BIOLOGY CAPSTONE EXAMPLE

EPIDEMIOLOGY OF MELANOMA

INTRODUCTION

Melanoma is one of the most malignant skin tumors. It emerges from melanocyte pigment cells that malignantly alter and are tend to early lymph and hematogenic metastasis. It makes to about 5% of all primary malignant skin tumors but is responsible for about 80% of all deaths of skin tumors. The annual increase in illness is around 7%. Melanoma occurs in unchanged skin or precursor lesions. It usually occurs on the skin, but it can also occur on the mucous membranes, the eye and the nervous system. The greatest malignant potential have innate and dysplastic nevus. Melanoma is usually dark in color, from brown to black, but can be without pigment. Melanoma goes through three stages of growth: melanoma in situ (stage of malignant melanocyte appearance in the epidermis), radial phase (signifies lateral spread) and vertical phase (phase of dermis invasion). According to clinical features and histologic pictures we distinguish 4 most common types: surface spreading melanoma - SSM, nodular melanoma - NM, lentigo malignant melanoma - LMM and acral lentiginous melanoma - ALM. Most common is the surface spreading melanoma with the highest incidence on the backs of men and lower limbs in women. Clinical signs suggesting melanoma suspect are asymmetrical, irregular, toothed or frustrated edges, colors that may vary from light to dark brown, usually larger than 6 mm. The prognosis of melanoma is primarily associated with the thickness of the tumor (Breslow), the existence ulceration and increased number of mitosis.
According to the relative five-year survival rate, the 0-stage prognosis is 97%, the I-stage is 90-95% / 75%, the IIA-stage is 80% / 65%, IIB stadium has 72-75% / 50-60%, IIC stage has 53% / 44%, III-stage has 45% and IV-stage has 10% survival. In remote metastases at IV stage, depending on one or more metastatic sites, the survival rate in one year decreases. Other adverse prognostic factors are regression of part of the tumor, microsatellites, older age and male sex. Therapy is always a radical surgery, 1-3 cm into healthy tissue. If metastases are detected in regional lymph nodes, lymph nodes dissection is also performed. Early diagnosis and education are key to successful melanoma treatment. People with melanoma or skin cancer who are suffering from a family history or have dysplastic nevus syndrome (accumulation of dysplastic discomfort) should be dermatologically inspected at least once a year.

Melanoma is the result of malignant transformation of melanocytes or neurosis cell

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in precursor lesions. Such changes usually occur in congenital and dysplastic discomfort (DN), LMM, or melanocytic blue nevus. The real cause of melanoma is still unknown. There are numerous hypotheses that try to lead to the causal link of this tumor and certain exogenous and endogenous factors. What many authors agree is that there is a great association between melanoma formation and the amount of exposure to UV radiation. Particularly emphasized is the association of skin burns caused by UV radiation, early childhood and later melanoma. Therefore, among the exogenous factors are UV radiation, ozone depletion, oncogenic viruses, (retroviruses, papilloma viruses), (polychlorinated and polyvinylchloride) and drugs (immunosuppressive). In spite of the earlier opinion, according to current knowledge, the effect of oral contraceptives or substitute estrogens in the formation of melanoma was not observed. Exposure to UV radiation is still considered to be the major risk factor for the development of all skin cancer, including melanoma. The role of UV radiation in skin cancer pathogenesis has been demonstrated in numerous studies as well as in experimental photo-carcinogenesis. Namely, melanin absorbs UV irradiation in melanocytes, and released energy releases free radicals that lead to mutations on deoxyribonucleic acid receptions, resulting in a number of benign changes, i.e., the nose. Exposure to high intensity sunlight within the first ten years of life and the total number of noises are the strongest risk factors for melanoma development. It is important to mention the influence of artificial UV light used in therapeutic and cosmetic purposes in the formation of melanoma. The legacy also plays a very important role in the development of melanoma. The proportion of melanoma breast cancer patients in the total number of melanoma patients is 8-12%

There is no clinically typical melanoma image. But one should always doubt if notices signs on the skin such as: pigmented, especially black or dark blue stain or rising moon, changing the color of the existing mole, especially spreading red, white or blue pigmentation in the surrounding tissue, skin changes above the pigmented site, such as changes in strength or form and signs of skin inflammation surrounding the already existing mole. Melanoma can develop on previously unchanged skin or precursor lesions including congenital and acquired melanocytic neoplasms, dysplastic dislocations (DN) and lentigo malignant (LM), and may very rarely arise from melanocytic blue sores and in the case of diseases called xeroderma pigmentosum. Congenital melanocytic nevus are present at birth, while acquired melanocytic nevus occurs during the course of life. DN are pigmented skin lesions built from

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nevus cells. Clinical properties of DN are uneven pigmentation, irregular shape, sharp edges to healthy skin, diameter greater than 5 mm. It is characterized by not only clinical but also histological atypia. They are most often inherited, even if they occur sporadically. The incidence of sporadic DN in the population is 5-10%. In persons with more than six DN there is a statistically confirmed increase incidence of melanoma. DN have been observed in families with high incidence of melanoma, although they may be unrelated to a positive family history. WHO set the basic criteria based on the five major symptoms of alteration of melanoma, renowned as ABCDE symptoms indicating A - asymmetry - irregular shape of mole, B - border irregularity - obstructed, irregular, frustrated edges , C - (color variegation) change and / or color inequality, D - diameter - doubt if the muzzle is larger than 6 mm and E - elevation of the pigmented skin lesion above the skin, which has grown over time. Some authors also say about the symptom F-feeling - a long-lasting feeling of pain, itching, or nausea in the nail.

The appearance of melanoma is very different. Some people are experiencing all of the above changes, while others may have one to two unusual features. Melanoma is usually dark brown to black and part of the tumor can be without pigment. Amelanotic melanoma (melanoma without melanin) is rarely seen. Melanoma are with unusual morphological diversity, as the tumor can vary in size, shape, color, tumor penetration depth, as well as in secondary changes, such as wetting, scabies, erosion, ulceration.

Histopathological analysis provides a range of data that, apart from setting the diagnosis, can help determine prognosis and patient therapy. Microscopic examination provides data on: growth mode, degree of invasion, histological type, cell type, amount of melanin pigment, inflammatory infiltration on the base and edges, ulceration and number of mitosis. Melanoma can show two ways of growth, radial and vertical. The radial growth phase (horizontal, surface spread) is characterized by histological proliferation of melanocytes in the epidermis along the basal membrane (melanoma in situ) and / or proliferation in the surface of the papillary dermis. Tumors at this stage of growth have a very favorable prognosis. Vertical growth phase (growth by depth and height) is characterized by the ability of tumor proliferation and the formation of tumor mass in the dermis.

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