DERMOSCOPY TEACHING PROGRAMME

MODULE 1. LOCAL AND GENERAL CRITERIA IN PIGMENTED MELANOCYTIC LESIONS.

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Dermoscopy is a non-invasive in vivo technique that provides illumination and magnification (10x) of cutaneous structures not visible with the naked eye. In expert hands, increases the diagnostic accuracy of pigmented lesions. It requires training and is not intended to replace histopathologic examination.

The first dermatoscopes were oil-immersion based. Now we have modern polarized light devices, which allow checking multiple lesions in the same patient.
Oil-immersion and polarized light dermoscopy both provide high quality images, in general, oil immersion allows a better visualization of nail and mucosal lesions. Polarized light devices allow better visualization of vascular structures, which is important in amelanotic melanoma and in non melanocytic tumours, such as basal cell carcinoma.

Dermoscopic examination allows the identification of different structures and colours. By assessing dermoscopic images, two basic groups of features should be analysed:

- *Local features*: represent the letters of the dermoscopic alphabet
- *Global features*: allow a quick initial categorisation of a pigmented lesion before more detailed examination.

DERMOSCOPIC COLOURS

Colour plays an important part in dermoscopy. The colour of cutaneous lesions is mainly determined by the presence of melanin and blood vessel density.
Melanin appears *black* in the stratum corneum and upper epidermis, light to dark *brown* in the epidermis, *gray to bluish* in the papillary dermis and *steel blue* in the reticular dermis. The colour *red* is associated with vascularity and/or inflammation and *white* is often due to depigmentation, regression or scarring.

DERMOSCOPIC LOCAL FEATURES

There are several dermoscopic algorithms for diagnosing pigmented lesions but most dermatologists use the pattern analysis. The basic principle is that pigmented skin lesions are characterized by global patterns and combinations of local criteria.
The main local criteria of melanocytic lesions are:

The **Pigment network** is a web-like structure of brown/black lines and hypopigmented holes that create a “honeycomb pattern”. It has been classically described as typical and atypical**.**

Typical network pattern is characterized by uniform, regular lines and holes, homogeneous colour, and usually fades at the periphery.

Atypical network pattern shows non-uniform, darker and/or broadened lines with heterogeneous holes in areas or shapes. The lines are often hyperpigmented and end abruptly at the periphery.

Dots and globules are defined as small round to oval brown, black or gray-bluish structures less than 0.1 mm diameter (dots) or larger than 0.1 mm (globules). Dots and globules are uniform in shape and evenly distributed in benign melanocytic lesions (commonly in the centre of a lesion). In malignant melanomas they show variable size and shape and are frequently found at the periphery.

Streaks or radial streaming appear as linear extensions at the edge of the lesion, being called *pseudopods* when they show knobs at the end of the projections. A symmetric peripheral arrangement over an entire lesion is very suggestive of Reed's naevus. In malignant melanomas streaks are usually irregular and with a patchy distribution.

Structureless (homogeneous) areas are regions devoid of any discernible structures (dots, globules, network, etc). They can be hyperpigmented (*blotches*, see below) or hypopigmented. Focal central hypopigmented areas devoid of structures are relatively common in acquired naevi, including dysplastic naevi, while in malignant melanomas tend to be located in the periphery.

Blotches are dark brown to black areas of pigment obscuring the underlying structures. Blotches appear as structureless focal areas in benign lesions and are asymmetrically and irregularly distributed in malignant melanomas.

The **blue-whitish veil** appears as an irregular focal confluent blue pigmentation with overlying, white, ground-glass haze. The presence of blue-white veil in a melanocytic lesion is almost exclusively found in malignant melanomas and Spitz/Reed naevi.

Regression areas are revealed as white, scar-like pigmentation often combined with blue-gray granular peripheral zone ("peppering"). Regressed areas show milky white hue, usually lighter than the surrounding skin, along with small foci of blue areas often leading to a gray-blue coloration. The white areas from regression should be distinguished from the normal hypopigmentation present in some melanocytic naevi.

GLOBAL FEATURES: DERMOSCOPIC PATTERNS

Melanocytic lesions may display one or more of the structures and colours mentioned above, whose location and distribution allows the recognition of distinct global patterns that are characteristic of certain specific lesions.) In many cases, a combination of patterns is the most frequent finding within a lesion.

Reticular pattern is characterized by a pigment network covering most parts of a given lesion, and represents the most common global feature in

melanocytic lesions. Reticular pattern is the dermoscopic hallmark of acquired melanocytic naevi (in particular the junctional type, and thin malignant melanomas. A typical reticular pattern shows a uniform symmetrical network. In malignant melanoma and dysplastic naevi the network is prominent, irregular and asymmetrically distributed, often with an abrupt cut off at the periphery.

Globular pattern displays a predominance of numerous round oval globules variable in size and colours. A globular pattern is commonly found in melanocytic naevi (especially compound and intradermal naevi, and in some seborrhoeic keratoses, where the globules are uniform in size and distribution. In dysplastic naevi and malignant melanomas, the globules show different size and asymmetric distribution throughout the lesion, being very suggestive of malignant melanoma when reddish in colour.
"Cobblestone pattern" is considered a variant of the globular pattern: large angulated globules form close aggregates resembling cobblestones. This pattern is frequently seen in congenital melanocytic naevi and seborrhoeic keratoses. In malignant melanoma, the cobblestone globules are not uniform and often have a red colour; other structures such as regression areas and atypical vessels are also frequently seen.

Starburst pattern is characterized by the presence of pigmented streaks in a radial arrangement around the periphery of a lesion. A typical starburst pattern is commonly seen in Spitz/Reed's naevi, where the radial arrangement of streaks is symmetric and present around the entire periphery of the lesion. Malignant melanomas usually have a patchy distribution of peripheral streaks and globules. Beware that a minority of malignant melanomas display a typical starburst pattern, thus representing a major pitfall (false-negative cases). Caution is advisable when finding a starburst pattern in a melanocytic lesion in adults, these lesions should be excised, even those cases with typical pattern.

Homogeneous (structureless) pattern appears as a diffuse, brown, grey or bluish pigmentation in the absence of pigment network or other discernible structures. A blue homogeneous pattern is the dermosocpic hallmark of blue naevi. However, it may also appear in other melanocytic naevi (where the homogeneous pattern is usually brown in colour), nodular and metastatic malignant melanomas, thrombosed haemangiomas and, occasionally, in basal cell carcinomas. When malignant melanomas display a brown dark or bluish homogeneous pattern it is usually associated with fine vascular structures, which are absent in blue naevi.

Parallel pattern is exclusively found in melanocytic lesions on palms and soles due to particular anatomic structures inherent to these regions.
Parallel furrow pattern represents the most common dermoscopic pattern in acral melanocytic naevi. The parallel lines tend to be thin and homogeneous in benign lesions, and the pigment is found in the sulcus superficialis, following the skin furrows. Several variants of this pattern have been described, such as fibrilar, and lattice-like.
Parallel ridge pattern is the dermoscopic hallmark of acral malignant melanomas. The parallel lines tend to be thick and heterogenous, being the

pigment found in the crest; the openings of the eccrine ducts can often be seen in the centre of the pigmented lines.

Multicomponent pattern is characterized by the presence of three or more distinct structures within the same lesion. The multicomponent pattern is highly suggestive of malignant melanoma, but may be also found in basal-cell carcinomas. Occasionally, congenital melanocytic naevi and acquired melanocytic naevi may display a multicomponent pattern. Lesions showing a multicomponent pattern on dermoscopy should be managed with caution.

Unspecific pattern is reserved for pigmented lesions, which cannot be categorized into one of the abovementioned global patterns. Although this non-specific pattern does not have diagnostic implications, if atypical vessels are seen (especially dotted or irregular linear), malignant melanoma should be strongly considered in the differential diagnosis.

TWO-STEP DERMOSCOPY ALGORITHM

The two-step algorithm is a well-established approach for the initial evaluation of a pigmented lesion. In the first step, the lesion under investigation is classified as melanocytic or non-melanocytic according to the recognition of certain structures. The presence of pigment network, dots and globules, streaks, and homogeneous blue pigmentation, are considered criteria of melanocytic lesions. If none of these structures are present, the lesion should be evaluated for criteria of non-melanocytic lesion, which will further help in the diagnosis.

If the lesion has criteria for a melanocytic lesion, the second step of the algorithm should be applied to differentiate between benign and malignant lesions. Experienced dermoscopists almost exclusively rely on pattern recognition to help differentiate between melanocytic naevi and malignant melanomas. In order to simplify the differential diagnosis for beginners, I propose a simplified algorithm. Melanocytic criteria with asymmetric and heterogenous distribution and/or the presence of blue-white veil, regression features and atypical vessels in a pigmented lesion are features suggestive of malignancy.

Lesions with no specific criteria for either melanocytic or non-melanocytic lesions need to be considered melanocytic by default and malignant melanoma has to be ruled out, especially if vessels are visible (malignant melanoma may present as a completely featureless lesion).

FURTHER READING

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