Association of PIM-1 expression with tumor progression and patients' prognosis in salivary gland adenoid cystic carcinoma

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BACKGRAND: PIM-1 kinase is proved to phosphorylate a series of substrates to exert its oncogenic function in many malignancies. In current study, the clinical significance of PIM-1 protein, apoptosis status and apoptosis related proteins including FOXO3a, BAD and BCL-2 were investigated in salivary gland adenoid cystic carcinoma (ACC) tissues.

METHODS: PIM-1 expressions in 4 pairs ACC tissues and corresponding normal slivary gland tissues were estimated by Westernblot. PIM-1, FOXO3a, BAD and BCL-2 levels in 60 ACC tissues were examined by immunohistochemistry (IHC). TUNEL assay was performed to detect the apoptosis status of ACC tissues.

RESULTS: PIM-1 highly expressed in ACC tissues compared with adjacent normal tissues. IHC staining results showed that high expression ratios of PIM-1, FOXO3a, BCL-2 and BAD were 33.33% (20/60), 51.67% (31/60), 51.67% (31/60) and 55% (33/60), respectively and there were significant correlations between the expression of PIM-1 and FOXO3a and BCL-2 ($p < 0.05$). Apoptotic rates were significantly associated with PIM-1, FOXO3a, BCL-2 and BAD levels ($p < 0.05$). PIM-1 levels was significantly related to tumor size, lymph node involvement, nerve invasion, distant metastasis and weakly associated with TNM stage. FOXO3a level was closely correlated with T-status, tumor size and lymph node involvement. Meanwhile, there were significant correlations between BAD level and TNM stage and distant metastasis. BCL-2 level had no significant correlations with any clinical index. Kaplan–Meier survival curves showed that PIM-1 level was weakly associated with overall survival of ACC patients (p=0.062). Cox regression multivariate analysis results revealed that apoptotic rate and histotype are independent prognosis factors in ACC.

CONCLUSIONS: Assessment of PIM-1 might be useful in investigating the malignant behaviors of ACC and predicting the outcome of ACC patients.