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23041 | Study of the relevance of antioxidant enzymes in thyroid cancer

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Background & Aim: Thyroid cancer(TC) is the most common endocrine malignancy, arising from follicular and parafollicular cells. Oxidative stress, caused by excess reactive oxygen species(ROS) and metabolites, influences TC development and progression, as the thyroid is highly exposed to ROS. The redox balance is maintained by antioxidant enzymes (SOD, GPX) and non-enzymatic antioxidants, which limit ROS formation and detoxify metabolites. Dysregulation of this balance is observed in various TC types(papillary, follicular, medullary, anaplastic). However, the role of antioxidants in TC progression, prognosis, and therapy remains under study. This project aims to explore the correlation between antioxidant enzyme expression and clinicopathological factors to address their role in TC. **Methods:** A series of 90 TC samples were collected, corresponding to benign and malignant lesions. The protein expression pattern of superoxide dismutase 1(SOD1), superoxide dismutase 2(SOD2) and glutathione peroxidase 1(GPX1) was optimized and assessed by immunohistochemistry in formalin-fixed paraffin-embedded samples for this cohort. In addition, the mRNA expression of *SOD1*, *SOD2* and *GPX1* are underway by quantifying mRNA expression using real-time quantitative PCR(qPCR). **Results:** Our series comprise the following histotypes: Multinodular Follicular Disease(2.2%), follicular adenoma(17.8%), fetal adenoma(7.8%), papillary thyroid carcinoma (PTC)(31.1%) - classic PTC(5.6%) and follicular variant of PTC(11.1%) - follicular thyroid carcinoma(12.2%), oncocytic carcinoma(1.1%), medullary thyroid carcinoma(3.3%) and others(26.7%). QuPath evaluation of immunohistochemical analyses are underway being validated by a specialized pathologist. In parallel, qPCR analysis is ongoing. Clinicopathological parameters will be correlated with the expression patterns of the analyzed molecules. **Conclusions:** We expect to disclose the expression of antioxidant enzymes in TC and assess their potential as diagnostic and prognostic biomarkers.

Keywords: thyroid cancer, reactive oxygen species, SOD1, SOD2, GPX1.

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