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Melanoma

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The Pathophysiology of Melanoma

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Introduction

There are many types of skin cancer prevalent in the world today. The three most common types of skin cancer are basal cell carcinoma, squamous cell carcinoma, and melanoma (Watson et al, 2015). This poster presentation will focus on the skin cancer known as melanoma. In the words of Hawryluk & Tsao (2014), "Melanoma is an aggressive malignancy borne of melanocytes, the pigment-generating cells of the skin". In 2013, malignant melanoma had an estimated 76, 690 new cases in the United States, with 9,480 deaths, that accounts for sixty percent of deaths from skin cancers (Hawryluk & Tsao, 2014). Melanoma has shown an "increase of 3-6% over the last few decades, making this one of the fastest growing cancers worldwide" (Liu et al, p. 1, 2014).

Melanoma is now a common occurrence in everyday practice. Nurse practitioners and physicians need to be aware of risk factors, keep watch on nevi, and consult the correct dermatological physicians if there is worry of melanoma. Within this poster presentation we will dive into the pathophysiology of melanoma including a patient scenario, with risk factors, sign and symptoms, and implications of nursing care.

The patient with Melanoma

A 50 year old Caucasian female, with blonde hair and fair skin presented to the office for a routine physical exam. The patient has a family history of melanoma and has been visiting the office every six months due to recurring basal cell lesions. A nevi on the right dorsal forearm has been under watch for a year now, with no change or issue. The practitioner suggest to remove the nevi for biopsy due to the risk factors the patient has.

A punch biopsy is done on the nevi and the pathology report confirms melanoma stage II. A wide excision of the right forearm with sentinel lymph node biopsy is done. The pathology report for the sentinel lymph biopsy comes back negative for metastasis. The patient continues to follow up with the practitioner every three to six months.

Four years down the road the patient discovers a lump under the right axilla. The patient is sent to a surgeons office for a fine needle aspiration to confirm pathology. The pathology report confirms malignancy. A biopsy reports recurrent metastatic melanoma stage IIIB. A PET scan is ordered and confirms malignancy contained to the right axilla region.

The patient is scheduled for dissection of the right axillary lymph nodes. Approximately eighteen lymph nodes were removed, with three positive lymph nodes showing melanoma. The patient is then recommended for adjuvant therapy.

* Real patient experience, posted with permission*

Signs and Symptoms

- Change in existing mole
- New spot or patch on the skin
- A spot that looks like changing freckle/age spot
- Dark streak under fingernail/toenail
- Band of darker skin around finger/toenail
- Slowly growing patch of thick skin that looks like a scar

(American Academy of Dermatology, 2018)

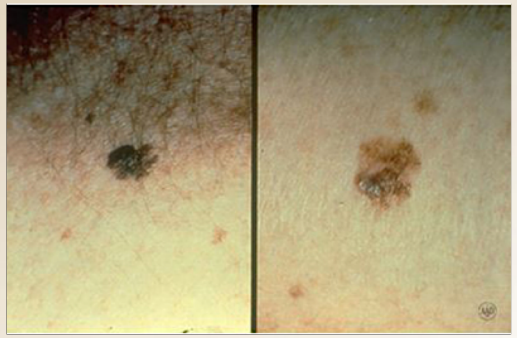
Clinical Manifestations & Staging

(American Cancer Society, 2019).

Stage	Description
0	confined to the epidermis (also known as melanoma in situ)
I	No more than 2 mm thick and may or may not be ulcerated. Has not spread to nearby lymph nodes or to distant sites
II	atleast 1.01 mm and may be thicker than 4.0 mm. May or may not be ulcerated. Has not spread to nearby lymph nodes or to distant sites
IIIA	no more than 2.0 mm thick. May or may not be ulcerated. Has spread to 3 or less lymph node(s) but is so small It can only be seen under a microscope. Has not spread to distant sites
IIIB	no sign of the primary cancer AND- Has spread to only one lymph node –OR- has spread to small areas of nearby skin but has not spread to distant sites. OR the cancer is no more than 4.0 mm thick. May or may not be ulcerated -AND- has spread to only one lymph node -OR- has spread to very small areas of nearby skin -OR- has spread to two or three lymph nodes but has not spread to distant sites.
IIIC	no sign of primary cancer AND- has spread to one or more lymph node -OR- has spread to very small areas of nearby skin -OR- has spread to any lymph nodes that are clumped together. Has not spread to distant sites. OR no more than 4.0 mm thick. May or may not be ulcerated AND- has spread to one or more lymph nodes -OR- has spread to very small areas of nearby skin -OR- has spread to lymph nodes that are clumped together. It has not spread to distant sites OR is between 2.1 and 4.0 mm OR thicker than 4.0 mm. May or may not be ulcerated AND- spread to one or more lymph nodes -OR- spread to very small areas of nearby skin -OR- has spread to lymph nodes that are clumped together. Has not spread to distant sites. OR is thicker than 4.0 mm and is ulcerated AND- has spread to no more than 3 lymph nodes -OR- has spread to very small areas of nearby skin. Has not spread to distant sites
IIID	Thicker than 4.0 mm and is ulcerated AND- has spread to very small areas of nearby skin -OR- has spread to lymph nodes that are clumped together. Has not spread to distant sites.
IV	Any thickness and may or may not be ulcerated. May or may not have spread to nearby lymph nodes. Has spread to distant lymph nodes or organs such as the lungs, liver, or brain.

Staging involves the size, degree of local invasion, and the extent of where it has spread (McCance et al, p. 1204, 2018).

Underlying Pathophysiology



Melanoma can develop in an existing mole or look like a new mole (American Academy of Dermatology 2018)

Melanocytes can be found on the epidermis of the skin. Melanocytes are responsible for producing the pigment melanin, which gives the skin its color. Cutaneous melanoma is caused by malignant neoplasms of the melanoctyes (Liu et al, 2014).

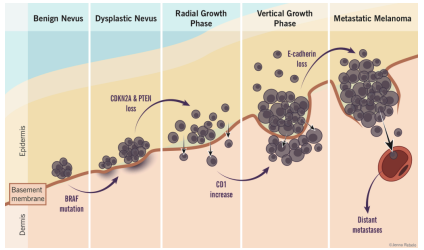
The etiology and pathogenesis of melanoma can be explained by Ultraviolet(UV) radiation, melanocytic nevi, and molecular changes associated with malignant melanoma. It is known that "one or more blistering sunburn during childhood or adolescence more than doubles the risk for melanoma later in life" (Liu et al, p. 3, 2014). UV radiation can make DNA mutations occur, forming pyrimidine dimers or deamination of cystosine into thymidine (Liu et al, 2014).

Another etiology are melanocytic nevi. Nevi, or moles, are completely benign lesions concentrated with a large amount of melanocytes which give them a darker pigmentation on the skin. When nevi begin to change in shape, color, or texture we begin to worry that malignant melanoma may be present (Liu et al, 2014). Catching the nevi in this early phase results in an extremely high survival rate. Practitioners should use the ABCDE's of melanoma. This looks at (A) asymmetry, (B) border, (C) color, (D) diameter, and (E) evolving (American Academy of Dermatology, 2018).

If melanoma is not caught before it metastasizes into cutaneous or subcutaneous tissue the result is a malignancy. In order to treat malignant melanoma specific molecular changes must be identified in order to use the best treatment therapies. There are eight different mutations that may occur due to genetic susceptibility. The mutations include BRAF, NRAS, P13K-ATK/PTEN, p53, CD4K/CDKN2A, c-KIT, MC1R, and cadherin (Liu et al 2014).

Tumor progression:

1. Benign melanocytic nevi
2. Atypical/dysplastic nevi
3. Radial growth
4. Vertical growth
5. Metastasis



(McMaster Pathophysiology Review, 2018)

Significance of Pathophysiology

Early recognition and treatment of melanoma is crucial. When caught in the early stages melanoma is easily treatable. When mutations occur is when things get tricky for the practitioner.

UV exposure and age are the biggest contributors to melanoma (Watson et al, 2015). With practitioners knowing this, they must take time to evaluate the entirety of the skin, watch for any change, as well as be responsible for educating the patient on risk factors and signs and symptoms of melanoma (Chang et al, 2014).

Using the ABCDE method, practitioners must know what they are looking for, any suspicion of melanoma, or skin cancer must be taken cautiously and a biopsy should be done. Knowing the patient physical and social history will help make the decision easy. Practitioners must be aware of age if there is suspicion because "increasing age leads to worse survival rates in stages I, II, and III" (Ribero et al, p. 624, 2018).

Health care providers must has knowledge of the pathyophysiology and etiology of melanoma in order to distinguish the signs and symptoms and diagnose and treat the condition.

Implications of Nursing Care

- Routine annual physical exams
- Nevus count
- Monitoring suspicious nevi
- In depth familial history
- Routine lab workup
- Punch biopsy of any suspicious nevi
- Consult to specialists
- Use of microscope/dermascope when evaluating skin
- Use of MEDS- and automated melanoma diagnosis system
- Blood assay for those termed cancer free to predict recurrence of melanoma
- (MITF)- microphthalmia transcription factor- used to detect melanoma
- History of sunburns with blistering
- Education on reducing UV exposure/ wearing sunscreen and clothing that covers most of the skin/eyes.
- Education on tanning bed exposure
- Education on smoking cessation
- Emotional support to those diagnosed with metastatic melanoma
- Education on best treatment options and patients age
- Expediting care if patient does come back positive for metastatic melanoma with biopsy of possible metastasis
- Educating on all signs/symptoms and risk factors

Conclusion

Melanoma is a very treatable cancer if diagnosis and treatment are in the early stages. In 2014 an estimate of " nearly 76, 100 new cases of melanoma of the skin will be diagnosed and about 9,710 people will die due to the disease within the year alone" (Liu et al, p. 1, 2014). This makes melanoma one of the fastest growing cancers in the United States.

The pathophysiology can be technical when diagnosis of malignant melanoma and treatment options all depend on age and the stage of the cancer. Treatment has become more sophisticated, but diagnosis and early detection have also become very specific. Discovering the specific markers and mutations of melanoma can allow for early detection and eliminate the amount of cytotoxic treatment a patient must receive (Liu et al, 2014).

The practitioner must force efforts for education and awareness of the disease and make it communitywide. The cost for treating melanoma has increased significantly, specifically about 250% (Watson et al, 2015). Early detection and treatment will decrease morbidity and mortality rate as well as decrease unnecessary treatment.

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