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Editorial

Photodynamic therapy in the treatment of early squamous cell carcinoma of the oral cavity

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Oral squamous cell carcinoma (OSCC) is the most common subtype of malignant tumor of the oral cavity.[1] In India, oral cancer is the commonest cancer in males.[2] Although there have been great advances in the diagnosis and treatment of OSCC in recent years, the 5-year survival rate for advanced oral cancer patients has remained approximately 20.0%.[3]

Oral lesions like leukoplakia, erythroplakia and submucosal fibrosis are common precursors of malignancy.[4] Histologically, leukoplakic lesions show hyperparakeratosis or hyperorthokeratosis and/or epithelial hyperplasia, whereas nearly all erythroplakia reveal some degree of epithelial dysplasia and carcinoma in situ.[4] Surgical treatment of leukoplakia or other oral precancerous lesions may be performed either through conventional surgery, electrocauterization, laser ablation, or cryosurgery. Recurrence of leukoplakia with dysplasias after surgical treatment has been reported in 10-35% of cases.[5] Large oral precancerous lesions treated by total surgical excision frequently result in scar formation.[6]

Photodynamic therapy (PDT) is another effective treatment modality for human oral cancerous lesions because it can be used repeatedly without cumulative side effects, results in little or no scar formation, with low penetration capability, can treat multifocal lesions and can be administered to patients with pacemakers and bleeding tendency.[7] Photodynamic therapy has been used to good effect in basal cell carcinoma, bowen's disease, actinic keratosis and all stages of head and neck cancer.[7,8] Image-guided interstitial PDT has been successfully used in advanced head and neck tumors.[9]

Photodynamic therapy is a recent, promising treatment option for superficial nonmelanoma skin cancers with comparable effectiveness to traditional therapies.[9,10] ALA-PDT has been used for treatment of oral cancerous and precancerous lesions with relatively good clinical outcomes.[11,12] The probable mechanisms of PDT action on skin tumors are direct light effect, vascular, and/or immunologic mechanisms leading to tumor ablation.[13] Photodynamic therapy induces early, intense damage to the epithelial cells, strongly suggesting a direct cytotoxic effect as the main mechanism of tumor cell death.[13]

A total of 60 mg/kg dose of 5-ALA is administered orally in three fractions (20 mg/kg each) at hourly intervals. Red light delivery started 15 min after the third dose. Light-emitting diode (LED) light (~640 nm peak) is delivered to the target lesion using a flexible optical fiber attached to a portable LED light source. The total light dose was 100J/cm^2, fractionated into 10-min periods of light delivery with 2-min breaks, proceeding until the total light dose had been delivered (approximately three fractions total=100J/cm^2). The LED light spot covered the lesion as well as a margin of normal tissue. After the procedure, patients remains in subdued lighting in a side room on the

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ward for 24 h after photosensitizer administration, followed by re-adaptation to indirect sunlight for increasing periods while still an in-patient. Blood investigations were repeated 24 hours after PDT.

A repeat biopsy of the treated site is taken after 7-10 days of PDT treatment to evaluate the response of therapy, fixed in formalin, paraffin embedded and 3-5 micron thick sections prepared for histological examination using hematoxylin and eosin staining (H&E). Histopathologic analysis of the site of treatment can help to determine the pattern of necrosis, tumor response by lymphocytic cell infiltrate, the extent of healing by fibrosis & scar formation, angiogenesis and apoptosis.

The common PDT induced changes seen on histopathologic biopsy are zonal, lymphocytic tumor response, angiogenesis, healing by fibrosis & scar tissue formation, apoptosis, red cell extravasation and neutrophilic infiltrate. The definite pattern of necrosis, extent of angiogenesis and scarring and the amount of inflammatory cell response can help in the prognostification of PDT treated micro-invasive squamous cell carcinoma of the oral cavity.

Conflict of Interest

None.

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Author biography

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