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Abbreviation:

AIDS = acquired immunodeficiency syndrome

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Electron-Beam Therapy for AIDS-related Molluscum Contagiosum Lesions: Preliminary Experience¹

PURPOSE: To determine the effects of electron-beam therapy on cutaneous molluscum contagiosum lesions in patients with acquired immunodeficiency syndrome (AIDS), because current treatment modalities are limited in their effectiveness and by long-term rates of lesion recurrence.

MATERIALS AND METHODS: Five patients with AIDS, with 23 molluscum contagiosum lesion sites, received electron-beam radiation treatment of recurrent molluscum contagiosum lesions.

RESULTS: All 23 lesions treated resolved completely and have not recurred during up to 24 months of follow-up. Radiation therapy was well tolerated; mild skin erythema was the only reported side effect.

CONCLUSION: The use of electron-beam radiation is a promising alternative to current treatment modalities.

Molluscum contagiosum is a commonly reported sexually transmitted disease. In healthy (ie, immunocompetent) individuals, molluscum contagiosum manifests as a benign viral infection of the epidermal layer, with the lesions often resolving spontaneously over time (1).

In contrast to its course in healthy individuals, infection with molluscum contagiosum in patients who are immunocompromised is not as innocuous. Molluscum contagiosum-associated cutaneous lesions are often numerous, disseminated, and disfiguring. In patients infected with the human immunodeficiency virus (HIV), molluscum contagiosum may act as an opportunistic pathogen and as a sentinel of late-stage immunodeficiency (2,3). An inverse relationship between the CD4+ cell count and the number of molluscum contagiosum lesions has been observed in patients with HIV (3).

Several therapeutic modalities have been used in the treatment of molluscum contagiosum lesions. These are localized treatment with antiviral ointments, cryotherapy, injection with interferon- α , chemical peels with use of trichloroacetic acid, surgical excision, and laser therapy. Although these therapies often result in a clearing of the lesions, their effect is usually temporary.

It is not uncommon for cutaneous lesions in immunocompromised hosts to harbor more than one pathogen. Investigators (4) have reported on the simultaneous occurrence of two pathologic entities within the same lesion in patients with acquired immunodeficiency syndrome (AIDS): cytomegalovirus with herpes simplex virus, Kaposi sarcoma with *Histoplasma capsulatum*, and *Cryptococcus neoformans* with molluscum contagiosum. The appearance of molluscum contagiosum lesions is a common dermatologic manifestation observed in patients with advanced HIV and AIDS: The lesions have been observed in 5%-18% of individuals with HIV infection (5).

In our practice, we routinely use electron-beam radiation to treat patients with AIDS-related Kaposi sarcoma skin lesions unresponsive to other modalities. During the course of time, we observed that irradiation of Kaposi sarcoma lesions that were contained within a field of molluscum contagiosum lesions produced resolution of the Kaposi sarcoma and, inadvertently, the molluscum contagiosum lesions. The purpose of this study was



Figure 1. Patient 1. (a) Photograph of a 34-year-old man shows the right cheek and neck before treatment with seven 200-rad (200-cGy) fraction (12 MeV electrons: total, 1,400 rad [1,400 cGy] over 2 weeks). (b) Photograph obtained 2 years later shows complete resolution after treatment. Follow-up was 2 years, and complete resolution was maintained.

to determine the effects of radiation therapy on cutaneous molluscum contagiosum lesions in patients with AIDS.

MATERIALS AND METHODS

Five men (average age, 39 years; age range, 31-46 years) with AIDS-related recurrent molluscum contagiosum lesions at one or more sites were referred for consideration of radiation therapy. All patients had a several-year history of molluscum contagiosum lesions that had been treated with both localized measures (ie, liquid nitrogen, local ointments) and laser surgery, with limited success. All patients provided written informed consent after the nature of the procedure had been explained. Informed consent included re-view of the manuscript for those individuals whose photographs are published in this article. The study was conducted according to the Declaration of Helsinki principles.

Treatment was administered by using megaelectron voltage (9 MeV or 12 MeV) electron-beam energy. The selection of the radiation technique was determined on the basis of the location and size of the lesion site. The daily radiation treatment dose was either 180 cGy (used on sites located on the face and neck) or 200 cGy (used on sites located on the body). Treatments were administered five times per week for up to 18 treatments per site,

with duration dependent on the severity of the lesions unless an acute toxic reaction to irradiation developed.

Response was assessed clinically. Patients who had complete resolution of the symptoms or disappearance of the molluscum contagiosum lesions at examination were considered to have had a complete response. Those with substantial but incomplete reduction of the lesions (ie, greater than 50% decrease in size) were considered to have had a partial response. Lesions that were minimally affected by the treatment were considered not to have responded.

RESULTS

Twenty-three molluscum contagiosum lesion sites on five patients were treated. Lesion sites ranged from, 5 x 5 cm to 15 x 15 cm and contained one to 50 lesions per site. Each site received an average course of 12 radiation therapy fractions. Lesion sites were located on the face, neck, chest, and anal areas.

The total radiation dose per lesion site was 1,400-4,560 cGy. Patients 1 and 3 each had one lesion site requiring a total radiation dose of 1,400 cGy and 1,800 cGy, respectively. Patient 2 had six lesion sites treated with 1,600-2,000 cGy per site. Patient 4 had 11 lesion sites treated with 2,160-4,560 cGy per site.

Patient 5 had four lesion sites treated with 2,160 cGy per site.

Response to irradiation was rapid and complete, as illustrated in figures 1 and 2. In general, small sites containing superficial lesions were given shorter courses of radiation, while larger sites containing deeper lesions were given more prolonged radiation treatment courses. At least a partial regression of most lesions occurred after the 1st week of treatment. After 10 treatments (five treatments per week for 2 weeks), three patients experienced complete resolution, defined as a flattening and fading, of their lesions. Two patients with deep lesions required 1X treatments for complete lesion resolution.

No lesion recurrence has been noted during the follow-up period (mean, 18.8 months; range, 14-24 months). Minor radiation toxic reactions were noted. Two patients experienced mild skin erythema, which responded to aloe vera ointment. No patient reported dry mouth or mucositis.

DISCUSSION

Results in this report on the use of electron-beam energy in the treatment of cutaneous molluscum contagiosum lesions in patients with AIDS suggest a potential and promising role for radia-



Figure 2. Patient 2. (a) photograph of a 33-year-old man shows left cheek and neck before treatment with eight 200-rad (200-cGy) fractions (12 MeV electrons; total, 1,600 rad [1,600 cGy] over 2 weeks). (b) Photograph obtained 2 years later shows complete resolution after treatment. Follow-up was 2 years, and complete resolution was maintained.

tion therapy in these individuals. Advantages of a rapid and complete response in the majority of patients, with only minor side effects, are distinct clinical benefits compared with the benefits of current therapeutic options.

While a wide variety of treatment strategies have been available for the treatment of cutaneous molluscum contagiosum lesions, the majority have poor initial as well as long-term success rates and require frequent clinic visits (6). In one study (6), molluscum contagiosum lesions that were unresponsive to other therapies were injected with one megaunit of interferon- α weekly for 4 weeks. Of 29 treated lesions, 11 (38%) completely cleared and 18 (62%) were reduced in size by greater than 50%. No effect on surrounding lesions was noted, and lesions smaller than 0.5 cm and lesions in patients without AIDS were more likely to show a clinical response. Trichloroacetic acid peeling reduced molluscum contagiosum lesion counts by an average of 40%, (range, 0-90%) in a study (7) of seven patients infected with HIV. The peels were performed with 25% - 50% trichloroacetic acid (average, 35%) and were repeated every 2 weeks as needed.

After 2 months of follow-up, no lesion spread, residual scarring or secondary infection was noted.

Surgical excision has even more limited success as a long-term method of eliminating molluscum contagiosum lesions in patients with AIDS. In a study by Robinson and colleagues (8), eyelid lesions from two patients with AIDS were removed by means of surgery and cryotherapy. Lesions recurred in both patients within 6-7 weeks, the usual viral incubation period.

The traditional treatment modalities (eg, topical ointments) for patients with cutaneous molluscum contagiosum may offer patients transient relief of their disfiguring lesions. However, regardless of the treatment modality, a large proportion of patients experience rapid recurrence of the lesions, even after surgical excision (9). The reasons for the molluscum contagiosum lesion recurrence is unclear. It has been suggested that, in addition to being present in the lesion site, the virus harbors within the surrounding clinically normal epidermis in patients infected with HIV (10). Despite this understanding of the virus, the development and evaluation of efficacious

treatments for patients with molluscum contagiosum has been hampered, in part, by the inability to replicate the virus and its morphologic effects in vitro. It has been only recently that investigators (11), by using human foreskin grafts in athymic mice, observed molluscum contagiosum virus-induced morphologic changes that were indistinguishable from those in patient biopsy specimens.

While molluscum contagiosum typically manifests as numerous small hypopigmented papules or giant nodular tumors over the face, including the eyelids, or genital area (12,13), in up to two-thirds of cases molluscum manifests atypically with regard to localization, morphology, growth pattern, and size of the lesions (14) and may mimic other disease states. For example, the clinical manifestation of molluscum contagiosum lesions often resembles lesions due to nevus sebaceous of Jadassohn, ecthyma, and giant condylomata acuminata (14). Further, because of its atypical manifestation pattern, it has been suggested that molluscum contagiosum be included in the differential diagnosis of patients who are immunosuppressed and who present with abscess (15,16).

Conversely, mycotic and bacterial infections of the skin in patients infected with HIV may vary substantially in their clinical manifestation and severity and may mimic molluscum contagiosum. As early as 1985, investigators (17) began reporting on patients infected with HIV who had cutaneous cryptococcosis that resembled molluscum contagiosum. Numerous reports (18-22) of similar cases have been published since this early observation. Hennessey and Cockerell (23) described two patients infected with HIV with scattered translucent cutaneous papules that resembled molluscum contagiosum lesions but that were found to be due to extrapulmonary *Pneumocystis carinii*.

In addition to the ability of other pathogens to clinically masquerade as molluscum contagiosum in patients who are immunocompromised, there is the potential for coexistent infection with more than one pathogen. For example, Sulica and colleagues (4) in 1994 reported on, to our knowledge, the first patient infected with HIV in whom molluscum contagiosum and *C. neoformans* were documented in the same cutaneous lesion.

While the results of radiation therapy are promising, we must keep in mind that an accurate diagnosis of molluscum contagiosum before initiation of treatment is essential for therapeutic success. As a guide to treatment, skin biopsy is mandatory in patients infected with HIV who have mucocutaneous lesions that resemble molluscum contagiosum to rule out squamous cell carcinoma or other infections (mycotic or bacterial).

In conclusion, these preliminary results suggest that electron-beam radiation therapy offers a substantial benefit to patients with localized molluscum contagiosum lesions.

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