Review Article

THE ROLE OF DERMOSCOPY IN DIAGNOSIS OF BENIGN SKIN NEOPLASMS

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ABSTRACT

Benign skin neoplasms are commonly found in the population. It has a well-differentiated and slow growth nature. The patients often come seeking treatment when the tumor has developed into malignancy. This usual delay in diagnosis and therapy frequently happens because early-stage mass has not generated any complaints by the patients. Detection and monitoring of benign skin neoplasms can be carried out earlier and more effectively if the clinician or dermatologist has the knowledge of distinguishing benign from malignant lesions. The histopathological examination can help to establish the diagnosis, but this method is invasive and requires an extended amount of time. Dermoscopy is a practical, non-invasive and accurate method for early detection of skin disorder which reduces the number of unnecessary excisions of benign skin neoplasms. Knowledge of the vascular pattern and arrangement description, combined with the additional dermoscopic feature can lead to the prompt diagnosis of benign skin neoplasms.

Keyword: Dermoscopy; benign skin neoplasms; diagnosis; diseases; tumor

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1. Dermoscopy is a practical, non-invasive and accurate method for reducing the number of unnecessary excision of benign skin neoplasms.
2. Knowledge about vascular pattern and description setting can lead to a prompt benign skin neoplasm diagnosis.

INTRODUCTION

The incidence of skin neoplasms becomes more common, especially in the United States, Australia, and England. According to several studies, white people have a threefold increased risk of developing skin malignancies. In Indonesia, a tropical country where UV rays from the sun are quite intense and most people engage in activities that expose them to direct sunlight, the process of skin cancers is influenced (Rata 2016, Tsai & Dlugosz 2019).

Benign skin neoplasms are well-differentiated, grow slowly, and are frequently delayed in therapy. Benign skin neoplasms can be unsightly and maybe an indication of other disorder that can potentially be malignant. History taking, physical examination with the introduction of skin fluorescence, dermoscopy, and skin biopsy as the gold standard can all be utilized to assist in the identification of skin malignancies (Djuanda et al. 2016). Due to the lack of biopsy as a gold standard of diagnosis, understanding the practical features of many biopsy techniques, as well as the difficulties that can arise from a skin biopsy and how to handle them, is essential (Sonthalia et al. 2021).

The use of dermoscopy can improve the diagnostic accuracy of suspected skin malignancy in primary care physicians in several countries with sensitivity and specificity of 79.2% and 71.8% for dermoscopy, respectively, compared to 54.1% and 71.3% for naked eyes. The significant difference in sensitivity on dermoscopy was p=0.002 (Argenziano et al. 2006).

Dermoscopy is a link between microscopic and macroscopic aspects of a skin tumor that has a direct clinical and histopathological correlation. This reviewed the clinical aspects of common benign cutaneous neoplasms and recognized a classic hallmark in dermoscopy of some benign skin neoplasms. Furthermore, a review was necessary in order that doctors or dermatologists could recognize early management of skin therapy to prevent a malignancy or cancer of the skin.

OVERVIEW

Benign Skin Neoplasms

Tumor or neoplasms refers to swelling; an indication of inflammation, a pathological enlargement, or new growth of tissue with uncontrolled cell multiplication long after progressive stimulus has gone away. It is usually differentiated or mature with slow growth, no invasive or metastatic potential, does not spread to other parts of the body, and is usually isolated and encapsulated (Cuda et al. 2019).

Incidences and pathogenesis of benign skin neoplasms

The incidence of benign skin neoplasms varies in each population because the occurrence of neoplasms and their development is influenced by several factors, especially exposure to ultraviolet light and familial factors (Cuda et al. 2019).

A retrospective study showed that seborrheic keratoses (SK) ranked first for benign skin neoplasms (29.2%) out of 355 new patients with skin neoplasms (Hamzah & Effendi 2011). Another study on 482 patients (16.3%) with 21 types of benign skin neoplasms had found that among the group of patients with benign skin neoplasms, 132 patients (27.4%) verruca Vulgaris and 121 patients (25.1%) with SK were the most common benign skin neoplasms (Wijaya et al. 2011).

The etiology of skin neoplasms, whether benign or malignant, is not known with certainty, but there are factors that play an important role in the incidence of neoplasms in the skin, including internal and external factors. Internal factors include genetic, immunologic, race, and gender involvement. Irregularities in the expression of apoptotic markers p53 and Bcl-2 have been reported, although no genetic or chromosomal locus imbalance has been detected so far. Most individuals with skin neoplasms have a positive family history. External factors include carcinogens or chemicals (such as hydrocarbons, lead, nickel, etc.), sun exposure, environment, stress, and trauma/ infection (Tsai & Dlugosz 2019).

These internal and external factors predispose the local tissue to lose control over its growth at the gene level. Pluripotent epidermal cells and/or their epidermal or adnexal origin are assumed to be the source of the tumor (Djuanda et al. 2016).

Classification of benign skin neoplasms

Benign skin neoplasms are usually classed based on their origin, predisposition, clinical symptoms, and treatment options. Other research divides skin tumors into groups based on their histologic origin, age, location, and clinical characteristics. There is no uniformity in the classification system for benign skin neoplasms because of the varied origins and clinical features (Cuda et al. 2019).

The Indonesian Collegium of Dermatology and Venereology divides benign epidermal neoplasms, epidermal cysts, and adnexal benign neoplasms into benign epidermal neoplasms, epidermal cysts, and adnexal benign neoplasms; benign neoplasms of melanocytes and nevus cells; benign neoplasms of connective tissue; benign neoplasms of fat tissue and disorders of fat metabolism; benign neoplasms caused by viruses and vascular hyperplasia (Hamzah & Effendi 2011). The following types of benign skin neoplasms are frequently reported (Table 1).

Table 1. The most common type of benign neoplasms

Types of benign neoplasm	Tumor origin	Predilection site
Seborrheic Keratoses	Epidermis	Face Upper body
Nevus Pigmentosa	Neural crest	Face and body
Haemangioma	Blood vessel	Face, Trunk
Skin Tag	Fibrovascular tissue, epidermis, and dermis	Area of skin folds
Syringoma	Eccrine gland	Upper/lower eyelids Cheek Forehead
Xanthelasma	Lipid deposits	Eyelid
Keloids	Connective tissue Trauma	Deltoid area Chest Extremities
Solitary Trichoepithelioma	Hair follicle	Face, Body

Source: Djuanda et al. (2016)

The role of dermoscopy in benign skin neoplasms

Dermoscopy has been demonstrated to improve sensitivity for detecting skin malignancies when compared to naked-eye examination (NEE), with no loss of specificity. Essentially, dermoscopy allows biopsy specimens to be acquired from a smaller

number of lesions and this is reflected in the decreased number of benign lesions from which biopsy specimens are acquired for every skin cancer discovered (Yelamos et al. 2018).

Although skin biopsy is a simple outpatient procedure, complications such as bleeding, infection, and scarring may occasionally be encountered while performing a biopsy in an out-patient with basic infrastructure can occur and it is prudent to avoid them. When they occur, to recognize and manage them effectively (Killic et al. 2020, Sonthalia et al. 2021).

Minimizing factors such as improper lesion selection, poorly executed technique, unspecified clinical diagnosis, insufficient clinical information, faulty tissue fixation, and processing, improper staining for specific diagnoses, or insufficient collaboration between the dermatologist and the dermatopathologist. Furthermore, using dermoscopy to choose a biopsy site, as well as immunohistochemical staining and immunofluorescence procedures (if needed), can improve diagnostic accuracy (Korfitis et al. 2014, Ramsey & Rostami 2022).

Dermoscopy is an excellent tool for improving skin cancer diagnosis, as it offers high sensitivity for detecting skin malignancies while maintaining high specificity. A thorough understanding of dermoscopy is necessary; it can serve as a link between clinicians and pathologists, enhancing clinicopathologic correlation (Gulia et al. 2012, Yelamos et al. 2018).

Many diagnostic criteria and models have been established during the last decade to aid the proper detection of melanocytic lesions. Several studies have demonstrated that there are three algorithm approaches that can be employed and are accurate in distinguishing between benign and malignant skin lesions. The analysis pattern is based on extensive, qualitative evaluations of many factors on each individual. As a result, proper dermoscopy training is required (Gulia et al. 2012).

The physicians or doctors must be familiar with some dermoscopy terminology to do a dermoscopy examination. The terminology includes descriptive (clods, reticular lines, angular lines) and unique metaphors (globules, pigment network, rhomboid) (Kittler et al. 2016).

The following are various dermoscopy algorithms that can be used to distinguish between benign and malignant skin lesions (Table 2).

Table 2. Dermoscopic algorithms

Algorithm	Criteria	Description
ABCD rule of dermoscopy	Asymmetry, irregular borders, multiple colors, different dermoscopic structures within the lesion	A score >5.45 indicates a malignant lesion in a semiquantitative scoring method. A score of 5.45 indicates a benign lesion.
Seven-point checklist	Major criteria: network, blue-white veil, and atypical vascular pattern Minor criteria: irregular dots/globules, irregular streaks, irregular blotches, and regression structures	Each major criterion receives two points, while the minor criterion receives one point. Melanoma must be diagnosed with a total score of 3 or higher.
Three-point checklist	Asymmetry (streaks, dots/globules) Pigment network (typical, atypical) Blue-whitish veil	Critical evaluation of morphology and distribution of dermoscopic features

Source: Wang et al. (2012)

The role of dermoscopy in seborrheic keratoses

Seborrheic keratoses (SK) are keratinocyte neoplasms that are common and benign. They have distinct clinicopathologic characteristics. It most commonly affects people between the age of 40-50 years and over (Rata 2016). The hallmarks of clinical SK are flat lesions with obvious boundaries, light brownish to dark brown in hue, dull, and with pseudohorn cyst. All types of SK have a favorable family history. Seborrheic areas, such as the chest, back, abdomen, face, and neck, are frequently affected (Kittler et al. 2016).

Figure 1. (a) clinical manifestations of SK, (b) dermoscopy appearance of the *milia-like cyst*, (c) *Comedo-like opening*, (d) *Moth-eaten border*, (e) *Hairpin-shaped*

After the advent of dermoscopy in 1998, the diagnostic accuracy for skin neoplasms and SK grew dramatically, attaining a sensitivity of 95.7% and a specificity of 78.3% (Carrera et al. 2017).

Dermoscopy, which looks for *milia-like cysts* (cloudy or starry), *comedone-like opening* (clods, brown, yellow, or orange lumps), *moth-eaten border,* fissures, and peaks, can assist to confirm the clinical diagnosis of SK. Another secondary dermoscopy feature of SK is the presence of well-defined blood vessels with a smooth superficial surface in a *hairpin-shaped structure* (Kittler et al. 2016). A study indicated that there were only 10% of the 203 SK were suspect and required histological confirmation (Carrera et al. 2017).

The role of dermoscopy in nevus pigmentosus

Nevus Pigmentosus is a benign skin tumor composed of nevus cells with skin disorders in the form of pigmentation. The location of these cells can be in the epidermis (junctional), the dermis (intradermal), or both areas (compound) (Rata 2016, Cuda et al. 2019). Nevus pigmentosus is a common problem since almost everyone has a nevus, with a 400% chance of turning cancerous if it changes. Nevus pigmentosus can affect any region of the body's skin, including mucous membranes close to the skin's surface.

Dermoscopy can reveal the deeper skin structure and characteristics of the junctional, compound, and dermal nevi, allowing for a better understanding of their prognosis. Dermoscopy has a sensitivity of 95.7% in nevus pigmentosus, making it a reliable alternative to

the histological investigation. Dermoscopy features of nevus pigmentosus include typical pigment networks (lines, reticular, regular with minimal variations in color, thickness, and arrangement of pigment lines); *cobblestones* pattern*; starburst* pattern*;* and homogenous pattern (Wang et al. 2012, Kittler et al. 2016).
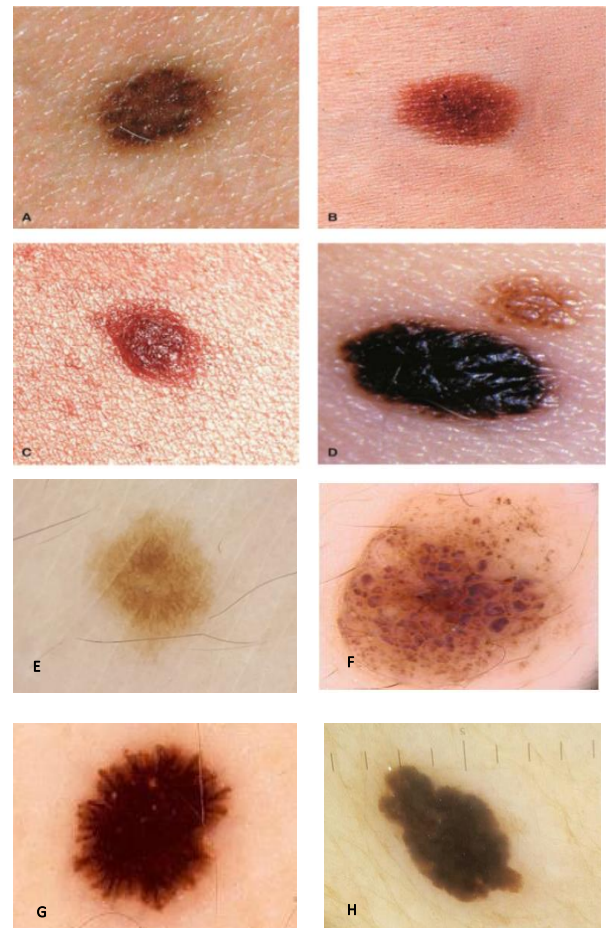

Figure 2. (a-d) clinical manifestations of nevus pigmentosus, (e) dermoscopy appearance of typical pigment network, (f) cobblestones pattern, (g) starburst pattern, (h) homogenous pattern

The role of dermoscopy in hemangioma

Hemangioma is a benign tumor that develops in the skin, mucous membranes, and other organs as a result of abnormalities in the development and creation of blood vessels caused by endothelial cell proliferation. Hemangiomas are classified histopathologically as capillary hemangioma, cavernous hemangioma, or mixed capillary and cavernous hemangioma (Ahuja et al. 2013).

Hallmark dermoscopy hemangioma is the presence of *lacunae* characterized by well-defined, round, or oval areas, colored red, reddish-brown or reddish-blue, black separated from the stroma without other vascular

structures in it (red-purple *lacunes*) (Zaballoi et al. 2012).
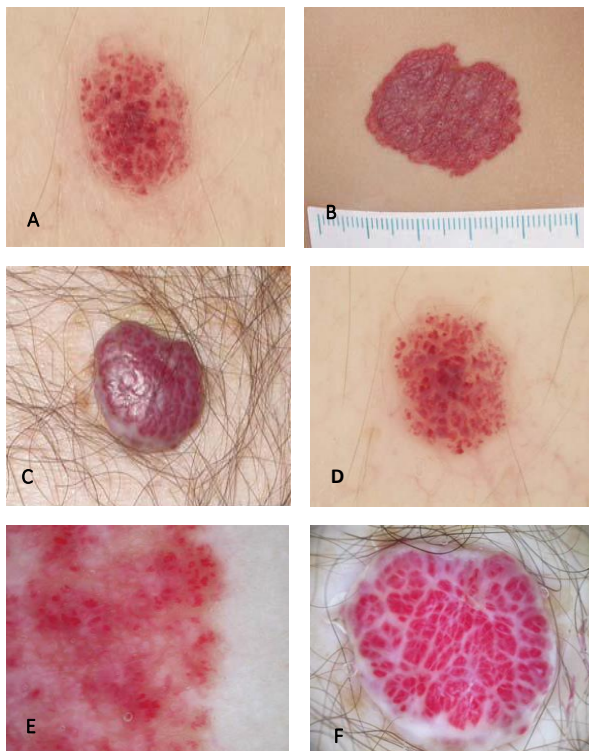

Figure 3. Clinical manifestations of *cherry* hemangioma (a) with appearance of *lacunae* in the middle and dilatation of peripheral blood vessels on dermoscopy (d); infantile hemangioma (b) with multiple, small, well-defined, homogenous red-white *lacunae* with red network of blood vessels on dermoscopy (e); other clinical manifestations of *cherr* hemangioma with multiple red *lacunae*, well-defined and tightly fused (f).

The role of dermoscopy in epidermal cyst

An epidermal cyst is one of the most common benign neoplasms, originating from the proliferation of epidermal cells and contains keratin. It is most common in areas rich in sebaceous glands, such as the face, neck, upper chest, and upper back. It is also linked to injuries to the palms and soles, as well as the buttocks. The lesion is a dome-shaped nodule with a central punctum that varies in diameter, is firm in substance, has a smooth surface, and is easily movable from the base yet adheres to the skin. The existence of a punctum, or pores of follicular origin, is a diagnostic clue, and epidermal cysts frequently mimic basal cell cancer (BCC) (Cuda et al. 2019).

The dermoscopy appearance of an epidermal cyst is a pore sign or comedo, and is a keratin-filled orifice that appears whitish, yellow, brown, or black in color (Figure 3c-d), and no characteristic features of

arborizing BCC are found, such as vessels and large ovoid nests. Besides, a study reported in 83 patients with a diagnosis of epidermal cysts who underwent dermoscopy examination found 90% gave a pore sign (Ghigliotti et al. 2014).
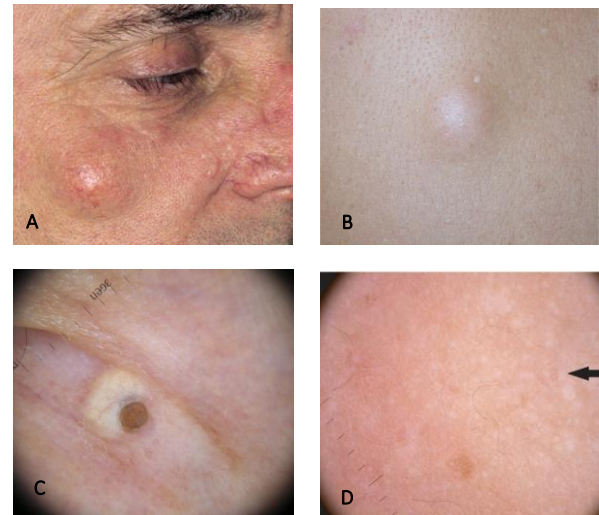

Figure 4. (a, b) clinical manifestations of epidermal cysts, (c) dermoscopy appearance of comedo with brown center and surrounded by yellow-white color, telangiectasia, (d) pore sign indicated by a black arrow

The role of dermoscopy in lymphangioma

Lymphangioma is a lymphatic vessel abnormality that often develops after birth. Lymphangiomas are divided into three types based on their clinical and histological characteristics there are localized circumscribed lymphangiomas, circumscribed lymphangiomas, and cavernous lymphangiomas. Circumscribed lymphangioma is the most frequent clinical type of lymphangioma, characterized by clusters of transparent, frog-like vesicles that develop shortly after birth or at any age. Lymphangia, hemangioma, angiokeratoma, and molluscum contagiosum are all possible diagnoses for this condition (Rata 2016, Zaballos et al. 2017).

Depending on the amount of blood in the vesicles, lymphangioma has a variety of dermoscopy patterns, characterized by a *lacunar* arrangement, clear fluid-filled lesions are light brown *lacunas* bordered by pale septa. When vesicles are blood-filled, dermoscopy characteristics vary depending on the amount of blood, localized crimson patches inside the lagoons for low blood content, pink diffuse coloration for a little amount of blood, or reddish to liliaceous *lacunar* structures for a larger amount of blood. In this situation, lymphangioma and hemangioma may be difficult to tell apart (Zaballos et al. 2017).
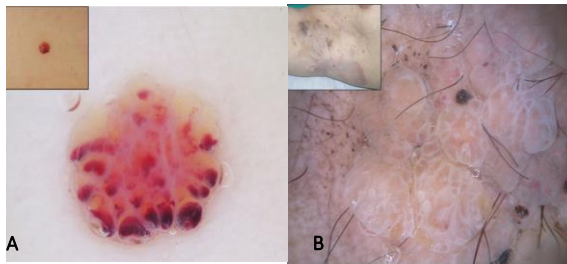
Figure 5. (a) clinical manifestations of circumscribed lymphangioma with *two-tone lacunae*, yellowish, with white lines and vascular structures, (b) yellowish *lacunae* with white stripes

The role of dermoscopy in angiokeratoma

Angiokeratoma is a benign hyperkeratotic vascular proliferation. Although the specific cause of angiokeratoma is unknown, causal factors include trauma, pregnancy, or tissue hypoxia. It clinically shows the presence of hyperkeratotic papules, solitary or multiple dark red to blue-black with a diameter of 2-10 mm, are present clinically. Five types of angiokeratomas are recognized angiokeratoma of Mibelli, angiokeratoma of Fordyce (angiokeratoma scrota), angiokeratoma corporis *diffusum*, angiokeratoma circumscriptum *naeviforme,* and solitary angiokeratoma (Sadana et al. 2014).

Dark *lacune*, whitish veil, erythema, peripheral erythema, red *lacunae*, and hemorrhagic crusts were all seen in at least 50% of single angiokeratomas. The most accurate pattern for a correct diagnosis of angiokeratoma is dark l*acunae* with sensitivity and specificity of 93.8% and 99.1%, respectively (Papageorgiou et al. 2018).

Figure 6. (a) clinical manifestations of solitary angiokeratoma, (b) dermoscopy appearance of red *lacunae,* (c) scrotal angiokeratoma (c), (d) with a whitish veil

Strength and limitation

The topic of early detection and monitoring of benign skin neoplasms is important for both patients and healthcare providers.The article acknowledges the delay in diagnosis and therapy that often occurs with these types of tumors, highlighting the need for improved detection methods.The article does not provide specific data or research to support its claims about the effectiveness of dermoscopy in detecting and monitoring benign skin neoplasms.

CONCLUSIONS

Recognition and finding of benign skin neoplasms lesions are highly essential to assist in establishing the diagnosis and treatment. Dermoscopy is one of the diagnostic tools used to aid in the diagnosis of benign neoplasms. It was useful in clarifying the patterns and structures in the lesion, resulting in a more accurate clinical diagnosis, and allowing for more appropriate therapy in determining the extent of the lesion that requires excision and some benign neoplasms have a classic hallmark that could improve diagnostic accuracy.

Conflict of interest

None0

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Author contribution

IP contributed conseptual, collecting data, and analysis data. MS was write the manuscript. IP was final checking content.

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