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Clinically significant incidental findings among teledermatology patients with history of skin cancer

To the Editor: Store-and-forward teledermatology relies on primary care providers' (PCPs') ability to detect suspicious lesions. Incidental findings, defined as imaged lesions beyond the reason for consultation and undocumented by the referring PCP, have not yet been quantified in teledermatology. Although others have studied incidental skin cancers comparing teledermatology to in-person evaluation and found 8 of 9 incidental malignancies in patients with history of neoplasia,[1] to our knowledge none have investigated incidental lesions that were missed but visible during the consultation itself.[1,2] We aimed to evaluate clinically significant incidental lesions in teledermatology consultations of veterans with a skin cancer history and factors associated with higher likelihood of lesion discovery as evidenced by teledermatologist documentation.

The Emory University institutional review board and Atlanta Veterans Affairs Medical Center approved this retrospective cohort study of 95 teledermatology consultations. Implementation of a clinical log tracking incidental lesions began July 21, 2015; 45 and 50 consultations were randomly selected from before and after this date, respectively. Inclusion criteria were personal history of melanoma or keratinocyte carcinoma. The final cohort comprised 11.2% (95/847) of the screened consultations. Patient, disease, and teledermatology reader characteristics were chosen a priori and summarized descriptively. A board-certified dermatologist blinded to the previous diagnosis and patient characteristics independently reviewed only consultation images for clinically significant lesions. Consultation characteristics were compared by the presence or absence of incidental findings using unpaired t tests and Fisher exact tests in SAS, version 9.4 (SAS, Cary, NC) with statistical significance at P less than .05. The same was performed among consultations with an incidental finding to determine predictors of lesion discovery.

Table I. Association of consultation characteristics with presence of incidental finding

Characteristics	Incidental lesion present: No (n = 69)	Incidental lesion present: Yes (n = 26)	*P* value
Patient age in years, mean (SD)	68.3 (9.6)	68.4 (12.0)	.98
Race, n (%)			
White	64 (92.8)	25 (96.2)	1.0
African American	1 (1.4)	0	
Unknown	4 (5.8)	1 (3.8)	
Sex, n (%)			
Male	66 (95.7)	26 (100)	.56
Female	3 (4.3)	0	
Consultation year, n (%)			
2012	1 (1.4)	1 (3.8)	.07
2013	5 (7.2)	4 (15.4)	
2014	11 (15.9)	7 (26.9)	
2015	23 (33.3)	3 (11.5)	
2016	21 (30.4)	5 (19.2)	
2017	8 (11.6)	6 (23.1)	
History of NMSC, n (%)*			
Yes	54 (78.3)	23 (88.5)	.38
No	15 (21.7)	3 (11.5)	
History of melanoma, n (%)*			
Yes	18 (26.1)	3 (11.5)	.17
No	51 (73.9)	23 (88.5)	
Consultation anatomic location, n (%)†			
Head or neck	22 (31.9)	20 (76.9)	.0009
Lower extremity	9 (13.0)	0	
Upper extremity	13 (18.8)	4 (15.4)	
Trunk	23 (33.3)	2 (7.7)	
Missing	2 (2.9)	0	
Chief complaint, n (%)†			
Lesion	45 (65.2)	20 (76.9)	.19
Rash	13 (18.8)	1 (3.9)	
Other/missing	11 (15.9)	5 (19.2)	
Image quality, n (%)			
Fully satisfactory	62 (89.9)	24 (92.3)	>.99
Satisfactory with suggestions	7 (10.1)	2 (7.7)	
Number of images, mean (SD)	13.8 (12.4)	13.4 (11.5)	.88

NMSC, Nonmelanoma skin cancer; *SD*, standard deviation.
*Determined via documentation by dermatology, not pathology report.
†As stated on consultation request, collected via chart review.

The majority of participants were white men, and the mean participant age was 68.3 years. A total of 77 (81.0%) patients had keratinocyte carcinoma history, and 21 (22.1%) had melanoma history. In 26 of 95 (27.3%) consultations, 27 incidental findings were discovered, including 17 actinic keratoses, 6 neoplasms with uncertain behavior, 1 pigmented lesion, 1 melanoma, 1 squamous cell carcinoma, and 1 seborrheic dermatitis. Consultations requested for a head or neck location were more likely to have an incidental finding than those requested for other locations ($P = .0009$) (Table I). Implementation of the clinical tracking log, resident training level, and number of images were not significant predictors of documenting an incidental finding on the original consultation (Table II).

The high prevalence of incidental findings in this cohort with a skin cancer history represents a vital area for teledermatology quality improvement. Many of the incidental lesions were from consultations requested for a head or neck location. Teledermatologists should be especially vigilant when evaluating these areas. The majority of incidental findings were actinic keratoses; the identification and treatment of these precancers is critical to delaying skin cancer.[3]

Other studies have shown that referring PCPs may not choose the most important lesion to submit for consultation, even if the lesion is visible.[4,5] In our study, lesions were close enough to be imaged yet still undocumented. Limitations include sample size, which resulted in low power to detect small differences, and information bias in cases referred for clinical follow-up. Further study is warranted to evaluate the benefit of lesion-directed teledermatology with total body skin examination for patients with a skin cancer history.

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Table II. Predictors of incidental lesion discovery during original consultation

Characteristics	Discovered (n = 8)	Not discovered (n = 18)	*P* value
Age in years, mean (SD)	65.37 (18.08)	69.72 (8.51)	.53
Race, n (%)			
White	8 (100)	17 (94.4)	>.99
African American	0	0	
Unknown	0	1 (5.6)	
Sex, n (%)			
Male	8 (100)	18 (100)	n/a
Female	0	0	
Consultation year, n (%)			
2012	0	1 (5.6)	.46
2013	0	4 (22.2)	
2014	2 (25)	5 (27.8)	
2015	2 (25)	1 (5.6)	
2016	1 (12.5)	4 (22.2)	
2017	3 (37.5)	3 (16.7)	
Clinical tracking log implemented, n (%)			
No	3 (37.5)	11 (61.1)	.40
Yes	5 (62.5)	7 (38.9)	
History of NMSC, n (%)*			
Yes	6 (75)	17 (94.4)	.21
No	2 (25)	1 (5.6)	
History of melanoma, n (%)*			
Yes	2 (25)	1 (5.6)	.22
No	6 (75)	17 (94.4)	
Consultation anatomic location, n (%)†			
Head or neck	5 (62.5)	15 (83.3)	.16
Lower extremity	0	0	
Upper extremity	1 (12.5)	3 (16.7)	
Trunk	2 (25)	0	
Chief complaint, n (%)†			
Lesion	4 (50)	16 (88.9)	.05
Rash	1 (12.5)	0	
Other/missing	3 (37.5)	2 (12.5)	
Resident level, n (%)			
PGY-2	0	0	.62
PGY-3	4 (50)	7 (38.9)	
PGY-4	4 (50)	7 (38.9)	
PA or attending only	0	4 (22.2)	
Image quality			
Fully satisfactory	7 (87.5)	17 (94.4)	.53
Satisfactory with suggestions	1 (12.5)	1 (5.6)	
Number of images, mean (SD)	18.75 (16.16)	11.06 (8.32)	.24
Bother/QOL score†‡	2.50 (1.41)	1.56 (1.10)	.08

NMSC, Nonmelanoma skin cancer; *PA*, physician assistant; *PGY*, postgraduate year; *QOL*, quality of life.
*Determined via documentation by dermatology, not pathology report.
†As stated on consultation request, collected via chart review.
‡Patients were asked either, "How much does this problem bother you?" or "How does this problem affect your symptomatic, emotional, and activity quality of life?" Scale was 0 to 4, with 4 being the most bothersome or affecting.

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Characteristics of atypical postradiation vascular proliferation: A retrospective review of 193 patients

To the Editor: Atypical postradiation vascular proliferations (APRVPs) can be difficult to distinguish from cutaneous angiosarcoma.[1,2] Angiosarcomas are associated with *MYC* amplification and Ki-67 expression, whereas APRVPs are not.[3,4] However, the potential for angiosarcomatous transformation of APRVP remains unclear. We conducted a large, multi-institutional review to examine individuals with APRVP, determine the rate and timing of angiosarcoma diagnosis after APRVP diagnosis, and compare outcomes of APRVP after excision vs active surveillance.

The study included patients with histopathologic atypical postradiation vascular proliferation diagnoses from January 1, 1988, to December 8, 2018, at Brigham and Women's Hospital, Dana Farber Cancer Institute, and Massachusetts General Hospital. Patients with concurrent (diagnosed on the same day) or prior histopathology showing cutaneous angiosarcoma and those without radiation exposure were excluded. Records of included patients were reviewed, and percentages were reported with the denominators excluding missing cases.

There were 193 patients (98% women) who met inclusion criteria, with mean age of 61.3 years at APRVP diagnosis (Table I); of these, 88% had primary breast malignancies. The median time to APRVP onset was 6 years postradiation. Follow-up was available for 100 patients (median, 3.2 years). Radiation-associated complications occurred in 42 patients (42%), 21 of whom had lymphedema (Table I). The primary cancer recurred in 25% of patients, with 92% (23 of 25) experiencing recurrence before APRVP onset.

Table I. Demographic and clinical features of patients diagnosed with atypical postradiation vascular proliferations (*APRVPs*)*

Variables	Patients with APRVP (N = 193)
Demographic features	
Age at APRVP diagnosis, mean (95% CI), y	61.3 (59.5-63.0)
Female sex	190 (98.4)
Race/ethnicity	(n = 189)
White	178 (94.2)
Hispanic	4 (2.1)
Asian	4 (2.1)
Black	3 (1.6)
Smoking status	(n = 82)
Current	4 (4.9)
Former	39 (47.6)
Never	39 (47.6)
Clinical features	
Mutation	(n = 15)
BRCA1	2 (13.3)
BRCA2	2 (13.3)
Variant of unknown significance	5 (33.3)
No found mutations	6 (40.0)
Primary cancers	(n = 163)
Breast	143 (87.7)
Lymphoma	4 (2.5)
Lung	2 (1.2)
Vulvar cancer	2 (1.2)
Anal squamous cell cancer	2 (1.2)
Merkel cell carcinoma	2 (1.2)
Melanoma	2 (1.2)
Leiomyosarcoma	1 (0.6)
Synovial sarcoma	1 (0.6)
Angiosarcoma	1 (0.6)
Liposarcoma	1 (0.6)
Desmoid tumor	1 (0.6)
Mucoepidermoid cancer	1 (0.6)
Radiation characteristics	
Radiation dosage, median (range), Gy (n = 15)	50.4 (45-64)
Time from radiation to disease, median (range)† (n = 127)	6 (1-40)
Complications of radiation	(n = 100)
Lymphedema	21 (21)
Cardiopulmonary restrictive disease	3 (3)
Thyroid dysfunction	1 (1)
Chronic dermatitis	9 (9)
Infection	4 (4)
Delayed wound healing	3 (3)
Chronic pain from lymphadenopathy	1 (1)
Treatment	(n = 91)
Excision	43 (47.3)
Monitor	48 (52.7)

Continued