

Impact of mean platelet volume on the occurrence and severity of sudden sensorineural hearing loss

Dear Sirs,

We read the above article by Sagit *et al.* with great interest.¹ These authors investigated whether mean platelet volume was elevated in patients with sudden sensorineural hearing loss (SNHL), compared with healthy controls, and whether it was related to severity of hearing loss. They found that mean platelet volume was significantly greater in the sudden SNHL group compared with the control group. However, there was no significant correlation between mean platelet volume and hearing loss severity. This is an interesting study. However, we wish to make a minor criticism of some methodological aspects of this study.

The method used for mean platelet volume assessment is basically correct. It should be kept in mind, however, that mean platelet volume is significantly associated with smoking, obesity, coronary artery disease, metabolic syndrome, statin use and atrial fibrillation.² Sagit *et al.* did not state the body mass index, smoking status, or metabolic syndrome status of the patients and controls in their study. They stated that they excluded individuals with diabetes mellitus; however, the reported mean blood glucose level in the patient group was 123 ± 52 mg/dl, significantly higher than that in the control group (95 ± 16 mg/dl). This would seem to indicate that a number of pre-diabetic and diabetic individuals had in fact been included in the patient group. Previous reports have shown that mean platelet volume is strongly and independently associated with the presence and severity of pre-diabetes and diabetes.^{3,4} Thus, the higher mean platelet volume values observed in the patient group might be due to higher blood glucose levels. Regression analysis is needed to eliminate the effect of blood glucose on mean platelet volume. Similarly, data on body mass index, metabolic syndrome and smoking status should have been reported and adjusted for during analysis, as all three parameters are known to increase mean platelet volume.^{2,5}

Mean platelet volume values are universally available via routine blood count testing performed by automated haemograms. This provides a simple, easy method of assessing platelet function. In comparison to smaller platelets, larger ones have more granules, aggregate more rapidly with collagen, have higher thromboxane A2 level, and express more glycoprotein Ib and IIb/IIIa receptors.^{2,6} We believe that mean platelet volume can be affected by many inflammatory and cardiovascular risk factors. Therefore, all possible confounding factors must be taken into account.

Recent reports have shown that inflammation is an important factor in the pathophysiology of idiopathic SNHL.⁷ Platelet activation plays a major role in the pathophysiology of diseases affected by thrombosis and inflammation; accordingly, mean platelet volume might represent a link between thrombosis and inflammation.⁸ It might be

speculated that inflammation exists in patients with SNHL, and that this in turn causes increased platelet reactivity, reflected in increased mean platelet volume, in these patients.

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References

- 1 Sagit M, Kavugudurmaz M, Guler S, Somdas MA. Impact of mean platelet volume on the occurrence and severity of sudden sensorineural hearing loss. *J Laryngol Otol* 2013;**127**:972–6
- 2 Vizioli L, Muscari S, Muscari A. The relationship of mean platelet volume with the risk and prognosis of cardiovascular diseases. *Int J Clin Pract* 2009;**63**:1509–15
- 3 Shah B, Sha D, Xie D, Mohler ER 3rd, Berger JS. The relationship between diabetes, metabolic syndrome, and platelet activity as measured by mean platelet volume: the National Health and Nutrition Examination Survey, 1999–2004. *Diabetes Care* 2012;**35**:1074–8
- 4 Shimodaira M, Niwa T, Nakajima K, Kobayashi M, Hanyu N, Nakayama T. Correlation between mean platelet volume and fasting plasma glucose levels in prediabetic and normoglycemic individuals. *Cardiovasc Diabetol* 2013;**12**:14
- 5 Varol E, Icli A, Kocyigit S, Erdogan D, Ozaydin M, Dogan A. Effect of smoking cessation on mean platelet volume. *Clin Appl Thromb Hemost* 2013;**19**:315–19
- 6 Park Y, Schoene N, Harris W. Mean platelet volume as an indicator of platelet activation: methodological issues. *Platelets* 2002;**13**:301–6
- 7 Masuda M, Kanzaki S, Minami S, Kikuchi J, Kanzaki J, Sato H *et al.* Correlations of inflammatory biomarkers with the onset and prognosis of idiopathic sudden sensorineural hearing loss. *Otol Neurotol* 2012;**33**:1142–50
- 8 Gasparyan AY, Ayvazyan L, Mikhailidis DP, Kitas GD. Mean platelet volume: a link between thrombosis and inflammation? *Curr Pharm Des* 2011;**17**:47–58

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Authors' reply

Dear Sirs,

We thank Varol and Ozaydin for their valuable comments. In our study, we investigated the relation of mean platelet volume and sudden SNHL, and found elevated mean platelet volume in patients with sudden SNHL, compared with controls.¹

In their letter, Varol and Ozaydin mention that obesity, smoking, coronary artery disease, metabolic syndrome, statin use and atrial fibrillation might have an impact on mean platelet volume.^{2,3} However, as stated in the methods section of our paper, patients with coronary artery disease and hypercholesterolaemia were not included in our study. We have subsequently extracted data from our patient database regarding body mass index (BMI) and smoking

status, for all patients and controls enrolled in the study, and have found that these two groups had similar BMI (mean \pm standard deviation, 27.4 ± 1.6 and 27.7 ± 1.4 , respectively; $p = 0.453$) and smoking status (a total of 3 and 2 smokers, respectively; $p = 0.641$). Likewise, we have identified no patients with atrial fibrillation in either group.

Varol and Ozaydin also mention the possible effect of hyperglycaemia on our mean platelet volume results. We have subsequently performed linear regression analysis to address the impact of blood glucose level on mean platelet volume, and have found that mean platelet volume was not significantly associated with blood glucose level in patients with sudden SNHL (β coefficient = -0.063 ; $p = 0.756$). Varol *et al.* state that some of our patients would have been pre-diabetic, because glucose levels were higher in the patient group than the control group. We were rigorous in our identification of diabetes in our study population. The higher glucose levels observed in our patients (compared

with controls) were probably associated with the acute stress caused by patients' sudden hearing loss.

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References

- 1 Sagit M, Kavugudurmaz M, Guler S, Somdas MA. Impact of mean platelet volume on the occurrence and severity of sudden sensorineural hearing loss. *J Laryngol Otol* 2013;**127**:972–6
- 2 Vizioli L, Muscari S, Muscari A. The relationship of mean platelet volume with the risk and prognosis of cardiovascular diseases. *Int J Clin Pract* 2009;**63**:1509–15
- 3 Varol E, Icli A, Kocyigit S, Erdogan D, Ozaydin M, Dogan A. Effect of smoking cessation on mean platelet volume. *Clin Appl Thromb Hemost* 2013;**19**:315–19

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Mean platelet volume in patients with sensorineural hearing loss

Dear Sirs,

We read with interest the article entitled 'Impact of mean platelet volume on the occurrence and severity of sudden sensorineural hearing loss' by Sagit *et al.*¹ In this important study, mean platelet volume, a determinant of platelet activation, was found to be elevated in patients with sudden sensorineural hearing loss.

Sudden sensorineural hearing loss is a symptom of cochlear injury. Potential aetiologies include vascular diseases, viral infections, allergic reactions, autoimmune disorders, use of medication and traumatic rupture of the intralabyrinth membrane, all of which can be related to mean platelet volume (as one aspect of platelet function).² A complete blood count is a relatively routine and inexpensive test which includes assessment of mean platelet volume.³ Platelet function can also be affected by vascular risk factors including age, smoking, diabetes mellitus, hypertension, hyperlipidaemia, metabolic syndrome and obesity, as well as by deep vein thrombosis.⁴

Mean platelet volume has also been related to peripheral artery disease, atrial fibrillation,⁵ previous surgery, trauma, cancer, immobilisation, ulcerative colitis, coeliac disease and some medications.^{5,6} Inflammation plays a role in the pathogenesis of many diseases, such as Behçet's disease, in which mean platelet volume changes may occur.⁷ Obstructive sleep apnoea syndrome may be associated with increased cardiovascular morbidity and mortality, platelet activation and increased mean platelet volume. Non-alcoholic fatty liver disease may be associated with cardiovascular risk; after controlling for other factors associated with non-alcoholic fatty liver disease, a significant correlation has been found between this disease and mean platelet volume.⁴

Finally, standardised laboratory methods are essential. In the methods section of Sagit and colleagues' paper, the nature of their biochemical analysis was not made clear. Likewise, the methods section did not define the mean platelet volume measurement technique. Platelets exhibit a time-dependent swelling when blood samples are anticoagulated with ethylene diamine tri-acetic acid ('EDTA'), which does not occur in the presence of citrate. Thus, measurement of mean platelet volume in blood samples anticoagulated with ethylene diamine tri-acetic acid can be unreliable, since mean platelet volume increases significantly in a time-dependent manner following collection of blood samples prepared in this way.⁸ The optimal measurement time should be within 120 minutes of venepuncture, in order for comparison with reference ranges to be reliable.⁹

In conclusion, mean platelet volume may be affected by many factors which need to be considered. It is difficult to adjust for all the variables listed above. In the absence of information on other overt inflammatory markers, an initial mean platelet volume value, taken alone, may not give clinicians reliable information regarding chronic endothelial inflammation.

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References

- 1 Sagit M, Kavugudurmaz M, Guler S, Somdas MA. Impact of mean platelet volume on the occurrence and severity of sudden sensorineural hearing loss. *J Laryngol Otol* 2013;**127**:972–6