Dermoscopy Patterns of Halo Nevi

Isabel Kolm, MD; Alessandro Di Stefani, MD; Rainer Hofmann-Wellenhof, MD; Regina Fink-Puches, MD; Ingrid H. Wolf, MD; Erika Richtig, MD; Josef Smolle, MD; Helmut Kerl, MD; H. Peter Soyer, MD; Iris Zalaudek, MD

Background: Halo nevi (HN) are benign melanocytic nevi surrounded by a depigmented area (halo). This study aims to evaluate the dermoscopic features of HN and their changes during digital dermoscopic follow-up and to investigate the frequency of the halo phenomenon in a series of melanomas.

Observations: In a retrospective study, digital dermoscopic images of HN from patients who attended the Pigmented Skin Lesions Clinic of the Department of Dermatology, Medical University of Graz, between October 1, 1997, and March 31, 2004, were reviewed and classified by dermoscopic morphologic criteria. For HN that were followed up with digital dermoscopy, the percentages of changes in the size of the nevus and halo components were calculated. In addition, digital dermoscopic images of histopathologically confirmed melanomas obtained from the same database were reviewed for the presence of an encircling halolike depigmentation. We classified 138 HN in 87 patients (mean age, 22.4 years). The most common dermoscopic structures were the globular and/or homogeneous patterns in more than 80% of HN. Follow-up of 33 HN revealed considerable size reduction of the nevus component, but this was not associated with significant structural changes. Of a total of 475 melanomas, only 2 revealed an encircling halo, but both displayed clear-cut melanoma-specific patterns according to dermoscopy.

Conclusions: Halo nevi exhibit the characteristic dermoscopic features of benign melanocytic nevi, represented by globular and/or homogeneous patterns that are typically observed in children and young adults. Halo nevi reveal considerable changes of area over time during digital dermoscopic follow-up, albeit their structural patterns remain unchanged. For this reason and because melanoma with halolike depigmentation, despite being rare, additionally exhibits melanoma-specific dermoscopic criteria, the role of digital dermoscopic follow-up in the diagnosis of HN is insignificant.

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Author Affiliations:
Department of Dermatology, Medical University of Graz, Graz, Austria (Drs Kolm, Hofmann-Wellenhof, Fink-Puches, Wolf, Richtig, Smolle, Kerl, Soyer, and Zalaudek); and Department of Dermatology, University of Rome Tor Vergata, Rome, Italy (Dr Di Stefani). Dr Zalaudek is currently with the Department of Dermatology, Second University of Naples, Naples, Italy.

Halo nevi (HN), also termed Sutton nevi or leu-koderma acquisitum centrifugum, are defined as benign melanocytic nevi that are surrounded by a rim of depigmentation, resembling a halo.1-3 Halo nevi are common in children and young adults, with a mean age at onset of 15 years.4 Affected individuals frequently have multiple HN, which are usually localized on the back and may be clustered.5 The incidence of HN in the population is estimated to be approximately 1%.6 There is no predilection for sex, and all races are susceptible to the development of these lesions. A familial tendency for HN has been reported,2 and HN may be associated with atopic dermatitis or with autoimmune disorders such as vitiligo and Hashimoto thyroiditis.7,8

Halo nevi exhibit the characteristic dermoscopic features of benign melanocytic nevi, represented by globular and/or homogeneous patterns that are typically observed in children and young adults. Halo nevi reveal considerable changes of area over time during digital dermoscopic follow-up, albeit their structural patterns remain unchanged. For this reason and because melanoma with halolike depigmentation, despite being rare, additionally exhibits melanoma-specific dermoscopic criteria, the role of digital dermoscopic follow-up in the diagnosis of HN is insignificant.

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the frequency of halo phenomenon in melanomas to evaluate the occurrence of this peculiar type of regression.

**METHODS**

For this retrospective study, dermoscopic images of HN were selected from a database that contained 29,383 digital images of pigmented skin lesions from 6079 patients who attended the Pigmented Skin Lesions Clinic of the Department of Dermatology, Medical University of Graz, between October 1, 1997, and March 31, 2004. The digital dermoscopic images were recorded with a digital epiluminescence microscopic system (Mole and March Ltd., Vienna, Austria) and stored at 30-fold magnification in JPEG format, with a resolution of 640 × 480 pixels at 24-bit color depth. The diagnosis of HN was made by experienced dermatologists (I.K., A.D.S., and R.H.-W.) and was based on clinical and dermoscopic examination. The HN were classified according to the primary dermoscopic structural patterns (reticular, globular, or homogeneous). When 2 different dermoscopic structural patterns were present, the HN were classified as reticular-globular, homogeneous-globular, or homogeneous- reticular. The HN that showed almost total disappearance of the nevus component were classified as regressed. If a nevus could not be classified because of poor quality of the digital dermoscopic image, it was labeled as “not classifiable.”

When available, follow-up digital images of a given nevus were measured and compared with the earlier digital images. Because of the retrospective study design, we were unable to clarify the exact time of onset of HN in an individual patient. However, given that the approximate waiting time for consultation at our specialized clinic is 2 months, we assumed that the baseline visit for treatment of HN was sought within the first 6 months of onset. Measurement was performed on-screen (semiautomatically) with the Mole Max “Expertizer” program (Derma Medical Systems), and the percentage of change in the area per month was calculated for both the nevus and halo components. In addition, we reviewed the dermoscopic images of histopathologically confirmed melanomas obtained from the same database for the presence of an encircling halo.

**RESULTS**

We analyzed 138 digital dermoscopic images of HN from 87 patients. Of the 138 HN, 123 (89.1%) were located on the trunk, 12 (8.7%) on upper or lower extremities, and 3 (2.2%) on the head and neck region (Figure 1).

Forty-six patients (52.9%) were women and 41 (47.1%) were men, with a mean age for all patients of 22.4 years (range, 5-69 years).

From data included in the patient registration forms, we recorded concomitant diseases (Table 1). In 6 patients, generally accepted risk factors for melanoma were recorded. These patients were older (mean age, 34.8 years; range, 14-58 years) with respect to the mean age of 23.2 years in our study population. However, in none of these patients was the time at onset of HN related to melanoma development and/or melanoma progression.

In 58 nevi (42.0%), we observed a combination of homogeneous and globular patterns in different areas of the lesion. The homogeneous-globular pattern was followed in frequency by the homogeneous pattern (32 nevi; 23.2%) and the globular pattern (24 nevi; 17.4%) (Figure 2 and Figure 3). Variations on the reticular patterns were recorded in only 9 nevi, and no single nevus in the study showed a combination of all 3 patterns (reticular, globular, and homogeneous). Three nevi showed complete regression of the nevus component, characterized by a light brown to pink central area that exhibited dotted vessels as the only dermoscopic feature (Figure 4).

From a total of 138 HN, we were able to follow changes in 33 HN (23.9%) from 16 patients. The mean follow-up period for these nevi was 26 months (range, 4-61 months). We observed a reduction in the nevus area in all HN, with a mean reduction of 2.2% per month. For 12 HN a follow-up image was available within 6 months after the initial baseline visit, and these nevi showed a mean reduction in the nevus area of 5.2% per month during the first 6 months (Table 2).

Halo size decreased over time in 17 (51.5%) of the 33 cases for which follow-up images were available (Figure 5), with a mean reduction in the halo area of 0.85% per month. Nine (27.3%) of the 33 HN showed a considerable enlargement of the halo component, with a mean increase in size of 1.3% per month. Poor quality of the follow-up images or large size of the HN, extending beyond the maximum field of view of the image frame, precluded our measuring change in halo area for the remaining 7 HN (21.2%).

![Figure 1. Geometric body site–related distribution of halo nevi (N=138).](image-url)

![Table 1. Demographics of Patients With Halo Nevi Revealing a History of Concomitant Disease](table-url)
Remarkably, of 475 melanomas, only 2 (0.4%) showed an encircling halo. The 2 melanomas were located on the backs of a 33-year-old man (patient 1) and a 44-year-old man (patient 2). In the first case, histologic analysis revealed a superficial spreading melanoma with focal regression (Clark level III; tumor thickness, 1.25 mm with focal regression), whereas in the second case, an exact histopathologic measurement of the level of invasion and tumor thickness was not possible because of the presence of significant extensive regression. Dermoscopy of both melanomas revealed a multicomponent pattern, characterized by a marked asymmetry of structures (ie, atypical pigment network, blue-white veil, irregular dots and globules, streaks, and regression structures) and colors that varied from white to brown to blue to black (Figure 6).

In our study, we found the globular and/or homogeneous patterns to be the typical dermoscopic features in HN. These patterns are generally associated with benign melanocytic nevi and represent, together with the reticular patterns, the main criteria in the dermoscopic...
classification of melanocytic nevi.\textsuperscript{17,18} Notably, only a small proportion of HN in our series displayed reticular and/or unspecific patterns. The high frequency of globular and homogeneous patterns compared with reticular patterns in our series of HN is an intriguing observation that requires further examination.

One explanation might be that halo phenomenon commonly occurs in melanocytic nevi, such as compound...
nevi, congenital melanocytic nevi, and less frequently, compound Spitz nevi and blue nevi.\(^1\)\(^2\)\(^3\)\(^6\)\(^9\)\(^10\) All these nevi are common in children and young adults and often exhibit globular and/or homogeneous patterns according to dermoscopy, including the so-called cobblestone patterns as a variant of the globular patterns.\(^17\)\(^18\) We recently demonstrated that nevi exhibit considerable age-related differences in their dermoscopic patterns, with variations on the globular pattern as the characteristic feature of nevi in children and of the reticular patterns in adults.\(^20\) Given that a mean age of 22.4 years in the present study reflects a relatively young study population, it could therefore be assumed that the predominance of the globular and/or homogeneous patterns in our series of HN was influenced by the age of our study population.

Only 6 patients had recorded risk factors for melanoma. These patients tended to be older at onset of HN compared with those without risk factors, although no significant differences in dermoscopic pattern of HN between these 2 patient groups were observed. In no patient was the onset of HN directly time related to melanoma development and/or progression. Accordingly, our data do not support previous reports that have suggested an association between HN and melanoma. However, following the general rule that the examination of all patients with pigmented skin tumors should include an inspection of the entire body, we consider the same procedure also valid for patients with HN, regardless of associated risk factors. On the other hand, the decision to perform a biopsy on a halo lesion that reveals clinically and/or dermoscopically atypical features must not be based on the patient’s age.\(^12\)\(^13\)

In addition, we analyzed follow-up images of 33 HN and compared these images with those obtained at the initial visit. Although we were unable to clarify the exact onset of HN development because of the retrospective study design, we observed in 12 HN a marked reduction in size of the nevus component during the first 6 months of the follow-up period, whereas changes in size were less evident after the first 6 months.

In this context it seems critical to underline that the primary purpose of short-term follow-up is to monitor eventual changes over time, which aids the more accurate differentiation of melanoma from nevi. It has been shown that significant changes in size, structure, and/or morphologic findings that occur in the short time of 3 to 6 months are often associated with melanoma, whereas such changes are unusual in benign nevi.\(^21\)\(^22\)\(^23\)

Because we found remarkable changes in the size of HN during follow-up, albeit the dermoscopic patterns remained basically unchanged, our observation questions in part the value of short-term digital dermoscopic follow-up for the diagnosis of these particular nevi and the impact of follow-up on their differentiation from melanoma. This is also because we found that halo melanoma not only was rare (2 of 478 melanomas) but also revealed evident melanoma-specific patterns according to dermoscopy that allowed its diagnosis with high confidence and without the need for additional digital dermoscopic follow-up. Thus, the halo was more irregular than that seen in HN. Furthermore, both melanomas occurred in adults and exhibited a multicomponent pattern, including an atypical pigmented network, irregular dots and globules, irregular streaks, blotches, blue-white veil, and atypical vascular structures. These features are strongly associated with melanoma and therefore indicate the necessity of subsequent histopathologic diagnosis.\(^17\)\(^24\) Despite this finding, it must be noted that digital dermoscopic follow-up carries the certain risk that a lesion that displays extensive regression at baseline could eventually completely regress during follow-up and subsequently would no longer be detectable at the next visit. We therefore conclude that digital dermoscopic follow-up of HN does not provide additional diagnostic information compared with a good clinical dermoscopic correlation at baseline.

Our study has some limitations. The small number of patients with concomitant diseases associated with increased risk of melanoma is not enough to draw definite conclusions about an eventual association of HN with melanoma development and/or the prognostic significance for melanoma progression. However, all patients with pigmented skin lesions, regardless of whether they display HN, should undergo a routine full-body examination.\(^12\)\(^13\)

Furthermore, the retrospective study design did not allow us to exactly define the date of onset in patients with HN who were followed up. Given that the waiting time for consultation at our clinic is approximately 2 months, we assumed that onset of HN occurred no longer than 3 months before baseline examination was performed. Accordingly, our observation of more rapid change in size during the first 6 months of follow-up must be seen in light of a speculative assumption of the time of HN development in a given individual. Finally, it must be underlined that we observed only 2 melanomas that displayed an encircling halo, but in both cases clear-cut melanoma-specific features were observed.

In summary, our study indicates that HN are common, although not exclusive, in children and young adults and display the typical dermoscopic features of benign melanocytic nevi, represented by variations on the globular pattern. The role and diagnostic impact of digital dermoscopic follow-up of HN in these patients, however, seem questionable. By contrast, halo melanoma is rare but reveals evident melanoma-specific patterns according to dermoscopy.

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Correspondence: Rainer Hofmann-Wellenhof, MD, Department of Dermatology, Medical University of Graz, Anuenbruggerplatz 8, 8036 Graz, Austria (rainer.hofmann@meduni-graz.at).

Author Contributions: Study concept and design: Hofmann-Wellenhof, Kerl, and Zalaudek. Acquisition of data: Kolm, Di Stefani, Hofmann-Wellenhof, Fink-Puches, Wolf, and Richtig. Analysis and interpretation of data: Kolm, Di Stefani, Hofmann-Wellenhof, Smolle, and Soyer. Drafting of the manuscript: Kolm, Hofmann-Wellenhof, Fink-Puches, Wolf, Richtig, and Smolle. Critical revision of the manuscript for important intellectual content: Di Stefani, Hofmann-Wellenhof, Kerl, Soyer, and Zalaudek. Administrative, technical, and material support: Kolm, Hofmann-Wellenhof, Wolf, and Zalaudek. Study...

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