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miRNA146-b expression as biomarker detection for papillary Thyroid Cancer

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ABSTRACT

Background: miRNA-146b is known as the post-transcriptional gene silencers, which is play important role in the regulating inflammatory responses. MicroRNAs (miRNAs) have been labeled as the promising molecular prognostic marker in several tumor types Thyroid cancer is the most common type of endocrine malignancy. Over the past few decades, the incidence of thyroid cancer has the considerably increased. Blood it is the most convenient and difficult to contaminate body fluid in diagnosis of diseases. The present study aimed to identify the most successful prognostic factors in well- defined thyroid carcinoma patients. One of the main objectives in this study is the miRNA 146b.

Methods: By using Real time PCR, micro RNA-146b gene expression was measured in serum samples for 80 patients, 40 patients was diagnosed with papillary thyroid carcinoma and another 40 with benign thyroid goiter.

Results: The current study revealed highly significant difference in median expression of miRNA-146b it was 47.3 folds (range=12.6-281.11 folds) in TC patients compared to 10.23 folds (range=0.51-134.83 folds) in those with BTT.

Conclusions: Micro RNA-146b gene expression increased significantly in papillary thyroid carcinoma patients compared with benign thyroid goiter can be used for detection of thyroid cancer.

Key words: thyroid cancer , papillary thyroid carcinoma, micro RNA-146b, real time PCR

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INTRODUCTION

Thyroid cancer is most common type of endocrine malignancy about 90% of thyroid neoplasms is Differentiated Thyroid Cancers (DTC) with low malignant potential and the very good prognosis. Over the last some decades, the incidence of thyroid cancer has increased.

Thyroid cancer develops in the thyroid gland, a part of the endocrine system. The thyroid gland produces the hormones that regulate body temperature, heart rate and metabolism. Thyroid gland is one of many glands that is make endocrine system.

The pituitary gland in the brain controls thyroid gland and other endocrine glands. It releases Thyroid-Stimulating Hormone (TSH), TSH stimulates the thyroid gland to produce thyroid hormone.

In the past 10 years, the incidence of thyroid cancer has been increasing yearly, and it became the 4th highest in women Part of the reason might due to the rapid development of imaging detection technologies and increasing awareness of people's health. But at the same time, data show that the incidence of the advanced thyroid cancer and the diagnosis of low-risk thyroid cancer are also increasing A large number of patients with thyroid disease have to undergo thyroidectomy. It is a paramount importance to categories the disease as benign or malignant. Such categorization greatly influences the type of the surgery.

Limited diagnostic method mainly depends on the ultrasound and the gold standard for the screening benign and malignant thyroid nodules is percutaneous Fine Needle Aspiration (FNA).However there is a limited accuracy of these methods.

But in view of the limited accuracy of the ultrasound diagnosis, and the defect that FNA depends too much on the diagnostic

level of the pathology department of the medical institution and due to the small sample size, some specimens cannot be diagnosed, repeated puncture, we need to find a biomarker to assist or even replace existing diagnostic methods. Thus, alternative methods are required for precise detection potential blood markers for thyroid cancer [1-5].

Blood is the most convenient and difficult-to contaminate body fluid in the diagnosis of the diseases, and the various tumor markers in blood have been widely used in the diagnostic procedures, confirmed its value in the diagnosis of tumours. As an important endocrine organ in body, the thyroid has a wide range of effects on the human body, and its concentration will be undoubtedly being reflected in the blood.

This study to find alternative methods precise detection potential in blood markers for thyroid cancer and to categories the disease as benign or malignant and compared the result with FNA. The study included measurement of miRNA146b expression.

miR-146b are known as post-transcriptional gene silencers, which play an important role in regulating inflammatory responses. MicroRNAs (miRNAs) have been labelled as promising molecular prognostic markers in several tumor types. The role of microRNAs (miRNAs) in various human diseases has become a hot research topic in recent years. miRNAs are a class of short non-coding RNA molecules containing 19–22 nucleotides. They are highly conserved molecules and are involved in the regulation of target genes by binding to 3′ untranslated regions (3′-UTRs) of the target gene in a completely or incompletely complementary manner According to literature, a variety of miRNAs are closely associated with cancer onset and progression, often playing the role of cancer suppressor genes or cancer promoting genes [6,7].

MATERIALS AND METHODS

Study subjects

The study included 80 patients (female) with Goiter have a standard error of mean age (mean ± SE) 46.562 years ± 1.105 years, Sample collected from patient was done FNA and before surgery .Patient were followed up after the operation to document the result of tissue histology examination. The patients were divided into two groups.group1include 40 sample serum of patient with benign thyroid goiter and another group include 40 sample serum of Patient diagnosed with thyroid cancer.

Measurement level of micro RNA-146b gene expression in serum

Micro RNA-146b gene expression by using Real time PCR.

Statistical analysis

Using SPSS version Analysis of variance will be used to compare means between the different groups and person's correlation will be used to find out any correlation between micro RNA-146b gene expression in benign and malignant patient.

RESULTS

The relative median expression of miRNA-146b was 47.3 folds (range=12.6-281.11 folds) in TC patients compared to 10.23 folds (range=0.51-134.83 folds) in those with BTT with a highly significant difference (Figure 1).

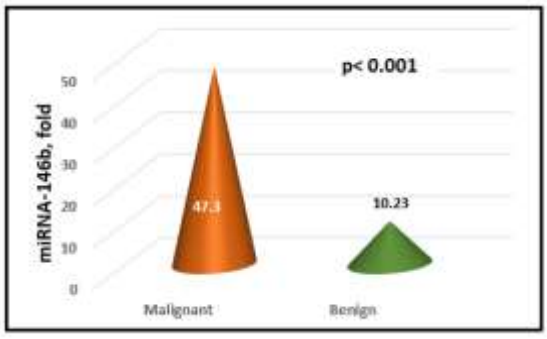

Fig. 1. Median serum level of miRNA-146b in malignant and benign cases

miRNA-146b gene expression, the AUC was 0.825, 95%CI=0.713-0.938, p<0.001. The sensitivity and specificity of the test at cut off value of miRNA-146b gene expression= 826.54 folds were 83% and 76%, respectively.

DISCUSSION

microRNA are the novel type of the short non coding RNA molecules. They control the expression of their targeted genes in a post-transcriptional manner and affect a wide range of crucial pathway that is responsible for growth of the tumors.

Thyroid cancer is the most common type of endocrine malignancy over the last few decades; the incidence of thyroid cancer has considerably increased. Although the majority of thyroid nodules are benign, 7% are diagnosed as Thyroid Cancer (TC) It is highly important to distinguish between malignant and the benign thyroid nodule. Overcoming the challenges of accurate assessments of the risk for individual patients is important to establish appropriate therapeutic strategies and to optimize clinical outcomes. May serve as a useful diagnostic for the thyroid cancer patients. Therefor early diagnosis of thyroid cancer is extremely important for the early treatment.

In the present study the median expression of miRNA-146b was 47.3 folds (range=12.6-281.11 folds) in TC patients compared to 10.23 folds (range= 0.51-134.83 folds) in those with BTT with a highly significant difference. The sensitivity and specificity of miRNA-146b were 83% and 76%, respectively.

Previous study was conducted by using Real-time PCR was used to quantify the expression of candidate miRNAs in 59 specimens from 30 patients with PTC and 29 patients with benign nodules. There was a significant difference between expression levels of miRNA in the PTC group Compared with non-PTC (p-value<0.05).

Past study carried out Showed the expression of miRNA-146b to be 28.9-fold higher in benign thyroid tumor compared with control when determined in 48 pairs of thyroid cancer and control samples using real time PCR [8-13].

CONCLUSION

Although the molecular mechanisms of the miRNAs in oncogenesis are remained to be fully explained, evaluating the miRNA expression in serum provides a diagnostic tool to differentiate the benign thyroid tumor form thyroid cancer it may also serve as the novel therapeutic target for thyroid cancer in the future.

ETHICAL CLEARANCE

The research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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