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SHORT COMMUNICATION

Relapse Pattern and Treatment Outcome of Curative Radiotherapy for Primary Cutaneous CD30+ Anaplastic Large-cell Lymphoma: A Retrospective Cohort Study

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Primary cutaneous anaplastic large-cell lymphoma (PCALCL), a unique category of mature T-cell neoplasms, was recognized in the 2008 WHO classification of lymphoid tumour as an indolent primary cutaneous CD30+ lymphoproliferative disorder (1). Radiotherapy (RT), which is frequently used for curative treatment of patients with PCALCL, involves only a few lesions or may be used to palliate the disorder in patients with multiple lesions. However, because of the rarity of PCALCL and the low number of cohort series and case reports investigating the disorder, the outcomes of using curative RT alone for CD30+ PCALCL are underreported, published studies have revealed that rapid recurrence of CD30+ PCALCL occurs within 2–8 months after treatment (2–4).

MATERIALS AND METHODS

For the period 1992 to 2011, medical records from National Taiwan University Hospital and Chang Gung Memorial Hospital were reviewed retrospectively. The study was approved by the Institutional Review Boards at both hospitals. Patients with localized lesions without lymph node or systemic involvement and prior treatment were recruited for analysis. An example of cutaneous findings of CD30+ PCALCL revealed grouped ulcerated nodular lesions. Staging evaluation included a detailed pathological review, a thorough physical examination, a bone marrow study, laboratory investigations, and whole-body computed tomography scans.

RT was delivered using either 8–15 MeV electron beams with or without a bolus (7 of 9 patients) or 6 MV photon beams with a 0.5–1.5 cm bolus (2 of 9 patients). A bolus is a tissue material that is placed in direct contact with the patient's skin to provide extra scattering of the external beam radiation and to increase the radiation dose to the skin. Considering that photon beam radiation has skin- and subcutaneous tissue-sparing effects, using a bolus is essential in treating skin lesions when using a photon beam with an energy of 6 MV or higher. In contrast to a photon beam, a bolus is used to ascertain an adequate skin surface dose and effective therapeutic depth for electron beam radiation. The thickness (cm) of a bolus depends on the tumour thickness and electron energy, which is determined by the treating physician (Table SI[1]). In this study, the radiation field encompassed a gross skin lesion with a 2–3 cm margin to account for the range of tumour microinfiltration, patient set-up error, and movement during radiation therapy and to allow for adequate dose build up (radiation beam penumbra). Thus, the margins of apparently healthy skin included in the RT field were 2–3 cm. A radiation dose was prescribed from 36 to 50.4 Gy with 1.8–2 Gy per fraction, 5 fractions per week.

RESULTS

This study included 7 men and 2 women with a median age of 40 years (age range 16–51 years). Table SII[1] lists the clinicopathological features, size and number of lesions, RT, and treatment responses. Among the patients, 5 (55.6%) had T1a disease, 1 (11.1%) had T1b disease, and 3 (33.3%) had T2a disease. All patients had no lymph node involvement and extracutaneous non-lymph node diseases.

All patients tolerated the RT and experienced grade 1–2 skin toxicities. The median follow-up time was 26.6 months (range 10.5–253.6 months) and the median dose prescribed for the tumours was 40 Gy (range 36–50.4 Gy). Of the 9 patients, 8 (88.9%) exhibited complete remission (CR) and 1 (11.1%) had partial remission (PR). Among the 9 patients, 7 with CR were alive at the time of analysis. The 3-year overall survival rate was 70% (Fig. S1A[1]). Of the 9 patients, 3 had disease recurrence at 2.4 months, 4.1 months and 2.9 years, respectively, after completing RT. The 3-year disease-free survival rate was 58.3% (Fig. S1B[1]).

DISCUSSION

PCALCL can present as solitary, grouped, multicentric, or generalized tumours. Immunophenotypically, CD30 is expressed by at least 75% of tumour cells, whereas CD4 and CD8 are expressed in most tumours with a variable loss of pan-T-cell antigens (CD2, CD3, and CD5) (5). Unlike in systemic ALCL, anaplastic lymphoma kinase and t(2;5) translocation are typically absent in PCALCL.

Surgical excision or curative RT is the primary treatment for localized PCALCL. Surgery resulted in a 100% CR rate, but relapse subsequently occurred in 43% of patients (6). Chemotherapy is used mainly for patients with multifocal, generalized lesions or relapsed disease. The treatment efficacy of several chemotherapeutic regimens, including CHOP or CHOP-like regimens (7); single-agent methotrexate, gemcitabine, and etoposide (8, 9); and biologic agents, such as bexarotene,

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isotretinoin, and thalidomide (10, 11), for PCALCL have been demonstrated.

However, there are few published studies on the curative RT for PCALCL (Table SIII[1]). At a radiation dose of 30–50 Gy, CR can be achieved in 85%–100% of patients; however, relapse after curative RT in these patients was approximately 30–40%. The current study showed that 3 (33.3%) of the 9 patients developed skin relapses outside of the initial radiation-field at 2.4 months, 4.1 months, and 2.9 years, respectively, after completing RT. The findings are consistent with the observation that the most common relapse pattern for PCALCL is skin relapse, and 40% of the patients developed relapses outside of the radiation-field and subsequent extracutaneous spread (2). Toxicities from the curative RT were mild. Radiation was typically delivered using electrons with or without a bolus or low-energy photons with a bolus to cover the epidermis and dermal tissue. At a dose of 30–50 Gy, all of the patients experienced only grade 1–2 dermatitis.

Recent advances in treatment for PCALCL have been focused on using monoclonal antibodies. SGN-30, a chimeric monoclonal antibody to CD30, caused a 56% CR rate and 27% PR rate for heavily treated PCALCL in an open-label multicentre phase 2 study (12). Furthermore, the antibody-drug conjugate, brentuximab vedotin (SGN-35), a CD30-specific monoclonal antibody attached to antitubulin agent monomethyl auristatin E, has prompted a high response rate in the treatment of relapsed or refractory ALCL (13–15). Because the relapse rate of PCALCL after curative RT was 30–40%, integration of biologic agents (e.g. thalidomide) or well-tolerated brentuximab vedotin after RT for PCALCL is warranted.

In conclusion, this study filled the gaps in the literature by reporting treatment outcome, radiation technique and dose, and relapse timing and pattern regarding curative RT alone for PCALCL. This study is the largest series published to date. For localized PCALCL, radiation therapy at a median dose of 40 Gy resulted in high response rates and low toxicities.

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The authors declare no conflicts of interest.

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