DERMOSCOPY OF HEMOSIDEROTIC/ANEURYSMAL DERMATOFIBROMA: A MORPHOLOGICAL STUDY OF 110 CASES.

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ABSTRACT

Background: Hemosiderotic/ aneurysmal dermatofibromas (HADF) are uncommon tumors which are frequently misdiagnosed. A dermoscopic diagnosis testing accuracy has not been performed for HADFs to date.

Objective: To determine the diagnostic significance of dermoscopic structures and patterns associated with HADFs in a large series.

Methods: Dermoscopic images of histopathologically proven cases of 110 HADFs and 501 other tumors were collected. The frequency, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of the dermoscopic structures and patterns associated with hemosiderotic/aneurysmal dermatofibromas were calculated.

Results: HADF are mostly symmetric lesions (86.5%) and a prominent homogeneous area (PHA) was present in 100% of them. The presence of vascular structures (VS) was very common (86.4%) and dotted vessels were predominant (58.2%). Shiny white structures (SWS) were seen in 85.5% of lesions, while a peripheral delicate pigment network (PDN) was present in 69.1%. The most significant pattern was the one composed of a PHA and PDN, which showed a specificity of 100% with a relatively good sensitivity (69.1%). All the patterns containing a PDN showed very good specificities, PPV and NPV. Those patterns without a PDN showed the highest sensitivities, but they showed a significant overlap with other tumors, mainly with melanoma (MM).

Limitations: First, it was conducted retrospectively. Second, the histopathologic diagnosis of HADF was not confirmed by a second pathologist. Third, the number of MMs is overrepresented in the differential diagnosis group.

Conclusion: Dermoscopy is helpful in improving the diagnostic accuracy of HADFs. However, there is a considerable dermoscopic overlap between HADF and MM, specifically when the PDN is absent.

KEY WORDS: Dermoscopy, hemosiderotic dermatofibroma, aneurysmal dermatofibroma, melanoma.

CAPSULE SUMMARY

- Hemosiderotic/ aneurysmal dermatofibromas are uncommon and they are commonly misdiagnosed due to their striking clinical appearance. Current evidence on their dermoscopic features is scarce.
- The main dermoscopic structures of hemosiderotic/ aneurysmal dermatofibromas are: a bluish-purplish to pinkish-reddish prominent homogeneous area; vascular structures; shiny white structures; and a peripheral delicate network. Different combinations of these structures are the basis of 7 patterns that can serve as a useful practical tool for the diagnosis of HADF. However, a significant overlap with melanoma should always be considered.

INTRODUCTION

Dermatofibroma (DF) represents one of the most common benign soft tissue tumors, accounting for approximately 3% of the skin biopsy specimens received at dermatology laboratories[1]. DF is a fibrohistiocytic dermal proliferation composed of a variable admixture of fibroblasts, histiocytes, and other inflammatory cells; randomly orientated coarse collagen bundles, blood vessels, and epidermal hyperplasia. Histopathologically, several variants of DF have been recognized, including atrophic, haemosiderotic, aneurysmal, deep penetrating, hemangiopericytoma-like, palisading, clear cell, granular cell, myofibroblastic, sclerotic, monster cells, cholesterotic and myxoid. Some authors consider that this classification may be largely artificial because of the occurrence of transitional forms in the same lesion. This could be the case in hemosiderotic and aneurysmal dermatofibroma. Most dermatologists and dermatopathologists consider that hemosiderotic dermatofibroma is probably a stage in the development of aneurysmal dermatofibroma. According to Santa Cruz *et al*, in some cases of dermatofibromas occur a slow extravasation of small amounts of blood from capillaries with the subsequent production of hemosiderin pigment. Later, this pigment is phagocytized by the tumor cells producing the haemosiderotic variety of dermatofibroma. Subsequently, that slow, continuous extravasation of small amounts of blood from vessels, especially in the highly cellular areas containing a poorly developed reticulin network, could produce the final formation of the blood pseudo-vascular spaces, which are the most relevant feature of aneurysmal dermatofibromas[2].

The clinical diagnosis of the classical type of DF is usually straightforward but atypical cases and variants can pose a diagnostic challenge. Hemosiderotic/aneurysmal DFs (HADF) are uncommon tumors which are frequently unrecognized and misdiagnosed by clinicians[3-11]. They usually present as a solitary dark papule, plaque, or

nodule, most commonly located on the lower limbs, which may be associated with pain and rapid growth due to spontaneous intralesional hemorrhage (Fig 1). The clinical diagnosis of DF was made in only three of 17 aneurysmal dermatofibromas of Santa Cruz and Kyriakos´study[2] and three of 40 patients of Calonje and Fletcher´s article[12]. The clinical differential diagnosis of HADF must include melanoma (MM) and other melanocytic tumors, vascular neoplasms, adnexal tumors, and cysts, among other entities[9,10,13].

Dermoscopy is a non-invasive technique, which has greatly improved the diagnostic accuracy of pigmented and non-pigmented skin tumors. As far as we know, apart from sporadic case reports and a short case series, it is the first time that dermoscopic diagnosis testing accuracy has been performed for HADFs[3-11,13]. The objectives of this study were to describe the dermoscopic characteristics of a large series of hemosiderotic/aneurysmal dermatofibromas and to investigate the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPP) of dermoscopic structures and patterns associated with this challenging variant of DF.

METHODS

Dermoscopic images of 110 histopathologically proven cases of HADF collected from 12 Hospitals in Spain, France, Turkey, and Italy were evaluated for the presence of dermoscopic features. Clinical data were obtained for each case, including the age and sex of patients and the anatomical location of the lesions. Dermoscopic images of each lesion were obtained using DermLite Foto (3Gen, LLC, Dana Point, CA, U.S.A.) mounted on a digital camera at 20 to 50-fold magnification. No pressure was used to avoid the collapse of the vessels in the lesions. The complete list of dermoscopic criteria based on the conclusions of the Third Consensus Conference of the International Dermoscopy Society (TCCIDS)[14] and the dermoscopic descriptions of HADFs made by various authors[1,3-11,13] were evaluated by two of the contributing authors (MAS and PZ). According to TCCIDS, we include the structures shiny white blotches, strands and streaks in the unifying feature “shiny white structures” (SWS), and a “prominent homogeneous area" (PHA) was considered when this feature was involving at least 50% of the lesion surface. The dermoscopic structures most commonly found in HADFs were used to build up seven global patterns and all HADFs were evaluated for the presence of these patterns.

In the second part of the study, dermoscopic images of 501 tumors that may be included in the differential diagnosis of HADF were similarly obtained and evaluated for the presence of the same dermoscopic structures and patterns. These 501 lesions comprised 389 MMs (nodular MM or invasive superficial spreading MM), 29 angiomas, 22 basal cell carcinomas (BCC), 17 squamous cell carcinomas (SCC), 14 seborrheic keratoses (SK), 11 Spitz nevi, 11 pyogenic granulomas, 4 Kaposi’s sarcomas (KS) and 4 adnexal tumors. Most of the lesions were MMs because they represent by far the most relevant differential diagnosis of HADF according to the literature[4,6,7,13.]

Variables were expressed as absolute and relative frequencies. Subsequently, we made comparisons between HADFs, and respectively, the 389 melanomas and the rest of the tumors (n=112), in relation to the dermoscopic findings, using $\chi 2$ statistics and, if it was not possible, then Fisher's exact test. Sensitivity, specificity, and positive and negative predictive values (PPV and NPV) of the 7 patterns to diagnose HADF against melanomas and the rest of the tumors were calculated, using 2 x 2 contingency tables. The level of statistical significance was $P < 0.05$. Statistical analysis was performed using SPSS 24.0 (IBM SPSS Statistics, Armonk, NY, USA).The study protocol was approved by the Local Research Ethics Committee (Comité de Ética de la Investigación de la Comunidad Autónoma de Aragón: CEICA) with the version 2.0 of the protocol.

RESULTS

A total of 110 cases of HADFs were collected for the study. The lesions were obtained from 45 men and 65 women ranging in age from 11 to 79 years (mean 44.3 years). Of the 110 lesions, 58 (52.7%) were located on the lower extremities, 32 lesions (29.1%) on the upper extremities, 18 (16.4%) on the trunk and only 2 lesions (1.8%) on the head and neck.

A careful dermoscopic examination of the HADFs allowed the observation of the following main features (table I): 1.- Most of the lesions (95; 86.5%) were symmetric in colors and structures; 2.- A PHA was present in all cases (100%); this pigmentation was bluish-purplish in 55 cases (50%), brownish-black in 23 cases (20.9%), and pinkish-reddish in 18 cases (16.4%); 3.- The presence of vascular structures (VS) was common in HADFs (95 cases, 86.4%); and they were mainly diffusely distributed (64; 58,2%); the morphology of these vessels was varied but dotted vessels were predominantly observed (64; 58.2%); it is important to note that 19 cases (26.9%) showed linear-irregular or polymorphous-atypical vessels; 4.- SWS were seen in 94 cases (85.5%); 5.- A peripheral delicate pigment network (PDN) was observed in 76 cases (69.1%); an atypical pigment network was found only in 2 cases (1.8%); 6.- Other less common features were; scales (33; 30%), ulceration (4; 3.6%), and verrucous structures (1; 0,9%); 7.- In all the HADFs included in the study, other specific criteria for melanocytic or non-melanocytic tumors previously described in the literature were absent.

Comparing dermoscopically HADFs and MMs in our study (Table I): 1.- MMs were significantly more asymmetric than HADFs (76.1% vs. 13.6%; $p < 0.001$); 2.- A PHA was clearly more common in HADFs (100% vs. 32.4%; $p < 0.001$), being the type of color very varied in both lesions; 3.- VS were common in both kind of lesions (HADFs

vs MMs: 86.4 vs. 72%; p 0.002); the distribution of VS was predominantly diffuse in HADFs (58%) and irregular in MM (59.4%) and the type of VS were predominantly dotted vessels in both lesions (HADFs vs MM: 58.2 vs. 36.2%); 4.- SWS were similarly found in both kind of lesions (HADFs vs MM: 85.5% vs. 73%; p= 0.007); 5.- The structure PDN was frequently found in HADFs and was non-existent in the MM included in our study (HADFs vs MM: 69.1% vs. 0%; p< 0.001). Dermoscopic comparison of HADFs and other tumors also appears in Table I.

We build up 7 patterns of HDAFs, arising from the combination of the following dermoscopic structures: PHA, present in 100% of HDAFs, VS, SWS and PDN (fig 2): pattern 1 (PHA and PDN), pattern 2 (PHA, VS and PDN), pattern 3 (PHA, SWS and PDN; Fig 3), pattern 4 (PHA, VS, SWS and PDN; Fig 4), pattern 5 (PHA and VS), pattern 6 (PHA and SWS) and pattern 7 (PHA, VS and SWS) (Fig 5). Frequencies of patterns and schematics illustrating these findings are shown in Table II and Figure 2.

Comparing the dermoscopic patterns in HADFs and melanomas (Table II): 1.- Patterns 5 and 6 exhibited the highest sensitivities (86.4% and 85.5%, respectively), very good NPVs (95.2% and 94.6%, respectively) but relatively low specificities (77.1 and 72.2, respectively); 2.- Patterns 1, 2, 3 and 4 showed a specificity and a PPV of 100%; 3.- The most significant pattern associated with HADFS was the pattern 1, with a relatively good sensitivity (69.1%); a specificity and a PPV of 100% compared to MM (99.4% and 96.2% compared to all lesions) and a very good NPV (92%). A comparison of the dermoscopic patterns in HDFs and other tumors also appears in Table II.

DISCUSSION

A PHA was present in 100% of HADFs and it could be considered the most characteristic finding of this kind of DFs. The color of this homogeneous area is highly variable: purplish to bluish in 50% of HADFs, brownish-black in 20.9%, pinkish-reddish in 16.4% and finally, we found a rainbow-like color in 7 % of cases. The histopathologic correlation of this structure is the presence of the prominent blood-filled spaces and intra- and extracellular hemosiderin deposits, which are the characteristic histologic findings in HADFs[2]. This structure, which has been repeatedly reported in literature associated with HADFs, is very common in other tumors, including MMs. Menzies *et al* found a homogeneous blue pigmentation in 80.8% of pigmented nodular MMs and milky red areas in 45.2% of amelanotic/hypomelanotic nodular MMs[15]. Pizzichetta *et al* reported that the presence of homogeneous blue pigmented areas was significantly associated with pigmented nodular MMs compared with pigmented superficial spreading MMs (OR 2.37) and nonmelanoma nodular lesions (OR 4.32)[16]. The presence of milky red areas was a significant positive predictor of amelanotic/hypomelanotic MMs (OR 2.5) according to Menzies et al[17]. All these studies did not refer to the size or percentage of the homogeneous structures in their MMs but, in any case, are not reassuring structures. In fact, we found a PHA in 32.4% of MMs included in the study. The symmetry of pigmentation pattern and structures is often a defining feature of benign pigmented lesions. 86.4% of the HADFs in our study were symmetric (Vs 23.9% of MMs; $p < 0.001$). It is important to note that a symmetrical pigmentation pattern is not seldomly associated with MMs, above all in nodular and hypomelanotic/amelanotic MMs. Menzies *et al* found a symmetrical pigmentation pattern in 5.8%[15] and Pizzichetta *et al*, in 4% of pigmented nodular MMs[16], but this finding was found in 22% of amelanotic/hypomelanotic NM and in 58.5% of amelanotic/hypomelanotic superficial

spreading MMs according to Pizzichetta et al[18]. On the other hand, not surprisingly, when HADFs show asymmetry of pigmentation pattern and structures (Fig 6), the dermoscopic distinction between this variant of DF and MM or other malignant tumors is frequently not possible.

The presence of VS was found in 85% of the HADFs in our study. The largest series of DFs published in the literature reported VS in 30-50% of cases, but this percentage reached 82% when non-contact polarized dermoscopy is used[19-21]. These structures are more frequently reported associated with HADFs and were found in 5/6 cases in the only series published[13]. The histopathologic correlation of these vessels is the presence of numerous capillaries and large blood vessels usually found in this kind of DFs by pathologists[2]. In our study, these VS were mainly diffusely distributed and the dotted vessels were the predominant type. In the exhaustive study of Argenziano *et al*, dotted vessels showed a PPV for a melanocytic lesion of 90%, and the probability of a lesion with dotted vessels being a MM was 37.8%[22]. However, none of the 531 melanocytic and nonmelanocytic skin tumors of the study were DFs and dotted vessels are usually the predominant type of VS in dermatofibromas according to literature[1,19,21].

SWS are only seen with polarized dermoscopy and encompass shiny white streaks, blotches and strands[14]. Histopathology, they correspond to altered dermal collagen resulting from stromal alterations and fibrosis, which are characteristic findings in all kind of DFs[23]. In our study, SWS were found in 85.5% of HADFs. However, it is important to note that SWS are frequently associated with Spitz nevi, lichenoid keratoses, adnexal tumors, BCCs, and, more importantly, MMs; especially when they are shiny white streaks or chrysalis[24]. In fact, in our study, we found SWS in 73% of MMs. Verzi et al evaluated 1507 melanocytic neoplasms (144 MMs) and reported that the sensitivity and specificity of these structures for MM were 22% and 98%, respectively[25]. Shitara et

al stated that the presence of shiny white streaks was associated with a 10.5-fold increased risk of malignancy (MMs, BCCs, and SCCs) and, in the context of melanocytic lesions, with invasive MMs (OR 10.33)[24]. However, these authors also found these structures in 6 out of 11 DFs and concluded that shiny white streaks are a strong clue to malignancy with the exception of DFs[24].

The presence of a PDN demonstrated to be a relevant finding. This structure is defined by light-brown, thin network lines and small holes in a regular mesh located at the periphery of the lesion and its histopathological correlation is the presence of a melanotic hyperpigmentation rather than melanocytic proliferation at the basal layer [21]. In our study, 69.1% of the HADFs and none of the MMs showed this structure (p <0.001%). This PDN has been frequently associated with DFs in the published series which collected a larger number of cases (66-100%)[1,19-21,26] and was found in 4/6 HADFs in the single series published to date[13]. On the other hand, this structure is rarely seen in other tumors, being described in accessory nipples, arteriovenous angiomas, leiomyomas, and dermatofibrosarcoma protuberans (rarely at the periphery in the last lesion)[27-30]. In our study, we found this structure in a few Spitz nevi and KS. The presence of an atypical pigment network was found in only 2 of our HADFs and is anecdotally reported in the literature.

In this study, we propose 7 dermoscopic patterns obtained from the combination of the aforementioned structures and, taking into account the results of our study, they can be clustered in two groups: those with PDN (PDNP: patterns 1-4) and those without PDN (NPDNP: patterns 5-7). Generally speaking, NPDNP showed relatively high sensitivities but low specificities and the opposite occurs with PDNP (very high specificities and relatively low sensitivities). In our study, NPDNP were found in many MMs, some CBCs, pyogenic granulomas, and KS and sporadically in Spitz nevi, adnexal tumors, and

angiomas, and these findings were repeatedly reproduced in the literature[15,31-33]. To name a few, Zalaudek *et al* reported a "dermatofibroma-like" spitzoid MM which showed a prominent reddish homogeneous area and linear-irregular vessels[34] and Sgouros *et al* recently published that irregular blue structureless areas, dotted vessels and SWS were predictors for thin nodular MMs compared to other non-MM nodular lesions[35]. Therefore, it is important to note that NPDNPs are very unspecific and are frequently associated with other tumors, especially MMs. On the other hand, all PDNPs showed specificities higher than 99% for HADFs, and, what is more important, none of these patterns were found in the MMs of our study. Apart from HADFs, we observed these patterns very sporadically in two Spitz nevi and in one lesion of KS. Pattern 1 (PHA and PDN) was the most balanced pattern with a relatively good sensitivity (69.1%) and a specificity and PPV of 100% compared to MM. This pattern was previously reported by Zaballos *et al* in their series of 412 dermatofibromas and was histologically associated with HADFs[21]. Some melanocytic tumors, such as invasive MMs, combined blue nevi or Spitz nevi can rarely display a similar pattern[36,37]. However, it should be noted that the pigment network of melanocytic neoplasms differs from the PDN of HADFs in terms of line thickness, homogeneity, and distribution[23]. On this basis, the presence of a PDN may be considered a useful dermoscopic clue for the differential diagnosis with other skin neoplasms, mainly with MMs. As noted above and according to literature, PDN may be observed in a few tumors (accessory nipples, arteriovenous angiomas, piloleiomyomas, and dermatofibrosarcoma protuberans)[27-30]. Dermoscopically, none of these lesions display a central PHA, as we can see in HADFs. Moreover, the delicate pigment network observed in 87% of the 15 dermatofibrosarcoma protuberans published by Bernard *et al* did not show a peripheral distribution[30]. Finally, additional dermoscopic features, like the

presence of non-arborizing telangiectasia in arteriovenous tumors, can help in the diagnosis[28].

The present study has several limitations. First, it was conducted retrospectively. Second, the histopathologic diagnosis of HADF was based on the official pathology diagnosis from the corresponding center and a second pathologist did not confirm the diagnosis. Third, the number of MM is overrepresented in the differential diagnosis group. Although this fact weighs on the evaluation of diagnostic testing accuracy, MM represents by far the most relevant and challenging differential diagnosis of HADF. Finally, we have to warn the reader that the presence of some dermoscopic features depends on the technique used (polarized vs. non-polarized); shiny white structures, which are an important finding in HADFs, are not seen on non-polarized dermoscopy, and the visualization of vascular structures is influenced by the pressure applied on the skin with the dermatoscope.

In conclusion, the pattern composed of a PHA and a PDN (with or without VS and/or SWS) is common and very specific to this kind of dermatofibromas. The present study confirms that dermoscopy is a helpful tool that may increase the physician's diagnostic accuracy of HADFs and allows the observer to differentiate them from other cutaneous tumors, including MMs. However, there is a considerable dermoscopic overlap between HADFs and MMs, specifically when the PDN is absent. Thus, when facing papulo-nodular lesions with reddish to bluish-purplish or pigmented PHA, VS and SWS, in which MM cannot confidently ruled out, excision is mandatory and histopathological study should always be performed.

FIGURES

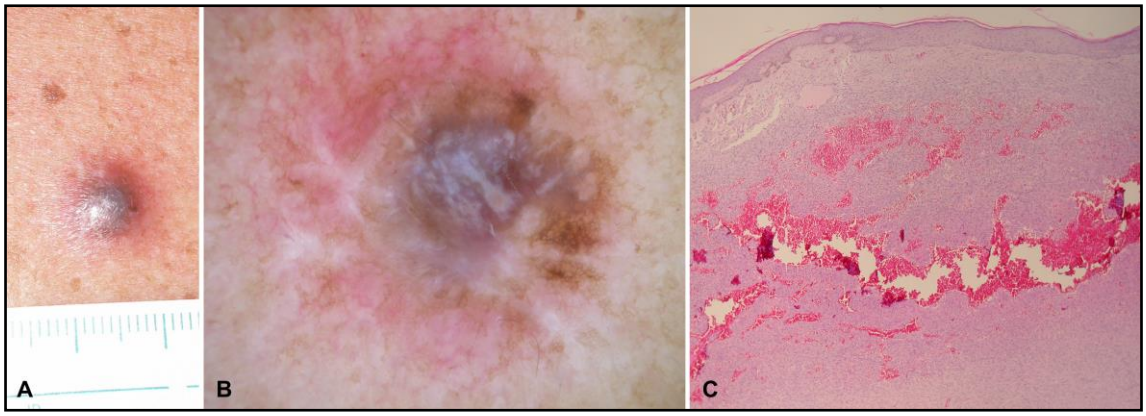

Fig.1 A.- Partially pigmented reddish papule located on the right shoulder of a 45-year-old man. **B.-** Dermoscopy revealed a striking multicomponent pattern composed of a bluish-purplish prominent homogeneous area, shiny white structures and a peripheral delicate network, along with an atypical network on the right side of the lesion (DermLite Foto; 3Gen, LLC, Dana Point, CA, USA Original magnification X10). **C.-** Histopathologic examination confirmed the presence of a fibrohistiocytic neoplasm, interspersed with marked blood-filled spaces without endothelial lining.

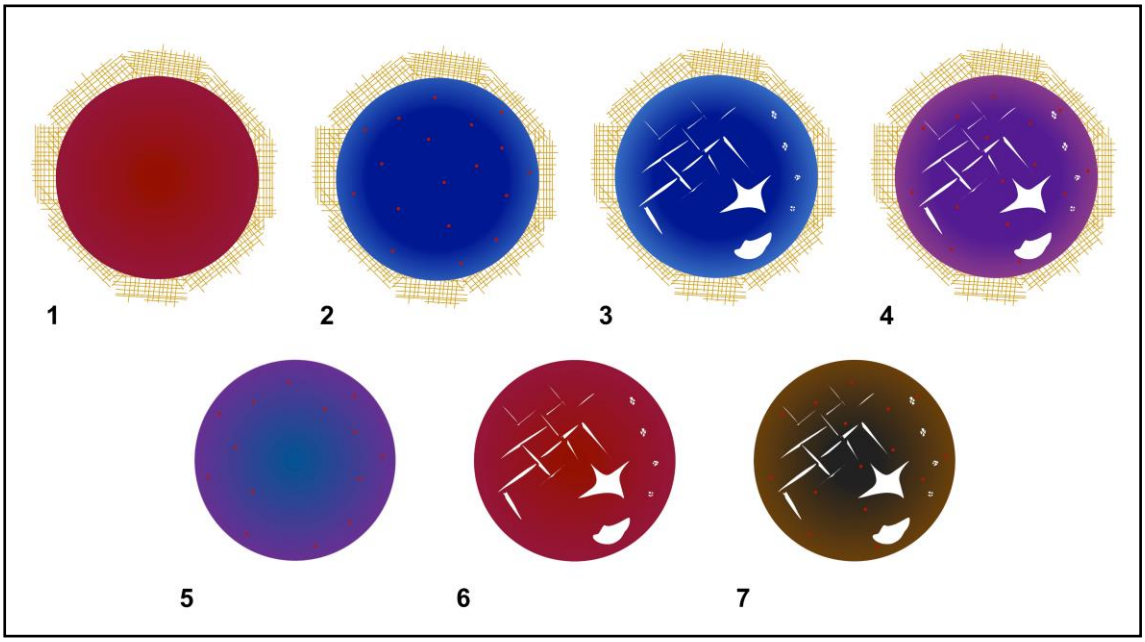

Fig.2 Schematic representation of the seven different patterns of HADFs. Pattern 1: prominent homogeneous area (PHA) and peripheral delicate network (PDN); Pattern 2: PHA, vascular structures (VS) and PDN; Pattern 3: PHA, shiny white structures (SWS) and PDN; Pattern 4: PHA, VS, SWS and PDN; Pattern 5: PHA and VS; Pattern 6: PHA and SWS; Pattern 7: PHA, VS and SWS.

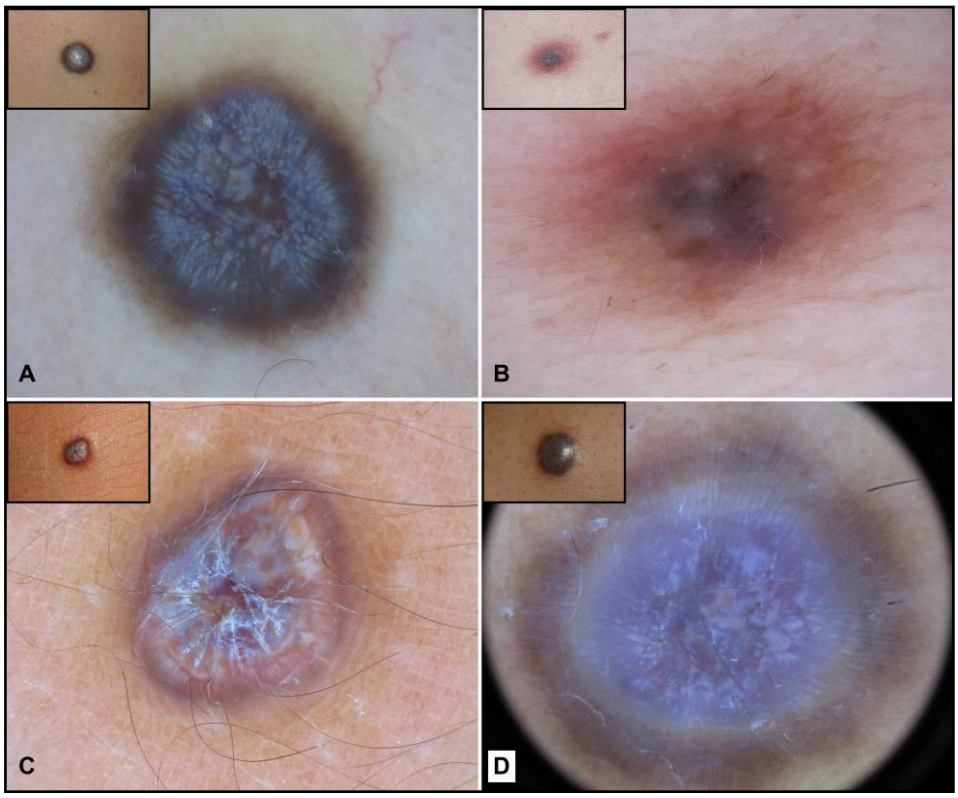

Fig.3 HADFs showing a prominent homogeneous area (PHA), shiny white structures (SWS) and a peripheral delicate network (PDN), without vascular structures. **A.-** Heavily pigmented nodule located on the leg of a 61-year-old woman (inset). Dermoscopy revealed a brownish-black PHA, SWS and a PDN. **B.-** Brownish cutaneous lesion on the back of a 47-year-old man (inset). Dermoscopic examination showed a brownish-black PHA, subtle SWS and a PDN. **C.-** Pigmented papule on the arm of a 27-year-old woman (inset). In the dermoscopic view, we can see a rainbow-like PHA, SWS and a PDN. **D.-** Pigmented nodule on the leg of an 18-year-old man (inset). Dermoscopy showed a bluish-purplish PHA, SWS, and a PDN (DermLite Foto; 3Gen, LLC, Dana Point, CA, USA Original magnification X10).

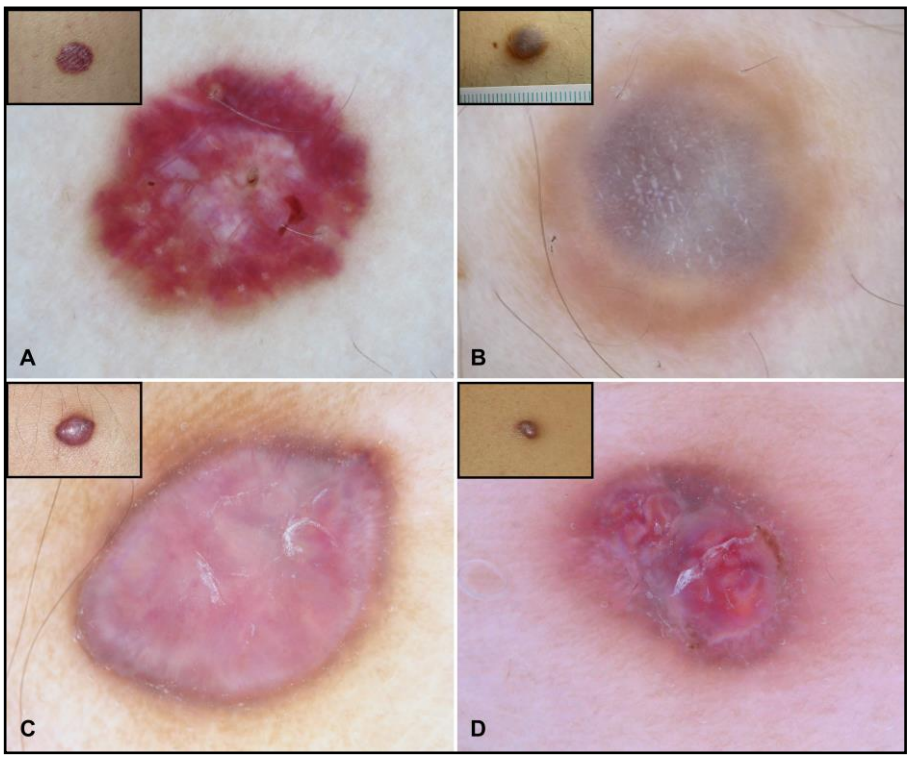

Fig.4 HADFs showing a prominent homogeneous area (PHA), shiny white structures (SWS) and peripheral delicate network (PDN), with vascular structures (VS). A.- Reddish plaque located on the leg of a 22-year-old woman (inset). Dermoscopic examination revealed a reddish PHA, SWS, VS (linear irregular vessels) and a PDN. **B.-** Pigmented nodule on the leg of a 26-year-old man (inset). Dermoscopy showed bluish-purplish PHA, SWS, VS (dotted vessels) and a PDN. **C.-** Reddish cutaneous lesion on the arm of a 32-year-old man (inset). In the dermoscopic view, we can see a pinkish PHA, SWS, VS (polymorphous-atypical vessels), and a PDN. **D.-** Pigmented papule on the thigh of a 47-year-old man (inset). Dermoscopy showed a rainbow-like PHA, SWS, VS (dotted vessels), and a PDN (DermLite Foto; 3Gen, LLC, Dana Point, CA, USA Original magnification X10).

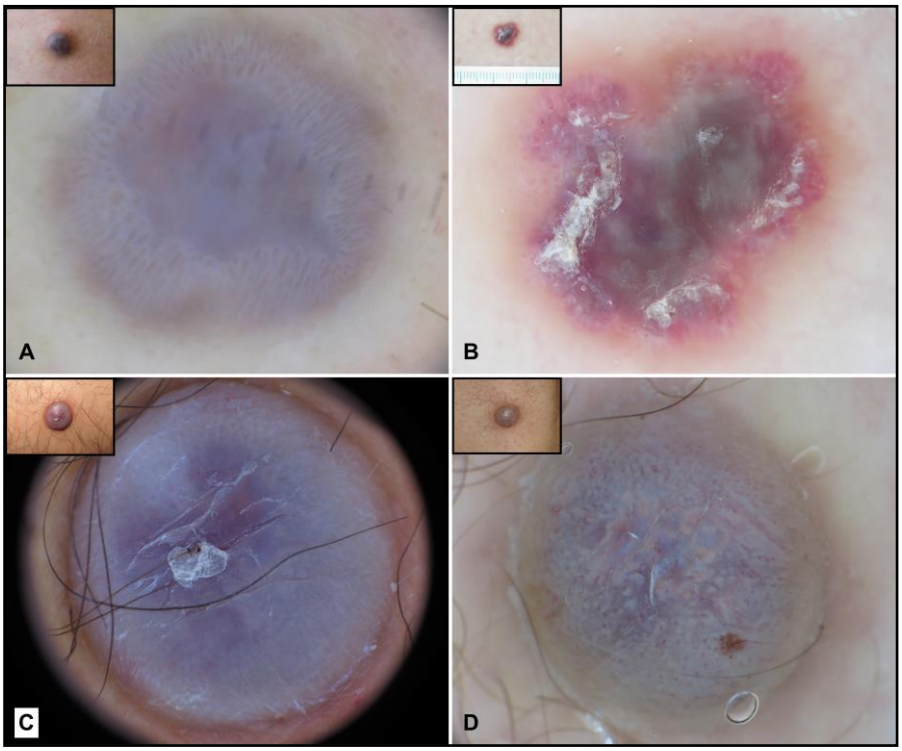

Fig. 5 HADFs without peripheral delicate network (PDN). A.- Pigmented nodular lesion located on the leg of a 19-year-old woman (inset). Dermoscopic examination revealed bluish-purplish prominent homogeneous area (PHA), shiny white structures (SWS) and vascular structures (VS) (peripheral hairpin vessels). **B.-** Partially pigmented lesion on the leg of a 12-year-old boy (inset). Dermoscopy showed a bluish-purplish PHA, SWS and VS (dotted vessels). **C.-** Bluish papule on the leg of a 31-year-old man (inset). In the dermoscopic view, we can see a bluish-purplish PHA, SWS and VS (dotted vessels). **D.-** Bluish cutaneous lesion on the arm of a 47-year-old man (inset). Dermoscopy revealed a bluish-purplish PHA, SWS, and VS (diffuse dotted vessels). Note the presence of a rainbow-like area in the central part of the lesion (DermLite Foto; 3Gen, LLC, Dana Point, CA, USA Original magnification X10).

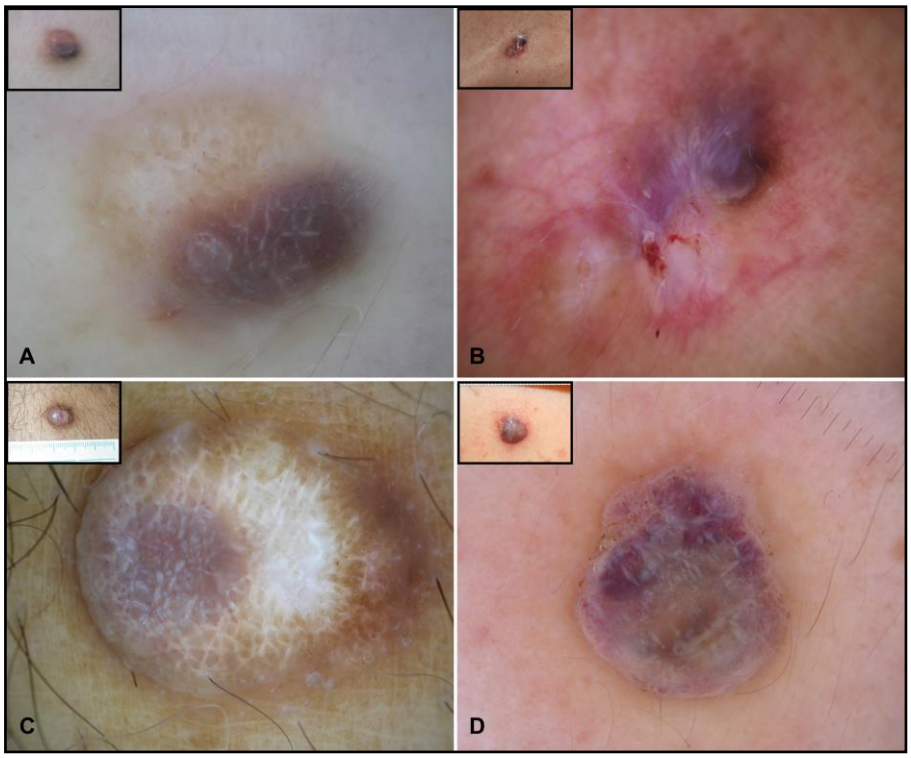

Fig. 6 HADFs with atypical dermoscopic patterns. A.- Multicolored papule located on the leg of a 49-year-old woman (inset). Dermoscopic examination showed an asymmetric bluish-purplish and white prominent homogeneous area (PHA), shiny white structures (SWS) and VS (dotted vessels). **B.-** Irregularly shaped, multicolored lesion on the chest of a 28-year-old man (inset). Dermoscopy revealed an asymmetric lesion with a bluish-purplish PHA, SWS, VS (polymorphous-atypical vessels), atypical pigment network and ulceration. **C.-** Pigmented nodular lesion on the leg of a 48-year-old man (inset). In the dermoscopic view, we can see a bluish-purplish, brown and white PHA, SWS, VS (dotted vessels), and a PDN. **D.-** Pigmented papule on the arm of a 38-year-old woman (inset). Dermoscopy showed an asymmetric bluish-purplish PHA with a central brownish area, SWS, VS (dotted vessels), and some peripheral brown globules (DermLite Foto; 3Gen, LLC, Dana Point, CA, USA Original magnification X10).

Dermoscopic features	HADF (n=110)	Others (n= 501)	P1	MM (n=389)	P2
Symmetry			<0.001		<0.001
Yes	95 (86.4)	180 (35.9)		93 (23.9)	
No	15 (13.6)	321 (64.1)		296 (76.1)	
PHA			<0.001		<0.001
Yes	110 (100)	156 (31.1)		126 (32.4)	
No	0 (0)	345 (68.9)		263 (67.6)	
Type of PHA			<0.001		<0.001
Bluish-purplish	55 (50.0)	54 (10.8)		51 (13.1)	
Brownish-black	23 (20.9)	45 (9.0)		44 (11.3)	
Pinkish-reddish	18 (16.4)	42 (8.4)		22 (5.7)	
Rainbow-like	8 (7.3)	3 (0.6)		1 (0.3)	
Two or more colors	6 (5.5)	12 (2.4)		8 (2.1)	
No	0 (0)	345 (68.9)		263 (67.6)	
Shiny white structures			0. 005		0.007
Yes	94 (85.5)	364 (72.7)		284 (73.0)	
No	16 (14.5)	137 (27.3)		105 (27.0)	
Vascular structures			0. 003		0.002
Yes	95 (86.4)	365 (72.9)		280 (72.0)	
No	15 (13.6)	136 (27.1)		109 (28.0)	
Vessel distribution			<0.001		<0.001
Diffuse	64 (58.2)	108 (21.6)		47 (12.1)	
Peripheral	13 (11.8)	18 (3.6)		4 (1.0)	
Irregular	10 (9.1)	259 (51.7)		231 (59.4)	
Central	8 (7.3)	1 (0.2)		0 (0)	

Dermoscopic features	HADF (n=110)	Others (n= 501)	P1	MM (n=389)	P2
Type of vessels			<0.001		(-)
Dotted	64 (58.2)	153 (30.5)		141 (36.2)	
Linear irregular	18 (16.4)	13 (2.6)		11 (2.8)	
Polymorphous-atypical	11 (10.0)	157 (31.3)		124 (31.9)	
Hairpin	2 (1.8)	12 (2.4)		2 (0.5)	
Others	0 (0)	48 (9.6)		1 (0.3)	
Pigment network			<0.001		(-)
PDN	76 (69.1)	10 (2.0)		0 (0)	
Regular	0 (0)	18 (3.6)		17 (4.4)	
Atypical	2 (1.8)	305 (60.9)		303 (77.9)	
No present	32 (29.1)	168 (33.5)		69 (17.7)	
Scales			0.55		0.53
Yes	33 (30.0)	136 (27.1)		105 (27.0)	
No	77 (70.0)	365 (72.9)		284 (73.0)	
Ulceration			<0.001		<0.001
Yes	4 (3.6)	108 (21.6)		72 (18.5)	
No	106 (96.4)	393 (78.4)		317 (81.5)	

Table I. Dermoscopic features observed in 110 haemosiderotic/ aneurysmal dermatofibromas, the other tumors group (P2), and, specifically, in MM (P2). PHA: prominent homogeneous area, PDN: peripheral delicate pigment network. (-) p-value cannot be calculated because more than 20 percent of the cells have expected frequencies of 5 or less.

Pattern	Sensibility (%)	Specificity (%)	PPV (%)	NPV (%)
HADF vs other tumors				
Pattern 1	69.1	99.4	96.2	93.6
Pattern 2	56.4	99.4	95.4	91.2
Pattern 3	60.0	99.6	97.1	91.9
Pattern 4	48.2	99.6	99.4	89.8
Pattern 5	86.4	76.9	45.0	96.3
Pattern 6	85.5	72.9	40.9	95.8
Pattern 7	73.6	78.6	43.1	93.1
HADF vs MM				
Pattern 1	69.1	100	100	92.0
Pattern 2	56.4	100	100	89.0
Pattern 3	60.0	100	100	89.8
Pattern 4	48.2	100	100	87.2
Pattern 5	86.4	77.1	51.6	95.2
Pattern 6	85.5	72.2	46.5	94.6
Pattern 7	73.6	78.9	49.7	91.4

Table II. Diagnostic significance of dermoscopic patterns in haemosiderotic/aneurysmal dermatofibromas. HADF: haemosiderotic/ aneurysmal dermatofibromas, MM: melanomas PPV, positive predictive values; NPV, negative predictive values.

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