ABSTRACT

Oral squamous cell carcinoma (ORCC) is one of the most prevalent cancer in India, especially in males. Podoplanin is a transmembrane glycoprotein that is expressed mostly in lymphatic endothelium and also in various normal tissues. The podoplanin expression was found to be higher in different squamous cell carcinoma (SCC) including oral squamous cell carcinoma (OSCC). Therefore, evaluation of the podoplanin expression in oral squamous cells would be helpful for the diagnosis of early OSCC. Monoclonal antibody D2-40 has been used to identify podoplanin expression in tissue samples with primary oral cancer. Delay in diagnosis is one of the major causes for low survival rate in oral cancer patients. Therefore, novel diagnostic methods of oral cancer need to be developed for early diagnosis and therapy. A better understanding of mechanisms leading to OSCC is required to enhance more efficient diagnostic and therapeutic methods for oral cancer.

The present study was comprised of 20 patients, diagnosed with oral squamous cell carcinoma (OSCC) and we also used 5 normal tissue (alveolar mucosa) samples as controls. The samples and clinical data were collected from Department of Oral Pathology and Microbiology at Madha Dental College and Hospital, Tamil Nadu, India. Immunohistochemical (IHC) staining method were used to detect the expression of podoplanin within the cell. Primary antibody used in this study was mouse monoclonal antibody (clone D2-40) and

immunohistochemical staining was done by using the PolyExcel HRP/DAB Detection System. The association between podoplanin expression and other relevant factors were analyzed using appropriate statistical tools with the help of IBM SPSS software 24.0.

Our present study evaluated the podoplanin expression in 20 OSCC cases, of which 12 cases (60%) showed podoplanin expression. Eight OSCC cases (40%) showed no detectable podoplanin expression (scored as 0), 6 cases (30%) showed podoplanin expression between 31-50% (scored as 3), 5 cases (25%) showed podoplanin expression between 51-80% (scored as 4), and only 1 case (5%) showed expression between 11-30% (scored as 1). We also observed grade-IV OSCC (poorly differentiated) exhibiting significantly higher levels of podoplanin expression, as compared to moderately (grade-II) or well differentiated (grade-I) OSCC (P=0.004). Higher podoplanin expression was found in buccal mucosa (46.1%) as compared to alveolar mucosa (24.3%) and we also found higher podoplanin expression in tobacco-betel quid chewers (56.7%), smokers (42.9%) and alcohol consumers (53.9%) as compared to non-consumers. However, only alcohol consumptions showed statistically significant correlation with podoplanin expressions (P=0.044).

Our study concludes that the expression of podoplanin could be used as a molecular biomarker for early detection of oral squamous cell carcinoma (OSCC). More studies containing a larger sample size are

required to validate the clinical perspective of podoplanin as a molecular biomarker for OSCC risk assessment. Present study opens up the new way to analyze the expression of podoplanin from biopsied tissues to evaluate the status of OSCC. Further investigations on the association between the podoplanin expression and habit-related factors in a larger sample size are needed. In recent times, different anti-podoplanin based therapeutic agents, like CasMab anti-podoplanin, have been tested to improve the prognosis of cancer patients.

Key words: Oral squamous cell carcinoma (OSCC), podoplanin, biomarker, immunohistochemistry (IHC)