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Chapter

Pigmented Lesions of the Eyelid Margin

Wojciech Adamski and Kinga Adamska

Abstract

The eyelid area poses a diagnostic and therapeutic challenge due to its specific anatomy. The eyelid is composed of skin, orbicularis muscle, tarsus, and the eyelid margin is continuous with palpebral conjunctiva. Among pigmented tumors, benign lesions such as epidermal or intradermal nevi, freckles, lentigo, or seborrheic keratosis are the most common. Melanoma is relatively rare in this location. A suspicious lesion may be biopsied or excised. Surgery in the eyelid area requires special considerations to maintain a safe surgical margin, vital function of the eyelid, and acceptable cosmetic effect due to the exposure of the eyelid region of the face.

Keywords: eyelid, margin, nevus, melanoma, seborrheic keratosis

1. Introduction

The main functions of the eyelid are to provide protection for the moist surface of the eye. Due to its function and exposition to outside factors such as sunlight, it has distinctive anatomy and requires a unique approach. Because of its location



Figure 1.
A hand dermatoscope with a contact plate designed for difficult anatomical locations.



Figure 2.
A small junctional nevus visualized with a contact plate designed for difficult locations.

and morphology, it often poses a challenge for contact dermatoscopy in diagnosis and requires distinct surgical methods when such an approach is necessary. Lesions located in the eyelid area may be visualized using a non-contact dermatoscope. More accessible areas of this region may be visualized with contact dermatoscopy using a non-alcoholic medium and a special contact plate designed to be used in difficult anatomical locations (**Figures 1 and 2**). Due to a close relation with sensitive conjunctiva, the examination may be preceded by applying local anesthetic drop (e.g. Proxymetacainum) into the conjunctival sack in order to prevent pain reflex and eyelid closure. To reduce the risk of irritation, an ophthalmic gel may be used instead of the immersion fluid. Another less recommended approach may involve a dry dermatoscopy, without a contact plate or with a contact plate, but without immersion fluid.

2. Relevant anatomy

The eyelid can be divided into four layers. Eyelid skin is continuous with the skin of the face, although it is substantially thinner. Underneath the skin lies the striated muscle called the orbicularis muscle, which is responsible for eye closure. Deeper lies the tarsus, a strong plate of dense connective tissue with meibomian glands. The innermost layer of the eyelid is the conjunctiva. The eyelids contain various glands like the eccrine sweat glands of the eyelid skin and the accessory lacrimal gland of Krause and Wolfring in the conjunctiva, the gland of Moll (an apocrine gland), and the sebaceous glands—the Meibomian glands and the glands of Zeiss.

Benign and malignant tumors may originate in all of the mentioned layers, although they are usually of skin origin, mostly epidermal [1].

Although the most numerous epithelial tumors of the eyelid margin like basal cell carcinoma except for its pigmented variant, epithelial cysts, or actinic keratosis will mainly not be discussed in this chapter.

3. Benign melanocytic eyelid tumors

3.1 Freckles

Freckles are small (1–5 mm in diameter), flat brown skin spots located in skin exposed to sunlight. They are usually multiple lesions in one site. Histologically, there is hyperpigmentation of the basal cell layer but no elongation of the rete ridges. They tend to darken after exposition to sunlight and lighten when devoid of it. With time they may clinically disappear. Dermoscopic features include evenly distributed pigmentation and a moth-eaten border [2, 3].

3.2 Simple lentigo

Simple lentigo (lentigo simplex) is a skin lesion with well-demarcated borders, light to dark brown. Arise due to melanocyte proliferation in the basal layer of the epidermis. They do not darken when exposed to sunlight which differentiates them from freckles. Multiple appearances of lentigo simplex lesions are called lentiginosis [4]. Dermoscopic features include structureless homogenous pigmentation. These lesions may be congenital and may be associated with genetic syndromes like Peutz-Jeghers Syndrome, Carney Complex, or LEOPARD Syndrome [5]. Dermoscopic features include a uniform thin brown, black or blue network (**Figures 3 and 4**).

3.3 Nevi

Nevus is commonly found in the area of the eyelids. It is a heterogeneous group of lesions with a wide array of clinical and histological presentation.

3.4 Congenital nevus

A congenital nevus is found in the skin of the eyelids in about 1% of newborns. It may vary in size, from small to large. Large lesions have a higher rate of malignant transformation. Histologically a congenital nevus is similar to an acquired nevus.



Figure 3.
Lentigo simplex of the lower eyelid.

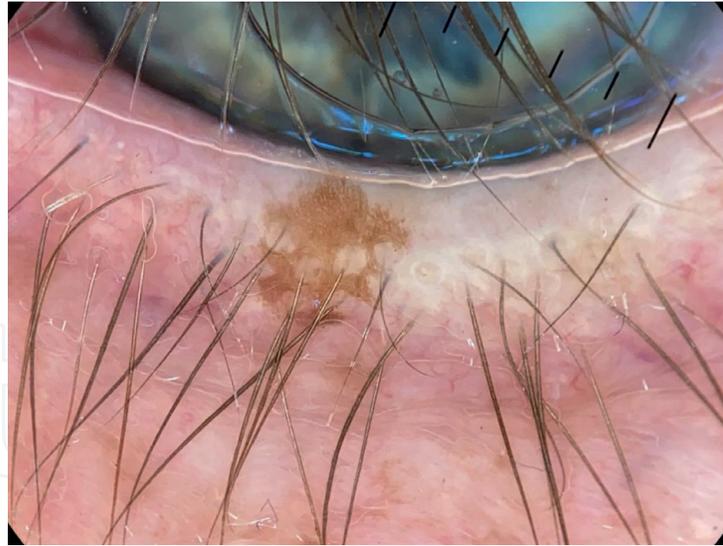


Figure 4.
Lentigo.

3.5 Kissing nevus

A kissing or split nevus is a rare subtype of a congenital nevus that appear on both the upper and lower eyelid. Its unique morphology indicates that it developed early in utero, before the 20th week of gestation, when the eyelids are divided [6, 7]. Due to its difficult location involving both eyelids and usually a large diameter as well as typically benign nature, those type of nevi are not usually surgically treated [7].

3.6 Nevus of Ota

Nevus of Ota (oculodermal melanocytosis) is a benign melanocytic lesion involving the face and eyelid region, specifically the area supported by the ophthalmic and maxillary branches of the trigeminal nerve. It is usually congenital but may appear in puberty. It appears due to the entrapment of melanocytes in the upper third of the dermis. The deeper location of melanocytes gives this lesion a blue/gray appearance. The cause of the failure of migration of the melanocytes to their typical location in the basal layer of the epidermis remains unknown. In addition to covering the eyelids nevus of Ota may also involve the conjunctiva as well as the sclera, increasing the risk of developing glaucoma. It also affects the uveal tract of the eye, increasing the risk of uveal melanoma. Histologically distinct dendritic melanocytes can be found in the affected areas [8]. It is usually unilateral. Some authors use the term “nevus of Hori” for a bilateral involvement [9].

3.7 Acquired nevus

Acquired nevus appears commonly in the eyelid area. The lesions usually appear in childhood and may increase in size during patient growth.

Histologically there are three main types of acquired nevus, according to the location of melanocyte proliferation: the junctional nevus, located in the dermo-epidermal junction, the intradermal nevus, located only in the dermis, and the compound nevus, which involves both of these locations. Junctional appears mainly among younger patients and presents as a flat, evenly colored spot. Dermatoscopic features include reticular or globular patterns, interrupted by the presence of follicular openings, the intradermal nevus is located deeper in the dermis and may be elevated

or papillomatous in shape. It might be slightly pigmented or have no pigmentation (achromic) at all. Dermatoscopic features may include comma vessels, globular pattern, centered coma, and occasionally arborizing vessels in case of repetitive trauma. A compound nevus combines the characteristics of the previous lesions.

A distinct subtype of intradermal nevus appearing in the face and neck region is called the Miescher's nevus. Its dermatoscopic features may include a homogeneous globular pattern with the focal and symmetric arrangement of globules arranged in a cobblestone pattern.

Some achromic intradermal nevus located on the eyelid margin may be misdiagnosed as basal cell carcinoma, which is typically found in the lower eyelid. Madarosis is often associated as a sign of malignancy, brown structureless



Figure 5.
A subtle junctional nevus close with a line of Meibomian glands. Courtesy of Pawel Pietkiewicz MD, PhD.



Figure 6.
A junctional nevus of the eyelid margin.



Figure 7.
Compound nevus of the eyelid margin with a junctional nevus of the conjunctiva.

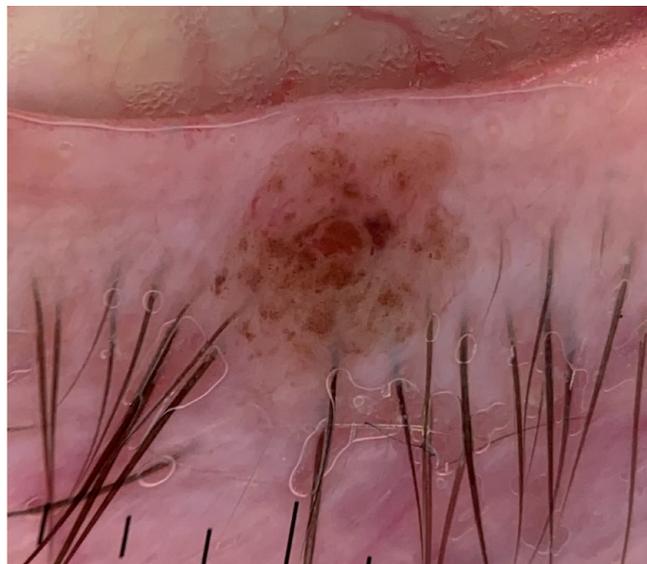


Figure 8.
Intradermal nevus of the eyelid margin – So called Miescher's nevus.



Figure 9.
An achromic intradermal nevus of the eyelid margin.



Figure 10.
An achromic intradermal nevus of the upper eyelid.



Figure 11.
An achromic kissing nevus of the upper and lower eyelid.

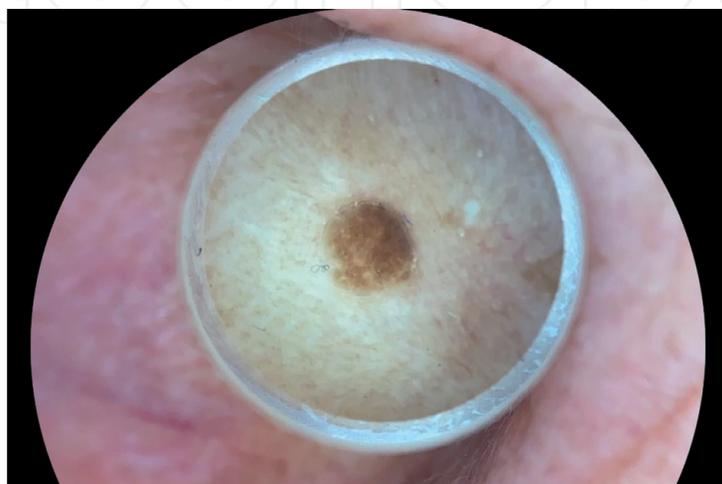


Figure 12.
An intradermal nevus as seen in dermatoscope.



Figure 13.
An intradermal nevus of the eyelid margin.



Figure 14.
A hypochromic intradermal nevus of the eyelid margin initially referenced as basal cell carcinoma.

pigmentation and brown globules are on the other hand more frequent in a nevi. Basal cell carcinoma has a more shiny and smooth surface, deprived of hair, whereas dermal nevus is more papilomatous with visible skin markings and hair follicles (**Figures 5–14**) [10].

3.8 Spitz and blue nevus

A Spitz and blue nevi are distinct types of melanocytic nevi. Their location in the eyelid area is extremely rare, and only a handful of cases have been described in the literature so far [11, 12].

4. Other benign lesions

4.1 Seborrheic keratosis

This benign skin lesion is a proliferation of basaloid cells. Although it is not composed of melanocytes, it may be pigmented in appearance due to a transfer of melanin from them to the keratinocytes. It is usually a well-demarcated plaque or papilla [13]. Dermatoscopic features include fingerprinting or cerebrilike (brain-like) structures, comedo-like openings or pseudocomedones, moth-eaten borders, sharp demarcation and milia-like cysts, and centered looped vessels (**Figure 15**) [14].

4.2 Cystic lesions

The eyelid skin is rich with glandular tissue which may produce cystic lesions like epidermal inclusion cysts, hidrocystomas which appear when a gland duct is occluded. Those benign lesions may sometimes be misdiagnosed as malignant, especially when filled with blood or blood components that give them a pigmented appearance. The most typical dermatoscopic findings include the structureless pattern with cystic intradermal space filled with fluid and the presence of arborizing vessels (**Figures 16 and 17**) [15].

4.3 Malignant lesions

4.3.1 Melanoma

Melanoma of the eyelid region is sporadic, comprising less than 1% of all malignant eyelid lesion [16]. Due to the fact that the lower eyelid is much more exposed to ultraviolet light, melanoma appears much more commonly in this region compared to the upper eyelid [17]. It affects mainly patients with blond or red hair, pale skin, and the presence of multiple skin lesions, a tendency to burn and tan poorly, and a history of sunburn in childhood as well as artificial tanning before 25 years old.

The most common histological variants of melanoma in the eyelid area are lentigo maligna melanoma and superficial spreading melanoma [18, 19]. The most common dermatoscopic features include a higher number of dermatoscopic structures, and colors. The most prevalent pattern of melanoma in the face include gray

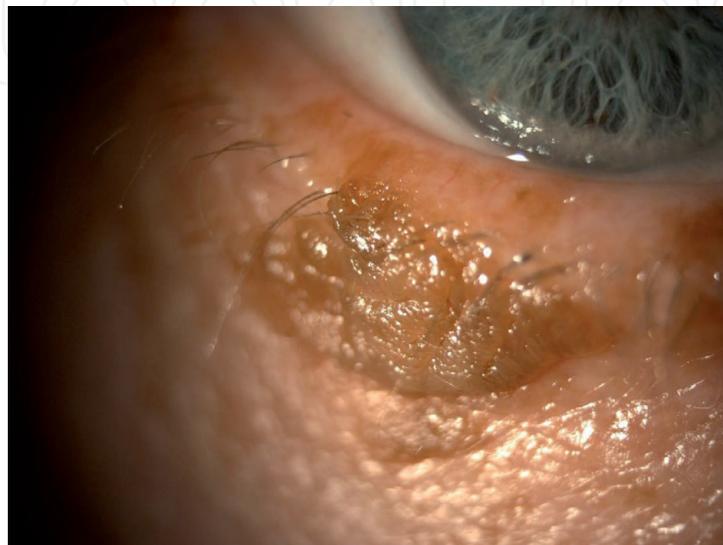


Figure 15.
Verruca seborrhoica.

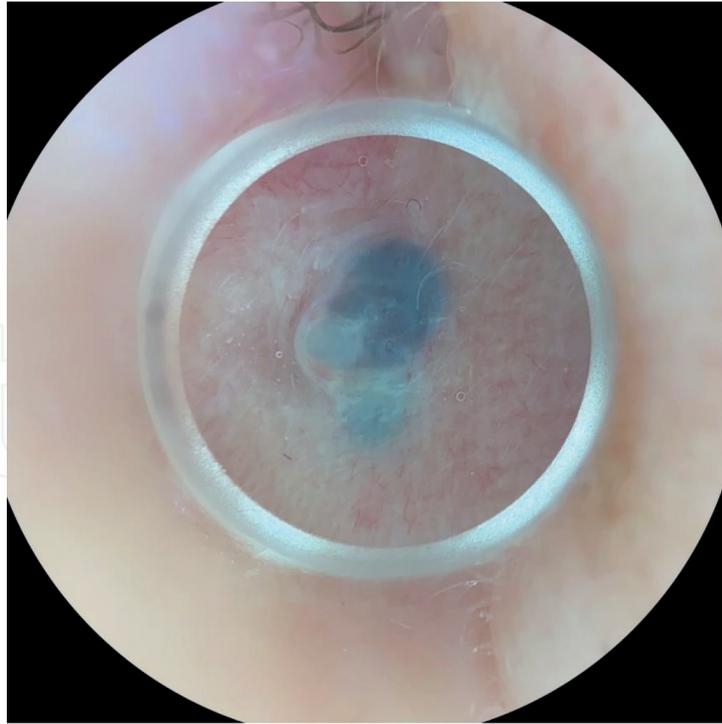


Figure 16.
Inclusion cyst filled with blood.

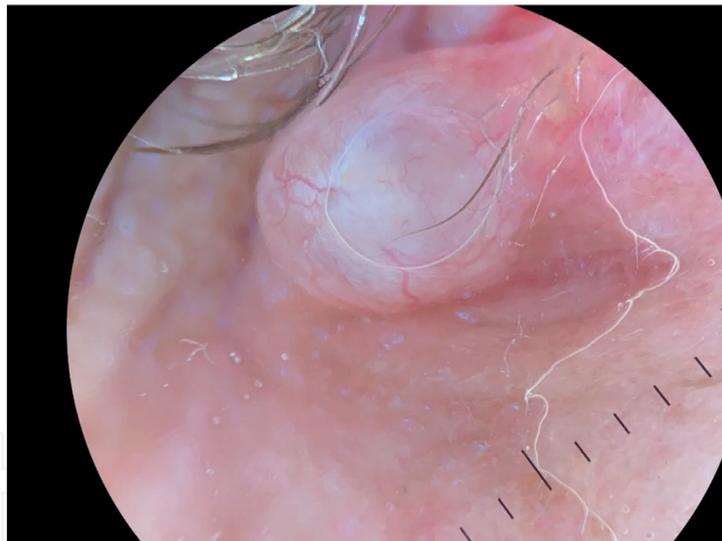


Figure 17.
Inclusion cyst of the eyelid margin.

color (homogenous areas, globules, dots, and circles), annular-granular pattern (dots aggregated around hair follicles), rhomboidal structures, and finally, obliterated hair follicles in invasive melanoma. Additional features include a shiny white line and a blue-whitish veil (**Figures 18 and 19**).

4.3.2 Basal cell carcinoma

Basal cell carcinoma (BCC) is the most common malignant skin lesion, accounting for 86% of all cutaneous malignancies. BCC is typically located in the lower eyelid or medial canthus. Clinically and histologically, the most common variants are the nodular, superficial, micronodular, morphiform, and pigmented. Pigmented BCC (pBCC) it is uncommon in light skin types, and more common in darker

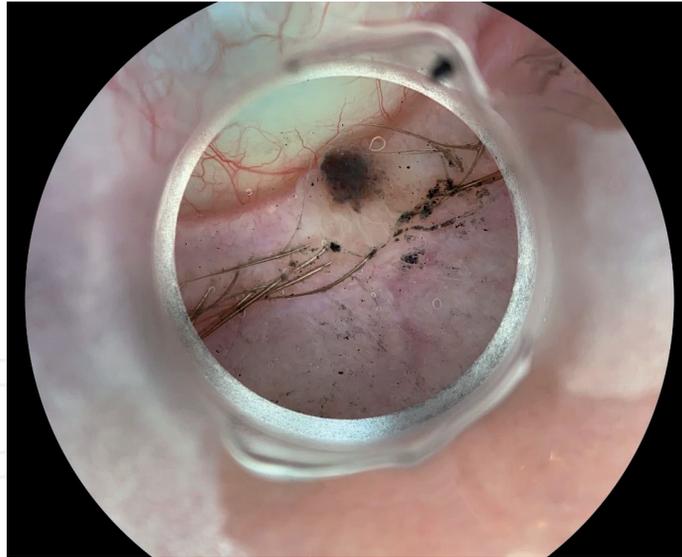


Figure 18.
A suspicious compound nevus of the eyelid margin.

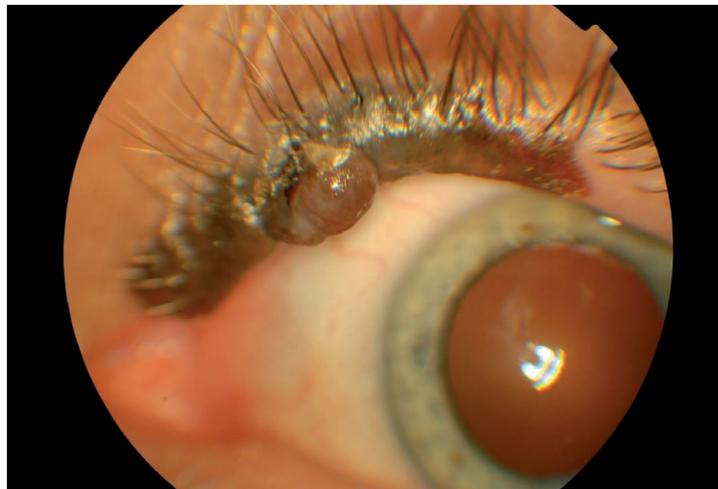


Figure 19.
Superficial spreading melanoma of the eyelid margin with a vertical nodular growth.

ones. The reason for the pigmented appearance of these lesions is that, that histologically they are composed of basaloid tumor cells intermingled with dendritic melanocytes. The melanocytes themselves usually do not demonstrate any atypical characteristics. No prognostic differences in pBCC are noted in comparison with clinically nonpigmented lesions [20]. Dermatoscopic features may vary. The most common dermatoscopic findings include arborizing vessels as well as mentioned above intense pink homogenous areas or yellow collar corresponding to ulceration. The vascular patterns may be different depending on the type of BCC. Nodular BCC usually presents with classical arborizing vessels while short telangiectasia suggests superficial BCC. Additional features may include leaf-like areas, spoke wheel-like areas, milia-like cysts, large ovoid nests, and target-like areas. Up to 10% of BCCs may contain pigmented structures like globules or dots [21–23]. Accurate dermatoscopic examination of the lesion borders may help plan surgical margins which may prove different than the ones observed surgically (**Figures 20 and 21**).

4.4 Conjunctival lesions

Infrequently, conjunctival lesions may also affect the eyelid margin. In the case of diffuse conjunctival infiltration, the involvement of eyelid skin should be

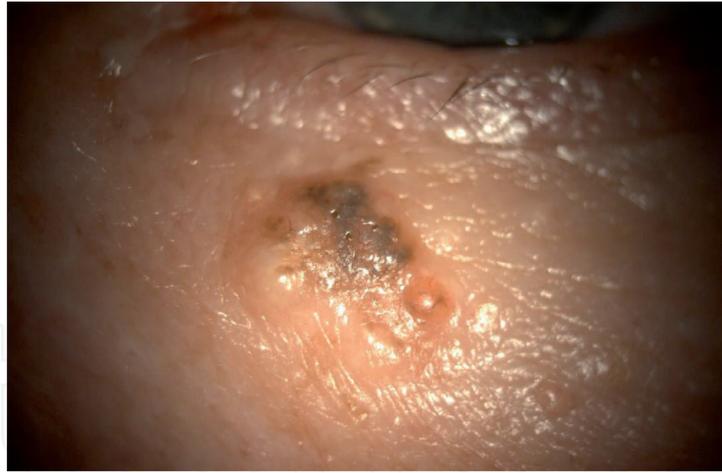


Figure 20.
Pigmentary basal cell carcinoma of the eyelid presenting shiny pearly-like surface.

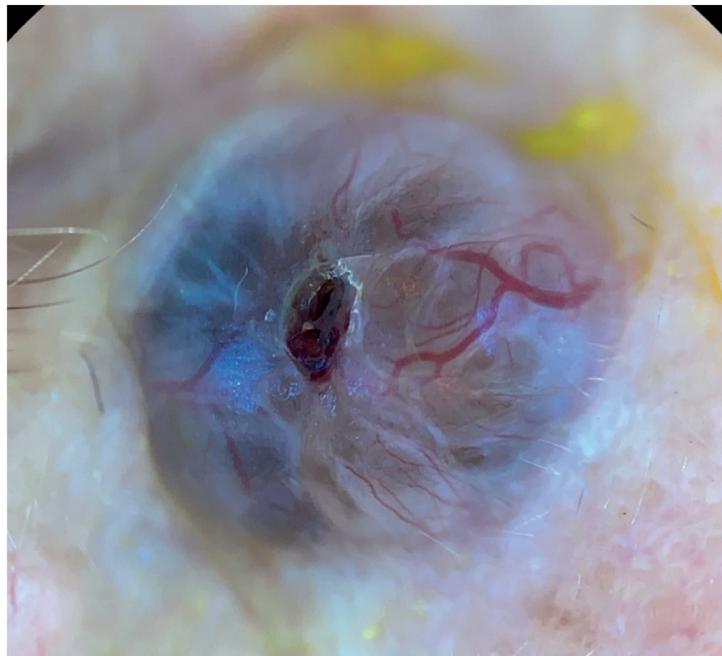


Figure 21.
Pigmentary basal cell carcinoma of the eyelid with ovoid nests, arborizing vessels, and central ulceration.

considered a poor prognostic factor. When noticing a melanocytic lesion of the eyelid margin, one should perform a precise assessment of the conjunctiva and conjunctival fornix, both the lower and the upper. Dermoscopic features of conjunctival melanoma were characterized as structureless areas, irregular dots, and a high prevalence of gray coloration [15]. Authors suggest that typical dermatoscopic features of skin melanoma may be also present in conjunctival melanoma such as atypical pigment network, irregular dots, and globules, regression structures, as well as blue-white veil (**Figure 22**) [24].

5. Lacrimal caruncle

While not specifically part of the eyelid region, the caruncle remains an interesting aspect. Although it may be confused with conjunctival tissue due to its proximity, it is, in fact, a skin fold covered with sebaceous and sweat glands located in the

medial canthus of the eye. Due to its nature, although infrequently, it may be a point of origin for various skin lesions, mainly nevi or papillomas (**Figure 23**) [15, 25].

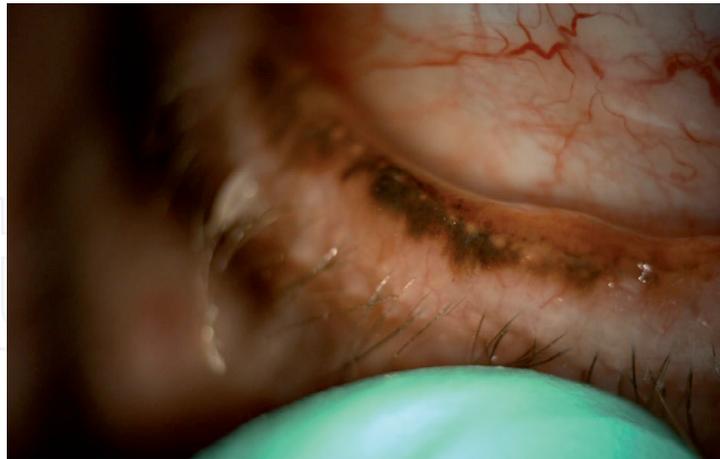


Figure 22.

Melanoma in situ of the conjunctiva, affecting the eyelid margin presenting black-brown-gray homogeneous area sparing hair follicle openings.

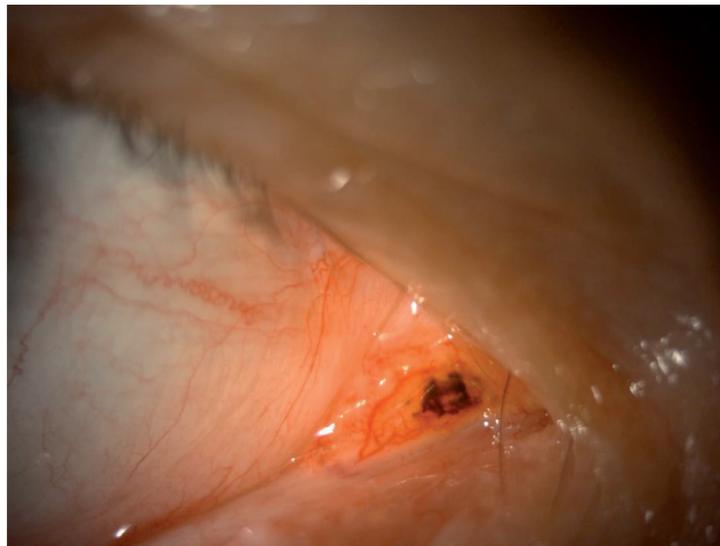


Figure 23.

Junctional nevus of the caruncle.

6. Approach to pigmented eyelid lesions

Because of the distinct anatomy of the eyelid, pigmented lesions of this area require a specific approach. Due to the eyelid being a very important cosmetic feature of the face, some patients pay special attention to lesions appearing in this region. Benign pigmented lesions may be removed by an ophthalmologist or an oculoplastic surgeon using surgery or other destructive methods such as cryotherapy or laser treatment after a careful dermatoscopic examination. Suspicious lesions require an incisional or excisional biopsy to determine their nature. Incisional biopsy should be chosen for large lesions, while small may undergo excisional biopsy.

Basal cell carcinoma with its pigmented variant may require Mohs micrographic surgery to safely assess its margins with the least healthy tissue traumatization.

General guidelines for the management of melanoma located in different areas of the body, where wide surgical excision is performed with margins according to the Breslow scale are not perfectly suitable for eyelid skin. It is caused by the specific

anatomy of skin in this region and by the proximity of critical structures and difficulties with reconstructive surgery of large eyelid defects. Because of that, most surgeons suggest 3–5 mm surgical margins, however, this issue remains controversial, as some authors use up to 10 mm of safe surgical margin [17, 18, 26]. Long-term observations suggest a high rate of recurrence in the area of the head and neck.

Diffuse melanoma of the conjunctiva with the involvement of the eyelid region may require orbital exenteration which includes removal of the eyelids, the eyeball, and all surrounding tissues and remains a very traumatizing surgical procedure.

7. Conclusion

Because of the distinct anatomy of the eyelid, pigmentary lesions of this area require a specific, multidisciplinary approach including a dermatologist, ophthalmologist, oculoplastic surgeon, and oncologist.

Acknowledgements

All photographs presented in this chapter, unless stated otherwise, have been captured in Ocular Oncology Service, Department of Ophthalmology, Poznan University of Medical Sciences.

Conflict of interest

The authors declare no conflict of interest.

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