Total Body Skin Exam and Number Needed to Screen

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Introduction

Skin cancer is the most common form of cancer in the United States and worldwide. However, the Surveillance, Epidemiology, and End Results Program does not currently track the incidence or prevalence of skin cancers outside of melanoma. Therefore, it is difficult to characterize the epidemiological features of skin cancer in the United States.

The current screening, diagnostic, and treatment modalities for skin cancer are effective and able to identify and treat skin cancers earlier than ever before. The primary screening modality, the total body skin exam (TBSE), involves a dermatologist examing the entire body surface area to identify concerning lesions. The main diagnostic modality is a skin biopsy that is taken and sent to dermatopathology for diagnosis. Finally, the treatment modality can vary depending on the type, location, and aggressiveness of the skin cancer. Important to note is that the prognosis of skin cancer is highly dependent on its stage and depth. Therefore, these screening, diagnostic, and treatment modalities have a high value in skin cancer prevention and treatment.

The United States Preventative Services Task Force (USPSTF) currently gives a grade I recommendation summary which states: "The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of visual skin examination by a clinician to screen for skin cancer in adults."

There is therefore a pressing need for more information regarding the epidemiology of skin cancer in the United States and for a better understanding of the efficacy and cost-effectiveness of the screening tools used for identifying those cases of skin cancer, particularly through the TBSE.

Methods

A retrospective chart review was carried out using the charts of all patients aged 18 or older that visited Jefferson Dermatology Associates and received a total body skin exam from January 1, 2017 to December 31, 2017.

RedCap was used as the primary database tool for the extraction of patient chart information from EPIC. SPSS was used as the primary statistical software for the descriptive statistics and stastical analysis of the data from RedCap.

Descriptive statistics were compiled on the general population of patients in the retrospective chart review, as well as the non-cancer, non-melanoma skin cancer, and melanoma skin cancer subsets.

The number-needed-to-screen to diagnose a case of skin cancer was calculated and compared by age in decades. A Pearson correlation test was run to confirm the significance of the correlation between age and number-needed-to-screen to diagnose a case of skin cancer.

Results

The demographics of the patients included in the study is outlined in Figure 1. There were 3155 patients that received a TBSE. Of these 3155, 180 (5.7%) were eventually diagnosed with skin cancer based on a biopsy taken after the TBSE.

Additionally, the most common gender of patients seen for a TBSE was female, with 1845 females and 1310 males being seen for a TBSE. However, the most common gender in patients diagnosed with skin cancer through a biopsy from their TBSE was male, with 115 males and 65 females being diagnosed with skin cancer.

Finally, there was a difference in the average age of overall patients and patients with a TBSE finding skin cancer, with the average ages of 53 and 66, respectively. The significance of this difference was confirmed by an independent samples t-test that showed a significance of $p < .001$.

Figure 1.

Descriptive Statistics	All Patients With TBSEs	Patients with TBSE Finding Skin Cancer
Number	3155	180
Gender (Male | Female)	1310 | 1845	115 | 65
Race (Caucasian | Other)	2855 | 300	174 | 6
Average Age (in years)	53.34	66.09

The number-needed-to-screen to diagnose a case of skin cancer was calculated based on patient age in decades. This showed a steep decrease in the number of TBSE needed to find one case of skin cancer as age increased. In the third decade of life, 331 TBSEs are needed to find one case of skin cancer. This decreases steeply to 66.3 and 60 in the fourth and fifth decade of life. There is another steep decrease into the 6th decade of life and beyond with TBSE per skin cancer reaching 21.5. By the tenth decade of life, 1 in less than 5 TBSE identifies a skin cancer.

Figure 2.

Age (Decade)	Number of Skin Cancers	Number of TBSE	TBSE per Skin Cancer
20s	1	331	331
30s	8	530	66.3
40s	6	360	60
50s	26	559	21.5
60s	68	763	11.2
70s	46	452	9.8
80s	22	130	5.9
90s	3	14	4.7

Results, cont.

A Pearson correlation test was run to determine the correlation and significance of such a correlation between the age of screened patients and the number of TBSE per skin cancer or number-needed-to-screen to diagnose a case of skin cancer. The calculated Pearson correlation was found to be statistically significant at -.724 (p=.042). This indicates a statistically significant strong negative linear relationship between age and the number-needed-to-screen with TBSE to find a skin cancer.

Discussion

The statistically significant difference in average ages between the overall TBSE population and the population of patients in which the TBSE identified a skin cancer agrees with the contemporary literature, and indicates the valuable role that patient age may potentially play in determining the appropriateness of skin cancer screening.

This is corroborated by the strong inverse correlation between patient age and the number-needed-to-screen with TBSE to identify a case of skin cancer. In light of these findings, creating age-based guidelines for skin cancer screening recommendations may be deemed appropriate. Screening patients in their sixth or seventh decade of life is likely to be the most cost-effective and efficacious use of resources due to the rapid increase in skin cancers found by TBSE by that decade in age. However, this needs to be counterweighed with an understanding that skin cancers do occur in younger age groups. Any skin cancer screening guidelines will have to balance the value of early diagnosis and recognition with societal resource demands and the risk of harmful and/or unnecessary care.

Conclusions

There is a statistically significant correlation between the age of patients and the number-needed-to-screen to diagnose a case of skin cancer. As patients get older, the effectiveness of skin cancer screening increases. This is particularly true for patients entering the sixth and seventh decade of life and beyond. These findings may help to illuminate any skin cancer screening recommendations or guidelines in the future.

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