

Advances in the understanding and treatment of non-melanoma skin cancers.

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Introduction

Non-melanoma skin cancers (NMSCs) encompass a range of malignant tumors that arise from the skin's basal cells or squamous cells. The two most common types of NMSCs are basal cell carcinoma (BCC) and squamous cell carcinoma (SCC). Over the years, significant advancements have been made in the understanding and treatment of these cancers, leading to improved outcomes and patient care. This article aims to explore some of the notable advances in the field of non-melanoma skin cancer research and therapy. Early detection plays a crucial role in the successful treatment of NMSCs. Dermoscopy, a non-invasive technique that allows for the visualization of skin structures, has emerged as an invaluable tool in the early diagnosis of skin cancers. It enables dermatologists to identify subtle morphological changes in skin lesions, aiding in the differentiation between benign and malignant growths [1].

Additionally, the development of molecular diagnostic techniques has improved accuracy in diagnosing NMSCs. Biomarkers and genetic tests can assist in distinguishing aggressive lesions and predicting the likelihood of recurrence or metastasis. These advancements have paved the way for personalized treatment strategies based on individual tumor characteristics. Traditionally, surgery has been the primary treatment modality for NMSCs. However, the advent of targeted therapies has revolutionized the management of advanced and metastatic cases. Hedgehog pathway inhibitors, such as vismodegib and sonidegib, have shown remarkable efficacy in treating locally advanced and metastatic BCC. These drugs specifically target the abnormal signaling pathways implicated in BCC development [2].

Similarly, immune checkpoint inhibitors have emerged as a promising therapeutic approach for advanced SCC. Antibodies targeting programmed cell death protein 1 (PD-1) or programmed death-ligand 1 (PD-L1) have demonstrated substantial clinical benefits, with durable responses observed in some patients. Combination therapies, involving immune checkpoint inhibitors and targeted agents, are also being explored to enhance treatment outcomes. Mohs micrographic surgery (MMS) has become a gold standard for the treatment of high-risk NMSCs. This technique involves the progressive removal and examination of thin layers of tissue until cancer-free margins are achieved. MMS offers several advantages,

including high cure rates, tissue preservation, and precise removal of tumor cells while minimizing damage to healthy tissue. The use of frozen section histopathology during surgery enables real-time evaluation, enhancing the accuracy of tumor removal [3].

While surgery remains the primary treatment, non-surgical approaches have gained prominence, particularly for patients who are poor surgical candidates or have multiple lesions. These modalities include topical therapies, photodynamic therapy (PDT), radiation therapy, and cryotherapy. Topical therapies, such as imiquimod and 5-fluorouracil, can be applied directly to the affected area, selectively targeting cancer cells. PDT utilizes photosensitizing agents and light to destroy cancer cells while minimizing damage to surrounding tissue. Radiation therapy is often used for high-risk or unresectable tumors, providing an effective alternative to surgery. Cryotherapy involves freezing the tumor using liquid nitrogen, leading to cell death and subsequent removal [4].

Non-melanoma skin cancers are the most common type of skin cancer worldwide, with increasing incidence rates over the past few decades. Risk factors include excessive sun exposure, fair skin, a history of sunburns, older age, immunosuppression, exposure to certain chemicals or radiation, and genetic predisposition (e.g., basal cell nevus syndrome). Recent research has focused on understanding the complex tumor microenvironment in non-melanoma skin cancers. The interaction between tumor cells, immune cells, and stromal components plays a crucial role in tumor progression and response to treatment. Investigating the immune landscape and tumor-infiltrating lymphocytes has provided insights into potential immunotherapeutic strategies [5].

Conclusion

Advances in the understanding and treatment of non-melanoma skin cancers have significantly improved patient outcomes. Early detection techniques, molecular diagnostics, targeted therapies, Mohs micrographic surgery, and non-surgical treatment modalities have all contributed to enhanced precision, efficacy, and personalized care. Continued research and collaboration among dermatologists, oncologists, and researchers hold the promise of further advancements in the fight against NMSCs, ultimately improving the lives of those.

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