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Age-related prevalence of dermatoscopic patterns of acral melanocytic nevi

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ABSTRACT The objective of this study was to evaluate the relation between age and dermatoscopic features of acral nevi. We evaluated 159 dermatoscopic images of melanocytic nevi from 146 individuals filed at the Dermatoscopy Outpatient Clinic of Tokyo Women's Medical University Medical Center East between April 2006 and March 2009. All images of melanocytic lesions on acral volar skin that showed a clear-cut dermatoscopic pattern of an acral nevus at the time of initial observation were included. The dermatoscopic patterns of all images were retrospectively examined in a blinded fashion according to the standard dermatoscopic classification criteria for acral melanocytic nevi. Images were classified using 15 structural variants of the parallel furrow pattern. These variants were then re-classified into two groups; the "single" line group and "double" line group. Patients of the double line group (age, 25.5 years) were significantly younger than those of the single line group (32.4 years). There was no significant difference in the age-related predominance between the solid line patterns and dotted line patterns. There was a significant age difference between patients with nevi showing the crista dotted pattern (mean age 24.9 years) and patients with nevi without the crista dotted pattern (mean age 34.6 years). We conclude that the double line variant of the parallel furrow pattern and crista dotted pattern, which probably correspond to the congenital type acral nevus, tend to be more common in young patients.

Background and objectives

Zalaudek et al. [1] discussed the age-related prevalence of dermatoscopy patterns in acquired melanocytic nevi of the trunk and extremities excluding palms and soles. They concluded that the globular pattern predominated in the youngest age group, while the reticular and/or homogeneous patterns were more common in older individuals.

In nonwhite populations including Japanese people, acral volar skin is the most prevalent site for malignant melanoma. About half of all cutaneous melanomas in Japanese patients are seen in acral skin [2]. Because Japanese media, including

TV and printed media, often emphasize this fact, recent recognition of acral melanoma has been increasing among the Japanese. One aspect of this awareness is wariness about the nature of any pigmented lesion that appears on the acral volar skin, with consequent increase in the number of consultations to dermatologists. On the other hand, acral melanocytic nevi are not rare and have an approximate incidence of 7 to 9% of the general Japanese population [3]. Therefore, it would be helpful to understand the dermatoscopic variations of acral melanocytic nevi. Based on dermatoscopic examination of acral melanocytic nevi, four different variants of parallel furrow patterns (single solid line, single dotted line, double solid line, double dotted line) and other variations (crista dotted pattern, crista reticulated pattern) are recognized (Figure 1). The purpose of the present study was to investigate the relationship between age and dermatoscopic features of acral nevi.

Methods

In this epidemiological observational study, dermatoscopic images filed in the Tokyo Women's Medical University Medical Center East Database (Tokyo, Japan) between April 2006 and March 2009 were evaluated. We retrieved all images of melanocytic lesions located on the acral volar skin that showed a clear-cut dermatoscopic pattern of an acral nevus at initial observation. Dermatoscopic patterns of all images were retrospectively examined in a blinded fashion according to the standard dermatoscopic classification criteria for the acral melanocytic nevi. We classified the retrieved images into 15 structural patterns as shown in Table 1. We then re-classified these 15 structural patterns into two groups, namely, the "single" line group and "double" line group. The single solid line (pigmented solid lines just on the furrow, Figure 1A) and single dotted line variants (pigmented dotted lines just on the furrow, Figure 1B) were classified into the "single" line group. The double solid line (pigmented solid lines facing each other right across the furrows, Figure 1C) and double dotted line variants (pigmented dotted lines facing each other right across the furrows, Figure 1D) were classified into the "double" line group. All cases of the lattice-like pattern (Figure 1G) in this study included a single solid line in the furrow, and were therefore classified into the "single" line group. Unclear images were excluded from subsequent analysis. Cases with regular fibrillar patterns (Figure 1H) were included in the study only when they demonstrated parallel furrow patterns by oblique view dermatoscopy. Because the fibrillar pattern can be regarded as an artifactual expression of the parallel furrow pattern, as reported by Maumi et al. [4], oblique view dermatoscopy alters the regular fibrillar pattern into a parallel furrow pattern.

The study participants were categorized into one of five age groups: 0-15 years, 16-30 years, 31-45 years, 46-60 years and > 60 years. For each dermatoscopic type of melanocytic nevus within each of the age groups, absolute numbers and percentages are provided as frequencies.

Results

Demographics of the study population and general results

We examined 159 melanocytic nevi in a study population of 146 individuals consisting of 47 men (32.2%) and 99 women (67.8%). The mean age of the study population was 29.8 years (range, 1-80 years). The distribution of nevi in the different age groups was 46 nevi in 0-15 years group, 29 nevi in the 16-30 years group, 55 nevi in the 31-45 years group, 20 nevi in the 46-60 years group and 9 nevi in the > 60 years age group. The mean age of each age group was 7.3, 26.8, 36.9, 50.9 and 70.0 years, respectively. The number of nevi on the palm was 9 (5.7%) while number of nevi on the plantar surface of the foot was 150 (94.3%).

In the parallel furrow group, the single solid line variant was identified in 74 lesions, of which 34 were prototypical single solid line variant only (Figure 1A), 32 were associated with crista dotted pattern (regular dots/globules on the center of the ridges) (Figure 1E), 1 was associated with crista reticulated pattern (reticular pigmentation on the ridges) (Figure 1F) and 7 were associated with lattice-like pattern (Figure 1G). The single dotted line variant was seen in 27 lesions, of which 12 were prototypical single dotted line variant only (Figure 1B), 14 were associated with the crista dotted pattern and 1 was associated with the crista reticulated pattern. The double solid line variant was identified in 34 lesions, of which 17 were prototypical double solid line variant only (Figure 1C) and 17 were associated with the crista dotted pattern. The double dotted line variant was seen in 22 lesions, of which 15 were prototypical double dotted line variant only (Figure 1D) and 7 were associated with the crista dotted pattern. The crista dotted pattern was seen in only 2 lesions. The total numbers of each group were 101 nevi in the single line group and 56 nevi in the double line group.

Age-related distribution of the structural dermatoscopic types of acral melanocytic nevi

The double line group pattern was the most predominant in the youngest age group (41.1%), but its frequency decreased with increasing age. On the other hand, the single line group was the most common (37.6%) in the third age group. The mean age of the double line group (25.5 years) was significantly lower than that of the single line group (32.4 years).

Age differences between subjects of the solid and dotted line patterns

We also analyzed differences in the age of patients with the solid and the dotted line patterns. The mean age was 31.5

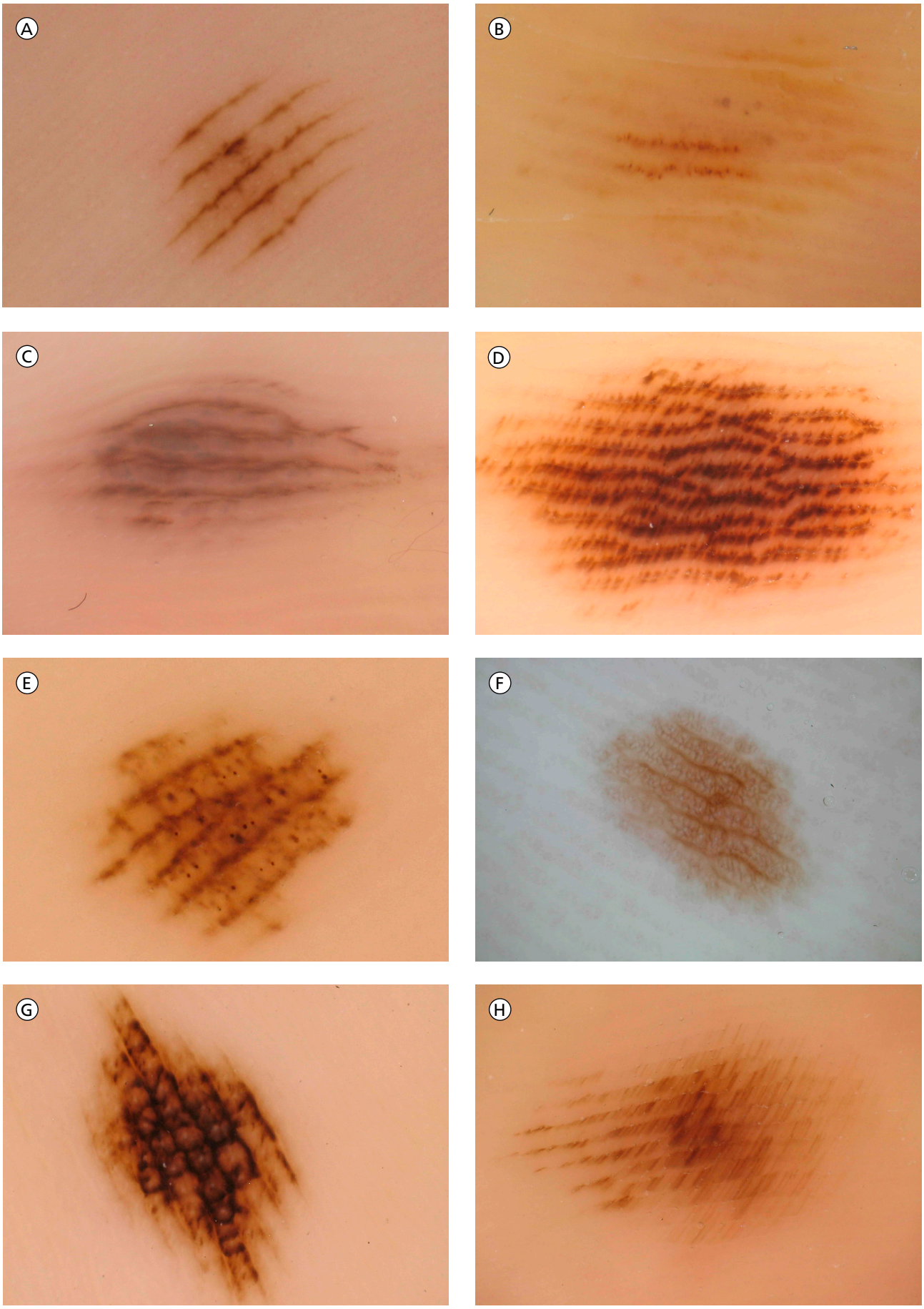

Figure 1. The definitions and *r*epresentative dermatoscopic images of the main structural patterns. (A) Single solid line variant. (B) Single dotted line variant. (C) Double solid line variant. (D) Double dotted line variant. (E) Single solid line variant + crista dotted variant. (F) Single solid line variant + crista reticulated variant. (G) Latticelike variant. (H) Fibrillar variant. [Copyright: ©2014 Suzaki et al.]

TABLE 1. Number of structural patterns in all dermatoscopic images

Dermatoscopic pattern	n	%
single solid line variant only	34	21.4
single dotted line variant only	12	7.5
double solid line variant only	17	10.7
double dotted line variant only	15	9.4
crista dotted pattern only	2	1.3
crista reticulated pattern only	0	0
single solid line variant with crista dotted pattern	32	20.1
single solid line variant with crista reticulated pattern	1	0.6
single dotted line variant with crista dotted pattern	14	8.8
single dotted line variant with crista reticulated pattern	1	0.6
double solid line variant with crista dotted pattern	17	10.7
double solid line variant with crista reticulated pattern	0	0
double dotted line variant with crista dotted pattern	7	4.4
double dotted line variant with crista reticulated pattern	0	0
latticelike pattern	7	4.4
Total number of cases	159	100

years for the group of patients showing the single solid line pattern and 34.9 years for the single dotted line pattern group, with no significant difference between the two groups. Similarly, the mean age of patients showing the double solid line pattern (24.8 years) was not significantly different from that of the double dotted line pattern group (26.6 years).

Age differences between nevi with crista dotted pattern and nevi without crista dotted pattern

We also analyzed the age differences between patients with nevi with crista dotted pattern and those without crista dotted patterns. The mean age was 24.9 years for the nevi with crista dotted pattern, and 34.6 years for the nevi without crista dotted pattern. For both the single and double groups, the mean age for patients with nevi with crista dotted pattern was younger than those without the crista dotted pattern. These results showed significant age differences between nevi with crista dotted pattern and those without crista dotted pattern.

Discussion

The following are the major findings of our study. First, the group of patients with the double pattern (solid or dotted) was significantly younger than the group of patients with the single pattern; 41.1% of patients in the double pattern group were the youngest in the entire study group. Second, there were no significant differences in age-related prelavence between the solid line group and the dotted line group. Third, patients displaying the crista dotted pattern were younger than those without the crista dotted pattern.

Based on these observations, we consider that the dermatoscopic patterns of the double solid line, double dotted line and crista dotted pattern are characteristic dermatoscopic features of early-onset nevi, including congenital nevi. The oblique view dermatoscopy at an angle could change the solid line pattern into a dotted line pattern. The solid line pattern can be considered a variant of the dotted line pattern. Thus, there should be no significant difference in age-related predominance between the solid and dotted line patterns.

Miyazaki et al. [5] indicated that the fibrillar pattern is caused by an oblique arrangement of melanin pigment in the slanting cornified layer. The slanting is considered to be produced by mechanical pressure from body weight. Of note, even in the fibrillar pattern, the nest of nevus cells is mainly located in the crista profunda limitans, as they are in the parallel furrow pattern. Therefore, the fibrillar pattern can be regarded as an artifactual expression of the parallel furrow pattern. These are the reasons for considering the parallel furrow pattern as the prototype of major dermatoscopic patterns seen in acral nevi. In fact, the three major dermatoscopic patterns seen in acral nevi, namely the parallel furrow, latticelike and the fibrillar patterns, are essentially the same and are not related to the age of the patients but to the anatomic sites.

Our personal experience with acral melanocytic nevi, based on daily clinical practice, concurs that the double dotted line or crista dotted variants are observed more commonly in younger patients. In contrast, the single line variants are more frequent in older individuals. Therefore, it is important to consider the age-related prevalence of the several parallel furrow pattern variants in acral melanocytic nevi.

Altamura et al. [6] reported their follow-up data of dermatoscopic patterns of acral nevi. In their study, they defined any change from a given benign pattern at baseline into a different pattern at the follow-up visit as substantial variation. A total of 230 acquired acral melanocytic nevi were followed-up digitally for 6, 12, 18 and 24 months. Dermatoscopic

changes over time were observed in 42 of the 230 acral nevi (18.3%), and the frequency of change increased linearly over time. Minimal variations in the parallel furrow pattern were the most common dermatoscopic changes over time (seen in 10 of the changing 42 nevi, 24%). They also reported that one case changed over time from single solid line pattern to a double solid line variant, however, the authors did not provide a detailed description of these minimal changes, and it is not clear if some cases changed over time from a double to single pattern.

The observations in this study raise further interesting questions regarding nevi evolution and age-related changes in histopathological findings in acral nevi. Understanding age-related patterns of acral nevi could perhaps lead to better evaluation of dermatoscopic structures and should be helpful in the differential diagnosis from melanoma.

Based on the data of Zalaudek et al. [1] and results of the present study, we conclude that the double line and the crista dotted acral patterns correspond to globular nevi seen on non-acral skin and that the single line acral pattern is equivalent to reticular nevi seen on non-acral skin. The double line variant of the parallel furrow pattern and crista dotted pattern seem to correspond to the congenital type nevi, similar to the suggestion of Zalaudek et al. that the globular nevi correspond to congenital type nevi.

The limitations of the present study are the relatively small sample size, single medical center based study, single ethnicity, referral bias in the data set, cross-sectional and retrospective designs.

In conclusion, the double line variants of the parallel furrow pattern and crista dotted pattern, which probably correspond to the congenital type acral nevus, tend to be more common in young patients.

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