Assessment of Circulating miRNA-17 and miRNA-222 Expression Profiles as Non-Invasive Biomarkers in Egyptian Patients with Non-Small-Cell Lung Cancer

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Abstract:

Background: Lung cancer is one of the main human health threats. Survival of lung cancer patients depends on the timely detection and diagnosis. Among the genetic irregularities that control cancer development and progression, there are microRNAs (miRNAs). This study aimed to assess the plasma level of circulating miRNA-17 and miRNA-222 as non-invasive markers in non-small-cell lung cancer (NSCLC) patients. Patients and methods: A total of 40 patients with NSCLC and 20 healthy controls who were matched in terms of age and sex with the patient group were included in this case-control study. Estimation of miRNA-17 and miRNA-222 expression profiles in the plasma was done using quantitative real-time PCR (qRT-PCR). The relationship between both markers and their clinicopathological features were also determined. Receiver operating characteristic (ROC) curve analysis was done to evaluate the role of these microRNAs in NSCLC diagnosis and follow-up. Results: MiRNA-17 and miRNA-222 levels were significantly upregulated in NSCLC patients compared with controls (48.32±12.35 vs 1.16±0.19 and 34.53±3.1 vs 1.22±0.14) (P=0.000). Plasma miRNA-17 level was increased, and the miRNA-222 level was decreased across different stages of the disease; however, these differences were not statistically significant (P=0.4, P=0.5, respectively). The miRNA-17 levels were higher in the lung cancer patients with metastasis, but miRNA-222 levels were lower in patients without metastasis. We found no statistically significant difference in this regard (P=0.4 vs P=0.3, respectively). ROC curve analysis showed that the sensitivity and specificity of miRNA-17 were 77.78% and 87.50%, and of miRNA-222 were 50% and 88.89%. Conclusion: MiRNA-17 and miRNA-222 can be considered as non-invasive biomarkers for detection of early lung carcinogenesis and metastasis in patients with NSCLC, hence providing a basis for the development of novel therapeutic approaches.

Keywords:

Biomarker; Non-invasive; miR-17; miR-222; non-small-cell lung cancer

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