ORIGINAL RESEARCH

Surgical Treatment of Nonmelanoma Skin Cancer in Older Adult Veterans

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Background: Older adult patients are frequently referred to surgical services for the treatment of nonmelanoma skin cancer (NMSC). The appropriateness of offering surgery to patients with serious comorbidities and a limited life expectancy has been questioned in the literature. The purpose of this study was to determine the morbidity and 5-year mortality for patients with NMSC referred to the plastic surgery service.

Methods: A retrospective chart review was performed from July 1, 2011, to June 30, 2015, of all plastic surgery service consults for the treatment of NMSC. We collected the following data: age and life-limiting comorbidities at the time of referral, treatment, complications, and 5-year mortality. A χ^2 analysis was used to determine the statistical significance ($P < .05$) between the individual risk factors and 5-year mortality. The relative risk of 5-year mortality was calculated combining advanced age with individual comorbidities.

Results: The plastic surgery service completed 800 consults for NMSC over a 4-year period. Five-year mortality was 28.6%. Median age of patients deceased at 5 years was 78 years at the time of the consult submission. The surgical complication rate was 5%. Aged ≥ 80 years, coronary artery disease, congestive heart failure, cerebral vascular disease, peripheral vascular disease, dementia, chronic kidney disease, chronic obstructive pulmonary disease, and diabetes mellitus were found individually to be statistically significant predictors of 5-year mortality. Combining aged ≥ 80 years, coronary artery disease, congestive heart failure, or dementia increased the 5-year mortality to a relative risk > 3.

Conclusions: Surgical excision of NMSC in older adult patients is indicated in most situations. A frank discussion with the patient and caregiver is suggested. Surgical treatment of NMSC in older adult patients has a low morbidity but needs to be balanced against a patient's quality of life when they present with life-limiting comorbidities.

Skin cancer is the most diagnosed cancer in the United States. Nonmelanoma skin cancers (NMSC), which include basal cell carcinoma and squamous cell carcinoma, are usually cured with removal.[1] The incidence of NMSC increases with age and is commonly found in nursing homes and geriatric units. These cancers are not usually metastatic or fatal but can cause local destruction and disfigurement if neglected.[2] The current standard of care is to treat diagnosed NMSC; however, the dermatology and geriatric care literature have questioned the logic of treating asymptomatic skin cancers that will not affect a patient's life expectancy.[2-4]

Forty-seven percent of the current living veteran population is aged ≥ 65 years.[5] Older adult patients are frequently referred to the US Department of Veterans Affairs (VA) surgical service for the treatment of NMSC. The veteran population includes a higher percentage of individuals at an elevated risk of skin cancers (older, White, and male) compared with the general population.[6] World War II veterans deployed in regions closer to the equator have been found to have an elevated risk of melanoma and nonmelanoma skin carcinomas.[7] A retrospective study of Vietnam veterans exposed to Agent Orange (2,3,7,8-tetrachlorodibenzodioxin) found a significantly higher risk of invasive NMSC in Fitzpatrick skin types I-IV compared with an age-matched subset of the general population.[8] Younger veterans who were deployed in Afghanistan and Iraq for Operation Enduring Freedom/Operation Iraqi Freedom worked at more equatorial latitudes than the rest of the US population and may be at increased risk of NMSC. Inadequate sunscreen access, immediate safety concerns, outdoor recreational activities, harsh weather, and insufficient emphasis on sun protection have created a multifactorial challenge for the military population. Riemenschneider and colleagues recommended targeted screening for at-risk veteran patients and prioritizing annual skin cancer screenings during medical mission physical examinations for active military.[7]

The plastic surgery service regularly receives consults from dermatology, general surgery, and primary care to remove skin cancers on the face, scalp, hands, and forearms. Skin cancer treatment can create serious hardships for older adult patients and their families with multiple appointments for the consult, procedure, and follow-up. Patients are often told to hold their anticoagulant medications when the surgery will be performed on a highly vascular region, such as the scalp or face. This can create wide swings in their laboratory test values and result in life-threatening complications from either bleeding or clotting. The appropriateness of offering surgery to patients with

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TABLE 1 Individual Predictors of 5-Year Mortality

Risk factor	*P* value
Age ≥ 80 y	< .001[a]
Coronary artery disease	< .001[a]
Congestive heart failure	< .001[a]
Cerebral vascular disease	< .001[a]
Peripheral vascular disease	< .001[a]
Dementia	< .001[a]
Chronic kidney disease	< .001[a]
Chronic obstructive pulmonary disease	< .001[a]
Tobacco use	.72
Diabetes mellitus	.002[a]
Liver disease	.14
Alcohol use	.99
Obstructive sleep apnea	.99

[a]Statistically significant at $P < .05$.

TABLE 2 Relative Risk of 5-Year Mortality for Patients Aged > 80 Years and a Comorbidity

Comorbidities	Relative risk (CI)	*P* value
Coronary artery disease	3.10 (2.57-3.74)	< .001
Congestive heart failure	3.23 (2.66-3.93)	< .001
Cerebral vascular disease	2.64 (2.03-3.43)	< .001
Peripheral vascular disease	2.83 (2.16-3.71)	< .001
Dementia	3.48 (2.97-4.09)	< .001
Chronic kidney disease	2.25 (1.72-2.95)	< .001
Chronic obstructive pulmonary disease	2.76 (2.22-3.43)	< .001
Diabetes mellitus	2.56 (2.05-3.20)	< .001

Abbreviation: CI, confidence interval.

serious comorbidities and a limited life expectancy has been questioned.[2-4] The purpose of this study was to measure the morbidity and unrelated 5-year mortality for patients with skin cancer referred to the plastic surgery service to help patients and families make a more informed treatment decision, particularly when the patients are aged > 80 years and have significant life-threatening comorbidities.

METHODS

The University of Florida and Malcom Randall VA Medical Center Institutional review board in Gainesville, approved a retrospective review of all consults completed by the plastic surgery service for the treatment of NMSC performed from July 1, 2011 to June 30, 2015. Data collected included age and common life-limiting comorbidities at the time of referral. Morbidities were found on the electronic health record, including coronary artery disease (CAD), congestive heart failure (CHF), cerebral vascular disease (CVD), peripheral vascular disease, dementia, chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), tobacco use, diabetes mellitus (DM), liver disease, alcohol use, and obstructive sleep apnea.

Treatment, complications, and 5-year mortality were recorded. A χ^2 analysis with *P* value < .05 was used to determine statistical significance between individual risk factors and 5-year mortality. The relative risk of 5-year mortality was calculated by combining advanced age (aged > 80 years) with the individual comorbidities.

RESULTS

Over 4 years, 800 consults for NMSC were completed by the plastic surgery service. Treatment decisions included 210 excisions (with or without reconstruction) in the operating room, 402 excisions (with or without reconstruction) under local anesthesia in clinic, 55 Mohs surgical dermatology referrals, 21 other service or hospital referrals, and 112 patient who were observed, declined intervention, or died prior to intervention. Five-year mortality was 28.6%. No patients died of NMSC. The median age at consult submission for patients deceased 5 years later was 78 years. Complication rate was 5% and included wound infection, dehiscence, bleeding, or graft loss. Two patients, both deceased within 5 years, had unplanned admissions due to bleeding from either a skin graft donor site or recipient bleeding. Aged ≥ 80 years, CAD, CHF, CVD, peripheral vascular disease, dementia, CKD, COPD, and DM were all found individually to be statistically significant predictors of 5-year mortality (Table 1). Combining aged ≥ 80 years plus CAD, CHF, or dementia all increased the 5-year mortality by a relative risk of > 3 (Table 2).

DISCUSSION

The standard of care is to treat NMSC. Most NMSCs are treated surgically without

FIGURE 1 Squamous Cell Carcinoma

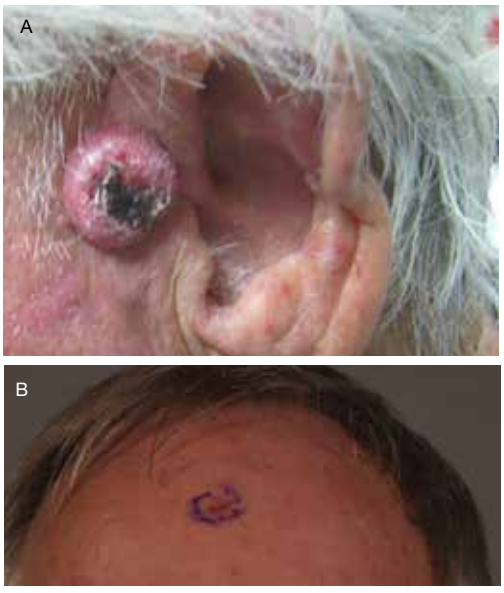
A, Squamous cell carcinoma on arm; B, Squamous cell carcinoma on anticoagulated patient's ear.

consideration of patient age or life expectancy.[2,4,9,10] A prospective cohort study involving a university-based private practice and a VA medical center in San Francisco found a 22.6% overall 5-year mortality and a 43.3% mortality in the group defined as limited life expectancy (LLE) based on age (≥ 85 years) and medical comorbidities. None died due to the NMSC. Leading cause of death was cardiac, cerebrovascular, and respiratory disease, lung and prostate cancer, and Alzheimer disease. The authors suggested the LLE group may be exposed to wound complications without benefiting from the treatment.[4]

Another study of 440 patients receiving excision for biopsy-proven facial NMSC at the Roudebush VA Medical Center in Indianapolis, Indiana, found no residual carcinoma in 35.3% of excisions, and in patients aged > 90 years, more than half of the excisions had no residual carcinoma. More than half of the patients aged > 90 years died within 1 year, not as a result of the NMSC. The authors argued for watchful waiting in select patients to maximize comfort and outcomes.[10]

NMSCs are often asymptomatic and not immediately life threatening. Although NMSCs tend to have a favorable prognosis, studies have found that NMSC may be a marker for other poor health outcomes. A significant increased risk for all-cause mortality was found for patients with a history of SCC, which may be attributed to immune status.[11] The aging veteran population has more complex health care needs to be considered when developing surgical treatment plans. These medical problems may limit their life expectancy much sooner than the skin cancer will become symptomatic. We found that individuals aged ≥ 80 years who had CAD, CHF, or dementia had a relative risk of 3 or higher for 5-year mortality. The leading cause of death in the United States in years 2011 to 2015 was heart disease. Alzheimer disease was the sixth leading cause of death in those same years.[12-14]

FIGURE 2 Basal Cell Carcinoma



A, Basal cell carcinoma on preauricular skin for minor procedure clinic; B, Basal cell carcinoma on forehead for minor procedure clinic.

Skin cancer excisions do not typically require general anesthesia, deep sedation, or large fluid shifts; however, studies have found that when frail patients undergo low-risk procedures, they tend to have a higher mortality rate than their healthier counterparts.[15] Frailty is a concept that identifies patients who are at increased risk of dying in 6 to 60 months due to a decline in their physical reserve. Frail patients have increased rates of perioperative mortality and complications. Various tools have been used to assess the components of physical performance, speed, mobility, nutrition status, mental health, and cognition.[16] Frailty screening has been initiated in several VA hospitals, including our own in Gainesville, Florida, with the goal of decreasing postoperative morbidity and mortality in older adult patients.[17] The patients are given a 1-page screening assessment that asks about their living situation, medical conditions,

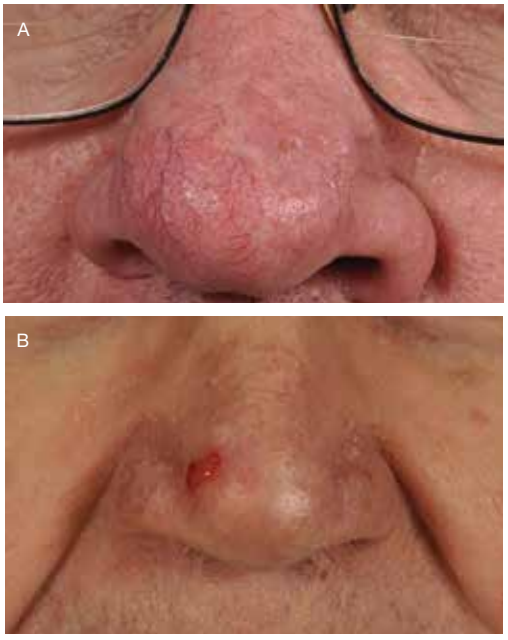
nutrition status, cognition, and activities of daily living. The results can trigger the clinician to rethink the surgical plan and mobilize more resources to optimize the patient's health. This study period precedes the initiative at our institution.

The plastic surgery service's routine practice is to excise skin cancers in the operating room if sedation or general anesthesia will be needed (Figure 1A), for optimal control of bleeding (Figure 1B) in a patient who cannot safely stop blood thinners, or for excision of a highly vascularized area such as the scalp. Surgery is offered in an office-based setting if the area can be closed primarily, left open to close secondarily, or closed with a small skin graft under local anesthesia only (Figure 2). We prefer treating frail patients in the minor procedure clinic, when possible, to avoid the risks of sedation and the additional preoperative visits and transportation requirements. NMSC with unclear margins (Figure 3A) or in cosmetically sensitive areas where tissue needs to be preserved (Figure 3B) are referred to the Mohs dermatologist. The skin cancers in this study were most frequently found on the face, scalp, hands, and forearms based on referral patterns.

Other treatment options for NMSC include curettage and electrodessication, cryotherapy, and radiation; however, ours is a surgical service and patients are typically referred to us by primary care or dermatology when those are not reasonable or desirable options.[18] Published complication rates of patients having skin cancer surgery without age restriction have a rate of 3% to 6%, which is consistent with our study of 5%.[19-21] Two bleeding complications that needed to be admitted did not require more than a bedside procedure and neither required transfusions. One patient had been instructed to continue taking coumadin during the perioperative office-based procedure due to a recent carotid stent placement in the setting of a rapidly growing basal cell on an easily accessible location.

The most noted comorbidity in patients with wound complications was found to be DM; however, this was not found to be a statistically significant risk factor for wound complications (P = .10). We do not have a set rule for advising for or against NMSC surgery. We do counsel frail patients and their families that not all cancer is immediately life threatening and will work with them to do whatever makes the most sense to achieve their goals, occasionally accepting positive margins in order to debulk a symptomatic growth. The objective of this paper is to contribute to the discussion of performing invasive procedures on older adult veterans with life-limiting comorbidities. Patients and their families will have different thresholds for what they feel needs intervention, especially if other medical problems are consuming much of their time. We also have the community care referral option for patients whose treatment decisions are being dictated by travel hardships.

FIGURE 3 Basal Cell Carcinoma Referred to Mohs Dermatologist



A, Basal cell carcinoma with unclear margins; B, Basal cell carcinoma on nose in cosmetically sensitive area.

Strengths and Limitations

A strength of this study is that the data were obtained from a closed system. Patients tend to stay long-term within the VA and their health record is accessible throughout the country as long as they are seen at a VA facility. Complications, therefore, return to the treating service or primary care, who would route the patient back to the surgeon.

One limitation of the study is that this is a retrospective review from 2011. The authors are limited to data that are recorded in the patient record. Multiple health care professionals saw the patients and notes lack consistency in detail. Size of the lesions were not consistently recorded and did not get logged into our database for that reason.

CONCLUSIONS

Treatment of NMSC in older adult patients has a low morbidity but needs to be balanced against a patient and family's goals when the patient presents with life-limiting comorbidities. An elevated 5-year mortality in patients aged > 80 years with serious unrelated medical conditions is intuitive, but this study may help put treatment plans into perspective for families and health care professionals who want to provide an indicated service while maximizing patient quality of life.

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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.

Ethics and consent

Institutional review board approval was obtained from University of Florida and Malcom Randall Veterans Affairs Medical Center (#202001899).

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