Assessment of Patient Knowledge of Longitudinal Melanonychia: A Survey Study of Patients in Outpatient Clinics

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Keywords

Melanoma · Melanonychia · Nail disorder

Abstract

Importance: Subungual melanoma (SM) is a rare subtype of cutaneous melanoma but carries a worse prognosis than similarly staged cutaneous melanomas. Assessing patient knowledge of melanonychia is integral to early diagnosis of SM. **Objectives:** The aim of this paper is to determine patient knowledge of longitudinal melanonychia (LM) and warning signs for SM, frequency of nail self-examinations, and satisfaction of patients with their physician's nail examinations. **Design, Setting, and Participants:** We conducted a survey-based study of 363 random patients at Weill Cornell Medicine in New York, USA, performed at 3 different clinics: a general dermatology clinic ($n = 167$), a nail specialty clinic ($n = 44$), and a primary care clinic ($n = 152$). **Main Outcomes and Measures:** Knowledge of the ABCDEF mnemonic for SM was compared to the ABCD mnemonic for cutaneous melanoma. Analyses were performed for patient behavior regarding suspicious nail changes as well as satisfaction with nail counseling and examination. **Results:** Only 5% (18/363) of the pa-

tients in our study had heard of the ABCDEF mnemonic. In contrast, 9.9% (36/363) of the patients had heard of the ABCD mnemonic for cutaneous melanoma. In total, 37/363 (10.2%) patients reported having LM, 32.4% (12/37) of the patients noted changes in color or width of the band, and 10.8% (4/37) presented with pain or bleeding of the nail, with only 45.9% (17/37) seeking medical attention. Only 11.8% (43/363) of the patients stated that their physician asked them about nail changes, and 1.4% (5/363) of the patients stated that they were counseled about the ABCDEF mnemonic. In comparison, 13.8% (50/363) of the patients were advised on the ABCD mnemonic for the cutaneous melanoma mnemonic. While 70.2% (255/363) of the patients stated that they used sunscreen or wore sun-protective clothing, only 31.4% (114/363) assessed their nails for color changes, with 54.9% (128/233) of the patients categorizing themselves as "very unsatisfied" with the evaluation of their nails by their dermatologist. **Conclusions and Relevance:** Our data shows that there is a lack of patient knowledge of LM and warning signs for SM. Further testing is needed to determine whether educating patients about LM, warning signs for SM, and nail self-examinations would improve patient outcomes.

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Introduction

Subungual melanoma (SM) is a subset of melanoma that originates from the nail matrix or nail bed. Despite comprising only 0.7–10% of all melanomas, it is the most frequent subtype in patients of African, Native American, and Asian descent and carries a poorer prognosis than similarly staged cutaneous melanomas [1–6]. Two-thirds of the SM cases present as longitudinal melanonychia (LM; a brown-black band of the nail plate), and these typically arise from the nail matrix and are melanoma in situ, as opposed to invasive melanoma [7]. LM may also arise from many nonmalignant conditions, such as nail matrix nevi, nail matrix lentigines, and nail matrix melanocytic activation (racial, inflammatory, infectious, traumatic, drug induced, or non-melanocytic nail tumors) [8–11].

The ABCD mnemonic was introduced in 1985 to facilitate early recognition of cutaneous melanoma by physicians and the community [12] and prompted the development of a similar mnemonic for SM in 2000 [4]. Early screening and evaluation for SM is integral because they are more often than not discovered in late stages. Melanoma-in-situ lesions, which, if recognized and treated early [13], are the only opportunity for real cure, represent only 10% [14] to 16.3% [15] of all nail melanomas.

The aims of this study were to assess patient knowledge of LM and warning signs for SM, as well as familiarity with the ABCDEF mnemonic for SM. Secondary objectives were to compare this knowledge to the ABCD mnemonic for cutaneous melanoma and assess the patient perception of their physicians' nail examinations.

Methods

After this study had been granted exemption from the Institutional Review Board at Weill Cornell Medicine (WCM), we prepared a 28-question, anonymous one-time survey. A copy of the survey questionnaire with summary statistics of answers is provided in the online supplementary Table 1 (for all online suppl. material, see www.karger.com/doi/10.1159/000452673). Study subjects included patients at 3 different WCM outpatient practices: general dermatology (GD), primary care (PC), and a nail specialty (NS) clinic. Patients were included in the study if they were ≥18 years old. Patients were excluded if they were not able to comprehend the survey due to a lack of fluency in English.

A paper survey, including an informed consent statement, was handed to patients when checking in at their clinics, with instructions to put the completed surveys into a labeled survey box. A research associate was present at the outpatient waiting rooms, and patients were asked to refer any questions regarding the survey to the physician they were seeing that day. REDCap, a data-management application provided by the Clinical and Translational Sci-

Table 1. Respondent characteristics

Characteristics	Survey distribution per clinic		
	general dermatology clinic (n = 167)	primary care clinic (n = 152)	nail specialty clinic (n = 44)
Age			
18–30 years	26 (15.6)	29 (19.1)	8 (18.2)
30–50 years	61 (36.5)	42 (27.6)	12 (27.3)
50–70 years	65 (39)	64 (42.2)	22 (50.0)
70+ years	15 (9.0)	17 (11.2)	2 (4.5)
Sex			
Male	62 (37.1)	39 (25.7)	14 (31.8)
Female	105 (62.9)	113 (74.3)	30 (68.2)
Race			
Asian or Asian-American	15 (9.0)	10 (6.6)	2 (4.5)
Black or African-American	17 (10.2)	49 (32.2)	1 (2.3)
Hispanic or Latino	13 (7.8)	41 (27.0)	5 (11.4)
White	122 (73.1)	45 (29.6)	36 (81.8)
Other	0 (0.0)	7 (4.6)	0 (0.0)
Skin type			
I	18 (10.8)	7 (4.6)	5 (11.4)
II	63 (37.7)	42 (27.6)	20 (45.5)
III	48 (28.7)	23 (15.1)	13 (29.5)
IV	18 (10.8)	25 (16.4)	4 (9.1)
V	19 (11.4)	50 (32.9)	2 (4.5)
VI	1 (0.6)	5 (3.3)	0 (0.0)
Presence of LM			
Yes	7 (4.2)	17 (11.2)	13 (29.5)
No	160 (95.8)	135 (88.8)	31 (70.5)
Family history of LM			
Yes	8 (4.8)	21 (13.8)	6 (13.6)
No	159 (95.2)	131 (86.2)	38 (86.4)
Family history of SM			
Yes	1 (0.6)	2 (1.3)	0 (0.0)
No	166 (99.4)	150 (98.7)	44 (100.0)

Data are reported as number (percentage) of respondents. LM, longitudinal melanonychia; SM, subungual melanoma.

ence Center (CTSC) at WCM, was used for data input and descriptive analysis. Bivariate analyses were performed using SAS software, version 9.4 (SAS Institute, Cary, NC, USA).

Results

Demographics and Pertinent Personal/Family History

Surveys were administered to 394 random subjects, and 363 participated and completed all of the questions to be included in the outcome analyses; demographic data

Table 2. Characteristics and behavior of patients with LM

Characteristics	Survey distribution per clinic		
	general dermatology (n = 7)	internal medicine (n = 17)	nail specialty clinic (n = 13)
Mean number of nails with bands	1.86	1.29	2.69
Age			
18–30 years	1 (14.2)	3 (17.6)	2 (15.4)
30–50 years	2 (28.6)	6 (35.3)	3 (23.1)
50–70 years	4 (57.2)	8 (47.1)	8 (61.5)
70+ years	0 (0.0)	0 (0.0)	0 (0.0)
Sex			
Male	3 (42.9)	6 (35.3)	4 (30.8)
Female	4 (57.1)	11 (64.7)	9 (69.2)
Race			
Asian or Asian-American	0 (0.0)	1 (5.9)	2 (15.4)
Black or African-American	2 (28.6)	9 (52.9)	1 (7.7)
Hispanic or Latino	0 (0.0)	4 (23.5)	1 (7.7)
White	5 (71.4)	2 (11.8)	9 (69.2)
Other	0 (0.0)	1 (5.9)	0 (0.0)
Family history of LM			
Yes	5 (71.4)	11 (64.7)	5 (38.5)
No	2 (28.6)	6 (35.3)	8 (61.5)
Band associated with change in color or width			
Yes	2 (28.6)	5 (29.4)	5 (38.5)
No	5 (71.4)	12 (70.6)	8 (61.5)
Band associated with pain or bleeding of the nail			
Yes	1 (14.3)	3 (17.6)	0 (0.0)
No	6 (85.7)	14 (82.4)	13 (100.0)
Did you seek medical attention for the band?			
Yes	4 (57.1)	4 (23.5)	9 (69.2)
No	3 (42.9)	13 (76.5)	4 (30.8)

Unless otherwise noted, data are reported as number (percentage) of respondents. LM, longitudinal melanonychia.

were reported for 363 participants. Respondents were from GD ($n = 167$), PC ($n = 152$), or NS clinics ($n = 44$), with 115 (31.7%) males and 248 (68.3%) females. Overall, the 50- to 70-year age group was the most highly represented group (41.6%). The majority of subjects classified themselves as “White” ($n = 203$, 55.9%) or as having skin types II (34.4%) and III (23.1%). Thirty-seven (10.2%) patients reported LM, 35 (9.6%) patients had a family history of LM, and 3 (0.8%) patients had a family history of SM (Table 1).

Melanonychia Characteristics

Thirty-seven subjects in total reported LM, with the highest prevalence among the 50- to 70-year age group (20/37, 54.0%). The percentage of females reporting LM (24/224, 9.7%) was similar to that of males (13/115, 11.3%). LM and a family history of LM, respectively, were most common amongst African-American (12/67, 17.9% and 13/67, 19.4%, respectively) and Asian-American subjects (3/27, 11.9% and 4/27, 14.8%, respectively) (Table 2).

The mean number of affected nails was 1.96 (median 1.00, range 1–20, standard deviation 3.26). A change in the color or width of the nail band was reported by 12/37 (32.4%) subjects, and 4/37 (10.8%) noted pain or bleeding of the associated nail. Only 17/37 (45.9%) patients sought medical attention, with higher frequencies in the GD and NS settings than in the PC clinics (Table 2).

Knowledge and Behavior Regarding SM Screening

Of the 363 participants, 18 (5.0%) patients heard of the ABCDEF nail melanoma mnemonic, and 9/18 (50%) picked the correct answer in a multiple-choice question with 4 possible choices. There was no statistically significant difference in knowledge of the ABCDEF mnemonic for nail melanoma amongst the 3 different clinics ($\chi^2 = 0.06$, $p = 0.9724$) (Table 3).

Forty-three patients (11.8%) stated that their physician asked them about nail changes, and this was more common in NS clinics (34.1%) than in GD (9.0%) and PC (8.6%) clinics ($\chi^2 = 23.74$, $p < 0.0001$). Only 5/363 (1.4%) patients stated that their physician discussed the ABCDEF mnemonic with them. The majority of subjects (54.9%) were “very unsatisfied” with the nail examinations by their dermatologists, which did not differ between clinics ($\chi^2 = 2.17$, $p = 0.7045$) (Table 3).

One hundred and fourteen patients (31.4%) reported that they check their nails for color changes, which did not differ between the 3 clinics ($\chi^2 = 4.77$, $p = 0.0919$) (Table 3).

Knowledge and Behavior Regarding Cutaneous Melanoma Screening

From the 363 participants, 36 (9.9%) heard of the ABCD mnemonic for cutaneous melanoma, of which 30/36 (83.3%) picked the correct answer in a multiple choice question with 4 possible answers. Significantly more patients in the GD (13.77%) and NS (11.36%) clinics heard of the mnemonic than in the PC clinics (5.26%; $\chi^2 = 6.57$, $p = 0.0375$) (Table 4).

One hundred and fifty-four (42.4%) patients reported that they received “regular skin checks”, and 50/363

Table 3. Knowledge of the ABCDEF mnemonic for SM and patient/physician behavior towards nail health

Characteristics	Survey distribution per clinic			<i>p</i> value
	general dermatology (<i>n</i> = 167)	internal medicine (<i>n</i> = 152)	nail specialty clinic (<i>n</i> = 44)	
Have you heard of the “ABCDEF” mnemonic for nail melanoma?				
Yes	8 (4.8)	8 (5.3)	2 (4.5)	0.9724
No	159 (95.2)	144 (94.7)	42 (95.5)	
Correct choice for mnemonic				
Correct	3 (37.5)	5 (62.5)	1 (50.0)	0.7984
Incorrect	5 (62.5)	3 (37.5)	1 (50.0)	
Does your doctor ask about nail changes?				
Yes	15 (9.0)	13 (8.6)	15 (34.1)	<0.0001
No	152 (91.0)	139 (91.4)	29 (65.9)	
Did your doctor discuss this “ABCDEF” mnemonic with you?				
Yes	2 (1.2)	2 (1.3)	1 (2.3)	0.6731
No	165 (98.8)	150 (98.7)	43 (97.7)	
Are you satisfied with your nail evaluation by your dermatologist?				
Very unsatisfied	78 (58.7)	29 (48.3)	21 (52.5)	0.7045
Satisfied	44 (33.1)	26 (43.3)	15 (37.5)	
Very satisfied	11 (8.3)	5 (8.3)	4 (10)	
Do you evaluate your nails for color changes?				
Yes	51 (30.5)	43 (28.3)	20 (45.5)	0.0919
No	116 (69.5)	109 (71.7)	24 (54.5)	

Unless otherwise noted, data are reported as number (percentage) of respondents. *p* values obtained from χ^2 tests for specified proportions with significance set to *p* < 0.05. SM, subungual melanoma.

(13.8%) patients stated that their physicians discussed the ABCD mnemonic with them, which was more common in the GD and NS settings than in the PC clinics. Two hundred and fifty-five (70.2%) patients stated that they wear sun-protective clothing (Table 4).

Discussion

The goal of this study was to assess patient knowledge of LM, nail self-examinations, and patient satisfaction with their physicians’ nail examinations. SM is relatively rare, comprising only 0.7–10% [1–5] of all cutaneous melanomas. In our patient population, 0.8% had a personal or family history of SM, 10.7% had a personal history of skin cancer (melanoma or non-melanoma), and 23.7% had a family history of skin cancer. LM was reported by 10.2% of the subjects, and 9.6% of the participants had a family history of LM. The prevalence of LM amongst African-American subjects in our study was 17.9%, 11.9% amongst Asian-Americans, 8.5% amongst Latin Ameri-

Table 4. Knowledge of the ABCD mnemonic for skin melanoma and patient/physician behavior towards skin health

Characteristics	Survey distribution per clinic			<i>p</i> value
	general dermatology (<i>n</i> = 167)	internal medicine (<i>n</i> = 152)	nail specialty clinic (<i>n</i> = 44)	
Have you heard of the “ABCD” mnemonic for skin melanoma				
Yes	23 (13.8)	8 (5.3)	5 (11.4)	0.0375
No	144 (86.2)	144 (94.7)	39 (88.6)	
Correct choice for mnemonic?				
Correct	20 (90.0)	6 (75.0)	4 (80.0)	n.a.
Incorrect	3 (10.0)	2 (25.0)	1 (20.0)	
Do you get regular skin checks?				
Yes	96 (57.5)	36 (23.7)	22 (50.0)	n.a.
No	71 (42.5)	116 (76.3)	22 (50.0)	
Does your doctor discuss this mnemonic with you?				
Yes	32 (19.2)	11 (7.2%)	7 (15.9)	n.a.
No	135 (80.8)	114 (92.8)	37 (84.1)	
Do you use sunscreen or sun-protective clothing?				
Yes	141 (84.4)	81 (53.3)	33 (75.0)	<0.0001
No	26 (15.6)	71 (46.7)	11 (25.0)	

Unless otherwise noted, data are reported as number (percentage) of respondents. *p* values obtained from χ^2 tests for specified proportions with significance set to *p* < 0.05. n.a., not applicable.

cans, and 7.9% amongst Caucasians. In another study, 73% of the patients with skin phototypes IV, V, and VI had LM on physical examination [16]. It is frequently seen in the African-American population, with an estimated 100% of the black patients over 50 years of age having melanonychia [17]. In a report on Chinese patients with LM, there was an increasing prevalence with age, peaking at 1.7% in subjects older than 30 [18]. A previous report on LM in a white population showed a prevalence of 1.4% [19]. Our study showed lower frequencies in African-Americans and higher rates in Whites and Asian-Americans than previous reports. This discrepancy may be due to differences in the study design (i.e., physician vs. patient examination of nails).

LM prevalence increases with age, being most commonly seen in patients between 45–65 years of age [19]. The “A” in the ABCDEF mnemonic stands for age of presentation (peak 5th–7th decades) [4]. In our study, LM increased with age, with the 50- to 70-year age group being most commonly affected. In addition, similar percentages of females (9.7%) and males (11.3%) reported LM. This is consistent with another study showing equal prevalence of LM among males and females [16].

Of the 37 subjects with LM, 32.4% reported a change in the color or width of the band, and 10.8% reported pain

or bleeding of the nail. Only 45.9% of the subjects stated that they were seeking medical attention, and only 29.4% of those patients were seeing a physician due to concern of possible malignancy. Notably, in the ABCDEF mnemonic, “C” represents a change in the color of the band [4]. These results are concerning and suggest that further efforts should be taken to educate the public about warning signs for SM. LM should be evaluated with a dermatoscope by an experienced dermatologist or nail specialist.

The ABCD mnemonic was originally created in 1985 to facilitate early recognition of cutaneous melanoma by physicians and the community. The mnemonic stands for Asymmetry, Border irregularity, Color variation (both within the lesion or compared to other moles), and Diameter larger than 6 millimeters (mm) [12]. The mnemonic was later modified to include “E” [20], for Evolution of the lesion, and “F” for Funny-looking, or the “ugly duckling” sign [21]. The original 1985 ABCD mnemonic prompted the development of a similar mnemonic for SM in 2000. In the mnemonic, “A” stands for Age of presentation and certain races (African-American, Asian, and Native American) in which SM is more likely. “B” stands for Black or Brown color of the band, a Breadth wider than 3 mm, and a Blurred border. “C” stands for Change in the band over time. “D” stands for Digit involved, single Digit involved and the Dominant hand (thumb and hallux most common). “E” represents Extension of pigment to proximal or lateral folds, and “F” stands for Family history or personal history of melanoma or dysplastic nevus syndrome [4].

Only 5% of the patients in our study had heard of the ABCDEF mnemonic for SM, and only 50% of these patients knew the correct meaning of the letters. The ABCDEF mnemonic for SM is widely cited and regarded as an important clinical aide for medical professionals in assessing LM [22, 23]. There are a few plausible explanations for the lack of familiarity with this mnemonic. First, there is a scarcity of print- and web-based literature. For example, it is not included in the “public and patients” section of the American Academy of Dermatology website [24]. It is also absent from the Melanoma Research Foundation website [25], Skin Cancer Foundation website [26], and the patient skin cancer education page of the NIH, National Cancer Institute [27]. Another possible reason why patients were not familiar with the SM mnemonic is that their physician never educated them. In our study, only 1.4% of the patients reported that their physician counseled them on the ABCDEF mnemonic. This in turn may be due to a lack of physician knowledge of the

mnemonic or hesitancy to use it. For example, in a study of 12 cases of melanonychia (5 melanomas and 7 non-melanomas) evaluated by clinical evaluation, the ABCDEF rule, dermoscopy of the nail plate, and intraoperative dermoscopy, accuracy in diagnosing SM using the ABCDEF rule was only 48–54%, and this was irrespective of whether the dermatologists or nail experts had <10 years, 10 or >10 years of experience in practice [28]. Further studies are needed to assess physician use and accuracy using this mnemonic for the diagnosis of SM.

In contrast, 9.9% of the patients had heard of the ABCD mnemonic for cutaneous melanoma, with 83.3% correctly identifying the correct representation in a multiple-choice question. It is not surprising that more patients know this mnemonic compared to the SM mnemonic given the wide presence on multiple websites appropriate for laypersons [24–26]. This difference is also supported by the finding in this study that amongst the patients who heard of the mnemonic, 44.4% had heard about it from their dermatologist.

Our study has several limitations. LM and SM are more common in African-Americans, Asians, and Native Americans; however, in our study population, 55.9% of the patients classified themselves as “White”, and only 18.5% as “African-American” and 7.4% as “Asian”. In addition, LM was self-reported by subjects instead of being evaluated by the physician. Taken together, this may underestimate the frequency of LM in this community. We did not separate out fingernails and toenails when querying subjects on LM or the family history of LM. This is important because patients are generally more aware of nail changes on the fingernails as opposed to the toenails. In addition, females may notice changes on their nails more often compared to males. Finally, many patients opted not to participate in the survey (response rate of <50%), limiting the quantity of the data collected.

Our study demonstrates a lack of knowledge of LM and warning signs for SM amongst this patient population. Further studies are needed to determine whether educating patients about LM, nail self-examinations, and the warning signs for SM, would result in improved patient outcomes. Since LM can be easily seen with naked eye, nail self-examination can be performed simply and frequently. Changes can be documented by taking serial photographs with their smartphones at regular intervals. Further studies, looking specifically at the benefit of the ABCDEF mnemonic for early detection of SM and usage among physicians, should be taken into consideration.

Author Contributions

P.H. and S.L. had full access to all data in the study and take the responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: P.H. and S.L.

Acquisition, analysis, and interpretation of data: P.H., A.A., and S.L.

Drafting of the manuscript: P.H. and S.L.

Critical revision of the manuscript for important intellectual content: R.S. and S.L. Statistical analysis: A.A.

Administrative, technical, or material support: P.H. and S.L.

Study supervision: S.L.

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Statement of Ethics

All patients provided written consent prior to completing the survey.

Disclosure Statement

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References

- 1 Patterson RH, Helwig EB: Subungual malignant melanoma: a clinical-pathologic study. *Cancer* 1980;46:2074–2087.
- 2 Banfield CC, Redburn JC, Dawber RP: The incidence and prognosis of nail apparatus melanoma. A retrospective study of 105 patients in four English regions. *Br J Dermatol* 1998;139:276–279.
- 3 Kato T, Suetake T, Sugiyama Y, Tabata N, Tagami H: Epidemiology and prognosis of subungual melanoma in 34 Japanese patients. *Br J Dermatol* 1996;134:383–387.
- 4 Levit EK, Kagen MH, Scher RK, Grossman M, Altman E: The ABC rule for clinical detection of subungual melanoma. *J Am Acad Dermatol* 2000;42:269–274.
- 5 Metzger S, Ellwanger U, Stroebel W, Schiebel U, Rassner G, Fierlbeck G: Extent and consequences of physician delay in the diagnosis of acral melanoma. *Melanoma Res* 1998;8:181–186.
- 6 Finley RK 3rd, Driscoll DL, Blumenson LE, Karakousis CP: Subungual melanoma: an eighteen-year review. *Surgery* 1994;116:96–100.
- 7 Haneke E, Baran R: Longitudinal melanonychia. *Dermatol Surg* 2001;27:580–584.
- 8 Baran R, Kechijian P: Longitudinal melanonychia (melanonychia striata): diagnosis and management. *J Am Acad Dermatol* 1989;21:1165–1175.
- 9 Jellinek N: Nail matrix biopsy of longitudinal melanonychia: diagnostic algorithm including the matrix shave biopsy. *J Am Acad Dermatol* 2007;56:803–810.
- 10 Tosti A, Piraccini BM, de Farias DC: Dealing with melanonychia. *Semin Cutan Med Surg* 2009;28:49–54.
- 11 Koga H, Yoshikawa S, Shinohara T, Le Gal FA, Cortes B, Saida T, et al: Long-term follow-up of longitudinal melanonychia in children and adolescents using an objective discrimination index. *Acta Derm Venereol* 2016;96:716–717.
- 12 Friedman RJ, Rigel DS, Kopf AW: Early detection of malignant melanoma: the role of physician examination and self-examination of the skin. *CA Cancer J Clin* 1985;35:130–151.
- 13 Park S-W, Jang K-T, Lee J-H, Park J-H, Kwon GY, Mun G-H, et al: Scattered atypical melanocytes with hyperchromatic nuclei in the nail matrix: diagnostic clue for early subungual melanoma in situ. *J Cutan Pathol* 2016;43:41–52.
- 14 Tan KB, Moncrieff M, Thompson JF, McCarthy SW, Shaw HM, Quinn MJ, et al: Subungual melanoma: a study of 124 cases highlighting features of early lesions, potential pitfalls in diagnosis, and guidelines for histologic reporting. *Am J Surg Pathol* 2007;31:1902–1912.
- 15 Cohen T, Busam KJ, Patel A, Brady MS: Subungual melanoma: management considerations. *Am J Surg* 2008;195:244–248.
- 16 Astur Mde M, Farkas CB, Junqueira JP, Enokihara MM, Enokihara MY, Michalany N, et al: Reassessing melanonychia striata in phototypes IV, V, and VI patients. *Dermatol Surg* 2016;42:183–190.
- 17 Leyden JJ, Spott DA, Goldschmidt H: Diffuse and banded melanin pigmentation in nails. *Arch Dermatol* 1972;105:548–550.
- 18 Leung AK, Robson WL, Liu EK, Kao CP, Fong JH, Leong AG, et al: Melanonychia striata in Chinese children and adults. *Int J Dermatol* 2007;46:920–922.
- 19 Duhard E, Calvet C, Mariotte N, Tichet J, Vaillant L: Prevalence of longitudinal melanonychia in the white population (in French). *Ann Dermatol Venereol* 1995;122:586–590.
- 20 Abbasi NR, Shaw HM, Rigel DS, Friedman RJ, McCarthy WH, Osman I, et al: Early diagnosis of cutaneous melanoma: revisiting the ABCD criteria. *Jama* 2004;292:2771–2776.
- 21 Grob JJ, Bonerandi JJ: The “ugly duckling” sign: identification of the common characteristics of nevi in an individual as a basis for melanoma screening. *Arch Dermatol* 1998;134:103–104.
- 22 Metzner MJ, Billington AR, Payne WG: Melanonychia. *Eplasty* 2015;15:ic48.
- 23 Bristow IR, de Berker DAR, Acland KM, Turner RJ, Bowling J: Clinical guidelines for the recognition of melanoma of the foot and nail unit. *J Foot Ankle Res* 2010;3:1–13.
- 24 <https://www.aad.org/public> (accessed on July 4, 2016).
- 25 <http://www.melanoma.org/> (accessed on July 4, 2016).
- 26 <http://www.skincancer.org/> (accessed on July 4, 2016).
- 27 <http://www.cancer.gov/types/skin/patient/melanoma-treatment-pdq> (accessed on July 4, 2016).
- 28 Di Chiacchio N, Hirata SH, Enokihara MY, Michalany NS, Fabbrocini G, Tosti A: Dermatologists’ accuracy in early diagnosis of melanoma of the nail matrix. *Arch Dermatol* 2010;146:382–387.