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Oral Squamous Cell Carcinoma Associated with a Dental Implant – a case report and literature review

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Abstract

Objectives: Prosthodontic rehabilitation using dental implants has become a common practice in dentistry at the present time. Although severe complications related to dental osseointegrated implants are uncommon, in recent years several cases of oral squamous cell carcinoma adjacent to dental implants have been published.

Study Design: A 67-year-old edentulous woman developed an oral squamous cell carcinoma around right mandibular implant about 12 months after receiving dental implants. The treatments involve chemotherapy, explantation of the implants and radiotherapy.

Result and Conclusions: The use of endosseous implants has been associated with a low risk for the development of cancer. However, this case report serves as evidence to the importance of careful screening at routine dental examinations especially if the patient suffers from peri-implantitis, any mucosal erosion or discoloration, leukoplakia around implant, pain, implant loosening, bone loss around implant, mucosal erythema, and soft tissue inflammation.

Key words: *Dental Implant, Squamous Cell Carcinoma, Neoplasm, Cancer, Malignancy.*

Introduction

Endosseous dental implants have become a predictable and common practice for the replacement of missing teeth. The overall success rate for dental implants is more than 90 percent (1). A wide variety of metallic, ceramic, and polymeric synthetic biomaterials have been used for prosthetic implants in the human body. Both the safety and effectiveness of this technique have been extensively demonstrated in the literature (2). Nevertheless, the number of complications associated to dental implants has increased proportionally to the popularization of its employment (3). Complications, which are uncommon, include postoperative infection, peri-implantitis, implant fracture, bone loss, and failure of osseointegration with loosening of the implant. Recently, some reports have also been published about primary squamous cell carcinoma of oral mucosa (4-7), primary osteosarcoma in jaws (8), and metastatic carcinoma (9) in the vicinity of the implants.

The case report we present here describes a patient with squamous cell carcinoma around her dental implants.

Case Report

A diabetic 67-year-old woman sought treatment for pain and swelling of four months duration involving the right mandible in the distal area of the canines. 15 years previously the patient started wearing full denture. 16 months ago she referred to a dentist in order to fix her loose denture and she also complained from denture induced alveolar mucosal inflammation in the right mandible. Her dentist surgically placed two 6.0 × 13 millimeter dental implant (Nobel Biocare, Göteborg, Sweden) in the edentulous canines' area of the mandible; afterwards, the dentist placed the overdenture abutments onto the implants. (Figure 1) 12 months after the implants insertion she started having pain in the right mandibular canine area; which was so aggravating that prevented her from wearing her overdenture. Her dentist prescribed antibiotics; however, when the lesion did not respond to initial antibiotic therapy, the patient's dentist performed an incisional biopsy to establish a definitive diagnosis. Thus, she was referred to the oral and maxillofacial pathology department of a dental school for a more definitive diagnosis and treatment. She had had the lesions for two months. A fellow of orthognathic surgery recorded her medical and dental history, which included no smoking or alcohol consumption; however, she suffered from diabetes and high blood pressure both of which were under medical control. An exophytic mucosal mass overlying alveolar mucosa and extending from anterior floor of mouth to ventral surface of the tongue was apparent. (Fig. 1) Peri-implantitis, implant loosening, mucosal erythema, inflammation of the soft tissue, and bone loss around right mandibular implant were evident. The right submandibular lymph nodes were easily palpable by finger touch. An excisional biopsy was performed and the tissue was submitted for pathological evaluation to the department of oral and maxillofacial pathology.

Fig. 1. *Intra oral photo of the patient*

Pathological findings: Microscopic examination of the submitted biopsy specimen revealed a moderately differentiated squamous cell carcinoma showing hyperchromatism of the nuclei, keratin pearl formation, pleomorphism, and numerous mitotic figures (Figures 2, 3).

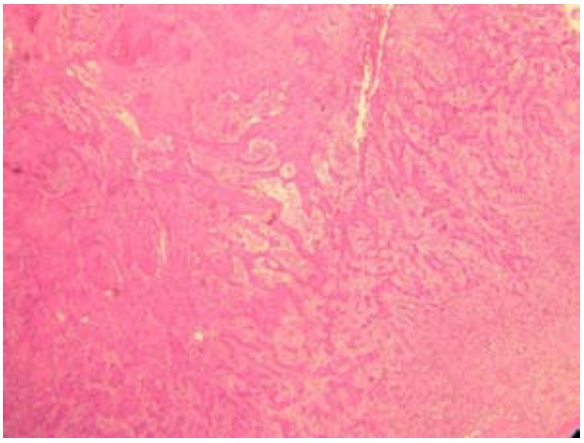

Fig. 2. *A, Section from the biopsy taken of the oral lesion (magnification ×4)*

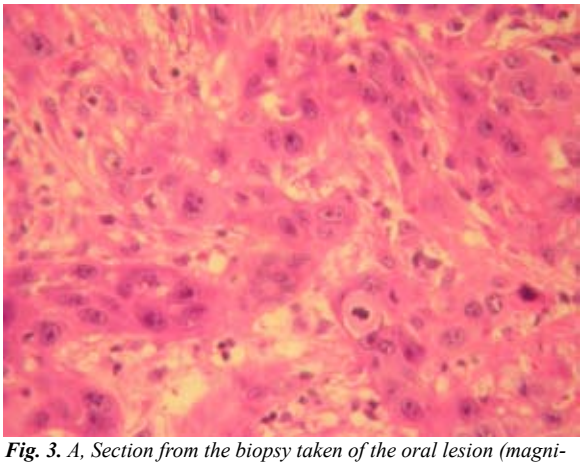

Fig. 3. *A, Section from the biopsy taken of the oral lesion (magnification ×40)*

Therapy: The patient received three initial courses of chemotherapy. Afterwards, the implants were explanted immediately. The tumor along with some local blood vessels and muscles were removed by pull-through technique. 34 lymph nodes were also removed, 3 of which were metastatic. The patient was then scheduled for radiotherapy.

Discussion

The development of neoplasia associated with alloplastic implant materials is a rare complication that a number of clinicians and researchers have reported, primarily in the orthopedic literature (10-11).

Although the materials composing these implants are relatively biologically inert and nontoxic they may induce a variety of tissue responses (12). By far the most serious complication of orthopaedic hardware and prosthetic material is malignancy. Animal studies analyzing the biological effects of the components of prosthetic joints revealed carcinogenic properties of beryllium, cadmium, chromium, cobalt, iron, lead, nickel, selenium, zinc, and titanium (13). In humans, prostheses containing cobalt, chromium, stainless steel, nickel, iron, manganese and silicon have been implicated as being carcinogenic. Other authors state that the placement of an implant may induce osteonecrosis, which in itself is a risk factor for the development of a sarcoma (8, 14).

Dental implants have also been of no exception. An electronic review of the literature suggests that an exhaustive differential diagnosis is required in implant patients who refer to dentist complaining from lesions, severe pain, halitosis, swelling and gum irritation, implant mobility, and numbness or paresthesia (1-9). Sometimes, the initial clinical appearance of lesions suggested peri-implantitis (7) with a red, hyperplasic or even ulcerated appearance while the patient was suffering from cancer. Detection of the oral lesions has great importance as they may be diagnosed first by the patient's dentist or by the maxillofacial surgeon. The lesion can indicate the presence of a primary squamous cell carcinoma, osteosarcoma and metastasis (9). Metastatic tumors of the jaws, from distant organs and tissues, may be diagnosed first by the oral surgeon, and most of the patients with oral metastasis may have seen another dentist recently but the condition has not been diagnosed (15).

Chronic inflammation, smoking and alcohol consumption as well as premalignant lesions and conditions such as leukoplakia, and oral lichen planus (OLP), have been recognized to be risk factors for the development of malignancy. It has also been reported that the majority of all presented cases had at least one recognized risk factor for oral cancer (4).

McGuff et al. have reported that there appears to be relation between implant-related sarcomas and sex of the patients. They also reported that the interval from implant placement to the development of osteosarcoma has ranged from six months to 30 years, with a mean of nine years. (8)

In this case report we have presented an unusual patient who developed a SCC adjacent to a mandibular implant. The lesion described in this report initially was confused with peri-implantitis. In implant patients or implant candidates who suffer from peri-implantitis, any mucosal erosion or discoloration, leukoplakia around implant, pain, implant loosening, bone loss around implant, mucosal erythema, and soft tissue inflammation regular follow-up and careful exploration of the area is essential

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