

Malignant melanoma: The enigma of skin cancer's darkness.

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Introduction

Malignant melanoma, a formidable adversary within the realm of skin cancer, has garnered increasing attention due to its alarming rise in incidence and potentially fatal consequences. This aggressive form of skin cancer arises from the uncontrolled growth of melanocytes, the cells responsible for producing the pigment melanin. While it accounts for a relatively small portion of skin cancer cases, malignant melanoma is responsible for the majority of skin cancer-related deaths. Understanding the etiology, risk factors, clinical presentation, diagnosis, and treatment options for malignant melanoma is vital in order to combat its pervasive threat to public health.

Risk factors

The development of malignant melanoma is multifactorial, involving both genetic predisposition and environmental triggers. Ultraviolet (UV) radiation, whether from natural sunlight or artificial sources like tanning beds, is a major risk factor. Prolonged and intense UV exposure damages the DNA within skin cells, potentially leading to mutations that can promote melanoma development. Additionally, fair-skinned individuals with a reduced ability to produce melanin are at a higher risk due to their increased sensitivity to UV radiation. Genetic factors also play a crucial role. Mutations in genes such as BRAF and NRAS have been linked to the development of melanoma. Individuals with a family history of melanoma are more likely to develop the disease, indicating a hereditary component. The interplay between genetic susceptibility and environmental exposures underscores the complexity of melanoma's etiology [1].

Clinical presentation

Malignant melanoma often originates from an existing mole or arises as a new, irregularly shaped pigmented lesion on the skin. The ABCDE rule serves as a helpful mnemonic for identifying potential signs of melanoma:

Asymmetry: One half of the mole or lesion does not match the other half.

Border irregularity: The edges are uneven, ragged, or notched.

Color variation: The color is uneven, with shades of black, brown, tan, white, gray, or red.

Diameter: The size is larger than a pencil eraser (approximately 6 mm).

Evolution: The mole or lesion changes in size, shape, color, or elevation over time.

These indicators, while valuable, are not exhaustive. Nodular melanoma, for instance, lacks some of these characteristics but is equally dangerous [2].

Diagnosis

Early detection and prompt diagnosis are crucial for effectively treating malignant melanoma. Dermatologists employ various diagnostic techniques, including:

Dermoscopy: A non-invasive method that magnifies the skin to assess mole structures and pigmentation patterns.

Biopsy: The removal of a tissue sample for microscopic examination to confirm the presence of cancer cells and determine its type.

Sentinel Lymph Node Biopsy: If melanoma has spread, a biopsy of the nearby lymph nodes may be conducted to assess the extent of metastasis.

Staging

Malignant melanoma is categorized into stages based on the extent of its spread. The American Joint Committee on Cancer (AJCC) TNM staging system assesses the tumor (T), nearby lymph nodes (N), and distant metastasis (M). The stages range from 0 (*in situ*) to IV (advanced metastatic disease), aiding in treatment planning and prognostic assessment [3].

Treatment

The treatment approach for malignant melanoma depends on the stage, location, and overall health of the patient. Common treatment modalities include:

Surgery: Surgical excision is the primary treatment for early-stage melanomas. Wide local excision removes the tumor along with a margin of healthy tissue. In cases of advanced disease, lymph node dissection may be performed.

Immunotherapy: Immune checkpoint inhibitors like pembrolizumab and ipilimumab enhance the body's immune response against cancer cells. These therapies target proteins that regulate immune activity and have shown promising results in advanced melanoma cases.

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Targeted therapy: Molecularly targeted drugs, such as BRAF and MEK inhibitors, are employed in cases where specific genetic mutations are present. They block the growth signals that fuel cancer cell growth.

Chemotherapy: While less commonly used, chemotherapy may be an option for advanced melanoma that has spread to distant sites. It is often combined with other treatments.

Radiation therapy: This approach uses high-energy rays to target and destroy cancer cells. It is primarily used for palliative care or when surgery is not possible [4].

Prevention and public awareness

Given the significant role of UV radiation in melanoma development, adopting sun protection measures is crucial. These include:

Sunscreen: Regular use of broad-spectrum sunscreen with an SPF of 30 or higher, applied generously and reapplied every two hours or after swimming or sweating.

Protective clothing: Wearing long-sleeved shirts, wide-brimmed hats, and sunglasses to shield the skin and eyes from UV radiation.

Seeking shade: Limiting sun exposure, especially during peak hours when the sun's rays are strongest.

Avoiding tanning beds: Artificial tanning devices emit UV radiation that can contribute to melanoma risk.

Regular self-exams: Conducting monthly self-examinations of the skin to detect any changes or new moles.

Public awareness campaigns play a pivotal role in educating individuals about melanoma's risk factors, prevention strategies, and the importance of early detection. Promoting healthy behaviors and fostering a culture of skin health can significantly reduce melanoma's impact on public health [5].

Conclusion

Malignant melanoma, a formidable form of skin cancer, poses a significant threat to individuals' health and well-being. Its multifaceted etiology, including genetic and environmental factors, underscores the complexity of its development. Early detection through vigilant self-examination, regular dermatological assessments, and public education are essential for minimizing the impact of malignant melanoma. Advancements in treatment modalities, including surgery, immunotherapy, targeted therapy, and radiation, offer hope for improved outcomes and survival rates. By adopting sun protection measures and embracing skin health, individuals can take proactive steps to safeguard themselves against the shadows of malignant melanoma.

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