Long-term outcomes of high-risk basal cell carcinoma treated with Mohs micrographic surgery

To the Editor: Mohs micrographic surgery (MMS) is indicated for the treatment of high-risk basal cell carcinoma (BCC) based on superior long-term outcomes compared to wide local excision (WLE).[1,2] Factors that may predict poor outcomes include tumor diameter of ≥2 cm, head and neck location, deep invasion, recurrence, aggressive histologic subtype, and perineural invasion.[3,4] The American Joint Committee on Cancer (AJCC, 8th edition) and the Brigham and Women Hospital (BWH) staging systems have incorporated some of these parameters to risk-stratify BCC.[4,5] The performances of AJCC and BWH staging systems have been previously assessed in a mixed cohort of patients with BCC treated with MMS and WLE.[5] In the current study, we investigated the rates of local recurrence (LR), metastatic disease, and disease-specific death associated with high-risk BCC, as defined by the existing staging systems, after treatment with MMS only.

A retrospective cohort chart review was performed after approval by the University of Texas Southwestern Medical Center Institutional Review Board. Between 2016 and 2020, of 6376 BCCs treated with MMS, 476 cases from 402 patients were AJCC stage T2 or greater (specifically ≥2 cm, had perineural invasion, and/or deep invasion). Patients with <3 months of follow-up were excluded. Cases with only isolated high-risk features were not included.

The mean age of the patients was 69 years, and most patients were White men. Sixty-five percent of the tumors were localized in the head and neck region, with a mean diameter of 2.6 cm (range 0.6-8.5 cm). Based on the AJCC staging, 402 cases were staged as T2 and 74 as T3. Four hundred and eighteen cases were BWH stage T1 and 58 were T2.

During posttreatment surveillance (mean, 25 months; range 3-70 months), there were 5 cases of LR and no cases of metastatic disease or disease-specific death (Supplementary Table I, available via Mendeley at https://doi.org/10.17632/3n3v9xfv72.1). Importantly, all recurrences were relatively low-risk AJCC stage T2 and BWH stage T1 tumors. Based on univariable statistical analyses, large size, head and neck location, deep invasion, previously treated tumor, aggressive histologic subtype, and perineural invasion were not associated with recurrence (Table I). Immunosuppressed patients comprised 40% of the recurrent cases, but this did not reach statistical significance. Cumulative incidence analyses did not show a significant difference in LR regardless of AJCC or BWH T staging (Fig 1).

We observed 98.9% disease-free survival in 476 cases of high-risk BCCs treated with MMS. AJCC and BWH T staging did not predict a poor outcome in our cohort. Our data are consistent with the published rates of LR after MMS.[2] In a previous report, 49 cases with BWH stage T2 had a 10-year metastatic disease/disease-specific death incidence of 36.9%, all of which occurred after WLE but not after MMS.[5] We also did not observe any adverse events in 58 cases with BWH stage T2 after MMS. Tumor factor—based prognostic systems for BCC may not predict outcomes in patients who are treated with MMS but may be more relevant for WLE. Based on the excellent outcomes associated with high-risk BCCs in our and previous study cohorts, MMS should be strongly considered for eligible patients. The limitations of the study include limited follow-up duration, loss of data due to cases lost to follow-up, and retrospective design.

Kevin Shi, MD, PhD, Agnes Kim, BS, Jorena Lim, BS, Madeleine O'Brian, BA, Andrew Matsumoto, MD, Rajiv I. Nijhawan, MD, and Divya Srivastava, MD

From the Department of Dermatology, University of Texas Southwestern Medical Center, Dallas, Texas.

Funding sources: None.

IRB approval status: Reviewed and approved by UT Southwestern IRB.

Key words: basal cell carcinoma; dermatology; Mohs micrographic surgery; outcome; recurrence; surgical specialties.

Correspondence to: Divya Srivastava, MD, Department of Dermatology, University of Texas Southwestern Medical Center, 5939 Harry Hines Blvd, 4th Floor Suite 100, Dallas, TX 75390

E-mail: divya.srivastava@utsouthwestern.edu

Table I. Patient and tumor characteristics of basal cell carcinoma treated with MMS

Clinical characteristic	No recurrence[§]	Recurrent[‖]	*P* value[¶]	Total cases
Age at diagnosis, y (mean, range)	69 (24-96)	66 (61-70)	.65	69 (24-96)
Race/ethnicity			>.99	
Caucasian	393	5		398
Other	4	0		4
Sex			.59	
Male	309	5		314
Female	88	0		88
Immunosuppresion*			.09	
Yes	41	2		43
No	356	3		359
Tumor size, cm (mean, range)	2.6 (0.6-8.5)	2.6 (2.1-3.3)	.91	2.6 (0.6-8.5)
Previously treated			>.99	
Yes	29	0		29
No	442	5		447
Tumor location			>.99	
Head and neck	307	3		310
Other	164	2		166
			.29	
H area[†]	172	3		175
M area[†]	153	0		153
L area[†]	146	2		148
Histologic subtype			>.99	
Superficial/nodular	373	3		376
Aggressive[‡]	98	2		100
Perineural invasion			>.99	
Yes	4	0		4
No	467	5		472
Deep invasion			>.99	
Yes	46	0		46
No	425	5		430
MMS stage performed (mean, range)	1.8 (1-6)	2.4 (2-3)	.13	1.8 (1-6)
Defect size, cm (mean, range)	3.9 (1.2-10)	3.9 (3.1-5)	.95	3.9 (1.2-10)
AJCC T stage, 8th edition			>.99	
T2	397	5		402
T3	74	0		74
BWH T stage			>.99	
T1	413	5		418
T2	58	0		58

AJCC, American Joint Committee on Cancer; *BWH*, Brigham and women's hospital; *MMS,* Mohs micrographic surgery.
*Immunosuppression: iatrogenic, HIV, or hematologic malignancy.
[†]Based on Mohs appropriate use criteria.
[‡]Micronodular, infiltrative, morpheaform, and/or with squamous differentiation.
[§]471 tumors in 397 patients.
[‖]5 tumors in 5 patients.
[¶]Fisher's exact test, χ^2 test, *t* test.

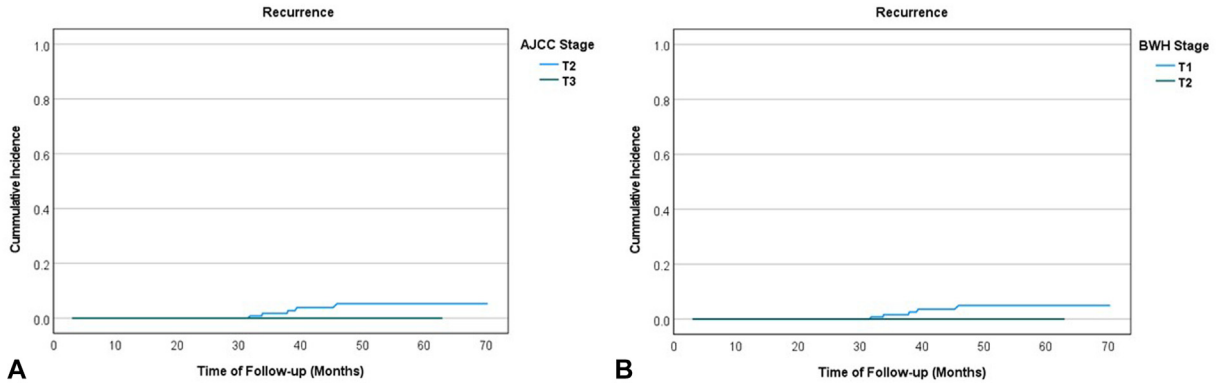

Fig 1. Cumulative incidence of local recurrence of high-risk basal cell carcinoma treated with Mohs micrographic surgery. Kaplan-Meier plots for the incidence of local recurrence over follow-up time for **(A)** AJCC, 8th edition T staging and **(B)** Brigham Women's Hospital T staging.

Conflicts of interest

None disclosed.

REFERENCES

1. Work Group; Invited Reviewers, Kim JYS, et al. Guidelines of care for the management of basal cell carcinoma. *J Am Acad Dermatol*. 2018;78(3):540-559.
2. Rowe DE, Carroll RJ, Day CL Jr. Long-term recurrence rates in previously untreated (primary) basal cell carcinoma: implications for patient follow-up. *J Dermatol Surg Oncol*. 1989;15(3):315-328.
3. Morgan FC, Ruiz ES, Karia PS, Besaw RJ, Neel VA, Schmults CD. Factors predictive of recurrence, metastasis, and death from primary basal cell carcinoma 2 cm or larger in diameter. *J Am Acad Dermatol*. 2020;83(3):832-838.
4. Amin MB, Greene FL, Edge SB, et al. The Eighth Edition AJCC Cancer Staging Manual: Continuing to build a bridge from a population-based to a more "personalized" approach to cancer staging. *CA Cancer J Clin*. 2017;67(2):93-99.
5. Morgan FC, Ruiz ES, Karia PS, Besaw RJ, Neel VA, Schmults CD. Brigham and Women's Hospital tumor classification system for basal cell carcinoma identifies patients with risk of metastasis and death. *J Am Acad Dermatol*. 2021;85(3):582-587.

https://doi.org/10.1016/j.jdin.2022.03.015