease could decrease or even eliminate the need for invasive dental procedures. Identification and prudent and appropriate management of the late sequelae of treatment are vital to afford the long-term survivor with an excellent quality of life [3].

CONCLUSION

Long-term management and close follow-up of children who have treated for RMS of the head and neck is essential. Dental abnormalities are frequently observed. To reduce these effects, a dental oncologist should be integrated into the team care of these patients. For that, dentists should understand about these dental abnormalities, improve his skills to handle them correctly. Strict radiographic and clinical surveillance, preventive approach and early intervention are necessary to facilitate management of these complications and enhancing the quality of life.

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