Clin. Lab. 2019;65:XXX-XXX


## LETTER TO THE EDITOR

# Preoperative Mean Platelet Volume in Thyroid Cancer

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**(Clin. Lab. 2019;65:xx-xx. DOI: 10.7754/Clin.Lab.2018.181024)**

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Letter to the Editor accepted November 2, 2018

**KEY WORDS**

mean platelet volume, thyroid cancer, platelet, thyroiditis

### TO THE EDITOR

We recently read an interesting article which investigated platelet count and mean platelet volume (MPV) in subacute thyroiditis by Fan et al. in this journal [1]. They reported that MPV was significantly decreased and showed negative correlations with platelet count in this patient group. To verify these changes in other thyroid diseases, we studied whether there were significant changes in MPV and platelet count in thyroid cancer with a brief review of literature.

The study enrolled 132 patients diagnosed with thyroid cancer as a patient group and 143 subjects for medical check-ups as the control group at Kyung Hee Medical Center, a tertiary teaching hospital in Korea. This control group has already been used in several of our previous reports [2,3]. Laboratory data from a total of 132 thyroid cancer patients were collected at the time of diagnosis and analyzed in this study. To obtain exact diagnoses, medical chart reviews were performed in this patient group. Mean age of patient group was 50.11 (range 21 - 80 years), and male to female ratio was 7:125. MPV was measured on an Advia 2120 (Bayer Diagnostics, Tarrytown, NY, USA) using EDTA-containing tubes containing venous blood within 2 hours of sampling. Statistical significance was analyzed using the independent sample Student's *t*-test, Pearson's correlation test, and regression analysis. These statistical analyses were done with MedCalc v11.6 (MedCalc Software, Mariakerke, Belgium) and Excel 2007 (Microsoft corporation, Redmond, WA, USA). Statistical significance was set at $p < 0.05$.

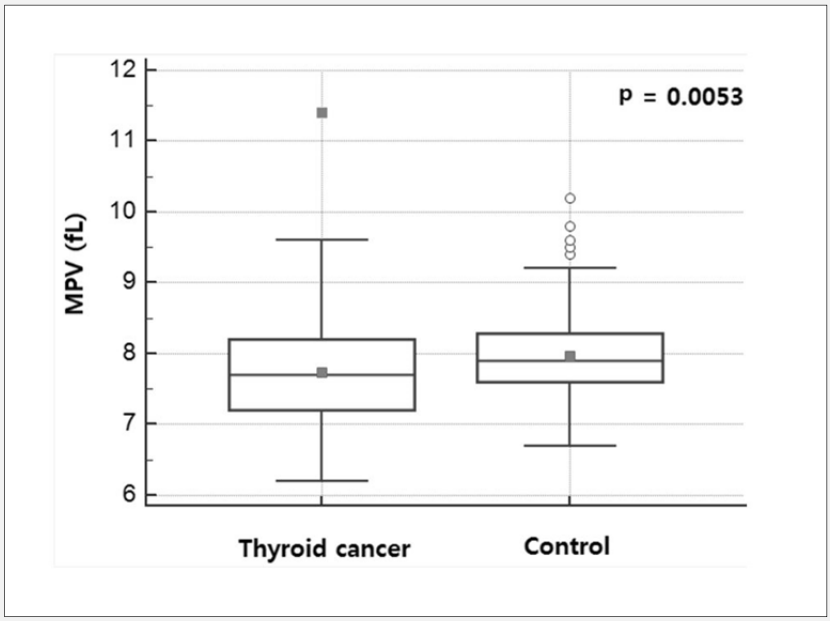


**Figure 1. Comparing means of mean platelet volume (MPV) level.**

**The mean of MPV was significantly lower in thyroid cancer (7.73 fL, p = 0.0053) compared with the healthy control group (7.96 fL).**

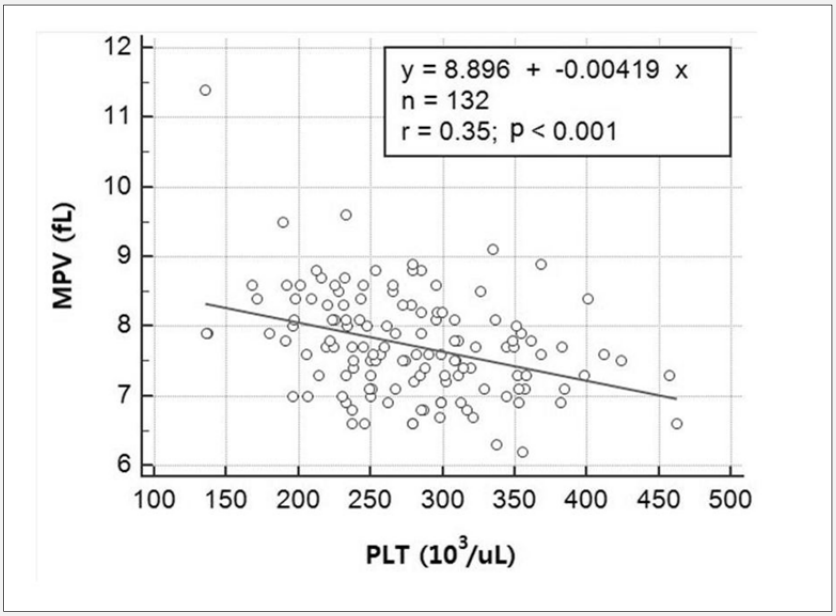


**Figure 2. Regression analysis between platelet counts and mean platelet volume in patients with thyroid cancer.**

**Mean platelet count shows the significant negative correlation with platelet count in thyroid cancer (r = -0.3545, $R^2$ = 0.1257, p < 0.0001).**

In this study, mean MPV levels showed a significant decrease in thyroid cancer patients, which were 7.73 fL (95% confidence interval: 7.60 - 7.86 fL) in the patient group and 7.96 fL in the control group (95% confidence interval: 7.86 - 8.05 fL) ($p = 0.0053$, Figure 1). Moreover, we found that MPV results showed negative correlations with platelet counts in the patient group ($r = -0.3545$, $R^2 = 0.1257$, $p < 0.0001$, Figure 2).

It has been reported that thyroid cancer can increase the thrombosis risk through various underlying causes such as angioinvasion of cancer cells or vessel compression by tumor mass [4]. Changes of the coagulation system in thyroid cancer have not been fully investigated. Also, there have been controversies regarding alteration of preoperative MPV in thyroid cancer. For example, Baldane et al. reported that preoperative MPV values showed a significant increase in papillary thyroid cancer compared with healthy controls and benign goiter [5]. However, the study performed by Yu et al. found that thyroid cancer patients have a significantly lower MPV compared to the control group [6]. Contrary to these studies showing significant alterations of MPV in thyroid cancer, Dincel et al. reported that there we no significant differences in MPV [7].

In our study, the mean of preoperative MPV was significantly lower in thyroid cancer (7.73 fL, $p = 0.0053$) compared with the healthy control group (7.96 fL). In pathologic conditions, mechanisms decreasing size of platelets can be explained by the following two hypotheses. First, overproduction of pro-inflammatory cytokines and acute-phase reactants can interfere with megakaryopoiesis, inducing subsequent release of small size platelets from the bone marrow into peripheral blood [8,9]. Second, the active consumption of large platelets at sites of inflammation can result in decreasing MPV [9]. Gasparyan et al. suggested that large platelets tend to be more active in releasing a variety of pro-inflammatory and thrombotic agents than smaller size platelets [9]. Therefore, their consumption may be increased during this stage and at the site of inflammation [8,9]. In addition, mean platelet volume shows the significant negative correlation with platelet count in thyroid cancer in this study. This inverse relationship between platelet count and MPV is often found in both healthy and pathologic conditions as part of maintaining homeostasis to preserve a constant total mass of platelets [8]. However, these explanations remain the first step in understanding the changes of function and reactivity of platelets including physical properties such as size and number in inflammatory or malignant diseases. In the future, there is a need to investigate the exact clinical meaning of qualitative and quantitative changes in platelet characteristics in thyroid disease. Further evaluations for elucidating and understanding the underlying mechanisms and clinical utilities of these should be continued.

**Acknowledgment:**
This research was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF), funded by the Ministry of Science, ICT and Future Planning (NRF-2016R1A1A3A04004875).

**Declaration of Interest:**
The authors do not report any conflicts of interest.

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