

IMMUNOHISTOCHEMICAL ANALYSIS OF EXPRESSION OF β -CATENIN IN THE PROGRESSION OF ORAL DYSPLASIA TO ORAL SQUAMOUS CELL CARCINOMA

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Oral dysplasia is a precancerous condition of the oral mucosa, representing an acute, intermediate stage in the development of oral cancer. With only 40–50% of patients having a survival of five years after diagnosis, it carries crucial challenges in the field of public health and oncology. There has been a growing amount of evidence indicating that the Wnt/ β -catenin pathway is elevated in oral cancer. However, the degree of this pathway's activation in different stages of oral carcinogenesis is poorly understood. Therefore, this study was aimed to address this knowledge gap by investigating the expression of β -catenin as a potential key player in the progression of oral dysplasia into the oral squamous cell carcinoma (OSCC) stage. A retrospective, case-control study was conducted using 60 archived oral samples collected from patients diagnosed with oral dysplasia and OSCC, with 12 samples representing each group of mild, moderate and severe epithelial dysplasia, 12 representing OSCC, and 12 samples representing healthy oral mucosa. A well-established protocol of immunohistochemistry (IHC) using anti- β -catenin antibodies was used to analyse the clinical tissue samples. Our findings indicate an increasing expression pattern of β -catenin in the cytoplasmic area stained when mild epithelial dysplasia progresses to the OSCC stage ($p < 0.05$). A similar increase is also observed in the nuclear area stained, with a counterinitiative drop at the OSCC stage. This is contrary to the membranous area stained, where no significant difference was observed ($p > 0.05$) among groups. These well-established relationships supported by statistically significant results obtained using one-way ANOVA analysis helped to designate β -catenin as one of the signature molecules in the progression of oral dysplasia. Therefore, this study holds the promise of improving early detection, risk assessment, and intervention strategies for oral dysplasia, thus potentially transforming the landscape of oral cancer prevention and patient care.

Keywords: Malignant transformation, Oral cancer, Oral dysplasia, Sub-cellular localization, Wnt/ β -Catenin pathway