Mohs Micrographic Surgery in the Veterans Health Administration

Andrew Tam; Joyce T. Yuan, MD; Theodora M. Mauro, MD; Robert P. Dellavalle, MD, PhD, MSPH; and Sarah T. Arron, MD, PhD

Veterans with skin cancer have seen improved access to Mohs micrographic surgery over the past 10 years, yet the challenges of travel distance and care coordination remain.

Author affiliations are listed at the end of this article.
Correspondence: Dr. Arron (sarah.arron@ucsf.edu)

Skin cancer is one of the most prevalent conditions among VHA patients.[1] One of the largest U.S. health care systems, the VHA serves more than 9 million veterans.[2] In 2012, 4% of VHA patients had a diagnosis of keratinocyte carcinoma or actinic keratosis; 49,229 cases of basal cell carcinoma and 26,310 cases of squamous cell carcinoma were diagnosed.[1] With an aging veteran population and the incidence of skin cancers expected to increase, the development of cost-effective ways to provide easily accessible skin cancer treatments has become a priority for the VHA.

National Comprehensive Cancer Network (NCCN) guidelines recommend 3 types of surgical treatment for localized keratinocyte carcinoma: local destruction, wide local excision (WLE), and Mohs micrographic surgery (MMS). Tumors at low risk for recurrence may be treated with local destruction or WLE, and tumors at high risk may be treated with WLE or MMS.[3]

Mohs micrographic surgery involves staged narrow-margin excision with intraoperative tumor mapping and complete circumferential peripheral and deep margin assessment (CCPDMA). With the Mohs surgeon acting as both surgeon and dermatopathologist, it is possible to provide intraoperative correlation with the tissue bed and immediate additional margin resection precisely where needed. Relative to WLE, MMS yields improved histopathologic clearance rates and lower 5-year recurrence rates. It also provides improved preservation of normal tissue, optimized aesthetic outcomes, and high patient satisfaction.[4-7] All this is achieved in an outpatient setting with the patient under local anesthesia; therefore the cost of ambulatory surgical centers or hospital operating rooms are avoided.[5,8,9]

The NCCN recommends WLE for high-risk tumors only if CCPDMA can be achieved. However, CCPDMA requires specialized surgical technique, tissue orientation, and pathology and is not equivalent to standard WLE with routine surgical pathology. Even with intraoperative bread-loafed frozen section analysis, WLE does not achieve the 100% margin assessment obtained with MMS.

In 2012, the American Academy of Dermatology in collaboration with the American College of Mohs Surgery, the American Society for Dermatologic Surgery, and the American Society for Mohs Surgery developed the Mohs Appropriate Use Criteria, which are now widely used as part of the standard of care to determine which cases of skin cancer should be treated with MMS over other modalities.[10] These criteria, which are based on both evidence and expert consensus, take into account tumor size, histology, location, and patient factors, such as immunosuppression.

Despite its established benefits, MMS has not been uniformly accessible to veterans seeking VHA care. In 2007, Karen and colleagues surveyed dermatology chiefs and staff dermatologists from 101 VHA hospitals to characterize veterans' access to MMS and found MMS available at only 11 VHA sites in 9 states.[11] Further, access within the VHA was not evenly distributed across the U.S.

The VHA often makes payments, under "non-VA medical care" or "fee-basis care," to providers in the community for services that the VHA is otherwise unable to provide. In 2014, Congress passed the Veterans Access, Choice, and Accountability Act and established the Veterans Choice program.[2,12] This program allows veterans to obtain medical services from providers outside the VHA, based on veteran wait time and place of residence.[12] The goal is to improve access. The present authors distinguish between 2 types of care: there are fee-based referrals managed and tracked by the VHA

physician and the Veterans Choice for care without the diagnosing physician involvement or knowledge. In addition to expanding treatment options, the act called for reform within the VHA to improve resources and infrastructure needed to provide the best care for the veteran patient population.[2]

The authors conducted a study to identify current availability of MMS within the VHA and to provide a 10-year update to the survey findings of Karen and colleagues.[11] VHA facilities that offer MMS were surveyed to determine available resources and what is needed to provide MMS within the VHA. Also surveyed were VHA facilities that do not offer MMS to determine how VHA patients with skin cancer receive surgical care from non-VA providers or from other surgical specialties.

METHODS

This study, deemed exempt from review by the University of California San Francisco Institutional Review Board, was a survey of dermatology section and service chiefs across the VHA. Subjects were identified through conference calls with VHA dermatologists, searches of individual VHA websites, and requests on dermatology e-mail listservs and were invited by email to participate in the survey.

The Research Electronic Data Capture platform (REDCap; Vanderbilt University Medical Center) was used for survey creation, implementation, dissemination, and data storage. The survey had 6 sections: site information; MMS availability; Mohs surgeon, Mohs laboratory, and support staff; MMS care; patient referral; and Mohs surgeon recruitment.

Data were collected between June 20 and August 1, 2016. Collected VHA site information included name, location, description, and MMS availability. If MMS was available, data were collected on surgeon training and background, number of MMS cases in 2015, and facility and support staff. In addition, subjects rated statements about various aspects of care provided (eg, patient wait time, patient distance traveled) on a 6-point Likert scale: strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree, or strongly agree. This section included both positive and negative statements.

If MMS was not available at the VHA site, data were collected on patient referrals, including location within or outside the VHA and patient use of the Veterans Choice program. Subjects also rated positive and negative statements about referral experiences on a Likert scale (eg, patient wait time, patient distance traveled).

Categorical data were summarized, means and standard deviations were calculated for nominal data, and data analysis was performed with Microsoft Excel (Redmond, WA).

TABLE

Mohs Patient Rooms, Surgeons, and Support Staff by Volume of Cases[a]

	Hospital Sites, No.		
	Low Volume (< 200 Cases)	Medium Volume (200-499 Cases)	High Volume (≥ 500 cases)
Total	**6**	**6**	**6**
Mohs patient rooms, n			
0-2	1	3	2
3-4	5	3	3
5+	0	0	1
Mohs surgeons, n			
1	4	3	1
2	1	1	1
3+	1	2	4
Mohs surgeons hired			
By eighths, n	4	5	10
For ≥ 5 of 8, n (%)	1 (25.0%)	1 (20.0%)	5 (50.0%)
Nursing staff (RN/NP/LVN), n			
0	1	0	0
1	2	3	3
2	3	2	0
3+	0	1	3
Other support staff (MA/CNA/MSA/PSA), n			
0	0	0	1
1	0	1	0
2	6	5	5

Abbreviations: CNA, certified nursing assistant; LVN, licensed vocational nurse; MA, medical assistant; MSA, medical support assistant; NP, nurse practitioner; PSA, program support assistant; RN, registered nurse.

[a]Number of surgeons, nurses, and support staff generally increased with increased volume of cases.

RESULTS

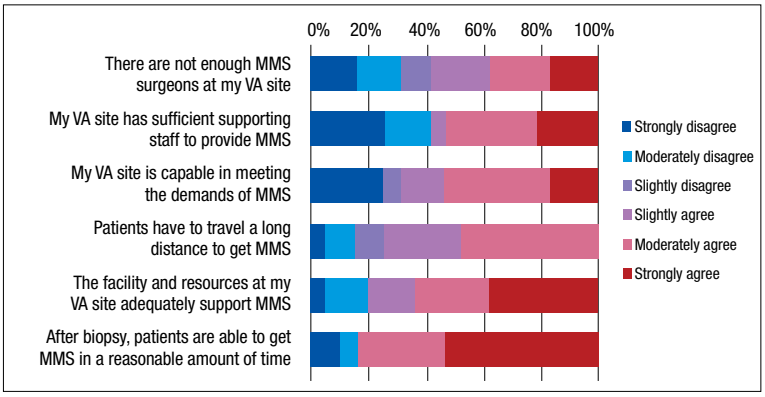
The authors identified and surveyed 74 dermatology service and section chiefs across the VHA. Of these chiefs, 52 (70.3%) completed the survey. Completed surveys represented 49 hospital sites and 3 community-based outpatient clinics (CBOCs), including an integrated community-based clinic-hospital.

Sites That Provided MMS

Of the 52 sites with a completed survey, 19 provided MMS. These 19 sites were in 13 states and the District of Columbia, and the

FIGURE 1

Self-Assessment of Care at VA Sites That Offer MMS



Abbreviation: MMS, Mohs micrographic surgery.
A majority of sites reported that facilities and resources were sufficient in supporting MMS and that patients were able to receive MMS within a reasonable amount of time. Most sites (74%) reported that patients had to travel a long distance to receive MMS.

majority were in major cities along the coasts. All 19 sites were hospital medical centers, not community-based outpatient clinics, and all provided MMS through the dermatology department. In 2015, an estimated 6,686 MMS cases were performed, or an average of 371 per site (range, 40-1,000 cases/site) or 4.9 MMS cases per day (range, 3-8). These 19 sites were divided by yearly volume: high (> 500 cases/y), medium (200-500 cases/y), and low (< 200 cases/y).

Physical Space. On average, each site used 2.89 patient rooms (SD, 1.1; range, 1-6) for MMS. The Table lists numbers of patient rooms based on case volume.

The MMS laboratory was adjacent to the surgical suite at 18 of the MMS sites and in the same building as the surgical suite, but not next to it, at 1 site. For their samples, 11 sites used an automated staining method, 7 used hand staining, and 2 used other methods (1 site used both automated and hand staining). Fourteen sites used hematoxlyin-eosin only, 1 used toluidine blue only, 3 used both hematoxlyin-eosin and toluidine blue, and 1 used MART-1 (melanoma antigen recognized by T cells 1) with hematoxlyin-eosin.

Mohs Micrographic Surgeons. Sites with higher case volumes had more Mohs surgeons and more Mohs surgeons with VA appointments (captured as "eighths" or fraction of 8/8 full-time equivalent [FTE]). Information on fellowships and professional memberships was available for 30 Mohs surgeons: Ten (33.3%) were trained in fellowships accredited by both the American College of Mohs Surgery (ACMS) and the Accreditation Council for Graduate Medical Education (ACGME), 8 (26.7%) were trained in ACMS-recognized fellowships only, 7 (23.3%) were trained at ACGME-accredited fellowships only, 2 (6.7%) were trained elsewhere, and 3 (10.0%) had training listed as "uncertain."

The majority of Mohs surgeons were members of professional societies, and many were members of more than one. Of the 30 Mohs surgeons, 24 (80.0%) were ACMS members, 5 (16.7%) were members of the American Society of Mohs Surgery, and 22 (73.3%) were members of the American Society of Dermatologic Surgery. Twenty-five (89.3%) were affiliated with an academic program.

Of the 30 surgeons, 19 (63.3%) were VHA employees hired by eighths, with an average eighths of 3.9 (SD, 2.7), or 49% of a FTE. Data on these surgeons' pay tables and tiers were insufficient (only 3 provided the information). Of the other 11 surgeons, 10 (33.3%) were contracted, and 1 (3.3%) volunteered without compensation.

Support Staff. Of the 19 MMS sites, 17 (89.5%) used 1 histotechnician, and 2 (10.5%) used more than 1. Ten sites (52.6%) hired histotechnicians as contractors, 8 (42.1%) as employees, and 1 (5.3%) on a fee basis. In general, sites with higher case volumes had more nursing and support staff. Thirteen sites (68.4%) participated in the training of dermatology residents, and 5 sites (26.3%) trained Mohs fellows.

Wait Time Estimate. The survey also asked for estimates of the average amount of time patients waited for MMS. Of the 19 sites, 8 (42.1%) reported a wait time of less than 1 month, 10 (52.6%) reported 2 to 6 months, and 1 (5.3%) reported 7 months to 1 year. Seventeen (89.5%) of the 19 sites had a grading or triage system for expediting certain cancer types. At 7 sites, cases were prioritized on the basis of physician assessment; at 3 sites, aggressive or invasive squamous cell carcinoma received priority; other sites gave priority to patients with melanoma, patients with carcinoma near the nose or eye, organ transplant recipients, and other immunosuppressed patients.

Sites That Did Not Provide MMS

Of the 52 sites with a completed survey, 33 (63.5%) did not provide on-site MMS. Of

these 33 sites, 28 (84.8%) used purchased care to refer patients to fee-basis non-VA dermatologists. In addition, 30 sites (90.9%) had patients activate Veterans Choice. Three sites referred patients to VA sites in another VISN.

Surgeon Recruitment

Five sites (9.6%) had an unfilled Mohs micrographic surgeon position. The average FTE of these unfilled positions was 0.6. One position had been open for less than 6 months, and the other 4 for more than 1 year. All 5 respondents with unfilled positions strongly agreed with the statement, "The position is unfilled because the salary is not competitive with the local market."

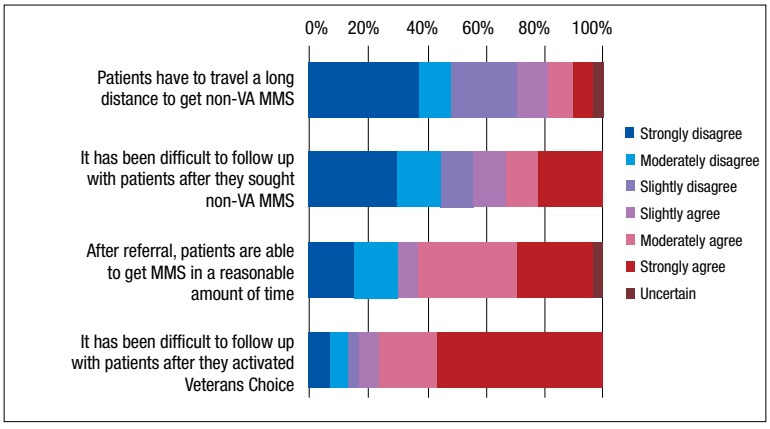
Assessment of Care Provided

Respondents at sites that provided MMS rated various aspects of care (Figure 1). Sixteen (84%) reported that MMS was received in a reasonable amount of time, 15 (79%) that facilities and resources for MMS were adequate, 13 (68%) that they themselves were capable of meeting the demands of MMS, 11 (58%) that their sites did not have enough Mohs surgeons, 11 (58%) that the number of support staff for MMS was sufficient, and 14 (74%) that patients had to travel a long distance to access MMS.

Respondents from sites that purchased MMS care from non-VA medical care rated surgery availability and ease of patient follow-up (Figure 2). Eighteen (66.7%) reported that referred patients received MMS in a reasonable amount of time, 7 (25.9%) that patients had to travel a long distance to the fee-basis/non-VA care facility, 12 (44.4%) that follow-up after fee-basis/non-VA care for MMS was difficult, and 25 (83.3%) that follow-up after activation of Veterans Choice was difficult.

FIGURE 2

Assessment of Referral Care by Dermatologists at VA Sites That Do Not Offer MMS



Abbreviation: MMS, Mohs micrographic surgery.

Difficulty with patient follow-up, particularly after activating Veterans Choice, was largely reported. Long travel distance to receive MMS was not generally perceived.

DISCUSSION

Skin cancer is highly prevalent in the veteran patient population, and each year treatment by the VHA requires considerable spending.[1] The results of this cross-sectional survey characterize veterans' access to MMS within the VHA and provide a 10-year update to the survey findings of Karen and colleagues.[11] Compared with their study, this survey offers a more granular description of practices and facilities as well as comparisons of VHA care with care purchased from outside sources. In outlining the state of MMS care within the VHA, this study highlights progress made and provides the updated data needed for continued efforts to optimize care and resource allocation for patients who require MMS within the VHA.

Although the number of VHA sites that provide MMS has increased over the past 10 years—from 11 sites in 9 states in 2007 to 19 sites in 13 states now—it is important to note that access to MMS care highly depends on geographic location.[11] The VHA sites that provide MMS are clustered in major cities along the coasts. Four states (California, Florida, New York, and Texas) had > 1 MMS site, whereas most other states did not have any. In addition, only 1 MMS site served all of the northwest U.S. To ensure the anonymity of survey respondents, the authors did not further characterize the regional distribution of MMS sites.

Despite the increase in MMS sites, the number of MMS cases performed within the VHA seemed to have decreased. An estimated 8,310 cases were performed within the VHA in 2006, which decreased to 6,686 in 2015.[11] Although these are estimates, the number of VHA cases likely decreased because of a rise in purchased care. Reviewing VHA electronic health records, Yoon and colleagues found that 19,681 MMS cases were performed either within the VHA or at non-VA medical care sites in 2012.[1] Although the proportions of MMS cases performed within and outside the VHA were not reported, clearly many veterans had MMS per-

formed through the VHA in recent years, and a high percentage of these cases were external referrals. More study is needed to further characterize MMS care within the VHA and MMS care purchased.

The 19 sites that provided MMS were evenly divided by volume: high (> 500 cases/y), medium (200-500 cases/y), and low (< 200 cases/y). Case volume correlated with the numbers of surgeons, nurses, and support staff at each site. Number of patient rooms dedicated to MMS at each site was not correlated with case volume; however, not ascertaining the number of days per week MMS was performed may have contributed to the lack of observed correlation.

The majority of Mohs surgeons (25; 89.3%) within the VHA were affiliated with academic programs, which may partly explain the uneven geographic distribution of VHA sites that provide MMS (dermatology residency programs typically are in larger cities). The majority of Mohs surgeons were fellowship-trained through the ACMS or the ACGME. As the ACGME first began accrediting fellowship programs in 2003, younger surgeons were more likely to have completed this fellowship. According to respondents from sites that did not provide MMS, noncompetitive VHA salaries might be a barrier to Mohs surgeon recruitment. If a shift to providing more MMS care within the VHA were desired, an effective strategy could be to raise surgeon salaries. Higher salaries would bring in more Mohs surgeons and thereby yield higher MMS case volumes at VHA sites.

However, whether MMS is best provided for veterans within the VHA or at outside sites through referrals warrants further study. More than 60% of sites provided access to MMS through purchased care, either by fee-basis/non-VA medical care referrals or by the patient-elected Veterans Choice program. According to 84.2% of respondents at MMS sites and 66.7% of respondents at non-MMS sites, patients received care within a reasonable amount of time. In addition, respondents at MMS sites estimated longer patient travel distance for surgery. Respondents reported being concerned about coordination of care and follow-up for patients who received MMS outside the VHA. Other than referrals to outside sites for MMS, current triage practices include referral to other surgical specialties within the VHA, predominantly ear, nose, and throat and plastic surgery, for WLE. Given that access to on-site MMS varies significantly by geographic location, on-site MMS may be preferable in some locations, and external referrals in others. Based on this study's findings, on-site MMS seems superior to external referrals in all respects except patient travel distance. More research is needed to determine the most cost-effective triage practices. One option would be to have each VISN develop a skin cancer care center of excellence that would assist providers in appropriate triage and management.

Limitations

A decade has passed since Karen and colleagues conducted their study on MMS within the VHA.[11] Data from this study suggest some progress has been made in improving veterans' access to MMS. However, VHA sites that provide MMS are still predominantly located in large cities. In cases in which VHA providers refer patients to outside facilities, care coordination and follow-up are challenging. The present findings provide a basis for continuing VHA efforts to optimize resource allocation and improve longitudinal care for veterans who require MMS for skin cancer. Another area of interest is the comparative cost-effectiveness of MMS care provided within the VHA rather than at outside sites through purchased care. The answer may depend on geographic location, as MMS demand may be higher in some regions than that of others. For patients who receive MMS care outside the VHA, efforts should be made to improve communication and follow-up between VHA and external providers.

This study was limited in that it surveyed only those VHA sites with dermatology services or sections. It is possible, though unlikely, that MMS also was provided through nondermatology services. This study's 70.3% response rate (52/74 dermatology chiefs) matched that of Karen and colleagues.[11] Nevertheless, given that 30% of the surveyed chiefs did not respond and that analysis was performed separately for 2 small subgroups, (19 VHA sites that provided on-site MMS and 33 VHA sites that did not), the present findings may not be representative of the VHA as a whole.

Another limitation was that the survey captured respondent estimates of surgical caseloads and resources. Confirmation of these estimates would require a review of internal medical records and workforce analyses, which was beyond the scope of this study.

CONCLUSION

Although some progress has been made over the past 10 years, access to MMS within the VHA remains limited. About one-third of VHA sites provide on-site MMS; the other two-thirds refer patients with skin cancer to MMS sites outside the VHA. According to their dermatology chiefs, VHA sites that provide MMS have adequate resources and staffing and acceptable wait times for surgery; the challenge is in patients' long travel distances. At sites that do not provide MMS, patients have access to MMS as well, and acceptable wait times and travel distances; the challenge is in follow-up, especially with activation of the Veterans Choice program. Studies should focus on standardizing veterans' care and improving their access to MMS.

AUTHOR AFFILIATIONS

Mr. Tam is a medical student at the University of California, San Francisco School of Medicine. **Dr. Yuan** is a Clinical Research Fellow, **Dr. Mauro** is a Professor, and **Dr. Arron** is an Associate Professor, all in the Department of Dermatology at the University of California San Francisco. Dr. Arron also is the Chief of Mohs Micrographic Surgery and Dr. Mauro is the Interim Deputy Chief of Staff, both at San Francisco Veterans Affairs Health System. **Dr. Dellavalle** is a Professor in the Department of Dermatology at the University of Colorado Denver and the Chief of the Dermatology Service at the Denver Veteran Affairs Medical Center.

AUTHOR DISCLOSURES

The authors report no actual or potential conflicts of interest with regard to this article.

DISCLAIMER

The opinions expressed herein are those of the authors and do not necessarily reflect those of *Federal Practitioner,* Frontline Medical Communications Inc., the U.S. Government, or any of its agencies.

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