

Single vs. Fractionated Low-Dose Radiation for Mycosis Fungoides Lesions: A Retrospective Comparative Analysis

Sarah J. Lange, BA¹, Nicole A. Trepanowski, MD², Ayushya Ajmani, BA¹, Frederick Lansigan, MD^{1,3}, Joi B. Carter, MD^{1,2}, Lesley A. Jarvis, MD^{1,4}

¹Dartmouth Geisel School of Medicine, Hanover, New Hampshire, USA

²Department of Dermatology, Dartmouth Health Medical Center, Lebanon, New Hampshire, USA

³Dartmouth Cancer Center, Dartmouth Health Medical Center, Lebanon, New Hampshire, USA

⁴Department of Radiation Oncology, Dartmouth Health Medical Center, Lebanon, New Hampshire, USA



INTRODUCTION

- Mycosis fungoides is a common variant of cutaneous T-cell (CTCL) lymphoma and is typically both indolent and radiosensitive
- Low-dose radiation therapy (RT), particularly 8–12 Gy total, is effective in local control with minimal toxicity
- Two fractionation regimens are commonly used:
 - **8 Gy × 1 fraction** (single-visit)
 - **4 Gy × 2 fractions** (split-visit)
- Prior studies support low-dose efficacy but do not directly compare fractionation strategies.^{1,2}

Clinical relevance: In rural areas, single-visit regimens may reduce travel burden and improve treatment accessibility.

RESEARCH QUESTION

Is single-fraction 8 Gy radiation clinically equivalent to split-fraction 4 Gy × 2 for localized mycosis fungoides lesions, with similar efficacy, recurrence, and safety?



METHODS

- Retrospective review of patients with biopsy-proven MF.

Setting: Rural multidisciplinary cutaneous lymphoma clinic

Primary Endpoints: Response rate (CR, PR, NR, PD)

- CR: Complete Response
- PR: Partial Response
- NR: No response
- PD: Progressive Disease

Secondary: Local recurrence, time to next therapy, toxicities

Analysis: Fisher’s exact test, Chi-square, Kaplan–Meier, Cox proportional hazards models, subgroup analyses (lesion type, stage, demographics, immunosuppression, concurrent therapy)



RESULTS

Patient Demographics:

- Median patient age was **73** years old (range: 39-95)
- Majority of patients were **male (54.4%)**.
- All patients were **white; 18.4% were Hispanic/Latino**

Response Rates:

Response	4 Gy × 2 (n=103)	4 Gy × 2 (%)	8 Gy × 1 (n=11)	8 Gy × 1 (%)	p-value
Complete Response (CR)	78	75.7%	11	100%	0.118
Partial Response (PR)	23	22.3%	0	0%	0.117
No Response (NR)	2	1.9%	0	0%	1.000
Progressive Disease (PD)	0	0%	0	0%	NA

Second Radiation Treatment:

- Needed in **12.7%** of **4 Gy × 2** and **none in 8 Gy × 1** (N.S.)

Local Recurrence:

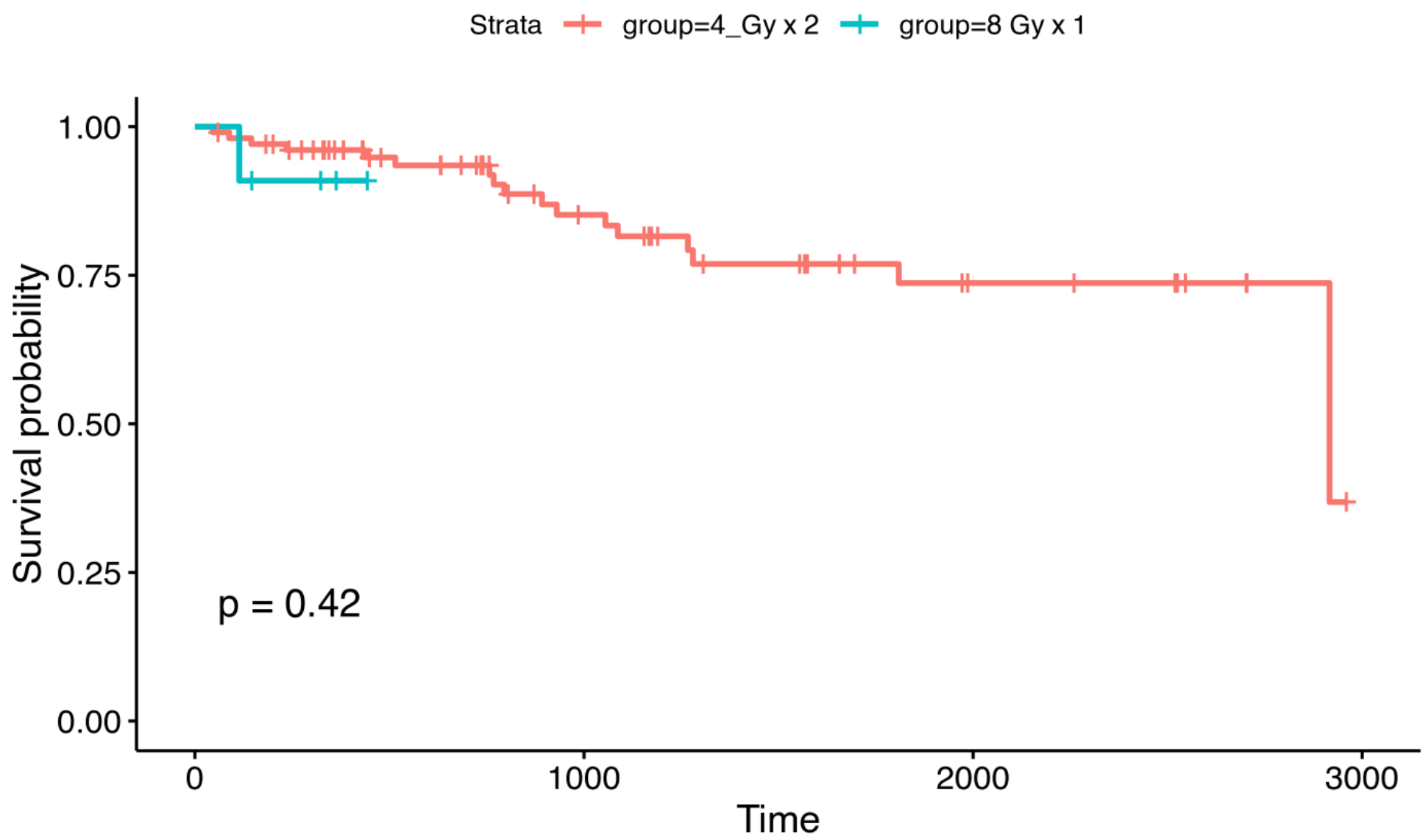
- Lesions recurred in **16.5%** of **4 Gy × 2** and **9.1%** in **8 Gy × 1** (N.S.)

Safety

- No grade ≥2 acute or late toxicities in either regimen

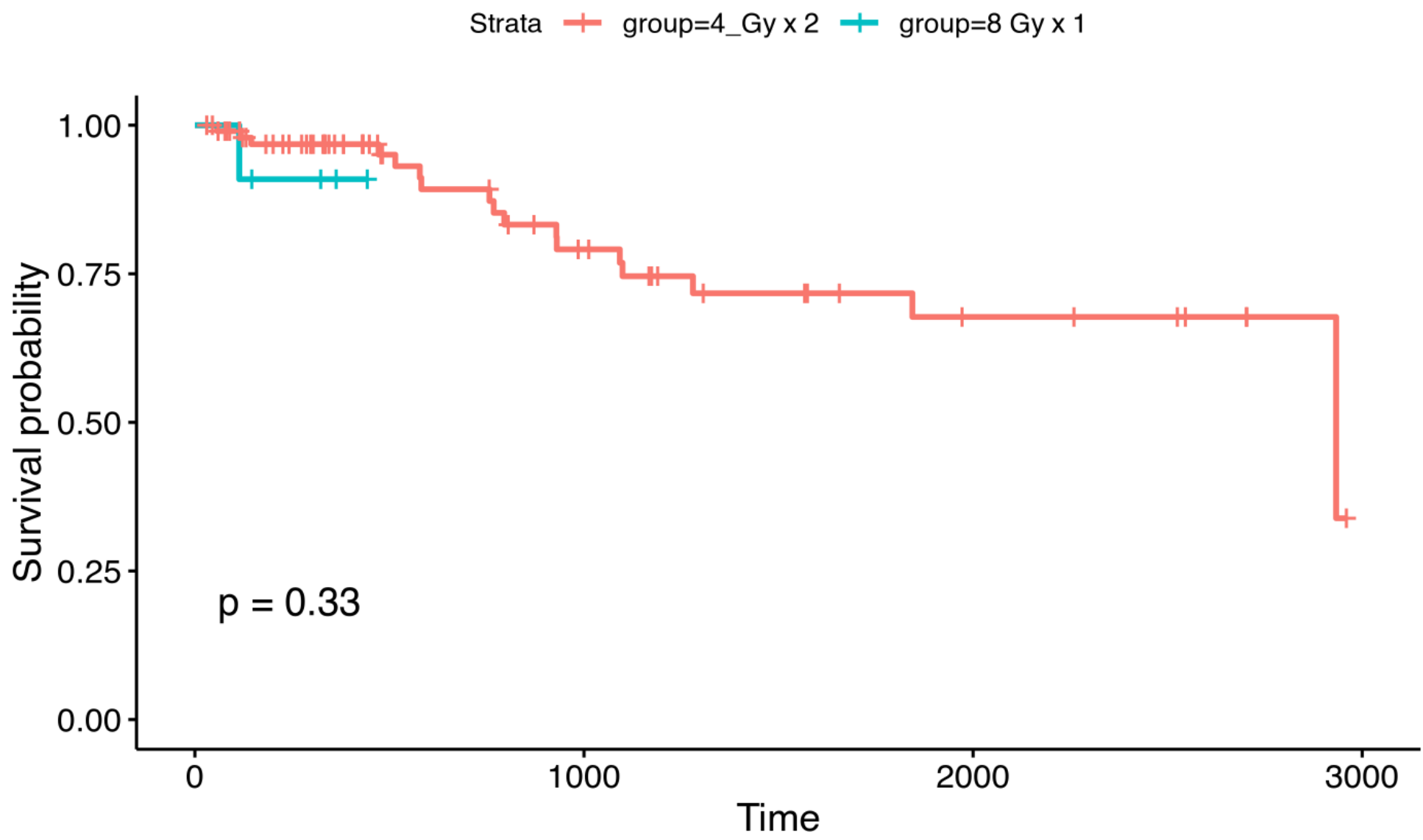
Relapse-Free Survival:

Cox model suggested higher relapse hazard with 8 Gy × 1 (HR = 2.4), but not significant (p = 0.43).



Time to Next Treatment:

There is no difference of time to next treatment between patients treated in 4 Gy x 2 and in 8 Gy x 1 but not significant (p = 0.35).



DISCUSSION

- **High response rates** were achieved with both regimens, confirming efficacy of low-dose radiation in MF.
- **No significant differences** in response, recurrence, or time to next treatment were detected between regimens.
- **Safety profile excellent:** no grade ≥2 toxicities.
- **Subgroup analyses** showed no effect of morphology, stage, or demographics on outcomes.
- These findings align with prior small studies suggesting **single-fraction therapy is effective** and highlight its logistical benefit for patients with geographic or access barriers.

Project Limitations

- **Small sample size** for 8 Gy × 1 group (n=11) limits power
- **Retrospective study** subject to selection bias and incomplete records
- **Homogenous**, primarily Caucasian population
- **Single-center rural clinic** may limit generalizability
- **Follow-up duration** relatively short for some patients

Future Directions

- **Multi-center studies** with larger 8 Gy × 1 cohorts to confirm findings
- **Prospective trials** directly comparing fractionation schedules
- **Longer follow-up** to assess durability of response and late toxicities
- **Patient-reported outcomes (PROs)** to capture quality-of-life benefits of single-fraction therapy
- **Cost-effectiveness analyses** to quantify savings from reduced visits

CONCLUSIONS

Single-fraction 8 Gy radiation is a safe and effective alternative to split-fraction 4 Gy × 2 in treating localized MF lesions. While larger studies are needed, our findings suggest **equivalent clinical outcomes** with fewer treatment visits — a particularly valuable consideration for **rural and underserved patients**.

References

1. Elsayad K, Eich HT. The evolving role of reduced-dose total skin electron beam therapy in skin malignancies: the renaissance of a rare indication. *Strahlentherapie und Onkologie*. 2023;199:950–953. doi:10.1007/s00066-023-02115-4

2. Wang P, Gilbert M, Lim HW, McHargue C, Friedman BJ, Veenstra JJ, Siddiqui F. Single-Fraction Radiation Therapy for Localized Cutaneous T-cell Lymphoma. *Practical Radiation Oncology*. 2023.