

# Treatment of primary cutaneous anaplastic large cell lymphoma with superficial X-rays

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## Abstract

The optimal radiation schedule for primary cutaneous anaplastic lymphoma (PCALCL) has not been investigated. We report here satisfactory outcomes of low-dose (16-20 Gy, 3-5 fractions), superficial X-ray radiation (40-50 kV) in a series of 10 patients with PCALCL. Only 1 patient developed a local relapse during the median observation time of 25 months; complete remission was recorded in the other patients. This observation indicates that superficial, low dose X-ray therapy may provide a cost-effective alternative to the traditional 35-45 Gy schedules.

## Introduction

Primary cutaneous anaplastic large cell lymphoma (PCALCL) is a rare indolent cancer with a favorable prognosis and the 5-year specific disease survival of 90%.<sup>1-5</sup> The patients often present with solitary or localized nodules or tumors, sometimes with ulceration.<sup>3</sup> Treatment in most cases comprises surgery or radiotherapy, sometimes in combination.<sup>1,5-8</sup> However, due to rarity of this disease the evi-

dence for the efficacy of these modalities is very low. Here we report the excellent outcome of PCALCL treatment with superficial radiotherapy in a small cohort of 11 patients.

## Materials and Methods

Patients with the diagnosis PCALCL were identified from the clinical lymphoma registry in our institution between September 2007 and October 2014. Among 277 patients with cutaneous T-cell lymphomas, 36 patients had a CD30+ lymphoproliferative disorder, and of these 13 were registered as having PCALCL. We have excluded one patient had spontaneous remission before treatment, one patient died of other causes before the outcome of the radiation therapy was registered and one patient who received electron beam radiation therapy (40 Gy) to multiple tumors in the scalp. The remaining 11 patients (Table 1) were treated with superficial radiotherapy using Gulmay D3100 X-ray unit (Gulmay Ltd., Surrey, UK).

## Results

The male:female ratio was 2.67:1 (8 men, 3 women) which is compatible with the 2-3:1 ratio reported in the literature.<sup>3</sup> The median age at diagnosis was 62 years. The median follow-up time after radiation therapy was 26 months. Five patients had an associated malignancy: lymphomatoid papulosis (LyP) or mycosis fungoides (MF).

The patients were treated with the dose 16-20 Gy given in 3-5 daily fractions (40-50 kV). All patients were evaluated after 3 months when complete response was observed in 8/10 patients and partial response (PR) in 3/10

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patients (in patient 1 one of the tumors had a CR and one tumor had a PR). On a long-term observation one patient (Patient 9) had a local relapse and Patient 1 progressed and developed new lesions (but not within the irradiated site). No adverse effects were registered except for local hyperpigmentation and mild scarring within the irradiated site.

## Discussion and Conclusions

Our data document satisfactory effect of superficial X-ray treatment of PCALCL tumors, using the doses 16-20 Gy and photon energy 40-50 kV. Theoretically, 50% of the radiation of this energy is absorbed within the most superficial 10 mm of the skin,<sup>9</sup> which is less than the estimated thickness of some tumors.

Table 1. Patients' characteristics, treatments and outcomes.

Patient	Sex	Age at diagnosis	Clinical lesion(s)	Size of lesions, cm	Location	Secondary lymphoma	Radiation dose	Response at 3 months	Follow-up, months	Relapse	Follow up
1	M	46	2 tumors	3	Left thigh and crus	-	50 kV 4 Gyx5	CR + PR (crus)	56	Local	PD
2	F	35	1 tumor	2.5	Left crus	Lyp	50 kV 6 Gyx3	CR	85	New	CR
3	M	78	1 tumor	1.5	Right forearm	Lyp	50 kV 4 Gyx5	CR	13	None	CR
4	M	70	Multiple tumors	35x20	Upper back	-	50 kV 4 Gyx5	CR	41	None	CR
5	M	72	1 tumor	2x0.5	Right flank	-	40 kV 4 Gyx4	CR	5	None	CR
6	F	65	1 plaque	2x3	Behind right ear	-	40kV 4 Gyx5	CR	14	None	CR
7	F	48	3 tumors	7x5, 5x5.5, 1.5	Left upper arm, right foot, left first finger	MF	50 kV 4 Gyx5	PR	13	None	CR
8	M	67	1 tumor	4x3x0.5	Left foot	-	50kV 4 Gyx5	CR	11	New	CR
9	M	68	1 plaque	10, 3.5	Right calf, left hand	Lyp	50 kV 4Gyx5	PR	8	None	PR
10	M	78	1 tumor	1.5	Right upper arm	Lyp, MF	40kV 4 Gyx5	CR	6	None	CR

LyP, lymphomatoid papulosis; MF, mycosis fungoides; CR, complete response; PR, partial response; PD, progressive disease.

Nevertheless, the clinical outcome of the superficial therapy has been excellent with 90% long-term CR. This indicates the high radio-sensitivity of PCALCL and possibly involvement of secondary anti-tumor mechanism such as bystander effect.<sup>10</sup>

Studies reporting outcome of radiotherapy in PCALCL are scarce.<sup>2-5,7,10</sup> The Yale Center records from 2008 is the only study involving radiation therapy exclusively using the dose of 34-44 Gy given in 2-Gy fractions.<sup>7</sup> All eight reported patients achieved CR after 12 months median-follow-up. We propose here that the number of fractions and total radiation dose can be reduced to 16-20 Gy, without a significant loss of long-term efficacy. The modified, low-dose schedule can be delivered as superficial radiotherapy which is more cost-effective and will probably reduce the risk of side-effects.

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