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Treatment of Oral Verrucous Carcinoma With Carbon Dioxide Laser

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Verrucous carcinoma (VC) is a slow-growing, nonmetastasizing form of squamous cell carcinoma that most frequently affects the oral mucosa, although other sites such as the larynx, esophagus, nasal fossae, skin, and genitals may also be involved.[1] VC has an exophytic, cauliflower-like appearance and occurs predominantly in the elderly.[2-4] According to most reports, the neoplasm seems to be more prevalent in men than in women.[2,3,5-7] The cause is unknown, but consumption of tobacco in the form of chewing, snuffing, or heavy smoking is considered the most important factor associated with the development of VC.[6-8] Other studies have investigated whether human papillomavirus (HPV), mainly genotypes 2, 6, 11, 16, and 18, could be another possible causative factor.[9-13] However, most studies have failed to find a statistically significant association of any HPV genotypes with VC.[10-13]

Histologically, this neoplasm is characterized by a proliferation of hyperkeratotic, thickened epithelium with a papillary or verrucous surface. No invasion is observed at the connective tissue interface, only invagination of the squamous epithelial ridges. Combined characteristics such as integrity of the basement membrane and normal epithelial maturation, along with the absence of dysplastic changes, suggest that this disease is characterized by nonaggressive behavior.[4,14,15]

FIGURE 1. Clinical aspect of verrucous carcinoma (case 1). The lesion is characterized by a vegetating and extensive cauliflower-like appearance.

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The treatment of patients with VC has usually consisted of shave excision, cryosurgery, chemotherapy, or combinations of these therapies. Shave excision may cause a large scar, cryosurgery may not be useful for extensive lesions, and chemotherapy has many adverse effects.[1] A major shortcoming of these therapeutic approaches is that high rates of recurrence often follow their use. Radiotherapy, another form of treatment, is controversial because of its potential to induce anaplastic transformation.[16-18] Despite the use of carbon dioxide (CO_2) laser in many oral lesions, this technique has not been used very often in the treatment of patients with VC. This article describes 2 cases of VC in women treated with a CO_2 laser.

Report of Cases

CASE 1

A 72-year-old woman was referred to our Clinic of Oral Medicine in March 2002; she presented with a vegetating, cauliflower-like lesion on her tongue's dorsal surface of 1 year duration. The lesion had an approximate dimension of 6×4 cm and was surrounded by an extensive white plaque (Fig 1). The patient had no history of tobacco or alcohol use but did mention a history of a white lesion on the tongue that dated back 13 years. Her medical status was noncontributory, and she otherwise looked in good heath.

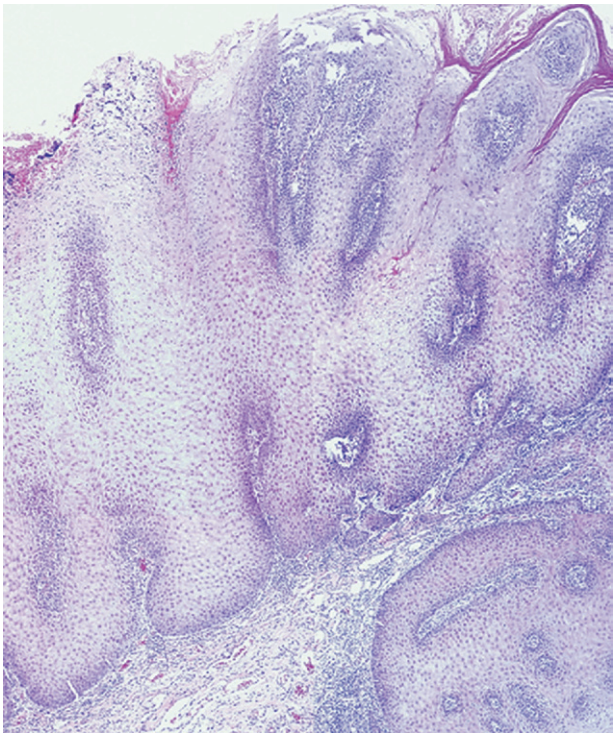

FIGURE 2. Verrucous carcinoma. General histopathologic aspect of the lesion exhibits normal maturation of the cells, without significant atypia, and long, broad rete ridges (hematoxylin-eosin, ×250).

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FIGURE 3. Clinical aspect of the tongue after the tumor was ablated with a carbon dioxide (CO_2) focused laser beam.

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The clinical diagnosis was VC and, with the patient under local anesthesia, an incisional biopsy was made with a 4-mm punch in 2 different areas of the lesion—one in the vegetating area and the other in the white plaque. Specimens

FIGURE 4. A persistent white-plaque lesion on the dorsal surface of the tongue that appeared after treatment with CO_2 laser was provided.

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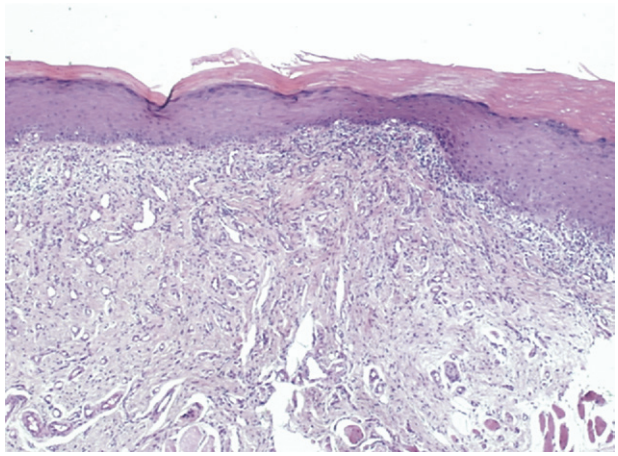

FIGURE 5. Histopathologic examination of the white plaque revealed marked hyperkeratosis and subepithelial mononuclear inflammatory infiltrate, but no features of verrucous carcinoma (hematoxylin-eosin, ×25).

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were sent for histopathologic examination. In both specimens, the histopathologic diagnosis was VC (Fig 2). Because the lesion was considered too extensive to be treated by conventional (shave) surgery, a CO_2 laser (UM-L30, wavelength 10.6 μm, continuous mode, power 6W; Union Medical Engineering Co, Seoul, South Korea) was used in the treatment. For complete excision of the tumor, 2 sessions of laser surgical therapy were required. During the first session, the exophytic part was removed with a focused laser beam (Fig 3). Healing time after this intervention was 2 months. The second intervention, provided 1 month after complete healing, was performed to remove the remaining white plaque with the use of laser vaporization while the beam was defocused with continuous mode (power 4 W). Complete healing after this second intervention took 1 month. For pain control, the patient was medicated with analgesic and anti-inflammatory drugs for 5 days in both interventions. During 2 years of follow-up, the tumor did not recur, but a white-plaque lesion that covered most of the dorsal surface of the tongue persisted (Fig 4). A biopsy specimen of this white plaque was taken, and hyperkeratosis, without features of VC, was diagnosed (Fig 5). Another attempt to remove this lesion with a CO_2 focused laser beam resulted in no benefit. Therefore, 0.1% retinoic acid in orabase, applied twice a day for 3 months, was used; the result was highly satisfactory with substantial reduction of the size of the lesion (Fig 6A). Use of medication was tapered to once a day for another month and was discontinued afterward. Unfortunately, the white plaque recurred 6 months after the retinoid was withdrawn; the patient has been monitored periodically since that time. A new biopsy of this lesion was performed in October 2005, and hyperkeratosis was again diagnosed. At the present time, the patient continues to present a large white plaque on the tongue (Fig 6B) but remains free of tumor.

CASE 2

A 70-year-old woman was referred to our clinic in 2003 for evaluation of a tumor that had been present on her tongue for 3 years. On clinical examination, 2 exophytic, cauliflower-like lesions were observed; taken together, they measured 5 × 4 cm. These lesions were surrounded by a whitish plaque (Fig 7). The patient had no history of tobacco or alcohol use, but she was diabetic and hypertensive. The clinical diagnosis was VC, and an incisional biopsy specimen was taken from the base of the exophytic tissue with a 4-mm punch. The specimen was sent for histopathologic examination, and the diagnosis was VC (Fig 8).

CO_2 laser, with the same parameters as used for case 1, was applied, and 2 surgical sessions were required. In the first session, a focused laser beam was used, and in the second session, a defocused beam with vaporization was selected. Complete healing time involving these 2 interventions was 2 months. The patient was medicated with

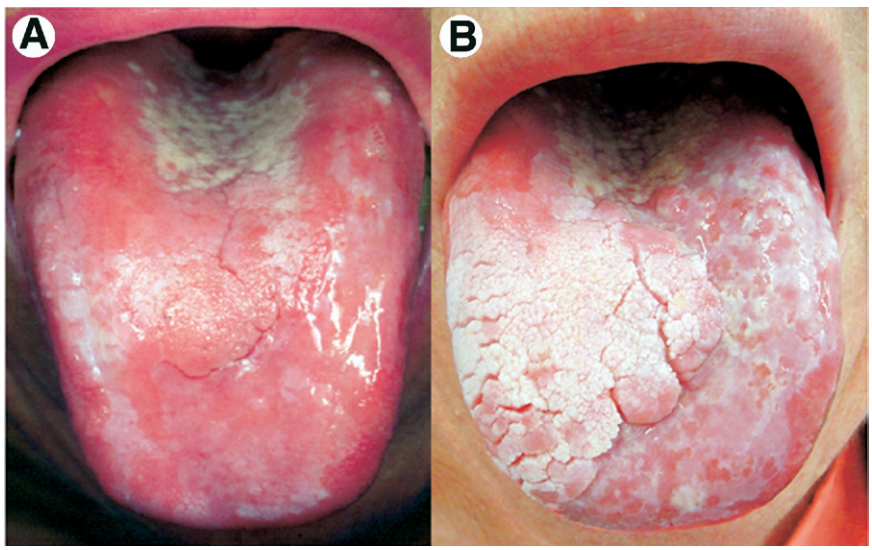

FIGURE 6. *A*, Aspect of the white plaque, with reduced size, after 3 months of treatment with 0.1% retinoic acid in orabase. *B*, Dorsal surface of the tongue, showing recurrent white plaque. This picture was taken at 4-year follow-up.

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FIGURE 7. Verrucous carcinoma (Case 2) is characterized by 2 exophytic, cauliflower-like lesions surrounded by a white plaque.

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analgesic, anti-inflammatory, and antibiotic drugs for 7 days during each session. After 9 months of follow-up, no recurrence was observed, but a small white plaque on the tongue persisted (Fig 9). A biopsy specimen of this white lesion was taken, and histopathologic analysis showed parakeratosis, acanthosis, and chronic inflammation, without features of VC. This lesion was treated with 0.1%

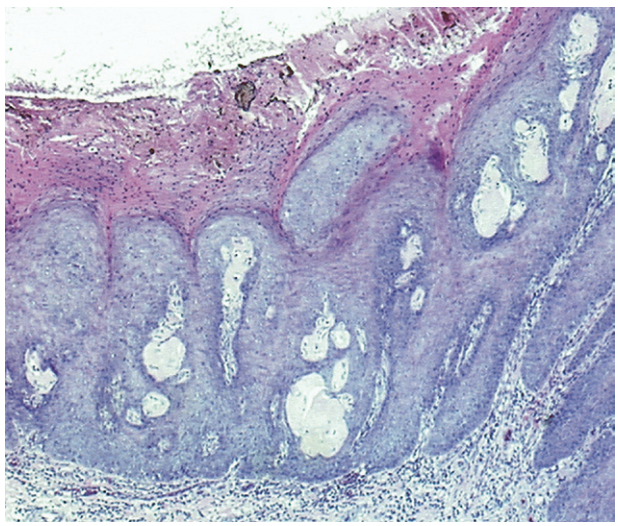

FIGURE 8. Verrucous carcinoma shows marked keratosis and a verrucous surface (hematoxylin-eosin, ×250).

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FIGURE 9. White plaque is apparent after treatment with CO_2 laser; it persisted after 9 months of follow-up.

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retinoic acid in orabase, applied twice a day, and the result was highly satisfactory after 2 months of treatment, yielding complete disappearance of the lesion. Therefore, the medication was withdrawn (Fig 10A). After 3 years of follow-up, the patient remains free of VC and of the white plaque (Fig 10B).

Discussion

VC is known as a nonaggressive variant of well-differentiated squamous cell carcinoma[19]; it shows low potential for invading the connective tissue or producing metastasis. Despite this behavior, VC can destroy adjacent tissues,[1,20] and it has a strong tendency to recur after treatment.[15,21]

Several methods are used to treat patients with VC of the oral mucosa, namely, shave excision, electrosurgery, cryosurgery, chemotherapy, and radiotherapy.[21-23] Shaving is generally considered the treatment of choice for VC, although extensive lesions may require multiple surgical interventions, which generally result in healing with a dysfunctional scar. Combinations of techniques are also used, the most frequent of which is shaving followed by chemotherapy.[23] Other techniques used in combination, such as shave excision together with electrosurgery or cryosurgery, have resulted in some level of satisfaction.[21] Despite these available therapeutic options, local recurrence has been seen as one of the main shortcomings of these techniques.[1,21,22] Although radiotherapy remains

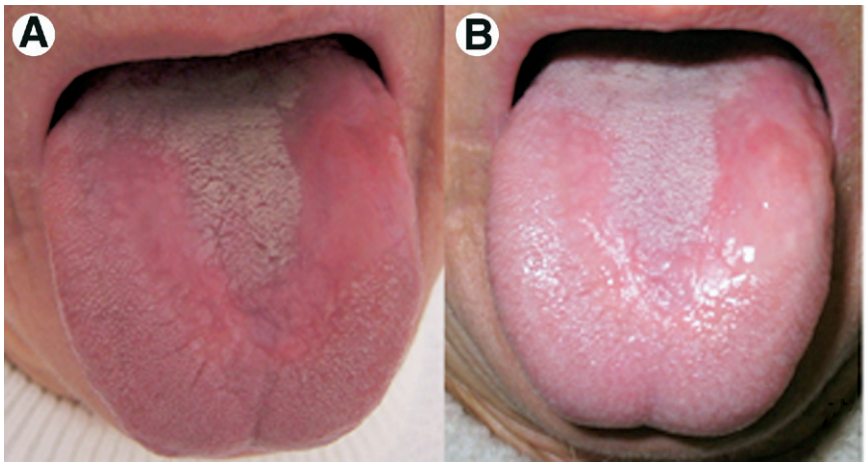

FIGURE 10. *A,* Clinical aspect of the tongue after treatment for 2 months of patient with white plaque with 0.1% retinoic acid in orabase. *B,* Clinical aspect of the tongue after 3 years of follow-up. The patient remains free of white plaque and tumor.

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controversial because of its potential for anaplastic transformation, it is considered an option of last resort. Perez et al[24] reported local recurrence of VC in all of his radiation-treated patients.

Since the early 1970s, CO_2 laser has proved to be an effective method of treatment for patients with several types of oral lesions, including early squamous cell carcinoma. However, few reports have appeared in the literature regarding the use of CO_2 in oral VC. The primary advantages of CO_2 laser treatment include prompt hemostasis, wound sterilization,[25] and the sealing of adjacent lymphatic vessels. This latter property potentially reduces the spread of malignant cells and may be useful in preventing metastasis during the treatment of a patient with squamous cell carcinoma.[26] Surgical time is greatly shortened and, according to results reported by other studies,[27,28] the healing process is usually faster and less painful compared with that following electrosurgery and cryosurgery techniques.

This article reports 2 cases of VC in which the patient was successfully treated with CO_2 laser. As has been reported frequently, VC usually manifests as a large lesion that can pose difficulties in terms of surgical treatment. The VC lesion in each of our patients was very large and covered an extensive area of the dorsal surface of the tongue. The CO_2 laser effectively removed both lesions and kept bleeding under control during the surgical procedure. Recovery was highly satisfactory for both patients, and no complications such as infection or edema were reported. The healing process spanned a period of 6 to 8 weeks and concluded with no scar and with altered anatomic form and function of the tongue.

Follow-up times were 4 years in the first case and 3 years in the second; up to the present time, no recurrences have been observed. Because most recurrences in VC occur during the first 6 months of follow-up,[23,29] the treatment provided to our patients was successful in terms of preventing recurrence, which has been considered one of the main problems associated with treatments used for VC.

The 2 cases reported here describe encouraging outcomes after treatment of patients with oral VC by CO_2 laser excision. One limitation of this analysis is that in these 2 cases, the use of CO_2 laser was followed by the development of a white plaque, most likely caused by the destruction of the lingual papillae. Biopsy of these white lesions was consistent with hyperparakeratosis. Treating one of these lesions with CO_2 laser resulted in no benefit for the patient. Because these white plaques were considered to be at risk for development into a malignant degeneration, such as squamous cell carcinoma, an alternative treatment with a 0.1% retinoid acid gel in orabase was used. The decision to treat both patients through application of topical retinoid was based on the fact that studies have shown that this medication may provide some chemopreventive effects in terms of carcinogenesis and may cause a reduction in size and thickness of white plaque lesions.[30-32] With 0.1% retinoid acid in orabase, both patients responded well with no adverse effects. In patient no. 1, however, recurrence of the white lesion was noted 6 months after the retinoid was withdrawn. Patients have been monitored periodically, as is appropriate for any patient treated for VC.

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