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DERMATOSCOPIC FEATURES OF DYSPLASTIC NEVI

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Abstract

Introduction. Dysplastic nevi (DN) are the subject of debates between clinicians and pathologists. There is no standard diagnostic and treatment approach, which causes many disagreements. At the same time, the increase in the incidence of malignant skin tumors is intensifying interest in DN.
Aim. There is a need to study the dermatoscopic features of DN and further elucidate the pathogenetic mechanisms of this melanocytic dermatosis that may affect the course of DN.
Materials and methods. We observed 70 cases of clinically atypical melanocytic tumors in adult patients 18-65 years old. The selection parameters were dermatoscopic criteria of «atypical nevi». We determined 13 dermatoscopic features that accompany DN: structureless areas, irregular globules, atypical pigment network, gray dots, blotches (hyperpigmentation), blue-white veil, negative pigment network, polymorphous vessels, «starburst» pattern, angulated lines, multiple colors, regression structures, pseudopods. The dermatoscopy with photographic recording was performed using devices Heine delta 20 plus, Dermlite Fotofinder handyscope, Illuco IDS 1100, Xiaomi M2003J6B2G, Canon EOS 1100D.
Results. We obtained this frequency of distribution of dermatoscopic signs: structureless areas – 77,1% (n=54/70), irregular globules – 51,4% (n=36/70), atypical pigment network – 40% (n=28/70), gray dots – 37,1% (n=26/70), blotches – 31,4% (n=22/70), blue-white veil – 30% (n=21/70), negative pigment network – 17,1% (n=12/70), polymorphous vessels – 14,3% (n=10/70), «starburst» pattern – 12,8% (n=9/70), angulated lines – 12,8% (n=9/70), multiple colors – 8,6% (n=6/70), regression structures – 8,6% (n=6/70), pseudopods – 7,1% (n=5/70). The study shows that the most common criterion is the structureless area, which is present in the majority of lesions.
Conclusions. The most common dermatoscopic feature was structureless areas. Generally, they were combined with another mentioned signs. Although the research is still ongoing and we hope to find correlations that will help in the early diagnosis of melanoma, it is definitely possible to trace their connection with DN. Dermatoscopy plays an important role both in the primary diagnosis of pigmentary neoplasms and in the dynamic observation of DN and is an integral tool in the routine practice of a dermatologist.

Keywords: **melanocytic lesions, atypical nevi, atypical naevi, dermatoscopy of melanocytic tumors, melanoma prevention, melanocytic dysplasia, skin neoplasms, dermatopathology, immunohistochemistry**

INTRODUCTION

Since the second half of 20th century the diagnostic and treatment of dysplastic nevi (DN) have been the subject of controversy in the field of dermatology and dermatopathology. Diagnostic changeability and lack of standardized nomenclature continue to cause unsureness among clinicians, dermatopathologists and patients [1]. Most of the world's leading dermatologists consider DN a precancerous melanocytic dermatosis but in recent years there have been attempts to revise these scientific ideas according to which DN is considered melanoma *in situ* [2]. It is alarming that in 15 years in Ukraine the incidence rate of melanoma has increased by 70% and the mortality rate has increased by 15.3%. The main increase in morbidity is observed at the expense of older age

groups as well as an increase in the diagnosis of localized forms of this pathology. Therefore, there is a need to study both the pathomorphological features of DN and further disclosure of the pathogenetic mechanisms of this melanocytic dermatosis which can affect the course of DN [3]. Ethyology and pathogenesis of dysplastic nevi are controversial [4]. DN are thought to be most prevalent in young adults but can appear or regress at any age [1]. They may be found on any anatomic surface, including sun-protected areas. Large series with epidemiological data about them are needed.

AIM

There is a need to study the dermatoscopic features of DN and further reveal the pathogenetic mechanisms of this melanocytic dermatosis that can affect the course of DN.

MATERIALS AND METHODS

We observed 70 cases of clinically atypical melanocytic tumors in adult patients 18-65 years old that had been dermatoscopically recorded and exited. We observed 70 cases of clinically atypical melanocytic tumors in adult patients aged 18 to 65 years, which has been dermatoscopically recorded and excised. Histological reports showed various degrees of dysplasia. All studied skin lesions belonged to acquired pigmented formations, had a distinctive picture from the existing lesions on the skin of patients, therefore showed clinical «atypia» [2]. The selection parameters were dermatoscopic criteria of «atypical nevi» which are described in the literature [2]. We determined and collected 13 dermatoscopic criteria which accompany DN: structureless areas, irregular globules, atypical pigment network, gray dots, blotches (hyperpigmentation), blue-white veil, negative pigment network, polymorphous vessels, «starburst» pattern, angulated lines, multiple colors, regression structures, pseudopods. All of the studied cases had a combination of the listed signs (Fig.1). We note that degree of expressions of dermatoscopic features can relate with the level of dysplasia. Below are the definitions of the criteria presented. Structureless areas are those within a lesion that are devoid of any structures. The size should be at least 10% of the lesion's total surface area. Irregular globules vary in size, shape and color, and can be frequently found focally and irregularly at the periphery of the lesion. The atypical pigment network is irregularly cancellated with lines that vary in width and degree of pigmentation and with «holes» that are heterogeneous in area and shape. An atypical network presents foci with wider and darker pigmented lines; the network often ends sharply at the lesion's periphery [1, 5, 7]. An atypical network within a lesion may also appear disheveled and broken up, a finding referred to as «branched streaks» [1, 5, 6]. Gray dots (also called granules or peppering) are due to fine melanin particles within melanophages or as extracellular «dust» in the superficial dermis; this feature is associated with regression [5, 7]. A blotch is defined as an area with a size that is at least 10% of the lesion's surface area and is heavily pigmented [5, 7]. In a blotch, the melanin pigment is often present throughout the skin, including *stratum corneum*, epidermis, and the dermis [5, 8]. Blue-white veil is confluent blue pigmentation with an overlying white «ground-glass» haze [5, 9]. The negative pigmented network consists of relatively lighter areas comprising the apparent grid of the network and relatively darker areas filling the apparent «holes» [5, 6]. Polymorphous vessels are used to describe the vasculature of lesions in which two or more types of vessel morphologies are detected [5, 10]. «Starburst» pattern is typified by multiple streaks of pigmentation or large globules arranged symmetrically at the periphery of the lesion in a radiating pattern like that of a star [5, 11]. In dermatoscopy, angulated lines are straight lines that meet at angles larger than 90 degrees but do not intersect [5, 12]. They can form complete or partial polygonal shapes. They are also known as polygons, zigzag or rhomboids pattern [5, 13]. Histological nature of these lines is still unknown, but there is opinion that they correspond to proliferation of atypical melanocytes at the dermoepidermal junction (DEJ) together with a local accumulation of melanophages [13]. Multiple colors are connected to different shades in lesion and appears as additional sign in pigmented lesions [14]. Regression structures appear dermatoscopically as white scar-like depigmentation or «peppering» (speckled multiple blue-gray granules) [15]. Pseudopods are bulbous and often kinked projections seen at the lesion edge [16], either directly associated with a network or solid tumor border [17].

The dermatoscopy with photographic recording was performed using devices Heine delta 20 plus, Dermlite Fotofinder handyscope, Illuco IDS 1100, Xiaomi M2003J6B2G, Canon EOS 1100D.

RESULTS

All of studied lesions had a combination of the presented criteria. We obtained this frequency of distribution of dermatoscopic signs: structureless areas – 77,1% (n=54/70), irregular globules – 51,4% (n=36/70), atypical pigment network – 40% (n=28/70), gray dots – 37,1% (n=26/70), blotches – 31,4% (n=22/70), blue-white veil – 30% (n=21/70), negative pigment network – 17,1% (n=12/70), polymorphous vessels – 14,3% (n=10/70), «starburst» pattern – 12,8% (n=9/70), angulated lines – 12,8% (n=9/70), multiple colors – 8,6% (n=6/70), regression structures – 8,6% (n=6/70), pseudopods – 7,1% (n=5/70). The study shows that most common criterion is structureless area that presented in majority lesion (Tab. 1).

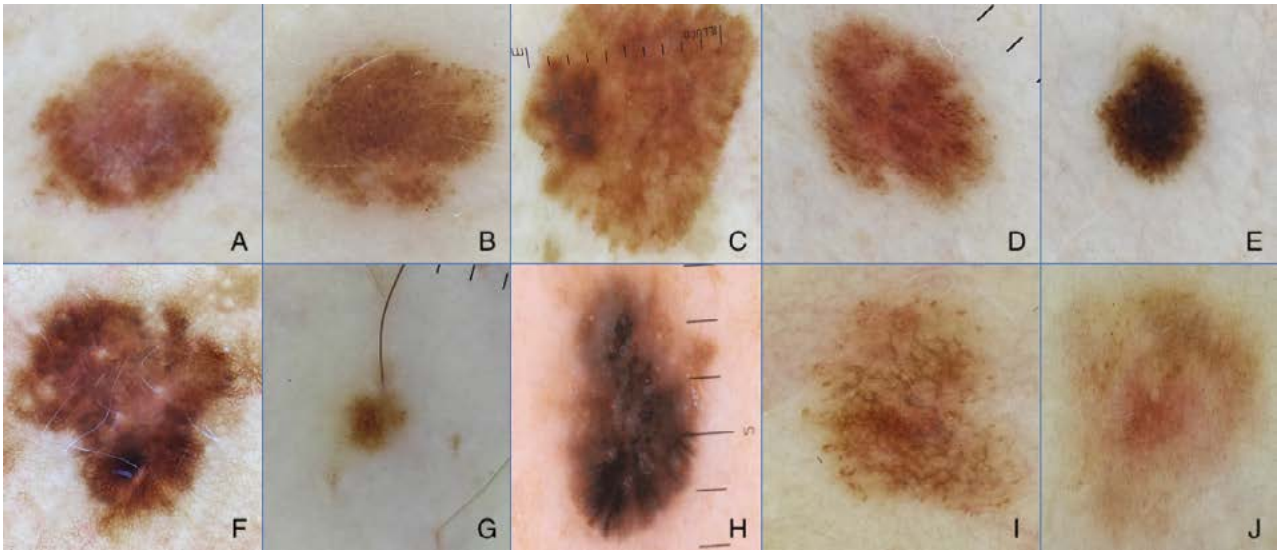

Figure 1. A – structureless areas, irregular globules, angulated lines, regression structures, blue-white veil; B – structureless areas, irregular globules; C – structureless areas, irregular globules, blotches, negative pigment network; D – structureless areas, irregular globules, atypical pigment network; E – blotches, structureless areas, irregular globules, pseudopods; F – atypical pigment network, multiple colors, blotches, regression structures; G – atypical pigment network, irregular globules; H – «starburst» pattern, gray dots, blotches; I – atypical pigment network, structureless areas, irregular globules; J – polymorphous vessels, blotches, structureless areas.

Table 1

Percentage and quantitative distribution of dermatoscopic features according to the results

Dermatoscopic feature	Frequency of occurrence, %	Quantity of cases
Structureless areas	77,1	54
Irregular globules	51,4	36
Atypical pigmented network	40	28
Gray dots	37,1	26
Blotches	31,4	22
Blue-white veil	30	21
Negative pigment network	17,1	12
Polymorphous vessels	14,3	10
«Starburst» pattern	12,8	9
Angulated lines	12,8	9
Multiple colors	8,6	6
Regression structures	8,6	6
Pseudopods	7,1	5

DISCUSSION

The study is currently ongoing and we are planning to find correlations between dermatoscopic criteria and immunohistochemistry, nevertheless often DN and melanomas show common dermoscopic features. We are expecting that intensity level of these features correlate with histopathology and will help to build a diagnostic protocol. Different reviews show lack of clinical diagnostic of dysplastic nevi [19]. Mnemonic ABCD'e used as clinician rule for melanoma diagnosis is incorrect and leads to diagnostic bias in 2 from 3 cases also lack of standardized nomenclature continues to cause uncertainty among clinicians and dermatopathologists. At the same time, dermatoscopy should be used for the clinical diagnosis of all pigmented lesions. Do we need to rethink the diagnoses severely dysplastic nevus and melanoma *in situ*? The study of the problem is still ongoing but there are some evidences to reject or support diagnostic thresholds. First was proof on the natural origin of these lesions, which we found was occasional as both severely dysplastic nevus and melanoma *in situ* are commonly managed with excision. According to the data of the one statistic model study only 3,5% of lentigo maligna (a subtype of melanoma *in situ*) could evolve into lentigo maligna melanoma (a subtype of invasive melanoma) [19]. Second was evidence of the solidity of diagnostic criteria for the two types of lesions. One of the studies – by Elmore et al., [20] detected bad reproducibility for diagnoses of severely dysplastic nevus and melanoma *in situ*. Third was a clue to diagnostic displacement in the diagnostic threshold over time, such that a more 'malignant' diagnostic label would now be applied, even though the same melanocytic tumor was

previously recognized as benign. We found two studies affording evidence of diagnostic displacement, both at high risk of bias. These studies both propose an implicit lowering of the diagnostic thresholds for melanoma and severely dysplastic nevi over time, causing an extension of the disease determination [19]. Thereby, occasional natural origin evidence affords indefinite but likely low risk of evolving from melanoma *in situ* to invasive melanoma, and insignificant risk of evolving from severely dysplastic nevus to invasive melanoma. These types of lesions may be better conceptualized as risk factors for, rather than obligate precursors to, invasive melanoma. There is strong evidence of low reproducibility for diagnosis of both types of lesions, and some evidence that disease definitions have expanded over time. There is a need for robust discussion, both in the clinical and pathology communities, on the benefits and weaknesses of changing diagnostic thresholds and/or terminology to address potential overdiagnosis. Such discussions could be alleviated through an international summit on the topic, which would inform the next steps towards achieving change in policy and practice for pathology diagnosis.

CONCLUSIONS

The most common dermatoscopic feature was structureless areas. Generally, they were combined with another mentioned signs. Although the research is still ongoing and we hope to find correlations that will help in the early diagnosis of melanoma, it is definitely possible to trace their connection with DN. Dermatoscopy plays an important role both in the primary diagnosis of pigmentary neoplasms and in the dynamic observation of DN and is an integral tool in the routine practice of a dermatologist.

Perspectives of further research. All histopathological materials we subject to immunohistochemistry with the study of Ki-67, SOX10, PTEN. Literature analysis shows perspective using of PTEN as a predictor of malignancy [18]. We are planning to find and implement the pathway of melanoma prediction and model of prevention.

FUNDING AND CONFLICT OF INTEREST

The study was conducted at the authors' own expense. The authors report no conflict of interest or external funding.

COMPLIANCE WITH ETHICAL REQUIREMENTS

The research was conducted in accordance with the fundamental principles outlined in the «Rules of Ethical Principles for Conducting Medical Research Involving Human Subjects,» as stated in the Helsinki Declaration (1964-2013).

AUTHOR CONTRIBUTIONS

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Резюме

ДЕРМАТОСКОПІЧНІ ОСОБЛИВОСТІ ДИСПЛАСТИЧНИХ НЕВУСІВ

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Вступ. Диспластичні невуси (ДН) є предметом суперечок між клініцистами та патологами. Не існує стандартного підходу до їх діагностики та лікування, що викликає багато розбіжностей. Водночас зростання захворюваності на злоякісні пухлини шкіри посилює інтерес до ДН.
Мета. Виникла необхідність вивчення дерматоскопічних особливостей ДН і подальшого виявлення патогенетичних механізмів цього меланоцитарного дерматозу, які можуть впливати на перебіг ДН.
Матеріали та методи. Ми спостерігали 70 випадків клінічно атипових меланоцитарних пухлин у дорослих пацієнтів 18-65 років. Параметрами відбору були дерматоскопічні критерії «атипових невусів». Ми визначили 13 дерматоскопічних критеріїв, які супроводжують ДН: безструктурні ділянки, атипові глобули, атипова пігментна сітка, сірі крапки, плями (гіперпігментація), синьо-біла вуаль, негативна пігментна сітка, поліморфні судини, патерн «starburst», кутові лінії, багатокольоровість, структури регресу, псевдоподії. Дерматоскопію з фотозйомкою проводили на апаратах Heine delta 20 plus, Handyscope Dermlite Fotofinder, Illuco IDS 1100, Xiaomi M2003J6B2G, Canon EOS 1100D.
Результати. Ми отримали таку частоту розподілу дерматоскопічних ознак: безструктурні ділянки – 77,1% (n=54/70), атипові глобули – 51,4% (n=36/70), атипова пігментна сітка – 40% (n=28). /70), сірі точки – 37,1% (n=26/70), плями – 31,4% (n=22/70), синьо-біла вуаль – 30% (n=21/70), негативна пігментна мережа – 17,1% (n=12/70), поліморфні судини – 14,3% (n=10/70), патерн «starburst» – 12,8% (n=9/70), кутові лінії – 12,8% (n=9/70), множинні кольори – 8,6% (n=6/70), структури регресу – 8,6% (n=6/70), псевдоподії – 7,1% (n= 5/70). Дослідження показує, що найпоширенішим критерієм є безструктурна ділянка, яка представлена в більшості випадків.
Висновки. Найпоширенішою дерматоскопічною ознакою були безструктурні ділянки. Як правило, вони поєднувалися з іншими згаданими ознаками. Хоча дослідження ще тривають, і ми сподіваємося знайти кореляції, які допоможуть у ранній діагностиці меланоми, однозначно можна простежити їх зв'язок з ДН. Дерматоскопія відіграє важливу роль як у первинній діагностиці пігментних новоутворень, так і в динамічному спостереженні ДН і є невід'ємним інструментом у повсякденній практиці лікаря-дерматолога.

Ключові слова: **меланоцитарні утворення, атипові невуси, дерматоскопія меланоцитарних уражень, профілактика меланоми, меланоцитарна дисплазія, новоутворення шкіри, патологія, імуногістохімія**

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