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Evaluation Of serum p-selectin level In Patients with Thyroid Dysfunction

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Abstract:

Introduction: Introduction: Around the world, 200 million people suffer from thyroid dysfunction. The regulation of body temperature, metabolism, blood pressure, fertility, fetal neurological development, children's academic achievement, mental health, and overall quality of life are all significantly impacted by thyroid dysfunction. In response to inflammatory circumstances, the adhesion molecule P-selectin is transported to the surfaces of platelets and endothelial cells. It is frequently investigated as an inflammatory disease biomarker.

Aim of the study: To evaluate the level of serum p-selectin among patients with thyroid dysfunction.

Subjects and methods: This case-control research is comprised of twenty patients in Group A who have hyperthyroidism and have elevated thyroid functions; twenty patients in Group B with hypothyroidism and reduced thyroid function; and twenty subjects in Group C with normal thyroid functions (the euthyroid group). After taking a full medical history, a full clinical examination was done. Blood samples were collected for routine labs and measurement of TSH, FT4, and P. SELECTIN LEVEL

Results: The p-selectin level was higher in the hyperthyroidism group than in the hypothyroidism group and in the control group.

Conclusion: P-selectin has a higher level in hyperthyroidism.

Key words: thyroid dysfunction; hemostasis; p-selectin.

1. Introduction

The thyroid gland produces thyroid hormones. They regulate lipid, carbohydrate, and protein metabolism as well as vital signs, neurological development, and various bodily functions. Thyroxine (T4), a prohormone primarily produced by the thyroid gland, is deiodinated by the enzyme 5'-deiodinase to produce the nuclear receptor-binding hormone (T3) [1].

In addition to their hemostatic function, platelets have multiple functions and are crucial in the control of inflammation and the immune system. In response to inflammatory conditions, many platelet-derived factors help to form an

inflammatory response. The most significant one is P-selectin, which is an adhesion molecule transported to the surfaces of platelets and endothelial cells. It is frequently investigated as an inflammatory disease biomarker [2].

P-selectin is an adhesive molecule that is kept in alpha-granules. It moves to the platelet membranes in response to triggering stimuli; it is translocated to the membranes of platelets. Numerous studies have shown raised P-selectin and platelet-leukocyte aggregates in the whole blood isolated from people with strokes or people who have elevated cholesterol levels and atherosclerotic carotid arteries [3].

2. Subjects and methods

2.1. Subjects

Inclusion criteria

All patients with thyroid dysfunctions >18 years old following up at internal medicine outpatient clinics, hospitals of Fayoum University. The control group included subjects with normal thyroid function.

Exclusion criteria

Patients who met the following criteria were disqualified:

1. Age > 70.
2. History of malignancy.
3. History of thromboembolic events or bleeding disorders.
4. Patients receiving oral anticoagulants, or OCPS.
5. Pregnancy.
6. Thyroiditis.

Sample size

Sample size was calculated using G-Power© software version 3.1.7 (Institute of Experimental Psychology, Heinrich Heine University, Dusseldorf, Germany). The minimum sample size of patients was 20 patients in each group. Effect size: 0.39, depending on previous research results. Two-sided (two-tails) type I error of 0.05 and power of 80%.

2.2. Study design

In this case-control research, participants were recruited from February 2021 to October 2021. Data regarding sixty people was gathered from Fayoum University Hospitals in the Fayoum Governorate as follows:

1. Group A: consists of 20 patients with elevated thyroid function (a group with hyperthyroidism on TT).
2. Group B: 20 thyroid dysfunction patients in Group B (hypothyroidism group, on TT).
3. Group C: Twenty participants in Group C (the euthyroid group) have normal thyroid function.

Every patient underwent the following procedures: a complete medical

history, including age, sex, smoking, blood disorders, or thromboembolic events; use of medications, including OCPS; and clinical assessment.

In this study, the following types of data were collected by laboratory investigations carried out on a sample of blood, including TSH and FT4.

To evaluate human P-Selectin in cultured cell supernates, serum, and plasma, a 1.25-hour solid-phase assay, the Quantikine® Human P-Selectin/CD62P Enzyme-Linked Immunoassay. It includes antibodies made in response to the recombinant factor and recombinant human P-Selectin.

2.3. Statistical analysis

The statistical package for the social sciences (SPSS) version 22 was employed for data collection, codification, and analysis. Categorical data were compared using the Chi-square (χ^2) test. The mean and standard deviation were employed to summarize numerical data. Both the independent t test and the Mann-Whitney U test were used to assess the degree of similarity between the two sets of information. When comparing courses, the Kruskal-Wallis test was utilized

3. Results

Regarding age and sex distribution, there was no statistically significant

difference between study groups ($P > 0.05$) (Table 1).

Table 1. Demographic comparisons between various study groups.

The Variables	Group (A) (N=20)	Group (B) (N=20)	Group (C) (N=20)	P-value.	
Age (years)	40.9±2.02	49.9±2.1	38.8±1.9	0.9	
Sex	Male	4 (20%)	1 (5%)	2 (10%)	0.3
	Female	16 (80%)	19 (95%)	18 (90%)	

The average TSH levels in all groups were 25, 8.5, and 1.8, respectively, while the average FT4 levels were 4.7, 1.8, and 1.3,

respectively. Between study groups, there was a statistically significant difference in thyroid profile ($P < 0.05$) (Table 2).

Table 2: Comparison of other investigation in study groups.

The Variables	Group (A) (N=20)	Group (B) (N=20)	Group (C) (N=20)	P-value.	
Thyroid profile	TSH	0.25±0.41	8.5±9.1	1.8±0.90	<0.001
	FT4	4.7±5.3	1.8±1.4	1.3±0.21	0.002

As regard p-selectin, between study groups, there was a statistically significant difference in terms of p-selectin level, with a

higher percentage of high p-selectin being noticed in group A (hyperthyroidism) and a

high percentage of low p-selectin level in group B (hypothyroidism).

On the other hand, the mean p-selectin titer among groups A, B, and C is 89.4, 69.4,

and 76.8, respectively. In terms of statistical significance ($P > 0.05$), there was no difference as regards the p-selectin titer between groups (**Table 3**).

Table 3. Comparisons between the levels of p-Selectin in various study groups.

The Variables	Group (A) (N=20)	Group (B) (N=20)	Group (C) (N=20)	P-value.	
p-Selectin titer	89.4±42.8	69.4±41.4	76.8±19.03	0.22	
p-Selectin	Normal	13(65%)	12(60%)	18(90%)	
	High	5(25%)	2(10%)	0(0%)	0.03
	Low	2(10%)	6(30%)	2(10%)	

4. Discussion

The relationship between thyroid dysfunction and hemostasis in clinical practice has been evaluated for years. In patients with thyroid disorders, numerous acquired coagulation and fibrinolytic system disorders have already been documented. Subclinical changes, as well as clinically significant problems with hemostasis, may be the cause of these abnormalities.

As regard the p-selectin level, there was a statistical difference between study participants, according to this study, with a

higher percentage of high p-selectin among group A (hyperthyroidism) and a high percentage of low p-selectin level among group B (hypothyroidism).

This agreed with a previous study by HARA et al. (2001), who showed that patients with uncontrolled Graves' disease had plasma P-Selectin levels that were significantly higher than those of healthy individuals. and those in Graves' disease controlled by methimazole [4].

That also agreed with Miyazaki et al. (1992), which showed that P-selectin expression was higher in autoimmune thyroid disease [5]. His selective expression of P-selectin in chronic inflammation has particular relevance for atherosclerosis.

Also, in agreement with Bossowski et al. (2000), who found that patients with

Graves' disease had significantly elevated levels of P-selectin in their serum both before and after treatment with methimazole [6].

Conclusion

P-selectin level was higher in hyperthyroidism group.

Ethical approval and consent to participate: This study was approved by the ethical committee of the faculty of medicine at Fayoum University (m 604, number (79), 10/1/2021). Written informed consent has

been obtained from the patients to participate and to publish this paper.

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Conflicts of Interest: The authors declare no conflicts of interest.

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