Transforming growth factor-beta and microRNA-21, microRNA- 29b, microRNA-92, and microRNA-129 in systemic sclerosis patients: a case–control study.

Background: Systemic sclerosis is characterized by extracellular matrix overproduction by activated fibroblasts. It was reported that microRNAs (miRNAs) participate in the regulation of processes that drive fibrosis, which include transforming growth factor-beta (TGF-β) signaling, fibroblast proliferation, differentiation, and deposition of extracellular matrix proteins.

Objective: To detect whether miRNA-21, miRNA-29b, miRNA-92, and miRNA-129, and TGF-β are considered as biomarkers for systemic sclerosis.

Patients and methods:

The current study was a case–control study carried out on 80 Egyptian adults. Of the participants, 30 were apparently healthy controls, while the other 50 patients were classified into 58% with limited skin type, 26% with diffused skin type while16% of the patients were with unclassified systemic sclerosis. miRNAs were quantitated by real-time PCR while TGF-β was measured by the ELISA technique.

Results

The results showed that the fold change level of miRNA-21 and miRNA-92 were upregulated compared with the control group with a P value of 0.001 each. Meanwhile, the fold change levels of miRNA-29b and miRNA-129 were downregulated compared with the control group (P=0.001, 0.048), respectively.

The present study showed that the mean value of the serum level of TGF-β was 145.0±42.84 pg/ml compared with the control group 23.42±5.79 pg/ml with a P value of 0.001. There was a statistically significant negative correlation between miRNA-29 and TGF-β (r=−0.31, P=0.05) among cases. The cutoff points of miRNA- 21, miRNA-29b, miRNA −92, and miRNA −129 were 2.45, 0.49, 5.38, and 0.55 fold changes. While for TGF-β, the cutoff point was 120 pg/ml. For miRNA-21, miRNA- 29b, miRNA-92, and miRNA-129 sensitivities were 70.5, 41.1, 54.5, and 73.5%, respectively, and 70.5% for TGF-β. Specificity was 100% for all except 98% for miRNA-29b and 99% for miRNA-129. There was no significant relation of all these markers regarding the extent of skin involvement or duration of disease.

Conclusion

It was concluded that miRNA-21, miRNA-29b, miRNA-92, and miRNA-129 as well as TGF-β can be considered as biomarkers for the diagnosis of systemic sclerosis.

Keywords:

microRNAs, systemic sclerosis, transforming growth factor-beta