e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:12/December-2024 Impact Factor- 8.187 www.irjmets.com

SQUAMOUS CELL CARCINOMA

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ABSTRACT

Squamous cell carcinoma (SCC) is one of the most common forms of skin cancer, originating from the squamous cells that make up the outer layer of the skin and mucous membranes. This article explores the causes, risk factors, clinical features, diagnostic approaches, and modern treatment strategies for squamous cell carcinoma, emphasizing the importance of awareness and prevention in managing this disease effectively.

Keywords: Squamous Cell Carcinoma, Pathogenesis, Diagnostics, Treatment.

I. INTRODUCTION

Squamous cell carcinoma (SCC) is the second most common forms of skin cancer, originating from the squamous cells that make up the outer layer of the skin and mucous membranes. Although frequently associated with sun-exposed areas of the body, such as the face, neck, and hands, SCC can develop in other regions, including the mouth, oesophagus, and lungs. This malignancy is often linked to chronic exposure to ultraviolet (UV) radiation, environmental carcinogens, and pre-existing conditions like actinic keratosis.

II. OBJECTIVE

The aim of this article is to understand the various aspects of squamous cell carcinoma including its aetiology, diagnosis, pathogenesis etc.

Materials required:

- The study was carried out from the online platforms such as journals and articles
- SCC patients

EPIDEMIOLOGY:

An accurate incidence of squamous cell carcinoma (SCC) is unknown, but the cancer is among the most common and costly malignancies in populations of European ancestry.

III. RISK FACTORS

- GEOGRAPHIC FACTORS
- AGE
- SEX

Geographic factors:

Geographic factors play an significant role in occurrence of squamous cell carcinoma of skin due to variations in environmental exposure in different regions.

1. UV RADIATION EXPOSURE:

- There are higher levels of UV radiation in tropical and subtropical areas.
- Areas near the equator receives high UV exposure throughout the year
- The places at high altitude receives more exposure

2. Climate:

- The areas with hot climate have more occurrence

3. Skin type distribution by geography:

- Fair skinned populations (Australia, Europe, and North America) have high occurrence due to low melanin content.

SEX:

Males are more commonly affected than females

AGE:

Older people are more commonly affected.

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ETIOLOGY:

The development of **SCC** occurs by the combination of Environmental genetic and lifestyle factors.

PRIMARY CAUSE:

- Exposure to UVR (UVA and UVB) has been recognised as the most important environment risk factor in the development of SCC.

GENETIC PREDISPOSITION:

- Genetic factors may critically potentiate the risk conveyed by environmental risk factors such as UVR. Clinical skin phenotype is defined by constitutive and facultative pigmentation, which are controlled by more than 150 genes.

CHRONIC INFLAMMATION OR INJURY:

- SCC most commonly develops in areas of chronic inflammation or injury.

VIRAL INFECTIONS:

- HPV (HUMAN PAPILLOMA VIRUS) -Persistent infection with high-risk HPV strains, such as HPV-16 and HPV-18, is a known cause of SCC in the genital, anal, and oropharyngeal regions.
- Individuals with HIV or undergoing organ transplantation are more susceptible to SCC due to compromised immunity.

PATHOGENESIS

- Exposure to UVR (both UVB and UVA) has been recognized as the most important environmental risk factor for the development of SCC with a strong dose– response association.
- UVB-induced mutagenesis of the skin gives rise to specific UV signature mutations (characteristic C-T and CC-TT Di pyrimidine transitions), which constitute most mutations found in SCC.
- Genotoxicity of UVA radiation seems mostly to indirectly add to the risk, primarily by photooxidative stress-mediated mechanisms such as the induction of reactive oxygen species in the skin.
- In addition to the mutagenic effects, UVR is thought to promote SCC development by its immunosuppressive and immunomodulatory properties, such as depletion of Langerhans cells from the epidermis, improper antigen presentation in skin-draining lymph nodes, and hindered tumour surveillance by the expansion of tumour antigen-specific regulatory T cells and a shift toward T-helper cell type 2 responses in UV irradiated skin.

MOLECULAR ASPECTS: The sequence of events in which normal keratinocytes transform into SCCs, referred to as skin carcinogenesis, is thought to be a multistep process of progressive and accumulating genetic and epigenetic alterations in key signalling pathways regulating cell survival, cell cycle, and genome maintenance.
Mutations in the tumour-suppressor gene p53 (TP53) are the most prominent and best studied aberrations in skin cancers.

LOCATIONS

1) ORAL SQUAMOUS CELL CARCINOMA

Oral SCC may arise on apparently normal mucosa but are usually preceded by leukoplakia, erythroplakia, or leukoerythroplakia, which are localization-specific.

2) SQUAMOUS CELL CARCINOMA OF THE LOWER LIP

SCC of the lip occurs on the lower lip more often than on the upper lip, because the lower lip, along with the nose and cheeks, is regarded as one of the typical "sun terraces.

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3) VERRUCOUS SQUAMOUS CELL CARCINOMA

Verrucous SCC clinically presents as a slowly growing ulcerated plaque or an exophytic cauliflower-like slowly growing tumour. Typical locations of verrucous SCC include the oral cavity (oral florid papillomatosis), the Genito anal region (often referred to as giant condyloma acuminatum Buschke-Löwenstein).

4) KERATOACANTHOMA

KA commonly is regarded as a subtype of highly differentiated SCC with typical clinical and histopathologic features. KA usually erupts rapidly within a few weeks and has the ability to spontaneously regress. KA clinically presents as a sharply circumscribed firm nodule with a central horn-filled crater that typically arises on the head and sun-exposed areas of the extremities.

DIAGNOSIS:

The standard histopathology report of SCC should include the following: histologic subtype (acantholytic, spindle cell, verrucous, or desmoplastic type); grade of differentiation (G1 to G4); maximum vertical tumor diameter in millimetres; extent of dermal invasion (Clark level); and presence or absence of perineural, vascular, or lymphatic invasion. To facilitate correct management of SCC, information about whether the margins are free or do not have the minimum distance required between the tumour and the resection margin.

DIFFERENTIAL DIAGNOSIS:

Depending on the localization and type of SCC there are different differential diagnoses to be ruled out, including SCC with a classical clinical presentation of

- Hyperkeratotic seborrheic keratoses
- viral acanthoma
- Airal warts and
- Acanthoma fissuratum
- Discoid lupus erythematosus
- Lichen planus

MANAGEMENT

As the treatment modality for the primary lesion is a major determinant for the risk of local recurrence, the ideal management of SCC is predicated on local tumour control along with maximal preservation of function and cosmetics. In cases of clinical uncertainty about invasiveness, surgical resection or a biopsy followed by histologic evaluation is recommended before employing any therapeutic intervention other than surgery.

IV. TREATMENT

SURGERY:

Surgical excision, preferably microscopically controlled surgery (Mohs surgery), is regarded as the primary mode of therapy for localized SCC and has a cure rate of 95%.

SCC may give rise to local in-transit metastasis, which may be removed by wide surgical excision or treated by irradiation of a wide field around the primary lesion. Treatment of nodal metastasis may involve lymph node dissection, radiation, or a combination of both.

TOPICAL THERAPY:

Topical therapeutic treatments such as topical imiquimod, topical or intralesional 5-fluoruracil, cryotherapy, and photodynamic therapy for SCC have been reported.90-92 As evidence for the efficacy of these treatments is lacking and limited to case reports, topical therapy is generally not regarded an appropriate treatment modality for invasive SCC.

RADIATION THERAPY:

While surgery is regarded the primary mode of local therapy for the vast majority of SCCs, patient preference and other factors, such as problematic locations for surgery, may lead to the selection of radiation therapy as the treatment modality. In any case, appropriate confirmation of the diagnosis by histologic evaluation is mandatory prior to radiotherapy.

CHEMOTHERAPY:

Although there are limited data on the efficacy of chemotherapy for metastatic SCC, standard options in metastatic or unresectable SCC include systemic platinum-based chemotherapeutic regimens, 5- fluorouracil/ capecitabine, monotherapy/chemotherapy with methotrexate.

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V. CONCLUSION

Squamous cell carcinoma (SCC) is a common yet preventable form of skin cancer that can become life-threatening if left untreated. It primarily arises from prolonged exposure to ultraviolet (UV) radiation, but other factors like genetic predisposition, immunosuppression, and chronic inflammation also contribute to its development. Early detection and timely intervention significantly improve outcomes, as SCC responds well to treatments such as surgical excision, radiation therapy, and topical medications.

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