Diagnostic value of BAT-25 and BAT-26 qPCR markers for microsatellite instability in colon cancer

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Colon cancer is a leading cause of cancer-related morbidity and mortality worldwide. Microsatellite instability (MSI), reflecting deficient DNA mismatch repair, is present in a subset of colon cancers and may serve as a useful diagnostic marker. This study aimed to detect MSI in colon cancer patients by analyzing BAT-25 and BAT-26 microsatellite markers using quantitative PCR (qPCR) in a Sri Lankan cohort. In a cross-sectional design, DNA was extracted from formalin-fixed paraffin-embedded (FFPE) tissues of ten patients who were confirmed as colon cancer patients by histopathological investigations. Five patients whose biopsy samples were confirmed negative for colon cancers, colon or rectal polyps were selected as controls. Comorbidities which effect the MSI status were not reported in the cohort. qPCR was performed to determine cycle threshold (Ct) values for BAT-25 and BAT-26. Group comparisons used t-tests, Mann-Whitney U, and ANOVA as appropriate. Logistic regression assessed the diagnostic potential of Ct values. ROC analysis determined the discriminatory performance of BAT-25 and BAT-26. Both BAT-25 and BAT-26 showed significantly different Ct values between patients and controls ($p < 0.05$). Lower (more negative) BAT-25 and BAT-26 values were associated with earlier T, N, and M stages. Logistic regression identified BAT-25 as a significant predictor of patient status ($p = 0.041$, OR = 0.82, 95% CI: 0.50–0.94). ROC analysis showed good discriminatory power for both markers, with area under the curve (AUC) values of 0.72 (BAT-25) and 0.80 (BAT-26), and specificity up to 80% in BAT 25 and 100% for BAT-26. qPCR-based analysis of BAT-25 and BAT-26 effectively distinguishes colon cancer patients from controls and correlating with disease stage. These findings support the utility of BAT-25 and BAT-26 as molecular markers for MSI detection in colon cancer, with potential diagnostic applications in clinical practice.

Keywords: *Colon cancer, Microsatellite instability, BAT-25, BAT-26, qPCR*