

Assessment of BRAFV600E Mutation by PCR in Background Thyroid Tissue with Chronic Lymphocytic Thyroiditis Associated Papillary Thyroid Carcinomas of Patients

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Papillary Thyroid Carcinoma (PTC) is the commonest type of endocrine malignancy in Sri Lanka, and its characteristic BRAFV600E mutation increases cancer risk and aggressiveness. Chronic Lymphocytic Thyroiditis (CLT) is an autoimmune disease studied for its association with PTC globally and in Sri Lanka. In this study, we hypothesized that CLT may serve as an etiological factor of PTC by facilitating an environment conducive to mutation occurrence; hence, the characteristic BRAFV600E mutation may also be present in non-neoplastic CLT areas. The aim of this study was to determine any significant association of BRAFV600E with CLT tissues. Hematoxylin and Eosin-stained slides of 62 PTC cases at National Hospital Kandy from January 2022 to July 2023 were retrieved and screened. Slides containing non-tumor backgrounds were categorized based on the presence and absence of CLT. FFPE tissue blocks of CLT-positive (n=15), and CLT-negative (n=17) cases were sectioned, followed by DNA isolation using an FFPE-specified gSYNCTM DNA Extraction kit. PCR amplification of a <150bp target sequence of BRAF exon 15 containing nucleotide 1799, and real-time mutation detection was performed using a Human BRAF gene mutation detection kit. Fischer's exact test with a significance level $\alpha=0.05$, and an Odds Ratio (OR) was calculated considering BRAFV600E status as outcome and CLT presence as cause. The RT-PCR found BRAFV600E in 1/15 CLT-positive samples and 0/17 CLT-negative samples. Fischer's exact test revealed no statistically significant difference between the two groups ($P=0.46875$). Odds ratio of 3.62 (0.136, 95.6) suggests that odds of BRAFV600E occurring in CLT-positive group is 3.62 times higher than CLT-negative group. Although odds ratio indicated a higher likelihood of BRAFV600E in CLT-positive cases, results were not statistically significant. Thus, no significant association between BRAFV600E and CLT in non-neoplastic tissue of PTC patients was established. Further research with larger sample sizes is needed to validate these findings.

Keywords: BRAFV600E, Papillary Thyroid Carcinoma, Chronic Lymphocytic Thyroiditis, PCR, Sri Lanka