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A Review on Skin Cancer and New Treatment Approach

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Skin cancer is a most common disease classified into "melanomas," which predominantly generates from melanocytes (the cells responsible for producing melanin), and "non-melanomas," which is comprised of "basal cell carcinoma," which arises from the basal cell located in the deepest layer of the epidermis, and "squamous cell carcinoma," which originates from the squamous cell found within the epidermal layer. It is influenced by both non-biological (UV rays and environmental exposure) and biological factors, such as genetics and types of skin. For better treatment, initial detection of cancer plays a vital role. Prevention and management of skin cancer requires changes in lifestyle, routine screenings, and modern medical treatments. Some of which are our hope include advancements in imaging techniques, immunotherapy, genetic markers, and plant-based management. As skin cancer cases are increasing worldwide, it is essential to explore various treatment and prevention strategies. Prevention and treatment of skin cancer and patient outcomes could improve by developing medical devices and novel therapeutic approaches. Initial detection, routine screening, and a blend of conventional and innovative treatments are crucial for fighting this widespread disease.

Keywords: Basal cell carcinoma; Herbal Medicine Melanoma; Non-melanoma; p53 Gene; Squamous cell carcinoma.

The skin performs various functions such as regulation of temperature, providing sensation, offering protection, and synthesizing vitamin D additionally, it provides information about the surrounding regions. And also, it helps to maintain bone health and the immune system by regulating the production of vitamin D. [1,2] Keratin, melanin, Langerhans cells, Merkel cells, and sensory receptors are produced by the epidermis. Keratin is the protective layer on the skin surface; melanin is the pigment that gives skin its colour; and Merkel cells are sensory receptors that detect light touch.[3] Keratin, melanin, Langerhans cells, Merkel cells, and sensory receptor production takes place in the epidermis. The skin's topmost layer of defence is composed of keratin. The pigment that gives skin its colour is called melanin, and Merkel cells are receptors for sensation that pick up on mild contact.[4]

Skin cancer

Since skin cancer is becoming more common, developing a successful treatment plan that includes cutting-edge diagnostic tools, creative drug delivery systems, and innovative therapeutic approaches is necessary. By leveraging these advancements, which can improve patient outcomes, enhance the efficacy of treatments, and ultimately reduce the global burden of skin

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cancer, the main contributing factor to skin cancer is UV radiation (the ozone layer is being destroyed).[5] Around 95% of cancer cases were skin cancers other than melanoma and caused by hereditary and environmental risk. Non-melanoma skin cancer (NMSC) is classified into two main subtypes: SCC and BCC, which account for 99% of all NMSCs[6], which are 18–20 times greater than melanoma. NMSC is more common in men owing to genotypic, phenotypic, and environmental factors.[7]

Types of skin cancer: They are commonly separated into two main categories: non-melanoma skin cancer, which truly began from cells taken from the epidermis, and melanoma skin cancer, which can be caused by malfunctioning melanocytes that can lead to the tumor (Table 1).[3]

Epidemiology

One form of skin cancer that appears to be growing more quickly than others is cutaneous melanoma. In 2012, there were 1.5 million reported cases of cutaneous melanoma worldwide with 55,000 fatalities.[10] Due to variances in racial skin histology and exposure to sunlight, cutaneous melanoma differs greatly between countries. The majority of those affected are young and middle-aged, with 57 being the median age of diagnosis. As people age, their risk of developing skin cancer arises, particularly in those over 25, but decreases in females after the age of 50. When cutaneous melanoma incidence is broken down by gender, men are more likely to develop the disease beyond the age of 55, while women are most prone to developing it in younger generations.[11]

Risk factors of Melanoma

The following are a few of the recognized risk factors for melanoma, a kind of skin Cancer (Table 2): [12]

Skin cancer prevention

Skin cancer can be prevented in part by educating patients about cancer, and sun exposure

Table 1. Types of Skin Cancer and their risk factors

S. no	Type of skin cancer	Description
1.	**Basal cell carcinoma (BCC)**	A type of carcinoma of the skin that starts in the basal layer of the epidermis. BBC can be divided into three categories and typically affects the neck, trunk, head and extremities: nodular, superficial, and sclerosing /morphea-form.BCC is low-quality cancer in all skin types of cancers but may cause greater morbidity. It rarely undergoes metastasis and requires specific immunohistochemical examination for accurate diagnosis. It's recommended to be removed at the early stages.[7]
2.	**Squamous cell carcinoma (SCC)**	Type of skin cancer that develops from the epidermis, the skin's outermost layer or in the squamous cells of the skin. Most frequently correlated with sun exposure that produces UV radiation, in addition to the additional environmental risk factors including exposure to toxins or specific chemicals, chronic skin inflammation, and weakened immune systems. The main causes of SCC are cutaneous keratinocytes and swallowing scars.Defects in TP53 tumor suppression gene, which regulates cell growth and division, can result in uncontrolled cell proliferation and tumor development.
• Kaposi Sarcoma		• Elderly people are particularly prone to Kaposi sarcoma, a type of skin cancer that may potentially be brought on by the KS virus, which is connected to the human herpes simplex virus. Upper arms, trunk, and lower limbs can all have Kaposi sarcoma, affecting the mouth, lymph nodes, stomach, and duodenum.[8]
• Epigenetic change and virus infection in epithelial melanoma		• Epigenetic modifications are those that affect gene expression but are not caused by variations in DNA sequences. These changes can be brought on by environmental variables, like viral infections, and they can aid in the onset and spread of numerous cancer types. For instance, infections with skin cancer viruses have been linked to the emergence of non-melanoma skin cancers including BCC, and SCC. Actinic keratosis (AK) is a frequent precancerous skin condition that puts transplant recipients at risk of prolonged immunosuppression, UV exposure, and viral infections are all Contributing causes.[9]

should be avoided in spite of its many health benefits. We can also advise patients individually about risks. [19] Patients should protect their skin from direct sunlight by wearing protective clothing, using sunscreen with SPF30 and reapplying it every two hours, avoiding artificial UV light, and practicing good skin hygiene and routine examination. They should also drink plenty of water and moisturize regularly to reduce the risk of skin cancer. [20] Cancer Research UK's Sun Smart campaign educates the public about the hazards of UV radiation and how to prevent skin cancer. Leaflets, pamphlets, movies, and internet articles are within their patient information materials. By providing these tools, they are enabling people to take control of their skin's health and reduce their risk of developing skin cancer. [21]

Screening of skin cancer: There is no data regarding the global population's level of screening programme. Personalized screening approaches are lacking, despite growing interest in studies on the use of models of risk assessment to identify individuals at increased risk of melanoma.[22] Individualized monitoring efforts

Table 2. Risk factors of Melanoma and Consequences

Risk factors	Consequences
Risk factors of Melanoma[12]	Increasing equality between genders. • Overall number of moles. • Pale or weak skin. • Person or Family record of skin cancer
Keratinocyte Carcinoma (KC)	Comes from the cells that comprise the skin's outermost layer.· • UV exposure: The main cause of risk for melanoma, the deadliest type of skin cancer, is exposure to sunlight. Based on wavelength, UV radiation is separated into three groups: UVA, UVB, and UVC. The most important UVA (320–400 nm) and UVB (280–315 nm) rays can damage skin cells' DNA, which can result in melanoma and sunburn. • Fair skin: Because fair skin has less melanin to shield the skin from UV rays than darker skin, people with fair skin are more likely to spread and develop KC. • Age: It is more prevalent in the elderly, particularly in individuals over 50. • Gender: KC is more common in men than in women. • Family history: Individuals with a family history of KC are more likely to experience further progression of the illness. • Immunosuppression: Individuals with compromised immune systems are more susceptible to developing KC.[13]
Non-biological factor	Geographic variations and exposure to direct sunlight are the main causes of skin cancer, a global health concern.[14] Numerous things might cause it, such as oxidative stress, inflammation, immunosuppression, DNA damage, apoptosis, and genetic abnormalities. One important mechanism in this process is the p53 pathway. Omega-6 fat-rich diets can increase the risk of skin cancer by lowering tumor latency and promoting tumor profusion; on the contrary hand, non-melanoma patients can lower their risk by following a low-fat diet. UV-induced immune responses or physiological alterations may be the cause of skin cancer.[15,16]
Biological factors:	Biological factors in skin carcinoma modify protein synthesis, leading to skin disorders such as melanoma and NMSC. Non-melanoma cancer progression risk is increasing due to viral infections and AIDs. People with AIDS have weakened immune systems, making them more susceptible to skin cancer, including non-melanoma.[17] A rare genetic condition called XP makes people more susceptible to developing skin malignancies, including melanoma and non-melanoma. It interferes with the body's capacity to repair UV-induced DNA damage, which can result in a build-up of mutations that might cause cancer.[18]

are insufficient, even in spite of the resurgence of interest in academia for employing risk assessment methods to identify individuals at greater risk of melanoma. In addition, the practitioners of the Royal Australian College of Medical Practitioners advise individuals at high risk of melanoma to have a comprehensive skin examination every six months and individuals at high risk of KC to have an annual review. Remarkably, a recent thorough comparison between WHO screening guidelines and BCC screening. [23]

Surgery management of skin tumor: Nowadays, surgery is a frequent method of treating skin cancer; it can be performed by removal or by cutting using various techniques (Karagas et al., 2010). This kind of treatment gives a regular look and functioning normally of a body cell (Walter et al., 1999). Because of the appearance of visible structures on the face, this method was apprehensive in cases of skin cancer.[24] This technique of treatment may lead to different effects on the skin, commonly scars (Gilchrest et al., 1999). We can solve this effect on the skin, such as scars, by using the skin grafting technique by taking a small part of the skin from the body's skin and placing it on the exaggerated scar area (Pfahlberg and colleagues, 2001). This transplant should be stopped to heal properly (Hanson et al., 2006).

Management of melanoma: The weighted Glasgow 7-point checklist and naked-eye inspection are recommended by NICE (2015) for assessing suspected skin lesions. If a lesion has a score of 3 and above, it must be referred to an urgent suspected cancer procedure. Other checklists are available as well. The most popular one in North America is the "ABCDE" mnemonic, which stands for asymmetry, boundary irregularities, colour fluctuation, diameters greater than 6 mm, and evolution/change.[25] NICE advises against excising a suspicious melanoma in primary care. Although recent research has found no damage in primary care excision in the remote Scottish environment. For certain skin lesions that may signify an atypical melanoma, NICE advises a prompt referral to the suspected cancer route. They include newly developed vascular or pigmented nodules, changes to the nails, such as the appearance of a new pigmented line, and any persistent, slowly progressing, resistant skin lesion that has an unclear diagnosis. A higher-risk group for melanoma, especially those with several congenital pigmented nevi, should get risk estimation education and surveillance.[26]

Management of Squamous Cell Carcinoma (SCC): It is a kind of skin cancer that is confirmed through excision and evaluation of histopathology. A healthcare professional should evaluate any suspicious skin lesion to decide whether a biopsy is necessary or any specialist referral is required. Suspected cancer pathway referrals may be appropriate depending on the severity and characteristic of the lesion.[25]

Management of Basal Cell Carcinoma (BCC): In order to reduce the risk of BCC, it is recommended by the NICE guidelines in 2010. The clinicians with appropriate techniques and training may be excised by primary healthcare. Local agreements, physician roles, competencies, and policies can all have an impact on how suspected BCC is handled and referred. Those with suspected BCC should be sent to a specialist frequently, as BCC is a common kind of skin cancer that develops slowly and seldom extends to other areas of the human body. Referral through an urgent cancer pathway may be considered if there is fear of a delay due to variables such as lesion size or location. [27]

Primary Health Care Assessment Tools for Abnormal Skin Disorders

Dermoscopy: A dermoscope is designed to be held by a finger device used to examine skin lesions, allowing physicians to visualize deeper layers and identify characteristic features of skin conditions. They are non-invasive and can help differentiate benign from malignant lesions, reducing the need for biopsies. A dermoscope device can be used only after adequate training by a skilled professional because it is a very sensitive device and extremely precise for diagnosing skin diseases compared to an unaided eye examination. Much research has been undertaken to assess the use of dermoscopy in diagnosing and to evaluate the application of dermoscopy in melanoma and keratinocyte carcinoma diagnosis, and the data shows that dermoscopy can enhance diagnostic accuracy and minimize the need for needless biopsies. Conversely, the breadth of the review and the articles incorporated into the analysis would dictate the specific results of the Cochrane reviews.[28] It is not recommended that primary

care physicians utilize dermoscopy to diagnose keratinocyte carcinomas. But according to a recent systematic assessment, there is certain proof that the device may assist primary care doctors in triaging worrisome lesions. Although dermoscopy can be used to enhance diagnostic accuracy and minimize the need for biopsies, for a conclusive diagnosis of skin cancer, it shouldn't be used instead of a biopsy and histological examination. If you have any worries about a worrisome skin lesion, seek medical assistance right away.[29]

Tele-dermatology: A subspecialty of telemedicine called teledermatology employs technology to diagnose and treat skin disorders remotely. It uses digital images or videos of skin lesions to transmit to dermatologists or other health care professionals for review and diagnosis. This system has been started recently in different areas of the United Kingdom. However, a Cochrane review found that teledermatology had a lower sensitivity for detecting both non-melanoma and carcinoma skin cancer and a higher rate of false positives compared to face-to-face diagnosis by specialists.[30]

Spectrophotometric intracutaneous analysis (SIA scope) or Mole Mate System: The Mole Mate system did not increase referral appropriateness but did lead to a larger number of lesions being referred. Tele-dermatology should not be used as a substitute for in-person evaluation due to a higher referral rate.[31]

Artificial Intelligence (AI) system: AI systems exceed the diagnosis accuracy in terms of categorizing the photos of skin lesions. Deep learning techniques are used in the scanning of digital photos to discover patterns or traits linked with certain forms of skin cancer. This could increase the precision and promptness of detection of skin cancer, particularly in areas with a shortage of specialists. [31]

Other Tools for Diagnostic: Skin cancer can now be detected with the help of minimally invasive testing and imaging techniques such as high-frequency ultrasonography, reflectance confocal microscopy, optical coherence tomography, and computer-assisted diagnostics. However, the available data is conspicuous, and further study is required to prove their accuracy and therapeutic relevance. It is crucial to remember that the diagnosis needs to be founded on a combination of clinical evaluation, imaging, and biopsy and that no single technology or test should be relied upon in isolation.[32]

Treatment and the medication: Medical history was required to be considered in patients for diagnosing the initial phase of cancer. It consists of collecting details about the patient's medication history, family history related to any occurrence of skin cancer, and also includes the medical background. The patient's skin is also assessed for the number of moles present and if there are any signs of dysplastic nevi. The individual social history is also considered in order to determine the exposure to any potential carcinogenesis and sun exposure.[33] The initial phase in examining people with cancer of the skin is taking a thorough medical history, medications, and personal and family history. Additionally, skin is assessed for moles, dysplastic nevi, and sun exposure. Social history is also taken to assess exposure to potential carcinogenesis. Options for BCC treatment include curettage and electrodesiccation, cryosurgery, laser surgery, topical chemotherapy, radiation therapy, immunotherapy, conventional surgical excision, skin grafting, and Mohs micrographic surgery. The size, location, and preferences of the patient will determine the course of treatment. A healthcare provider or dermatologist can help determine the best treatment option.[34]

Surgical Treatment of Primary Melanoma Management: Surgical techniques have evolved to evaluate the extent of melanoma and determine the appropriate surgical margins. Recently, less invasive surgical methods like Mohs micrographic surgery have become available to preserve healthy tissue while still removing cancerous cells. Other treatments may also be necessary, depending on the stage and severity of the cancer.[34] The recommendations for operating therapy on the period I and II tumours propose narrower surgical margins. For melanoma in situ, a margin of 0.5 cm, for melanomas less than 2 mm in thickness, and for those 2 mm or more, is recommended. The tumour's features and the patient's overall health will determine the surgical margin that is chosen. Careful monitoring and follow-up are required to detect any symptoms of recurrence or metastasis and ensure appropriate therapy is delivered. Overall, the decrease in surgical margins reflects a more tailored approach.[33]

Elective Lymph Node Dissection: This is a surgical procedure that involves removing all the lymph nodes in a particular area where melanoma is present or at a high risk of spreading. It is controversial due to its high complication as well as recurrence rates. There is no proper evidence in terms of long-term survival rate for the patients with no lymph node metastatic deposits as per ELIND. Some of the criteria should be followed for performing ELIND, which include the phase and position of the melanoma and also the patient's overall wellness, age, and comorbidities. ELND can be advised as a part of treatment, whereas in some cases it is not necessary and can be considered inappropriate. The reoccurrence and the complexity rate of ELND are higher. It should be reserved for the patients with confirmed malignancy lymphadenopathy that is detected through palpitation and who show no symptoms of metastases. For detecting the early stages of lymph node metastases, some of the alternative approaches, like a biopsy of the sentinel lymph nodes, can be a better option. A case-by-case analysis should be conducted to carefully balance the potential hazards and advantages of ELND.[35]

Sentinel lymph node dissection (SLND): It is a surgical method for treating melanoma, a kind of skin cancer. It entails locating and eliminating the SLND, or major lymph node, into which melanoma drains. SLND is repeatedly recommended for patients with moderate to perilous malignancy, which is clear as melanoma with a narrowness of 1.0-4.0 mm or larger than 4.0 mm. The first lymph node to which a tumour drains is the SLN, making it the most expected position of metastasis. Prior to surgery, the SLN is identified by injecting a Technetium 99-labelled colloid around the primary melanoma. During surgery, a critical blue dye is administered to help see the lymph node and aid in its removal. After surgery, the SLN is subjected to histopathological and immunohistochemical examination to detect micro-metastases or cells of cancer that have blowout to the lymph nodes. A positive SLN can help identify the lesion's malignant actions and guide future therapy options. SLND may potentially be utilized as a tool for the diagnosis of melanocytic skin lesions with ambiguous histopathological characteristics.[36]

Surgery for Advanced Malignant Melanoma: In patients with visceral metastases, surgery is regarded as palliative care and may prolong survival if a R0-resection is successful. It is crucial to take into account the patient's overall health, ability to tolerate the procedure, and any possible advantages or disadvantages. Chemotherapy is a form of therapy.[37]

Immunotherapy: Immunotherapy is a method of cancer treatment in which the immune system tries to boost its response to tumour cells. In recent years, interleukin-2 and interferon alpha-2b have been used as adjuvants in the medical treatment of cancer. IL-2 is a cytokine that stimulates T lymphocyte proliferation and activation, which are capable of recognizing and eliminating cancer cells. However, increased dose IL-2 therapy is restricted due to adverse effects and toxicity. It has been demonstrated that IFN-2b increases overall survival and disease-free survival in people with vulnerable melanoma. Even while the experiment conducted by Kirkwood et al. with high-dose IFN-2b produced positive outcomes for both overall survival and disease-free survival, subsequent studies were unable to demonstrate a statistically significant increase in overall survival. This has sparked a discussion regarding. The FDA has authorized IFN-2b adjuvant treatment in stage 2 and 3 melanomas; however, the responsibilities are uncertain. IFN- will eventually play a significant role as an adjuvant in numerous vaccinations. [38]

Chemotherapy: Separate from hyperthermic therapy and radiotherapy. Chemotherapy has been the mainstay chemotherapeutic drug for metastatic melanoma, but its response rate is modest, with only 1%–2% of individuals developing a long-term response. Novel medicines such as immunotherapy and targeted therapy are now often used as first-line treatments. They investigated a new protocol for multi-agent chemotherapy.[39] A combination of chemotherapy and cytokines has been studied; however, none of these treatments have been verified thus far to be significantly better than dacarbazine alone in terms of overall survival. Chemotherapeutic drugs such as Dacarbazine (DTIC), Paclitaxel, Temozolomide, Carmustine, Carboplatin, Cisplatin, and Vinblastine may be used to treat melanoma. Combinations of pharmaceuticals may be more helpful than single drugs, but they may increase the risk of side effects such as mouth sores, hair loss, appetite loss, nausea, diarrhoea, vomiting, a higher risk of infection,

exhaustion, easy bruising or bleeding, and nerve damage.[37]

New Immune and Gene Therapies: Recent discoveries have led to the development of "tumour-specific" therapy, such as melanoma cell vaccines, which use dead tumour cells to boost and/or generate an immune response. It has also been suggested that patient-role dendritic cells be isolated, in vitro enriched with peptides unique to melanoma, and then re-injected. Other techniques are molecular in nature, focusing on the genomic activities and contacts of tumour cells. However, it hasn't been shown that gene therapy or vaccinations are very effective in treating metastatic melanoma.[40]

Immunotherapy: It involves the usage of monoclonal antibody antibodies that bind to and suppress the receptors for tumour growth factors on the surface of tumour cells. Other immunotherapies involve using the patient's T cells to target as well as destroy tumour cells. Vaccines such as cytokines can be used to stimulate the immune system to target and attack tumors. High-dose interferon alpha-2b administration has been suggested by ECOG to promote overall survival and prolong disease-free survival. We don't have statistical significance, and the medication had serious negative effects. IFN has been used as an accessory therapy for intermediate- to high-rise melanoma patients, with initial studies finding that it improved overall survival rates. However, other studies have been conflicting, and its role as an adjuvant is still undecided. In the future, IFN may play a significant role in different vaccine strategies and may be the key to improving the survival rates of melanoma patients.[41]

Current Therapeutic Approaches in Treating Skin Cancer: Radiation excision surgery (NMSC) is used to treat non-melanoma skin cancer. This procedure entails removing the tumour along with the perimeter of healthy tissue that surrounds it. The amount of tissue that needs to be removed is determined by the tumour's depth, kind of NMSC, and size. The excised tissue is checked under a microscope after surgery to ensure all malignant cells have been eliminated. Cryotherapy, chemotherapy, radiation therapy, 5-fluorouracil, and diathermy are all therapeutic options for skin tumors. If cancer returns, radical excision surgery may be required. The patient's overall health and medical history, together with the size, location, and kind of cancer, will all influence the therapy that is selected. Twenty percent of MM patients have metastases found, and the choice to do a sentinel node biopsy is dependent on the tumour's histopathology studies. This method is used to detect metastases that are not obvious in clinical evaluation. Locate and remove the first lymph node or lymph nodes that drain the area surrounding the tumour, and the excised sentinel node is evaluated by a pathologist to identify the presence of cancer cells. If cancer cells are discovered, it may signal that cancer has progressed beyond the main location and that more therapy is required.[40] A fine needle aspiration biopsy is often used to confirm lymph node metastases. If the biopsy findings reveal that the lymph node contains metastatic cancer cells, a therapeutic lymph node dissection may be advised. The type and amount of the dissection will depend on the location, extent, and health and medical history of the patient. To lower the likelihood of a recurrence, further therapies, including radiation therapy or chemotherapy, could be suggested. Early diagnosis and treatment can improve patient outcomes and quality of life.[42]

Targeted Therapy

Transmembrane Receptor Tyrosine Kinase Type III: Targeting KIT, imatinib is a type of tyrosine kinase antagonist that has demonstrated potential in treating several carcinoma subtypes, especially those with mutations in KIT exon 11 or 13. However, it has not been successful in treating melanomas with BRAF or NRAS mutations, which are more frequent in other subtypes. Imatinib has been shown to be beneficial in some individuals with KIT mutations; however, resistance can develop with time. Nilotinib, another KIT-targeting tyrosine kinase inhibitor, has been investigated as a potential alternative therapy for individuals who are unbearable to or whose illness has progressed following imatinib treatment. Its ability to pass through the blood-brain barrier has been proven, making it a viable treatment option for the individuals suffering from brain metastases. However, more investigation is required to determine its proper application and effectiveness in this setting.[42]

Interleukin 2: One of the first cytokines to be thoroughly defined was interleukin-2 (IL-2), a 15.5 kDa molecule. When it binds to its receptor,

it causes NK, B, and T cells to proliferate, which is necessary to keep the immune system in balance. The FDA authorized the application of IL-2 in 1998 to treat a number of illnesses, but it can cause adverse reactions and has a low success rate.[43]

Interferon: Interferon alpha (IFN-) has been widely explored as a supplement to treatment for melanoma, particularly among patients at high risk. After surgery, it has been demonstrated to boost immunity, aid in the removal of residual melanoma cells, and have some mild anticancer activity. On the other hand, prolonged usage of IFN is associated with negative consequences like flu symptoms, exhaustion, depression, and hematologic toxicity, which may restrict its usage in some individuals.[44]

Cytotoxic T-lymphocyte-Associated Protein 4: Targeting CTLA-4, a protein on the surface of T lymphocytes that serves as an immunological checkpoint, Ipilimumab prevents T cell activation. Ipilimumab increases activation of T-cells and inhibits CTLA-4 to enhance the immunological response towards cancerous cells, resulting in better survival outcomes in patients with advanced melanoma.[43]

Immunotherapy using adoptive cells (ACT) is the process of providing patients with allogeneic T or NK cells that are reactive to tumours in order to cause regression of the umor. Using this technique, tumour antigen-immune cells are isolated. These lymphocytes can then be chosen ex vivo, activated, expanded, and reinfused into the patient. Many antigen-specific T lymphocytes have been recovered from MM tumours that have been removed, but the logistical and technical challenges associated with patient selection, tumour excision, and the establishment of viable tumour number infiltrating lymphocyte (TIL) cultures is limiting this technique. Novel techniques, such as genetically engineered T cells, are being explored to overcome this issues.[45]

Pre-clinical cancer models: Preclinical models are essential for developing new treatments and understanding the mechanisms of action of existing ones. Patient-derived samples and realistic models of the tumour microenvironment can provide a better representation of a treatment's effects and facilitate the translation of research findings to clinical application. Additionally, exploring factors such as the gut microbiome and lifestyle factors can lead to the development of tailored treatment plans (Zitvogel et al., 2016; Friedman et al., 2015). For a patient with metastatic tumours, the tumour microenvironment, which includes all the organoids involved in tumour propagation, can preserve the immune system's context. (Neal et al., 2018), spheroids or spheroids organotypic tumours are generated from patients (Jenkins et al., 2018) to study liquid alignancies. Various models and assays have been developed in recent years. Certain models and assays show possibilities in improving our understanding of certain types of tumours and may prove useful in supporting diagnosis and treatment. Tyner et al. (2018) Traditional cytotoxic chemotherapy and solid tumours have been connected to immunotherapy use in recent years (Vlachogiannis et al., 2018; Ooft et al., 2019). Preliminary precision RW A review on melanoma therapeutics is provided by Jenkins and DE Fisher, who discuss potential medical strategies that could be helpful in identifying certain medicines or therapeutic combinations that can enhance clinical efficacy and response durability in particular patient roles. (Spranger and Gajewski, 2013; Smyth et al., 2016)

Clinical trial drug: The PANAMA study was a clinical trial involving the treatment of colorectal cancer. Between May 2014 and February 2021, 387 individuals were enrolled for the study. Several factors, such as the expected complete dosage of pmab throughout maintenance therapy, the objective response to therapy following induction therapy, and previous adjuvant therapy with oxaliplatin, were used to stratify random assignment. In the FU/FA maintenance group, 45 patients (36%), and 75 patients (61%), received FOLFOX with pmab reinduction therapy. Patient and tumour characteristics were examined for both the safety set and the entire analysis set, with peritoneal lesions and > 1v organ disease having a little higher prevalence. For males and women, respectively, the median follow-up length was 35.8 months and 36.3 months. [46]

CONCLUSIONS

The integration of advanced diagnostic technologies and innovative drug delivery systems into clinical practice is poised to significantly enhance the early detection, prevention, and

treatment of skin cancer. By leveraging these advancements, healthcare providers can improve patient outcomes and manage skin cancer more effectively. Continued research and development in these areas will be critical to addressing the global burden of skin cancer and ensuring that cutting-edge treatments and diagnostic tools are accessible to all patients.

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Conflict of Interest

The authors claim no conflict of interest.

Authors' Contribution

Dr. Deepak kumar Jha: Conceptualization and Design; Amani Abdalbagi Eshag Hassan: Data Collection and Processing; Raveena Shree R: Contributed to the development and refinement.

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Not Applicable.

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